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PART 1

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POLITY

Religious Institutions and State

- The state is neutral with regard to religion, in that it has no defining values of its own; instead, the state is a 'ring' within which different religious interests and opinions may freely coexist and participate in social and civic life on an equal basis.
- Throughout the world, there exist religious institutions providing formal and informal resources, supports, and opportunities to children and families in their midst. The significance of these roles can be especially pronounced in areas where governments fail to protect children and families within their borders.
- Political secularism is a force for good in three ways. Firstly, secularism protects everybody's freedom of conscience and religion and belief, by staying neutral between them.
- Religious states promote religion. Atheist states promote atheism. Secular states promote neither.
- Secondly, secularism allows religious people to focus on preparing for whatever next world they believe in, based on applying faith to their beliefs about divine revelations, and it allows the State to focus on governing this world, applying reason to the best available evidence.
- Thirdly, secularism can combine with human rights standards as a foundation stone on which we can build a liberal democracy. This can in turn combat other threats from such ideologies as fascism and totalitarianism and communism and the unregulated free market.
- Secularism also has many practical advantages. The happiest countries are secular liberal democracies, including Scandinavian countries and northern European states.
- In general, secular countries have lower rates of homicide, juvenile and early adult mortality, STD infection rates, teen pregnancy, and abortion.
- recent electoral campaign in Tamil Nadu, a movement to free Hindu temples from state control under Hindu Religious and Charitable Endowments (HR&CE) laws gained some traction.
  - Entry 28 of Concurrent List → 28. Charities and charitable institutions, charitable and religious endowments and religious institutions.
  - Originally, the Constitution provided for seven Fundamental Rights, viz,
    1. Right to equality (Articles 14–18)
    2. Right to freedom (Articles 19–22)
    3. Right against exploitation (Articles 23–24)
    4. Right to freedom of religion (Articles 25–28)
    5. Cultural and educational rights (Articles 29–30)
    6. Right to property (Article 31)
    7. Right to constitutional remedies (Article 32)
- However, the right to property was deleted from the list of Fundamental Rights by the 44th Amendment Act, 1978. It is made a legal right under Article 300-A in Part XII of the Constitution. So, at present, there are only six Fundamental Rights.
- Article 25 guarantees the freedom of conscience, the freedom to profess, practice, and propagate religion to all persons. (citizens and non-citizens)
- Subjected →**public order, health, and morality.**
- Art 25 (2) → State can make laws:
  - That regulates and restricts any financial, economic, political, or other secular activity associated with any religious practice.
  - That provides for the social welfare and reform or opening up of Hindu religious institutions of a public character to all sections and classes of Hindus. Under this provision, Hindus are construed as including the people professing the Sikh, Jain, or Buddhist religions, and Hindu institutions shall

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also be construed accordingly.

- People of the Sikh faith wearing & carrying the *kirpan* shall be considered as included in the profession of the Sikh religion.
- Article 26 (Freedom to manage religious affairs)
- This Article provides that every religious denomination has the following rights, subject to morality, health, and public order.
- The right to form and maintain institutions for religious and charitable intents.
- The right to manage its own affairs in the matter of religion.
- The right to acquire the immovable and movable property.
- The right to administer such property according to the law.
- Article 27 (Freedom as to payment of taxes for promotion of any particular religion)
- According to Article 27 of the Constitution, there can be no taxes, the proceeds of which are directly used for the promotion and/or maintenance of any particular religion/religious denomination.
- Article 28 (Freedom as to attendance at religious instruction or religious worship in certain educational institutions)
- This Article permits educational institutions that are maintained by religious groups to disseminate religious instruction.
- This provides that no religious instruction shall be provided in State-run educational institutions.
- Educational institutions administered by the State but that were established under any endowment or trust which requires that religious instruction shall be imparted in such institutions are exempt from the above clause (that no religious instruction shall be provided).
- Any person who attends any educational institution recognized by the State or receiving State aid shall not be required to participate in any religious instruction that may be imparted in such institution, or also attend any religious worship in such institutions unless he/she has given consent for the same. In the case of minors, the guardians should have given consent for the same.

Comptroller and Auditor General of India

- Constituted under Article 148
- holds office for a period of six years or up to the age of 65 years.
- The CAG is appointed by the president of India by a warrantunder his hand and seal. The CAG, before taking over his office,makes and subscribes before the president an oath or affirmation:
  1. to bear true faith and allegiance to the Constitution of India;
  2. to uphold the sovereignty and integrity of India;
  3. to duly and faithfully and to the best of his ability, knowledgeand judgement perform the duties of his office without fear orfavour, affection or ill-will; andto uphold the Constitution and the laws.
- He holds office for a period of six years or upto the age of 65years, whichever is earlier. He can resign any time from his officeby addressing the resignation letter to the president.
- can be removed by the president on same grounds and in the same manner as a judge of the Supreme Court. (Ground of proved misbehaviour or incapacity)
- is not eligible for further office, either under the Government of India or of any state, after she ceases to hold his office.
- Administrative expenses of the office of CAG, including all salaries, allowances and pensions are charged upon the Consolidated Fund of India and not subject to vote.
  - Art 149: the Constitution empowers the Parliament to **prescribe the duties and powers of the CAG** and accordingly the **CAG's (Duties, Powers and Conditions of Service) Act, 1971** was enacted.
  - The duties and functions of the CAG as laid down by theParliament and the Constitution are:
    1. He audits the accounts related to all expenditure from theConsolidated Fund of

India, consolidated fund of each stateand consolidated fund of each union territory having aLegislative Assembly.

2. He audits all expenditure from the Contingency Fund ofIndia and the Public Account of India as well as thecontingency fund of each state and the public account ofeach state.

3. He audits all trading, manufacturing, profit and lossaccounts, balance sheets and other subsidiary accountskept by any department of the Central Government and stategovernments.

4. He audits the receipts and expenditure of the Centre andeach state to satisfy himself that the rules and procedures inthat behalf are designed to secure an effective check on theassessment, collection and proper allocation of revenue.

5. He audits the receipts and expenditure of the following:
    (a) All bodies and authorities substantially financed from theCentral or state revenues;
    (b) Government companies; and
    (c) Other corporations and bodies, when so required byrelated laws.

6. He audits all transactions of the Central and stategovernments related to debt, sinking funds, deposits,advances, suspense accounts and remittance business. Healso audits receipts, stock accounts and others, withapproval of the President, or when required by thePresident.

7. He audits the accounts of any other authority whenrequested by the President or Governor. For example, theaudit of local bodies.

8. He advises the President with regard to prescription of theform in which the accounts of the Centre and the states shallbe kept (Article 150).

9. He submits his audit reports relating to the accounts of theCentre to President, who shall, in turn, place them beforeboth the Houses of Parliament (Article 151).

10. He submits his audit reports relating to the accounts of astate to governor, who shall, in turn, place them before thestate legislature (Article 151).

11. He ascertains and certifies the net proceeds of any tax orduty (Article 279). His certificate is final. The 'net proceeds'means the proceeds of a tax or a duty minus the cost ofcollection.

12. He acts as a guide, friend and philosopher of the PublicAccounts Committee of the Parliament.

13. He compiles and maintains the accounts of stategovernments. In 1976, he was relieved of his responsibilitieswith regard to the compilation and maintenance of accountsof the Central Government due to the separation of accountsfrom audit, that is, departmentalisation of accounts.

- The CAG submits three audit reports to the President–audit report on appropriation accounts, audit report on finance accounts, and audit report on public undertakings. The President lays these reports before both the Houses of Parliament. After this, the Public Accounts Committee examines them and reports its findings to the Parliament.

- **Article 151** says that the reports of the Comptroller and Auditor-General of India relating to the accounts of the Union shall be submitted to the president, who shall cause them to be laid before each House of Parliament.

- **Article 279 –** Calculation of "net proceeds" is ascertained and certified by the Comptroller and Auditor-General of India, whose certificate is final.

- **Third Schedule –** Section IV of the Third Schedule of the Constitution of India prescribes the form of oath or affirmation to be made by the Judges of the Supreme Court and the Comptroller and Auditor-General of India at the time of assumption of office.

Controller General of Accounts

- works under the Department of Expenditure, Ministry of Finance'.
- The office of CGA is the apex Accounting Authority.
- It is the principal advisor on accounting matters to the Union Government.
- It is not a constitutional body, but it derives its mandate and exercises the powers of the

President from **Article 150** of the constitution.

- Article 150 states that, the accounts of the Union and of the States shall be kept in such form as the President may, on the advice of the Comptroller and Auditor-General of India.

CAG vs CGA

- CAG → Independent
- Constitutional
- It audits the accounts and related activities of the 3 tiers of government: Federal, Provincial and Local.
- CGA→under the Department of Expenditure in the Finance Ministry.
- It is not a constitutional body.
- is the Principal Accounting Adviser to the Government of India.
- **In 1976. The accounting functions of the CAG were taken away in the case of the Centre in 1976 and handed over to the CGA while accounts of the States continue to be compiled by the CAG.**
- According to **Sixth Schedule** the accounts of the District Council or Regional Council should be kept in such form as CAG, with the approval of the President, prescribe. In addition, these bodies account are audited in such manner as CAG may think fit, and the reports relating to such accounts shall be submitted to the Governor who shall cause them to be laid before the Council.

Third schedule

- Second schedule→ Provisions relating to the emoluments, allowances, privileges
- Third → Forms of Oaths or Affirmations for
- Union & State Ministers
- Candidates for election to Parliament and SL
- MP and MLA
- Judges of SC and HC
- CAG
- **Speaker? NO**
- **President? No**
- **Election Commissioner? NO**
- The second schedule contains provisions of the President, Governors of States,
- Speaker and the Deputy Speaker of the House of the People and the Chairman and the Deputy Chairman of the Council of States and the
- Speaker and the Deputy Speaker of the Legislative Assembly and the
- Chairman and the Deputy Chairman of the Legislative Council of a State,
- the Judges of the Supreme Court and of the High Courts and
- the Comptroller and Auditor-General of India.

Uniform Civil Code

- A UCC refers to a single law, applicable to all citizens of India in their personal matters such as marriage, divorce, custody, adoption and inheritance.
- replace the system of fragmented personal laws, which currently govern interpersonal relationships and related matters within different religious communities.
- Article 44 of the Constitution lays down that the 'State shall endeavor to secure a Uniform Civil Code for the citizens throughout the territory of India.'
- Article 44 is one of the Directive Principles of State Policy. These, as defined in Article 37, are not justiciable (not enforceable by any court) but the principles laid down therein are fundamental in governance
  - Personal Laws Mentioned in Concurrent List, Entry No. 5
  - **Entry 5 of Concurrent List** → Marriage and divorce; infants and minors; adoption; wills, intestacy and succession; joint family and partition; all matters in respect of which parties in judicial proceedings were immediately before the commencement of this Constitution subject to their personal law.

Curious Case of Delhi

- Delhi's current status as a Union Territory with a Legislative Assembly is an outcome of the **69th Amendment Act** through which **Articles 239AA and 239AB** were introduced in the Constitution.
- The Government of National Capital Territory of Delhi (GNCTD) Act was passed simultaneously to supplement the constitutional provisions relating to the Assembly and the Council of Ministers in the national capital.
- For all practical purposes, the GNCTD Act **outlines the powers of the Assembly, the discretionary powers enjoyed by the LG,** and the **duties of the Chief Minister** with respect to the need to furnish information to the LG.
- It **added two new Articles 239AA and 239AB** under which the Union Territory of Delhi has been given a special status.
- **Article 239AA** provides that the Union Territory of Delhi be called the National Capital Territory of Delhi and its administrator shall be known as Lt. Governor.
    - It also **creates a legislative assembly for Delhi** which can make laws on subjects under the State List and Concurrent List **except on these matters:** public order, land, and police.
    - It also **provides for a Council of Ministers for Delhi** consisting of not more than 10% of the total number of members in the assembly.
    - **The 91st Amendment to the Constitution, which came into effect in 2004 added Clause 1(A) to Article 75 of the Constitution. It limited the size of the Council of Ministers at the Centre and the States to no more than 15 per cent of the numbers in the LokSabha or the State Legislature. They are appointed by the president on the recommendation of the Prime minister.**
- **Article 239AB** provides that the **President may by order suspend the operation of any provision of Article 239AA** or of all or any of the provisions of any law made in pursuance of that article. This provision **resembles Article 356 (President's Rule).**
- **Provisions of the GNCT of Delhi (Amendment) Act 2021:**
    - It **amended the Sections 21, 24, 33 and 44 of the 1991 Act.**
    - States that the **"government"** in the National Capital Territory of Delhi **meant the Lieutenant-Governor** of Delhi.
    - It **gives discretionary powers to the L-G** even in matters where the Legislative Assembly of Delhi is empowered to make laws.
    - It **seeks to ensure that the L-G is "necessarily granted an opportunity"** to give her or his opinion before any decision taken by the Council of Ministers (or the Delhi Cabinet) is implemented.
    - It **bars the Assembly or its committees from making rules** to take up matters concerning day-to-day administration, or to conduct inquiries in relation to administrative decisions.
- **Administration of Union Territories:**
    - The states are the members of the federal system in India andshare a distribution of power with the Centre. The union territories, on the other hand, are those areas which are under the directcontrol and administration of the Central government.
    - While introducing the Jammu and Kashmir Reorganisation Bill,2019, in the Parliament, the central government gave the followingreasons for the creation of these two new union territories:
        a. The Ladakh division of the state of Jammu and Kashmir hasa large area but is sparsely populated with a very difficultterrain. There has been a long pending demand of people ofLadakh, to give it the status of a Union territory to enablethem to realize their aspirations. The Union territory ofLadakh will be without a legislature.
        b. Further, keeping in view the prevailing internal securitysituation, fuelled by cross border terrorism in the existingstate of Jammu and Kashmir, a separate Union territory forJammu and Kashmir is being created. The Union territory ofJammu and Kashmir will be with a legislature.

- **Article 239 to 242 under Part VIII** of the Indian Constitution deals with the administration of **Union Territories.**
- Every union territory is **administered by the President acting through an administrator** appointed by him.
- An **administrator** of a union territory is an agent of the President and not head of state like a governor.
  - The President can specify the designation of an administrator; it may be **Lieutenant Governor** or Chief Commissioner or Administrator.
- The **Union Territories of Puducherry (in 1963), Delhi (in 1992) and Jammu and Kashmir (in 2019) are provided with a legislative assembly** and a council of ministers headed by a chief minister.
  - But, the establishment of such institutions in the union territories **does not diminish the supreme control of the President** and Parliament over them.
  - The **Parliament can make laws on any subject of the three lists** (including the State List) for the union territories.

- **Provisions in Case of Failure of the Constitutional Machinery (as per the 1963 Act):**
  - If the **President, on receipt of a report from the Administrator** of (the Union territory) **or otherwise,** is satisfied, —
    - that a situation has arisen in which the **administration of the Union territory cannot be carried on** in accordance with the provisions of this Act, or
    - that **for the proper administration of the Union territory** it is necessary or expedient so to do,
  - The President may, **by order, suspend the operation of all or any of the provisions of this Act** for such period as he thinks fit, and
    - Make such incidental and consequential provisions as may appear to him to be necessary or expedient for administering the Union territory **in accordance with the provisions of Article 239.**

Special Provisions for Delhi

The 69th Constitutional Amendment Act of 1991 provided aspecial status to the Union Territory of Delhi, and redesignated itthe National Capital Territory of Delhi and designated theadministrator of Delhi as the lieutenant (lt.) governor. It created alegislative assembly and a council of ministers for Delhi.Previously, Delhi had a metropolitan council and an executivecouncil.

Part I	The Union and its territory	Art. 1 to 4
Part II	Citizenship	Art. 5 to 11
Part III	Fundamental Rights	Art. 12 to 35
Part IV	Directive Principles	Art. 36 to 51
Part IVA	Fundamental Duties	Art. 51A
Part V	The Union	Art. 52 to 151
Part VI	The States	Art. 152 to 237
Part VII	Repealed by Const. (7th Amendment) Act, 1956	
Part VIII	The Union Territories	Art. 239 to 242

Reservation: Topic in Current Affairs

Art. 15

- 15. Prohibition of discrimination on grounds of religion, race, caste, sex or place of birth
- (1) The State shall not discriminate against any citizen on grounds only of religion, race, caste, sex, place of birth or any of them
- (2) No citizen shall, on grounds only of religion, race, caste, sex, place of birth or any of them, be subject to any disability, liability, restriction or condition with regard to(a) access to shops, public restaurants, hotels and palaces of public entertainment; or
- (b) the use of wells, tanks, bathing ghats, roads and places of public resort maintained wholly or partly out of State funds or dedicated to the use of the general public
- (3) Nothing in this article shall prevent the State from making any special provision for women and children
- (4) Nothing in this article or in clause (2) of Article 29 shall prevent the State from

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making any special provision for the advancement of any socially and educationally backward classes of citizens or for the Scheduled Castes and the Scheduled Tribes

Art. 16

- Equality of opportunity in matters of public employment(1) There shall be equality of opportunity for all citizens in matters relating to employment or appointment to any office under the State
- (2) No citizen shall, on grounds only of **religion, race, caste, sex, descent, place of birth, residence** or any of them, be ineligible for, or discriminated against in respect or, any employment or office under the State
- (3) Nothing in this article shall prevent Parliament from making any law prescribing, in regard to a class or classes of employment or appointment to an office under the Government of, or any local or other authority within, a State or Union territory, any requirement as to residence within that State or Union territory prior to such employment or appointment
- (4) Nothing in this article shall prevent the State from making any provision for the reservation of appointments or posts in favor of any backward class of citizens which, in the opinion of the State, is not adequately represented in the services under the State

Ministry of Housing and Urban Affairs

Municipal Performance Index (MPI) 2020

Expanding the scope for the EoLI framework in order to make it more robust, a Municipal Performance Index assessment was also undertaken for the first time in the country. Whereas, the Ease of Living Index measures an outcome of the indicator, Municipal Performance Index focuses on the factors that produce those outcomes. The latter serves in determining elements that prevent efficient local governance in service delivery mechanisms, planning, financial systems, and governance practice.

The Municipal Performance Index is an effort to assess and analyse the performance of Indian municipalities based on their defined set of functions. The responsibilities of a municipality span across a range of verticals that include provision of basic pubic services to more complex domains like urban planning. The salient features of MPI are given below:

- The Municipal Performance Index provides a granular understanding of a municipalities' functionalities and the extent of their development and capabilities. Through the index, citizens can better understand their local government administration, which in turn builds transparency and generates trust among key stakeholders.
- The framework covers 20 varied sectors vis. Education, Health, Water & Wastewater, SWM & Sanitation, Registration & Permits, Infrastructure, Revenue Management, Expenditure Management, Fiscal Responsibility, Fiscal Decentralisation, Digital Governance, Digital Access, Digital Literacy, Plan Preparation, Plan Implementation, Plan Enforcement, Transparency & Accountability, Human Resource, Participation and Effectiveness.

Ease of Living Index 2020:

- The EoLI 2020 strengthens its scope by consolidating the framework with the addition of a Citizen Perception Survey in the index, holding a weightage of 30%. It, therefore, examines the outcomes that lead to existing living conditions through pillars of Quality of Life, Economic Ability, Sustainability, spanning across 13 categories of -Education, Health, Housing and Shelter, WASH and SWM, Mobility, Safety and Security, Recreation, Level of Economic Development, Economic Opportunities, Environment, Green Spaces, and Buildings, Energy Consumption, and City Resilience, that account for 70% of the overall outcome.
- The Citizen Perception Survey (CPS) was undertaken to help validate citizens' experience of their city in terms of service delivery. The assessment was conducted from 16th January 2020 till 20th March 2020. A total of 32.2 lakh citizens from 111 cities participated in the survey. Bhubaneshwar had the highest CPS score, followed by Silvassa, Davangere, Kakinada, Bilaspur and Bhagalpur.
- The methodology and approach for the revised edition of EoLI and MPI were released by MoHUA in February 2019. Essentially, the EoLI report aims to measure the well-

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being of Indian citizens in 111 cities, across the pillars of Quality of Life, Economic-ability, and Sustainability, with 49 indicators under 13 categories. The EoLI primarily seeks to accelerate India's urban development outcomes, including the achievement of the Sustainable Development Goals. The findings from the index can help guide evidence-based policymaking. It also promotes healthy competition among cities, encouraging them to learn from their peers and advance their development trajectory.

Pardoning Power

- Article 72 empowers the president to grant pardons to persons who have been tried and convicted of any offence in all cases where the o Punishment or sentence is for an offence against a Union Law; o Punishment or sentence is by a court martial (military court); and o Sentence is a sentence of death.
- Pardoning power of the President includes the following Pardon- it removes both the sentence and the conviction and completely absolves the convict from all sentences, punishments and disqualifications.
- Commutation- It denotes the substitution of one form of punishment for a lighter form.
- Remission- It implies reducing the period of sentence without changing its character.
- Respite- It denotes awarding a lesser sentence in place of one originally awarded due to some special fact, such as the physical and disability of a convict or the pregnancy of a woman offender.
- Reprieve- It implies a stay of the execution of a sentence (especially that of death) for a temporary period.
- Under Article 161, the governor of a state also possesses the pardoning power.
- But, the pardoning power of the governor differs from that of the President in following two respects: o President can pardon sentences inflicted by court martial (military courts) while the governor cannot.
- President can pardon death sentence while governor cannot. Even if a state law prescribes death sentence, the power to grant pardon lies with the President and not the governor.
- Governor can also grant pardons, reprieves, respites and remission of punishment or suspend, remit and commute the sentence of any person convicted of any offence against a state law.
- However, the governor can suspend, remit or commute a death sentence.

FEMA and FCRA

- FEMA 1999
- FEMA is regulated by the **Ministry of Finance** and was introduced to consolidate and amend the law relating to foreign exchange with the objective of facilitating external trade and payments.
- Enforcement Directorate 1956 →**is responsible for enforcement of the Foreign Exchange Management Act, 1999 (FEMA), and certain provisions under the Prevention of Money Laundering Act (PMLA), 2002**
- **ED is under** → the administrative control of the Department of Revenue (under the Ministry of Finance) for operational purposes

FCRA 2010

- **Foreign funding of voluntary organizations in India is regulated under FCRA act and is implemented by the Ministry of Home Affairs. (despite being a law related to financial legislation)**
- **The Acts ensures that the recipients of foreign contributions adhere to the stated purpose for which such contribution has been obtained.**
- required all NGOs to apply for a license to receive foreign funding
- **NGO with permanent FCRA licenses now have to get these renewed every five years**
- **NGO shall not spend more than 20% (from 50%)of Foreign Contribution received in a Financial Year to meet administrative expenses without prior approval of Central Government**.
- Accreditation: NITI Aayog has been appointed as the nodal agency for the purpose of

registration and accreditation of NGOs seeking funding from the Government of India.

- The Hon'ble Supreme Court of India in the said judgement stated that **non-governmental organizations** financed substantially directly or indirectly, by the appropriate government will fall within the ambit of 'public authority' **under** section 2(h) of the Right to Information **Act**, 2005.

Who cannot take Foreign Funding?

- Any organisation of a political nature and any association or company engaged in the production and broadcast of audio- or audio-visual news or current affairs programme have been placed in the category prohibited to accept foreign contribution.
- Prohibits acceptance and use of foreign contribution or foreign hospitality by a certain specified category of persons such as a candidate for election, judge, journalist, columnist, newspaper publication, cartoonist and others.
- Candidate contesting an election
- Cartoonist, editor, publishers of registered newspaper
- Judge
- Government servants or employee of any corporation
- Member of any legislature
- Political parties (ask students here)
- Recent Amendment adds public servants to this list. Public servant includes any person who is in service or pay of the government, or remunerated by the government for the performance of any public duty
  - 1951 Representation of the People Act.[1] Section 29B of the 1951 Act "prohibits all political parties registered with Election Commission to accept any contribution from a foreign source"
  - However, in 2017 the MHA, through the Finance Bill route, amended the 1976-repealed FCRA law paving the way for political parties to receive funds from the Indian subsidiary of a foreign company or a foreign company in which an Indian holds 50% or more shares.

What is foreign contribution?

- Definedunderthe act→ Yes
- Is gift for personal use a foreign Contribution?
- (1 lakh is the limit of value of Gift)
- Currency? Yes (even in Rupees)
- Security? Yes
- Interest On the Amount of Foreign Contribution? Yes

Central Information Commission

- The Commission consists of a Chief Information Commissioner and not more than ten Information Commissioners (IC).
- They are appointed by President on the recommendation of a committee consisting of Prime Minister as Chairperson, Leader of Opposition in the Lok Sabha and a Union Cabinet Minister nominated by the Prime Minister.
- They should be persons of eminence in public life with wide knowledge and experience in law, science and technology, social service, management, journalism, mass media or administration and governance.
- They shall not be Member of Parliament or Member of the Legislature of any State or Union Territory as the case may be , or hold any other office of profit or connected with any political party or carrying on any business or pursuing any profession.
- They are not eligible for reappointment.

Right to Information (Amendment) Act, 2019

- It provided that the Chief Information Commissioner and an Information Commissioner (of Centre as well as States) shall hold office for such **term as prescribed by the Central Government.** Before this amendment, their term was fixed for 5 years.
- It provided that the **salary, allowances and other service conditions** of the Chief Information Commissioner and an Information Commissioner (of Centre as well as States) shall be such **as prescribed by the Central Government.**

- Before this amendment, the salary, allowances and other service conditions of the Chief Information Commissioner were similar to those of the Chief Election Commissioner and that of an Information Commissioner were similar to those of an Election Commissioner (State Election Commissioners in case of States).

Strength of the Supreme Court

- Originally: Article 124 of the Indian Constitution the strength of Supreme Court was fixed at eight (one chief justice and seven other judges
- **Article 124(1)** -→ There shall be a Supreme Court of India consisting of a Chief Justice of India and, until Parliament by law prescribes a larger **number**, of not more than seven other **Judges**.
- recently passed the legislation to increase the sanctioned strength of the Supreme Court from 31 to 34 including the Chief Justice of India

Strength of the High Courts

- Constitution does not specify the strength of the HC.
- President...as per workload..time to time

Hindi Language and Constitution

- Art 351: duty of the Union,to promote the **spread of the Hindi language**,
- to develop it so that it may serve as a medium of expression for all the elements of the composite culture of India and
- to secure its enrichment by assimilating without interfering with its genius, the forms, style and expressions used in Hindustani and in the other languages of India specified in the Eighth Schedule.
- Art 120 and 210: regarding language to be used in Parliament and state legislature respectively gives the option of transacting business in Hindi as well in English.
- Art 343: Article   343 gives power to parliament to decide by law, the languages to be used for official work.
- Art 344: committee every 10 years to recommend to the President regarding progressive use of the Hindi language for the official purposes of the Union and restrictions on the use of English.
  - ART 350 A→ Facilities for instruction in mothertongue at primary stage

Yuelu Proclamation →Madeby UNESCO 2018

  - **(China)**
  - says that the protection and promotion of linguistic diversity,
  - 1. Helps to improve social inclusion and partnerships, 2. Helps to reduce the gender and social inequality between different native speakers.
  - Eighth Schedule and the related Constitutional Provisions
  - Part **XVII of the Indian constitution** deals with the official languages in **Articles 343 to 351.**
  - The Eighth Schedule to the Constitution consists of the following 22 languages: (1) Assamese, (2) Bengali, (3) Gujarati, (4) Hindi, (5) Kannada, (6) Kashmiri, (7) Konkani, (8) Malayalam, (9) Manipuri, (10) Marathi, (11) Nepali, (12) Oriya, (13) Punjabi, (14) Sanskrit, (15) Sindhi, (16) Tamil, (17) Telugu, (18) Urdu (19) Bodo, (20) Santhali, (21) Maithili and (22) Dogri.

Cabinet Committees

The following are the features of Cabinet Committees:

1. They are extra-constitutional in emergence. In other words, they are not mentioned in the Constitution. However, theRules of Business provide for their establishment.
2. They are of two types–standing and ad hoc. The former isof a permanent nature while the latter are of a temporarynature. The ad hoc committees are constituted from time totime to deal with special problems. They are disbanded aftertheir task is completed.
3. They are set up by the Prime Minister according to theexigencies of the time and requirements of the situation. Hence, their number, nomenclature, and composition varyfrom time to time.
4. Their membership varies from three to eight. They usuallyinclude only Cabinet

Ministers. However, the non-cabinetMinisters are not debarred from their membership.

5. They not only include the Ministers in charge of subjectscovered by them but also include other senior Ministers.

6. They are mostly headed by the Prime Minister. Sometimesother Cabinet Ministers, particularly the home minister or thefinance minister, also acts as their chairman. But, in casethe Prime Minister is a member of a committee, he invariablypresides over it.

7. They not only sort out issues and formulate proposals for theconsideration of the Cabinet, but also take decisions. However, the Cabinet can review their decisions.

8. They are an organisational device to reduce the enormousworkload of the Cabinet. They also facilitate in-depthexamination of policy issues and effective coordination. Theyare based on the principles of division of labour and effectivedelegation.

2 New Cabinet Committees

- **Cabinet Committee on Investment and Growth:**
- identify key projects required to be implemented on a time-bound basis, involving **investments of Rs 1,000 crore or more**, or any **other critical projects**, as may be specified by it, with regard to infrastructure and manufacturing
- **prescribe time limits** for giving requisite approvals and clearances by the ministries concerned in identified sectors. **It will also monitor the progress of such projects.**
- Cabinet Committee on Employment and Skill Development:
- provide direction to all policies, programmes, schemes and initiatives for skill development aimed at increasing the employability of the workforce

PM Part of Which Committee?

- Appointments Committee of the Cabinet
- Cabinet Committee on Economic Affairs
- Cabinet Committee on Parliamentary Affairs:
- Cabinet Committee on Political Affairs:
- Cabinet Committee on Security: (Ask Students)
- Cabinet Committee on Accommodation
- **PM part of 6 Panels Except → Committee on Accomodation& Committee on Parliamentary Affairs**

Flixing Netflix

- So far, digital media platforms were under the jurisdiction of the Ministry of Electronics and Information Technology (MeitY).
- while other media such as print, television and radio were under the I&B ministry.
- But the I&B ministry had been seeking jurisdiction over digital platforms due to a lack of clarity over regulations on content.
- The new notification means that OCCPs (Online Content curated Platform) such as digital news portals and video streaming platforms such as Netflix, Amazon Prime and Hotstar will now come under the I&B ministry. However, user-generated content, such as what is streamed on YouTube or Facebook, will continue to remain under MeitY

Lists Mentioning

- Concurrent List → 39. Newspapers, books and printing presses.
- **Entry 31 of the List 1 of the 7th Schedule of the Constitution already empowers Parliament** to **legislate on broadcasting (other like forms of Communication)** while **entry 60** provides for sanctioning of cinematograph films for exhibition.
- State List → Entry 33– Theatres, dramatic performaces, cinemas subject to Entry 60 of list 1...Sports, entertainment and amusements
- However, there are no specific entries for films and audio-visual programmes made available by online content providers and news/current event content on online platforms, which would then be covered by the **residual entry 97 of List 1.**

Press Council of India

- PCI was established under the PCI Act of 1978.
- **Aim:** It aims **to preserve the freedom of the press** and **maintain and improve the**

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standards of **newspapers and news agencies in India.**
- **Composition:** The PCI consists of a **chairman** and **28 other members.**
  - The **Chairman is selected by the Speaker of the LokSabha, the Chairman of the Rajya Sabha and a member elected by the PCI.**
- **Functions:** The functions of the PCI include
  - Helping **newspapers** maintain their independence.
  - Build a code of **conduct for journalists** and **news agencies.**
  - Help maintain "high standards of public taste" and foster responsibility among citizens.
  - Review developments likely to restrict flow of news.
  - **Powers:** The PCI has the power to receive complaints of violation of the journalistic ethics, or professional misconduct by an editor or journalist.
    - The PCI is responsible for enquiring into complaints received.
    - It may summon witnesses and take evidence under oath, demand copies of public records to be submitted, even issue warnings and admonish the newspaper, news agency, editor or journalist.
    - Decisions of the **PCI are final and cannot be appealed before a court of law.**
  - **Limitations on the powers of the PCI:** The powers of the PCI are restricted in two ways.
    - The PCI has **limited powers of enforcing the guidelines issued.** It **cannot penalize** newspapers, news agencies, editors and journalists for violation of the guidelines.
    - The PCI **only overviews the functioning of print media.** That is, it can enforce standards upon newspapers, journals, magazines and other forms of print media.
    - It **does not have the power to review the functioning of the electronic media** like radio, television and internet media.
  - The PCI has 28 members, apart from the chairman.
  - They include **eight nominated members, including three RajyaSabha MPs, two LokSabha MPs, and three people with 'specialised knowledge**'.
  - Currently, a representative from the Bar Council, University Grants Commission and SahityaAkademi represent the members with specialised knowledge.
  - The other 20 council members represent editors, working journalists from press associations, newspaper owners and managers, and news agencies.
  - **The News Broadcasters Association (NBA)** represents the private television news & current affairs broadcasters. It is the collective voice of the news & current affairs broadcasters in India.It is an organization funded entirely by its members.
  - News Broadcasting Standards Authority is an **independent body** set up by the News Broadcasters Association. Its task is to consider and adjudicate upon complaints about broadcasts.
  - The NBA has devised a Code of Ethics to regulate television content as a self regulation mechanism.
  - The News Broadcasting Standards Authority (NBSA), of the NBA, is empowered to warn, admonish, censure, express disapproval and fine the broadcaster a sum uptoRs. 1 lakh for violation of the Code.

Central Board of Film Certification
- The CBFC handles film certification in India.
- It is a statutory body under the **Information and Broadcasting Ministry.**
- It regulates the public exhibition of films under the provisions of the Cinematograph Act 1952.
- Films can be exhibited to the public only after they have been certified by the CBFC.

Forest Rights Act
- The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, or Forest Rights Act, 2006

- to protect the marginal and tribal communities and other forest dwellers and balance environmental conservation with their right to life and livelihood

Following rights

- **Title rights:** i.e., ownership - to land that is being cultivated by tribals or forest dwellers as on 13 December 2005, subject to a maximum of 4 hectares.
- **Community rights:** to grazing areas, fishing, accessing water bodies in forests, to pastoralist routes, etc. and to intellectual property and traditional knowledge related to biodiversity and cultural diversity
- **Relief and development rights:** to rehabilitation in case of illegal eviction or forced displacement; and to basic amenities, subject to restrictions for forest protection.
- **Forest management rights:** to protect, regenerate or conserve or manage any community forest resource which the communities have been traditionally protecting and conserving for sustainable use.
- **Right to collect and sell minor forest produce (MFP):** These include forest products like tendu leaves, honey and other products that have commercial value

Minor Forest Produce

- Section 2(i) of the said Act defines a Minor Forest Produce (MFP) as all non-timber forest produce of plant origin and includes bamboo, brushwood, stumps, canes, Tusser, cocoon, honey, waxes, Lac, tendu/kendu leaves, medicinal plants and herbs, roots, tuber and the like.
- ***Thus, the definition of "minor forest produce" included bamboo and cane, thereby changing the categorization of bamboo and cane as "trees" under the Indian Forest Act 1927.

MSP for MFP

- The Central government had introduced a minimum support price (MSP) for a select list of MFP through "Mechanism for Marketing of Minor Forest Produce through Minimum Support price and development of Value Chain of MFP" Scheme in 2011 to provide a social safety net to these underprivileged forest dwellers, and to aid in their empowerment.
- The Minimum Support Price would be determined by the Ministry with technical help of TRIFED.
- TRIFED, as the apex national organisation involved in the improvement of the livelihood and empowerment of these tribal people, is the nodal agency for the implementation of the schem

MSP for other Crops

- The Cabinet Committee of Economic Affairs announces MSP for various crops at the beginning of each sowing season based on the recommendations of the Commission for Agricultural Costs and Prices (CACP).
- The CACP takes into account demand and supply, the cost of production and price trends in the market among other things when fixing MSPs.

TRIFED

- **TRIFED is 'The Tribal Cooperative Marketing Development Federation of India'. It was established in 1987....Statutory...**

TRIFOOD

- **TRIFOOD Project**
- • It is a joint initiative of **Ministry of Food Processing Industry**, **Ministry of Tribal Affairs** and **TRIFED**.
- • Under this scheme, a tertiary value addition centre will be set up in Jagdalpur in Chhattisgarh and Raigad in Maharashtra.
- • The traditional Mahua tribal drink will be mainstreamed and marketed all over the Country under this project.

Van-Dhan Scheme

- **Van Dhan Scheme** is an initiative of the **Ministry of Tribal Affairs and TRIFED**. It was launched on 14th April, 2018 and seeks to improve tribal incomes through value addition of tribal products.
- Implementation of the **Van Dhan Scheme**:

– Under Van Dhan, 10 Self Help Groups of 30 Tribal gatherers are constituted.

– It is proposed to set up almost 6000 Van Dan VikasKendras comprising 300 tribal gatherers each in the Country providing employment to almost 45 Lakh tribals.

– At State level, the State Nodal Agency for MFPs and the District collectors are envisaged to play a pivot role in scheme implementation at grassroots level.

- The **Tribal Cooperative Marketing Development Federation of India (TRIFED)**, under the **Ministry of Tribal Affairs,** has launched **"Sankalp se Siddhi" - Village and Digital Connect Drive.**

- The **main aim** of this drive is to **activate the Van DhanVikasKendras (VDVKs) in the villages.**

- **About Sankalp se Siddhi Drive:** The drive will entail 150 teams (10 in each region from TRIFED and State Implementation Agencies/Mentoring Agencies/Partners) visiting ten villages each.

    – Thus, 100 villages in each region and 1500 villages in the country will be covered.

- The visiting teams will also **identify locations and shortlist potential Van DhanVikasKendras** for clustering as **TRIFOOD,** and **SFURTI** units as larger enterprises.

    – **Scheme of Fund for Regeneration of Traditional Industries (SFURTI)** is a scheme of the **Ministry of Micro, Small & Medium Enterprises (MSME).**

Article 61

- Procedure for the impeachment of the Prez.
- Can be removed "only for the Violation of the constitution"
- Does constitution define? What is Violation of the Constitution? NO
- The Impeachment Charge shall be preferred by either House of Parliament.
- `Charges should be signed by 1/4th members of the house and 14 days notice should be given.
- This resolution must be passed by 2/3rd of the total membership
    - Second house will investigate the charges
    - Prez has the right to sit in the Proceedings
    - If the other house also passes the impeachment resolution by 2/3rd Majority of the total membership...the prez stands impeached from the date on which resolution is so passed.

Art 361

Article 361 in The Constitution Of India 1949

361. Protection of President and Governors and Rajpramukhs

(1) The President, or the Governor or Rajpramukh of a State, shall not be answerable to any court for the exercise and performance of the powers and duties of his office or for any act done or purporting to be done by him in the exercise and performance of those powers and duties: Provided that the conduct of the President may be brought under review by any court, tribunal or body appointed or designated by either House of Parliament for the investigation of a charge under Article 61: Provided further that nothing in this clause shall be construed as restricting the right of any person to bring appropriate proceedings against the Governor of India or the Government of a State

(2) No criminal proceedings whatsoever shall be instituted or continued against the President, or the Governor of a State, in any court during his term of office

(3) No process for the arrest or imprisonment of the President, or the Governor of a State, shall issue from any court during his term of office

(4) any civil proceedings in which relief is claimed against the President, or the Governor of a State, shall be instituted during his term of office in any court in respect of any act done or purporting to be done by him in his personal capacity, whether before or after he entered upon his office as President, or as Governor of such State, until the expiration of two months next after notice in writing has been delivered to the President or Governor, as the case may be, or left at his office stating the nature of the proceedings, the cause of action therefor, the name, description and place of residence of the party by whom such proceedings are to be instituted and the relief which he claims

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Basic Structure

- In *Shankari Prasad case* **(1951)** and *Sajjan Singh case* **(1965).** In **both the cases** the court had ruled that the term **"law" in Article 13** must be taken to mean rules or regulations made in exercise of ordinary legislative power and not amendments to the Constitution made in exercise of constituent power under **Article 368.**
- This means **Parliament had the power to amend any part of the Constitution** including Fundamental rights

Basic Structure

- Golkhanth Case → Article 368 merely laid down the amending procedure but did not confer upon Parliament the power to amend the Constitution.
- any amendment of the Constitution must be deemed law as understood in Article 13 (2) (prohibits the state to make any law taking away or abridging FRs). This essentially meant that FRs could not be amended by the parliament. o To amend the FRs a new Constituent Assembly would be required.
  - 24th Amendment: It stated that-
  - the constitutional amendments are not 'law' under Article 13, thus Parliament has the power to amend any FRs.
  - the Parliament has the power to amend any provision of the Constitution of India

Kesavananda Case

- **any provision of the Indian Constitution can be amended by the Parliament** in order to fulfil its socio-economic obligations that were guaranteed to the citizens as given in the Preamble, provided that such amendment **did not change the Constitution's basic structure.**
- the court held that the **24th Constitutional Amendment was entirely valid.** But it found the **second part of the 25th Constitutional Amendment to be ultra vires.** The Supreme Court declared the **Article 31C** as unconstitutional and invalid on the ground that judicial review is basic structure and hence cannot be taken away.

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What Constitutes Basic Structure

- federalism, secularism, democracy
- the supremacy of the Constitution, the rule of law, Independence of the judiciary, doctrine of separation of powers, federalism, secularism, sovereign democratic republic, the parliamentary system of government, the principle of free and fair elections, welfare state
- **Harmony and balance between FRs and DPSPs**
- **Principle of Equality**

Question Hour

- first hour of a sitting
- the questions can also be asked to the **private members** (MPs who are not ministers).
- It is regulated according to **parliamentary rules.** The **presiding officers of the both Houses** (RajyaSabha and LokSabha) are the **final authority** with respect to the conduct of Question Hour.
- Starred Questions: The answers to these questions are desired to be given orally on the floor of the House during the Question Hour.
- Unstarred Questions: The answers to these questions which are deemed to have been laid on the Table of the House are given by Ministers at the end of the Question Hour in a written form.
- Short Notice Questions: These questions are asked orally in the House after the Question Hour or as the first item in the agenda where there is no Question Hour at a notice shorter than that prescribed for Starred and Unstarred Questions. ▪ These must be generally of public importance to a subject-matter considered by the Speaker/ Chairman on an urgent basis.

Zero Hour

- immediately following the Question Hour has come to be known as "Zero Hour".
- It starts at around 12 noon →hence the name
- Zero Hour is an Indian parliamentary innovation and unlike Question Hour it is not mentioned in the Rules of Procedure. Zero hour has been in existence since 1962.
- It is not mandatory to have a Zero Hour every day during the session
- **Ministers are not liable to reply to the issues raised during the Zero Hour.**
- The first Legislative Council in British India under the **Charter Act, 1853, gave members the power to ask questions to the executive.**
- The Indian Council Act of 1861 allowed members to elicit information by means of questions.
- The Indian Council Act, 1892, formulated the rules for asking questions including short notice questions.
- The Indian Council Act, 1909, incorporated provisions for asking supplementary questions by members.
- The Montague-Chelmsford reforms in 1919 incorporated a rule that the first hour of every meeting was earmarked for questions.

Art 163

- **Article 163 in The Constitution of India 1949**
- 163. Council of Ministers to aid and advise Governor
- (1) There shall be a council of Ministers with the chief Minister at the head to aid and advise the Governor in the exercise of his functions, except in so far as he is by or under this constitution required to exercise his functions or any of them in his discretion
- (2) If any question arises whether any matter is or is not a matter as respects which the Governor is by or under this Constitution required to act in his discretion, the decision of the Governor in his discretion shall be final, and the validity of anything done by the Governor shall not be called in question on the ground that he ought or ought not to have acted in his discretion
- (3) The question whether any, and if so what, advice was tendered by Ministers to the Governor shall not be inquired into in any court

For..Discretion of Governor..

- Nabam Rebia Vs Deputy Speaker 2016 case, SC held that a Governor cannot employ his discretion', and should strictly abide by the ―aid and advice‖ of the Cabinet to summon the House.

Disqualification

- **under the Tenth Schedule**
- The Anti-Defection Law was passed in 1985 through the **52ⁿᵈ amendment to the Constitution.** It **added the Tenth Schedule** to the Indian Constitution. The main intent of the law was to combat "the evil of political defections".
- According to it, **a member of a House belonging to any political party becomes disqualified for being a member of the House,** if
  - he **voluntarily gives up** his membership of such political party; or
  - he votes or abstains from voting in such House contrary to any direction issued by his political party without obtaining prior permission of such party and such act has not been condoned by the party within 15 days.
- **Exceptions to the disqualification on the ground of defection (Two cases)**
- If a member goes out of his party as a result of a merger of the party with another party. A merger takes place when two-thirds of the members of the party have agreed to such merger.
- If a member, after being elected as the presiding officer of the House, voluntarily gives up the membership of his party or rejoins it after he ceases to hold that office. This exemption has been provided in view of the dignity and impartiality of the office.
- A *member elected as an independent candidate shall be disqualified if he joins any political party after his election.*
- However, a nominated member is allowed to join a political party provided he joins such

political party of his choices within a period of six months. After that period, joining a political party would lead to defection and disqualification.

- The question whether a member is subject to disqualification in *all other matters except under 10th schedule (disqualification)* is decided by President. However, President should obtain the opinion of the election commission before taking such decision.
- The question of disqualification under Anti-defection / Tenth Schedule is decided by the Chairman in the case of RajyaSabha {i.e., Vice-President} and Speaker in the case of LokSabha.
- The decision of Chairman / Speaker in this condition is subject to judicial review.
    - The Attorney General (AG) of India is a part of the Union Executive, he is the highest law officer in the country.
    - AG is appointed by the President on the advice of the government (Article 76)
    - He must have been a judge of some high court for 5 years or an advocate of some high court for 10 years or an eminent jurist, in the opinion of the President (Similar to the appointment of SC Judge)
    - Term of the Office of Attorney General is not fixed by the Constitution.
    - Procedures and grounds for the removal of AG are not stated in the Constitution, thus he holds office during the pleasure of the President.
    - He has the right to speak and to take part in the proceedings of both the Houses of Parliament and their joint sitting, but without a right to vote.
    - He enjoys all the privileges and immunities that are available to a Member of Parliament.
    - He does not fall in the category of government servants and he is not debarred from private legal practice

Rajya Sabha

- It is a permanent House and is not subject to dissolution.
- However, one-third Members of RajyaSabha retire after every second year (biennial).
- member elected in a bye-election remains a member for the remainder of the term of the member who has resigned or died or disqualified to be member of the House under the Tenth Schedule

Consumer Protection Act, 2019

- Replaces the 1986 Act
- Now E-commerece Included, Was not there before
- Mediation for settlement can be initiated, earlier no provision
- *** No appeal against settlement through mediation
- Central Consumer Protection Authority to be made, earlier No regulator
- Compliant can be filed at consumer court of Complainant location, earlier → Office location of company
- Product Liability Introduced

5th Schedule

- Under Art 244: administration of Scheduled Areas other than in Northeast India
- States of Andhra Pradesh (including Telangana), Chhattisgarh, Gujarat, Himachal Pradesh, Jharkhand, Madhya Pradesh, Maharashtra, Odisha and Rajasthan.
- is notified by order of the President, after consultation with the Governor of that State.
- Each state having 'Scheduled Areas' **must** have a Tribal Advisory Council consisting of 20 members.
- **Governor is empowered to direct that any particular** law of parliament and state assembly is either not applicable or can be applied with certain 'modifications and exceptions' to scheduled areas.
- the President has the power to direct that the whole or any part of a Scheduled area has ceased to be a Scheduled area. He can after consultation with the governor of that state increase the area of any Scheduled Area. In this way he possesses the power to alter the boundaries of any Schedule area. The regulations made by the Governor come into effect only when they are accepted by the President.
- The Sixth Schedule of the Constitution provides for the administration of tribal areas in

Assam, Meghalaya, Tripura and Mizoram to safeguard the rights of the tribal population in these states.

- This special provision is provided under **Article 244(2) and Article 275(1)** of the Constitution.
- The Sixth Schedule provides for autonomy in the administration of these areas through Autonomous District Councils (ADCs).

- These councils are empowered to make laws in respect of areas under their jurisdiction, which cover the land, forest, cultivation, inheritance, indigenous customs and traditions of tribals, etc. and also to collect land revenues and certain other taxes.
- ADCs are like miniature states having specific powers and responsibilities in respect of all the three arms of governance: Legislature, executive and judiciary.

Nomination in RajyaSabha and Legislative council

- Art 80(1)(a): Prez can nominate 12 persons having special knowledge or practical experience in respect of such matters as the following: Literature, science, art and social service
- **Article 171(5)** - Governor can nominate persons with special knowledge in literature, science, art, co-operative movement and social service.1/6th of the sanctioned strength-Nominated

Art 142

- The Supreme Court in the exercise of its jurisdiction may pass such decree or make such order as is necessary for doing complete justice in any cause or matter pending before it, and any decree so passed or orders so made shall be enforceable throughout the territory of India...
- Can it Enquire into Proceedings of the Legislature... (Art 212 bars courts from inquiring into proceedigs of the leg)

Original Jurisdiction of The Supreme Court

- Article 131
- any dispute between the Centre and a state; the Centre and a state on the one side and another state on the other side; and two or more states.
- Does not extend to: A dispute arising out of any treaty, agreement, covenant, engagement or other similar instrument executed before the commencement of the constitution and continues to be in operation or which provides that the jurisdiction of the Supreme Court shall not extend to such a dispute.
- disputes relating to the use, distribution, or control of the water of any inter-state river;

Gram Nyayalayas

- 114th Law commission Report recommendations
- Article 39-A mandates for free legal aid to the poor and weaker sections of society.
- Gram Nyayalaya Act 2008 w.e.f 2009
- Is it Notified in all states? No (presently only 11)
- Is it notified in any North Eastern State? NO
    - Estd for every Panchayat at Intermediate level or a group of contiguous Panchayats at intermediate level in a district.
    - Who Notifies the area? **State Government, in consultation with the High Court**, notifies the boundaries of the area under the jurisdiction of a Gram Nyayalaya. It can also alter such limits at any time.
    - **State Government shall appoint a presiding officer called Nyayadhikari for every Gram Nyayalaya in consultation with the High Court**, who will be a person eligible to be appointed as a Judicial Magistrate of the First Class.
    - both civil and criminal jurisdiction
    - not bound by the rules of evidence provided in the Indian Evidence Act, 1872
    - The Act also makes the judicial process **participatory and decentralised** because it allows appointment of local **social activists and lawyers as mediators/reconciliators.**

Appeal

- The appeal in criminal cases shall lie to the Court of Session, which shall be heard and disposed of within a period of six months from the date of filing of such appeal.

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- The appeal in civil cases shall lie to the District Court, which shall be heard and disposed of within a period of six months from the date of filing of the appeal.
- A person accused of an offence may file an application for plea bargaining.

Delimitation Commission

- Appointed by the President of India and works in collaboration with the Election Commission of India.
- orders have the force of law and cannot be called in question before any court
- Art 82: Parliament enacts a Delimitation Act after every Census which establishes a delimitation commission
- Art 170: States also get divided into territorial constituencies as per Delimitation Act after every Census
- 2002, the 84th Constitutional Amendment was used to freeze the process of delimitation for LokSabha and State assemblies till at least 2026

Anglo-Indian

- Art 366 (2): An Anglo-Indian means a person whose father or any of whose other male progenitors in the male line is or was of European descent but who is domiciled within the territory of India and is or was born within such territory of parents habitually resident therein and not established there for temporary purposes only".
- The Anglo-Indian Term was defined in GOI Act 1935.

Art. 331 and Art. 333

- **Article 331; the President of India is authorised to nominate 2 members of the Anglo-Indian community** if no member of this community is elected among the 543 members for the LokSabha.
- Art 333: Governor can nominate. (1 member)

104th CAA

To extend the reservation of seats for SCs and STs in the Lok Sabha and states assemblies from Seventy years to Eighty years.

Removed the reserved seats for the Anglo-Indian community in the LokSabha and state assemblies.

Art 334

- Reservation of seats and special representation to cease after forty years Notwithstanding anything in the foregoing provisions of this Part, the provisions of Constitution relating to
- (a) the reservation of seats for the Scheduled Castes and the Scheduled Tribes in the House of the People and in the Legislative Assemblies of the States; and
- (b) the representation of the Anglo Indian community in the House of the People and in the Legislative Assemblies of the States by nomination, shall cease to have effect on the expiration of a period of forty years from the commencement of this Constitution: Provided that nothing in this article shall affect any representation in the House of the People or in the legislative Assembly of a State until the dissolution of the then existing House or Assembly, as the case may be
  - 103rd→ maximum of 10% Reservation for Economically Weaker Sections (EWSs) of citizens of classes other than the classes mentioned in clauses (4) and (5) of Article 15
  - 102nd→ Constitutional status to National Commission for Backward Classes
  - 101st→ Introduced the Goods and Services Tax.
  - 100th→ Exchange of certain enclave territories with Bangladesh and conferment of citizenship rights to residents of enclaves consequent to signing of Land Boundary Agreement (LBA) Treaty between India and Bangladesh.

Right to Information and Supreme Court

- SC and the office of CJI is a public authority under sec 2(h) of the act.
- disclosure of details of serving judges' personal assets was not a violation of their right to privacy.
- right to know under RTI was not absolute
- Section 8 (1) (j) of the RTI Act says that personal information, which has no relationship to any public activity or interest, or which would cause unwarranted invasion of the

privacy of the individual **shall be disclosed only if the appellate authority is satisfied that the larger public interest justifies the disclosure of such information.**

* **Judicial Appointment: Input Vs Output (Final Outcome)**

Regional Benches

* Art 130→ the Supreme Court may sit at place(s) other than Delhi **on the order of the Chief Justice of India with the prior approval of the President of India.**
* Under Article 130, **the chief justice of India acts as a persona designate and is not required to consult any other authority/person. Only presidential approval is necessary.**
* Also, **no constitutional amendment would be required** in order to set up such benches

Art 136

* Special leave to appeal by the Supreme Court:
    - (1) Notwithstanding anything in this Chapter, the Supreme Court may, in its discretion, grant special leave to appeal from any judgment, decree, determination, sentence or order in any cause or matter passed or made by any court or tribunal in the territory of India.
    - (2) Nothing in clause (1) shall apply to any judgment, determination, sentence or order passed or made by any court or tribunal constituted by or under any law relating to the Armed Forces.

> **Question: Other than the Fundamental Rights, which of the following parts of the Constitution of India reflect/reflects the principles and provisions of the Universal Declaration of Human Rights (1948)?**
> 1. Preamble
> 2. Directive Principles of State Policy
> 3. Fundamental Duties
>
> **Select the correct answer using the code given below:**
> (a) 1 and 2 only
> (b) 2 only
> (c) 1 and 3 only
> **(d) 1, 2 and 3**

Tribes Notified as Scheduled Tribes

* Tribes of Karnatkaeg: Parivara, Talawar, Siddis Etc..
* Artt 366→ defined 'Scheduled Tribes' (STs) as those deemed under **Article 342** to be ST for the purposes of this constitution.
* ART 342 →Procedure? Notified by Order of Prezaftr consultation with Governor
* orders can be modified subsequently only through an Act of Parliament.
* Criterion /Parameters for specifying a community as ST ....is it mentioned in the constitution? No..

Art. 30

* 30. Right of minorities to establish and administer educational institutions
* (1) All minorities, whether based on religion or language, shall have the right to establish and administer educational institutions of their choice
* (1A) In making any law providing for the compulsory acquisition of any property of an educational institution established and administered by a minority, referred to in clause (1), the State shall ensure that the amount fixed by or determined under such law for the acquisition of such property is such as would not restrict or abrogate the right guaranteed under that clause
* (2) The state shall not, in granting aid to educational institutions, discriminate against any educational institution on the ground that it is under the management of a minority, whether based on religion or language

Art. 29 v. Art. 30

* Art. 29: Provides **Any Section of Citizens residing in any part of the Country** having a **distinct language, script or culture of its own,** shall have the **right to conserve the same.**
* **'section of citizens'** in the Article that include minorities as well as majority.
* Art. 30: protection under Article 30 is confined only to minorities (religious or linguistic) and **does not extend to any section of citizens**

Lapsing of Bills

- Vice President called for rethink on provision that provides for automatic lapsing of Bill leading to wastage of time in LokSabha.
- Art. 107→ Intro and passing of The Bills, on the dissolution of LS, **cases when bill lapse**
- A bill originated in the LokSabha but pending in the LokSabha – lapses.
- A bill originated and passed by the RajyaSabha but pending in LokSabha – lapses.
- A bill originated and passed by the LokSabha but pending in the RajyaSabha – lapses.
- A bill originated in the RajyaSabha and returned to that House by the LokSabha with amendments and still pending in the RajyaSabha - lapses.

Cases when Bill doesn't lapse

- A bill pending in the RajyaSabha but not passed by the LokSabha does not lapse.
- If the president has notified the holding of a joint sitting before the dissolution of LokSabha, does not lapse.
- A bill passed by both Houses but pending assent of the president does not lapse.
- A bill passed by both Houses but returned by the president for reconsideration of Houses does not lapse

Preamble

- Is A Part of the constitution
- In the KesavanandaBharti Case, Hon'ble Apex Court held that the Preamble is a part of the Constitution.
- What Law is to Liberty ....Constitution is to Sovereignty..
- Socialist 0-→ 42nd Constitutional Amendment Act...Socialist, Integrity Secular word.
- Preamble is not the supreme power or source of any restriction or prohibition but it plays an important role in the interpretation of statutes and provisions of the Constitution.
- a part of the Constitution, preamble can be amended under Article 368 of the Constitution, but the basic structure of the preamble can not be amended.

Ninth Schedule: IXth Schedule

- The Schedule contains a list of central and state laws which cannot be challenged in courts and was added by the Constitution (First Amendment) Act, 1951.
  - The first Amendment added 13 laws to the Schedule. Subsequent amendments in various years have taken the number of protected laws to 284 currently.
- It was created by the new Article 31B, which along with Article 31A was brought in by the government to protect laws related to agrarian reform and for abolishing the Zamindari system.
  - While Article 31A extends protection to 'classes' of laws, Article 31B shields specific laws or enactments.
  - While most of the laws protected under the Schedule concern agriculture/land issues, the list includes other subjects.
- Article 31B also has a retrospective operation which means that if laws are inserted in the Ninth Schedule after they are declared unconstitutional, they are considered to have been in the Schedule since their commencement, and thus valid.
- Although Article 31B excludes judicial review, the apex court has said in the past that even laws under the Ninth Schedule would be open to scrutiny if they violated Fundamental Rights or the basic structure of the Constitution.

State Election Commission

- The Supreme Court has held that independent persons and not bureaucrats should be appointed State Election Commissioners.
- The Constitution of India vests in the State Election Commission, consisting of a State Election Commissioner, the superintendence, direction and control of the preparation of electoral rolls for, and the conduct of all elections to the Panchayats and the Municipalities (Articles 243K, 243ZA).
- The State Election Commissioner is appointed by the Governor.
- The State Election Commissioners work independently of the Election Commission of

India and each has its own sphere of operation.
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- The State Election Commissioner is appointed by the Governor
- The State Election Commissioners work independently of the Election Commission of India and each has its own sphere of operation.
  - The State Election Commissioner has the status, salary and allowance of a Judge of a High Court and cannot be removed from office except in like manner and on the like grounds as a Judge of a High Court.

Art 324 *v.*Art 243K
- 324. Superintendence, direction and control of elections to be vested in an Election Commission(1) The superintendence, direction and control of the preparation of the electoral rolls for, and the conduct of, all elections to Parliament and to the Legislature of every State and of elections to the offices of President and Vice President held under this Constitution shall be vested in a Commission (referred to in this Constitution as the Election Commission)
- (2) The Election Commission shall consist of the Chief Election Commissioner and such number of other Election Commissioners, if any, as the President may from time-to-time fix and the appointment of the Chief Election Commissioner and other Election Commissioners shall, subject to the provisions of any law made in that behalf by Parliament, be made by the President
- (3) When any other Election Commissioner is so appointed the Chief Election Commissioner shall act as the Chairman of the Election Commission.
  - 243K. Elections to the Panchayats The superintendence, direction and control of the preparation of electoral rolls for, and the conduct of, all elections to the Panchayats shall be vested in a State Election Commission consisting of a State Election Commissioner to be appointed by the Governor(2) Subject to the provisions of any law made by the Legislature of a State the conditions of service and tenure of office of the State Election Commissioner shall be such as the Governor may by rule determine: Provided that the State Election Commissioner shall not be removed from his office except in like manner and on the like ground as a Judge of a High Court and the conditions of service of the State Election Commissioner shall not be varied to his disadvantage after his appointment.

Panchayat Extension to Schedule Areas
- Povisions of **Part IX** of the constitution relating to the Panchayats are **not applicable to the Fifth Schedule areas**.
- The **Parliament may extend these provisions** to such areas, subject to such **exceptions** and **modifications** as it may specify
- PESA is a law enacted by Government of India to cover the "Scheduled Areas", which are not covered in the 73rd Constitutional amendment.

Part VIII	The Union Territories	Art. 239 to 242
Part IX	The Panchayats	Art. 243 to 243O
Part IXA	The Municipalities	Art. 243P to 243ZG
Part IXB	Co-operative Societies	Art. 243H to 243ZT
Part X	The Scheduled and Tribal Areas	Art. 244 to 244A
Part XI	Relations between the Union and the States	Art. 245 to 263
Part XII	Finance, Property, Contracts and Suits	Art. 264 to 300A
Part XIII	Trade, Commerce and intercourse within the Territory of India	Art. 301 to 307
Part XIV	Services under the Union and the States	Art. 308 to 323
Part XIVA	Tribunals	Art. 323A to 323B
Part XV	Elections	Art. 324 to 329A
Part XVI	Special provisions relation to certain classes	Art. 330 to 342
Part XVII	Official Language	Art. 343 to 351
Part XVIII	Emergency Provisions	Art. 352 to 360
Part XIX	Miscellaneous	Art. 361 to 367
Part XX	Amendment of the Constitution	Art. 368

- This particular act extends the provisions of Part IX to the Scheduled Areas of the country.

Part XX	Temporary, Transitional and Special Provisions	Art. 369 to 392
Part XXI	Short title, commencement, authoritative text in Hindi and repeals	Art. 393 to 395

Objectives

- To **extend the provisions of Part IX of the Constitution** relating to the panchayats to the scheduled areas with certain modifications
- To provide **self-rule for the bulk** of the tribal population
- To have **village governance with participatory democracy** and to make the **gram sabha a nucleus** of all activities
- To **evolve a suitable administrative framework** consistent with traditional practices
- To **safeguard and to preserve the traditions** and customs of tribal communities
- To **empower panchayats at the appropriate levels** with specific powers conducive to tribal requirements
- To **prevent panchayats at the higher level from assuming the powers and authority** of panchayats at the lower level of the gram sabha
- **Every Gram Sabha shall–**
- Approve of the plans, programmes and projects for social economic development before they are taken up implementation by the Panchayat at the village level;
- Be responsible for the identification of beneficiaries under poverty alleviation and other programmes.
- Every Panchayat at the village level shall be **required to obtain from the Gram Sabha a certification of utilisation of funds** for the above plans, programmes and projects.

Gram Sabha Shall...

- The **reservation of seats in the Scheduled Areas in every Panchayat** shall be in proportion to the population of the communities for whom reservation is sought to be given under Part IX of the Constitution.
- **The reservation for the Scheduled Tribes shall not be less than one-half of the total number of seats.**
- Further, **all seats of Chairpersons of Panchayats at all levels shall be reserved for the Scheduled Tribes.**
  - The **state government may nominate such Scheduled Tribes** which have no representation in the Panchayat at the intermediate level or the Panchayat at the district level. **But such nomination shall not exceed one-tenth of the total members** to be elected in that Panchayat.
  - The **Gram Sabha or the Panchayats at the appropriate level shall be consulted** before making the acquisition of land in the Scheduled Areas for development projects and before resettling or rehabilitating persons affected by such projects in the Scheduled Areas. However, the actual planning and implementation of the projects in the Scheduled Areas shall be coordinated at the state level.
  - **Planning and management of minor water bodies** in the Scheduled Areas shall be entrusted to Panchayats at the appropriate level.
  - The **recommendations of the Gram Sabha or the Panchayats at the appropriate level shall be mandatory** for grant of prospecting license or mining lease for minor minerals in the Scheduled Areas.
  - The **prior recommendation of the Gram Sabha or the Panchayats at the appropriate level** shall be **mandatory** for grant of concession for the exploitation of minor minerals by auction.
  - **While endowing Panchayats in the Scheduled Areas with such powers and authority as may be necessary to enable them to function as institutions of self-government, a State Legislature shall ensure that the Panchayats at the appropriate level and the Gram Sabha are endowed specifically with–**
  - the power to enforce prohibition or to regulate or restrict the and consumption of any intoxicant
  - the ownership of **minor forest produce**

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- the power to **prevent alienation of land** in the Scheduled A and to take appropriate action to restore any unlawfully alien land of a Scheduled Tribe
- the power to **manage village markets**
- the power to **exercise control over money lending** to Scheduled Tribes
- the power to **exercise control over institutions and functionary** all social sectors
- the power to **control local plans and resources** including tribal sub-plans
- Question 2: How many States with Fifth Schedule Areas are covered under PESA? Answer: Total ten States are covered under PESA. These States are: Andhra Pradesh, Chhattisgarh, Gujarat, Himachal Pradesh, Jharkhand, Madhya Pradesh, Maharashtra, Odisha, Rajasthan and Telangana.
- Question 3: Which community has the right to contest elections for the post of Chairperson of Panchayati Raj Institutions (PRIs)?
- Answer: All posts of Chairpersons of PRIs in the areas covered under PESA are reserved for tribal community and only persons belonging to tribal community can contest for these posts.
- The Gram Sabha after considering all the facts, shall make a recommendation regarding the proposed land acquisition and rehabilitation and resettlement plan of persons who are affected or displaced.
- In case the Land Acquisition Officer is not in agreement with the recommendations of the Gram Sabha, she/he will send the matter again to the Gram Sabha for its reconsideration and decision.
- **The Land Acquisition Officer or the Project Authorities may pass an order against the recommendations of the Gram Sabha**, if aggrieved, after recording the reasons for doing so and same shall be communicated to Gram Sabha. In case of industrial projects, all the Gram Sabhas that are influenced by such projects shall be consulted before commencing any activity.

Emergency

- The emergency provisions are contained in **Part XVIII** of the Constitution of India, from **Article 352 to 360.**
- These provisionsenable the Central government to meet any abnormalsituation effectively. The rationality behind the incorporation ofthese provisions in the Constitution is to safeguard thesovereignty, unity, integrity and security of the country, thedemocratic political system, and the Constitution.
- During an Emergency, the Central government becomes allpowerful and the states go into the total control of the Centre. Itconverts the federal structure into a unitary one without a formalamendment of the Constitution. This kind of transformation of thepolitical system from federal during normal times to unitary duringEmergency is a unique feature of the Indian Constitution.

Art 352

- Under Article 352, the president can declare a national emergency when the security of India or a part of it is **threatened by war or external aggression or armed rebellion.**
- The President can declare a national emergency even before the actual occurrence of war or armed rebellion or external aggression
- When a national emergency is declared on the grounds of **'war' or 'external aggression',** it is known as **'External Emergency'.** On the other hand, when it is declared on the grounds of **'armed rebellion',** it is known as **'Internal Emergency'.**
- This term 'armed rebellion' is inserted from the **44th amendment.** Before this term it was known as internal disturbance.
- If the situation improves the emergency can be revoked by the President of India through another proclamation.
- The 44th Amendment of the Constitution provides that ten per cent or more members of the LokSabha can make a requisition for meeting of the LokSabha and in that meeting; it can disapprove or revoke the emergency by a simple majority. In such a case emergency will immediately become inoperative.
- **Suspension of Fundamental rights under Article 19:** According to Article 358, when a proclamation of National Emergency is made, the six fundamental rights under article

19 are automatically suspended. Article 19 is automatically revived after the expiry of the emergency.

- The 44th Amendment Act laid out that Article 19 can only be suspended when the National Emergency is laid on the grounds of war or external aggression and not in the case of armed rebellion.
- **Suspension of other Fundamental Rights:** Under Article 359, the President is authorised to suspend, by order, the right to move any court for the enforcement of Fundamental Rights during a National Emergency. Thus, **remedial measures are suspended and not the Fundamental Rights.**
  - The suspension of enforcement relates to only those Fundamental Rights that are specified in the Presidential Order.
  - The suspension could be for the period during the operation of emergency or for a shorter period.
  - The Order should be laid before each House of Parliament for approval.
  - The 44 Amendment Act mandates that the President cannot suspend the right to move the court for the enforcement of Fundamental Rights guaranteed by Article 20 and 21.

Art 356

- Article 355 imposes a duty on the centre to ensure that the government of every state is carried on in accordance with the provisions of the constitution.
- **Article 356, President's Rule** can be imposed on any state of India on the grounds of the failure of the constitutional machinery. This is of two types:
- If the President receives a report from the state's Governor or otherwise is convinced or satisfied that the state's situation is such that the state government cannot carry on the governance according to the provisions of the Constitution.
- Article 365: As per this Article, President's Rule can be imposed if any state fails to comply with all directions given by the Union on matters it is empowered to.
- Parliamentary approval is necessary for the imposition of President's Rule on any state. The proclamation of President's Rule should be approved in both Houses of the Parliament within two months of its issue. The approval is through a simple majority.
- The President's Rule is initially for a period of six months. Later, it can be extended for a period of three years with parliamentary approval, every six months.
- The 44th Amendment to the Constitution (1978) brought in some constraints on the imposition of the President's Rule beyond a period of one year. It says that President's Rule cannot be extended beyond one year unless:
- There is a national emergency in India.
- The Election Commission of India certifies that it is necessary to continue the President's Rule in the state because of difficulties in conducting assembly elections to the state.

What happens after President's Rule is imposed?

- The governor carries on with the administration of the state on behalf of the President. He or she takes the help of the state's Chief Secretary and other advisors/administrators whom he or she can appoint.
- The President has the power to declare that the state legislature's powers would be exercised by the Parliament.
- **The state legislative assembly would be either suspended or dissolved by the President.**
- When the Parliament is not in session, the President can promulgate ordinances with respect to the state's administration.
- Revocation of President's Rule

President's Rule can be revoked anytime after such a proclamation has been made by a subsequent proclamation by the President. A proclamation of revocation does not require approval by the Parliament.

ECONOMY AND SCHEMES

Economic Budget

- According to Article 112 of the Indian Constitution, referred to as the annual financial statement, is a statement of the **estimated receipts and expenditure of the government** for that particular year.
    - The word budget is not mentioned in the constitution.
- First Indian budget was presented by James Wilson, Scottish economist & politician (1860)
- The **first Budget of Independent India was presented on November 26, 1947 by the then finance minister R K Shanmukham Chetty** - Nov 26 is celebrated as **constitutional day.**
- Till 1955, the Budget was presented only in English. However, from 1955-56, the Budget documents are printed both in English and Hindi.
- Maximum number (10) of Budgets has been presented by Moraji Desai.
- Indira Gandhi was the first woman to present the Budget when she took charge as the finance minister in 1970-71
- Union Budget presented in the year **1973-74 by Yashwantrao B Chavan** was known as the **'Black Budget'** due to high budget deficit of Rs 550 crore at that time.
- Until 2016, the Union Budget of India was presented in the Lok Sabha on **the last day of February**. However, from 2017, **the budget has been presented on February 1.**
    - Objective is to have the Budget constitutionally approved by Parliament and assented to by the President, and **all allocations to different sectors, before the financial year begins on April 1**.
    - The new system will **eliminate the need for the executive to obtain a vote-on-account** budget approval to incur expenditure during the first two months, which normally is in the second fortnight of May.
    - The Rail Budget, which was presented separately for 92 years was **merged with the Union Budget in the year 2017**.
- 'Halwa' ceremony considered as **final stage of Union Budget, 70-year-old ritual**, the sweet dish was prepared in a huge kadhai and served to the entire staff at the finance ministry, North Block.
- **Halwa ceremony marks the *printing of Budget documents*.**
- This year the Union Budget is **set to go digital**-First such in history.
- **Department of Economic Affairs in the Ministry of Finance** prepares the Union Budget. Budget is presented by the Finance Minister
- The budget contains:
    - Estimates of revenue and capital receipts;
    - Ways and means to raise the revenue;
    - Estimates of expenditure;
    - Details of the actual receipts and expenditure of the closing financial year and thereasons for any deficit or surplus in that year; and
    - Economic and financial policy of the coming year, that is, taxation proposals,prospects of revenue, spending programme and introduction of newschemes/projects.
- Union Budget is classified into Revenue Budget and CapitalBudget.
    - Revenue budget includes the government's revenue receipts and expenditure. There are twokinds of revenue receipts - tax and non-tax revenue.
    - Capital Budget includes capital receipts and payments of the government. Capitalexpenditure is the expenditureon development of machinery,equipment, building, healthfacilities, education etc.

- Fiscal deficit is incurred whenthe government's totalexpenditure exceeds its totalrevenue.
- **Budget documents apart from budget speech of FM**
    - Annual Financial Statement (AFS): Art 112 of the Indian constitution
    - Demands for Grants (DG): Article 113 of Indian constitution
    - **Demand for grants**:
        - Withdrawal of money from the Consolidated Fund of India should be presented to the Lok Sabha in **the form of a demand for grants**.
        - every ministry prepares a **demand for grants for the expenditure to be incurred in the next financial year**. These demands are collectively presented in the Lok Sabha as part of the Union Budget.
    - Finance Bill: 110 (a) of Indian constitution
    - **Statements mandated under the FRBM Act 2003**
        - Macro Economic Framework statement
        - Medium term Fiscal policy cum Fiscal policy strategy Management

Data shown by budget:

Four data of three years are mentioned:

- suppose in 2021-22 budget
- 2019-20 actual data is given
- 2020-21 budget estimate is given
- 2020-21 revised estimate is given
- 2021-22 budget estimates is given

Rupee comes in:

- Borrowing and other liabilities -> 36%
- GST -> 15%
- Income Tax 14%
- Corporation Tax 13%
- Union excise duties 8% -> tax imposed on goods for their production
- Non Tax revenue 6% -> other than tax
- Non-debt Capital receipt-> 5% -> those money receipts which are received by the government from the sale of old assets

Rupees goes out:

- Interest Payment-> 20%
- Share of taxes and duties-> 16%-> released to states
- Central sector schemes-> 14%
- Other expenditure-> 10%
- Centrally Sponsored Scheme-> 9%
- Subsidies-> 8%
- Defense-> 8%
- Pension -> 5%

6 pillars of the Union Budget 2021-22:

1. Health and Wellbeing
2. Physical & Financial Capital, and Infrastructure
3. Inclusive Development for Aspirational India
4. Reinvigorating Human Capital
5. Innovation and R&D
6. Minimum Government and Maximum Governance

HELATH: Focus on strengthening three areas: Preventive, Curative, and Wellbeing

PM AtmaNirbharSwasth Bharat Yojna:

- Will be launched over 6 years(till FY 25-26)
- will be in addition to the National Health Mission
- is to develop capacities of primary, secondary, and tertiary care health systems

- strengthen existing national institutions, and create new institutions, to cater to detection and cure of new and emerging diseases-> preparing health systems in responding effectively to the current and future pandemics/disasters
- Strengthening of the National Centre for Disease Control (NCDC), an institute under the Indian Directorate General of Health Services, Ministry of Health and Family Welfare.
- Establishing 11,024 urban Health and Wellness Centres in all the States
- Setting up of Integrated Public Health Labsin all districts
- Expansion of the *Integrated Health Information Portal* to all States/UTs to connect all public health labs
- Setting up of a national institution for One Health, a Regional Research Platform for WHO South East Asia Region, 9 Bio-Safety Level III laboratories and 4 regionalNational Institutes for Virology.
- PMASBY targets to build an IT enabled disease surveillance system by developing a network of surveillancelaboratories at block, district, regional and national levels, in Metropolitan areas->strengthening the health infrastructure at ground level
- Strengthening health units at the Points of Entry, *for* effectively detecting, investigating, preventing and combating Public Health Emergencies and Disease Outbreaks.
- National Health Policy (NHP), 2017 envisages raising public health expenditure from the existing 1.15% to 2.5% of GDP by 2025 in a time bound manner.

National Health Policy 2017:
- Intends to increase life expectancy at birth from 67.5 to 70 by 2025
- Reduce infant mortality rate to 28 by 2019
- It also aims to reduce under five mortality to 23 by 2025
- The policy proposes free drugs, free diagnostics and free emergency and essential health care services in all public hospitals in a bid to provide access and financial protection.

Mission Poshan 2.0:
- **Objective**: Strategy to improve **nutritional outcomes across 112 aspirational** districts to curb childhood malnutrition, stunting and wasting.
- Merging the Supplementary Nutrition Programme and the PoshanAbhiyan(The PoshanAbhiyan was approved by the Union Cabinet in 2017).
- Poshan 2.0 scheme in an umbrella scheme covering the **Integrated Child Development Services (ICDS), Anganwadi Services, PoshanAbhiyaan, Scheme For Adolescent Girls, National Creche Scheme.**
- **National Creche Scheme**- day care facilities to children (age group of 6 months to 6 years) of working mothers.

Aspirational Districts programme:
- Aspirational Districts are those districts in India that are affected by poor socio-economic indicators.
- These are aspirational in the context, that improvement in these districts can lead to the overall improvement in human development in India.
- The 115 districts were identified from 28 states, at least one from each state.
- At the Government of India level, the programme is anchored by NITI Aayog. In addition, individual Ministries have assumed responsibility to drive the progress of districts.
- The broad contours of the programme are Convergence (of Central & State Schemes), Collaboration (of Central, State level 'Prabhari' Officers & District Collectors), and Competition among districts driven by a mass Movement.
- It is one of the largest experiments on outcomes-focused governance in the world.
- It is based on 49 indicators from the 5 identified thematic areas; Health & Nutrition, Education, Agriculture & Water Resources, Financial Inclusion & Skill Development, and Basic Infrastructure.
  Jal Jeevan Mission (Urban):
- It will be implemented to enable universal water supply and liquid waste management in urban areas.
- This mission would be implemented over five years with an expenditure of ₹2.87 lakh crore.

- JalJeevan Mission: Provide safe and adequate drinking water through individual household tap connections by 2024 to all households in rural India. It was Central government initiative under the Ministry of Jal Shakti.
- The Mission would also aim to bridge the gap of 2.64 crore sewer connections in the 500 cities under the existing Atal Mission for Rejuvenation and Urban Transformation (AMRUT).
- It will promote circular economy of water through development of city water balance plan for each city focusing on recycle/reuse of treated sewage, rejuvenation of water bodies and water conservation.
  - A circular economy depends on reuse, sharing, repair, refurbishment, remanufacturing and recycling of resources to create a closed-loop system, minimising the use of resources, generation of waste, pollution and carbon emissions.

Scrapping Policy:
- Voluntary vehicle scrapping policyto phase out old and unfit vehicles
- It will help in **encouraging fuel efficient**, **environment friendly vehicles**, **thereby reducing vehicular pollution** and **oil import bill**
- Vehicles would undergo fitness tests in automated fitness centres after **20 years in case of personal vehicles** after **15 years in case of commercial vehicles**
- Although it will take until April 1, 2022 for vehicles belonging to the government and the public sector to be scrapped, another year thereafter to identify junk heavy commercial vehicles through mandatory fitness checks, and finally other vehicles by 2024, it is a constructive road map.

Urban Swachh Bharat Mission 2.0
- The Swachh Bharat Mission (Urban), which was being implemented by the Housing and Urban Affairs Ministry, would get a second round.
- For further swachhta [cleanliness] of urban India, we intend to focus on complete faecal sludge management and waste water treatment, source segregation of garbage, reduction in single-use plastic, reduction in air pollution by effectively managing waste from construction-and-demolition activities and bio-remediation of all legacy dump sites.
- The Swachh Bharat Mission (Urban) 2.0 would be implemented over five years – 2021 till 2026 – with an outlay of ₹1.41 lakh crore.
  - Bio-remediation isa branch of Bio-technology, that employs use of living organism like bacteria, to remove polluntants or contaminants.

Pneumococcal Vaccine-> for Pneumoniae
- A Made in India product, is presently limited to only 5 states will be rolled out across the country
- This will avert **more than 50,000 child deaths annually**

Physical and Financial Capital and Infrastructure
Production Linked Incentive scheme (PLI)-> it's a part of AtmaNirbhar Bharat
- *Invites **foreign companies**as well as **encourage local companies***
- ***Cut down reliance on import***
- Part of the national policy on Electronics by the **IT ministry to give incentives of 4-6% to electronic companies**-> over *next five years*
- To help manufacturing companies become an integral part of global supply chains, possess core competence and cutting-edge technology
- **To bring scale and size in key sectors**.
- To create and nurture manufacturing global champions for an AatmaNirbhar Bharat
- To**provide jobs** to our youth
- The PLI scheme has a simple framework — reward for increased production.

Textile
- To enable the textile industry to become globally competitive
- Attract large investments
- Boost employment generation

- A scheme of **Mega Investment Textiles Parks (MITRA)** will be launched in addition to the PLI scheme
    - 7 Textile Parks will be established over 3 years

Infrastructure:
- **National Infrastructure Pipeline (NIP)->2019-25**
- Both **economic and social infrastructure->** along with railway and airports, also giving emphasis on education and health
- Measures in three thrust areas to increase funding for NIP:
    1. Creation ofinstitutional structures
    2. Big thrust on monetizing assets: creation of new sources of revenue by unlocking of value of hitherto **unutilized or underutilized public assets**.
    3. Enhancing the share of capital expenditure:
- One taskforce headed **by AtanuChakraborty**on NIP, in may 2020 submitted its report
    - Setting up of **development of finance institutions**
    - **Monetization** of infrastructure
    - Strengthening of **municipal bond market-> Muni bond**
    - **This task force has recommended setting up following three committees:**
        1. Committee to **monitor NIP progress** and eliminate delays
        2. **Steering committee at each infrastructure ministry** level to follow up on the implementation process
        3. Steering committee in DEA for the raising financial resources for the NIP

1. Creating the institutional structures
   I. **Development Financial Institution (DFI):**
- Rs. 20,000 crore to set up and capitalise a DFI to act as a provider, enabler and catalyst for infrastructure financing
- Infrastructure needs *long term debt financing*
- Debt Financing of InVITs and REITs by Foreign Portfolio Investorswill further ease access of finance to InVITS (infrastructure investment Trust) and REITs (Real Estate Investment Trust) thus augmenting funds for infrastructure and real estate sectors
    - InVITS (infrastructure investment Trust)-> trusts registered with SEBI. Once registered, InvITs can raise funds via public or private placement and issue units to investors
    - REITs or real estate investment trust can be described as a company that owns and operates real estates to generate income.

2. Monetisationof Assets:
- **Public Infrastructure Assets** is a very important financing option for new infrastructure construction.
- **An Asset Monetization dashboard** will also be created for tracking the progress and to provide visibility to investors.
- A **"National Monetization Pipeline"** of potential brownfield (**develop the existing structure rather than a new one**) infrastructure assets will be launched.
    - Dedicated Freight Corridor assets to be monetized by Railways, for operations and maintenance, after commissioning
    - 5 operational toll roads worth Rs. 5,000crore being transferred to the NHAIInvIT
    - Transmission assets worth Rs. 7,000crore to be transferred to the PGCILInvIT

Sharp increase in Capital Budget:
- Rs. 5.54 lakh crore capital expenditure in BE 2021-22 – **sharp increase of 34.5%** over Rs. 4.12 lakh crore allocated in BE 2020-21 :
    - Over Rs. 2 lakh crore to States and Autonomous Bodies for their Capital Expenditure.
    - Over Rs. 44,000 crore for the Department of Economic Affairs to provide for

projects/programmes/departments exhibiting good progress on Capital Expenditure

Roads and Highway Infrastructure:
- Rs. 1,18,101 lakh crore, highest ever outlay, for Ministry of Road Transport and Highways – of which Rs. 1,08,230 crore is for capital
- Increase the number of kilometers of national highway->BharatmalaPariyojana project (BPP)
- Focuses on optimizing the efficiency of freight and passenger movement across the country by bridging critical infrastructure.
- Improvement in efficiency of existing corridors through development of Multimodal Logistics Parks and elimination of choke point
- Enhance focus on improving connectivity in North East and leveraging synergies with Inland Waterways -> find out inland waterways and places of connectivity
- Emphasis on use of technology & scientific planning for Project Preparation and Asset Monitoring
- Delegation of powers to expedite project delivery - Phase I to complete by 2022
- Advanced Traffic management system in all new 4 and 6-lane highways:
    - Speed radars
    - Variable message signboards
    - GPS enabled recovery vans will be installed

Railway Infrastructure:
- National Rail Plan for India (2030): to create a 'future ready' Railway system by 2030. It aims at providing a long term perspective planning for augmenting the Railway Network.
- To increase the modal share of Railways from 27% currently to 45% in freight by 2030 as part of a national commitment to reduce Carbon emission and to continue to sustain it.
- As part of the National Rail Plan, **Vision 2024** has been launched for accelerated implementation of certain critical projects by 2024 such as:
    1. 100% electrification.
    2. Multitracking of congested routes.
    3. Upgradation of speed to 160 kmph on Delhi-Howrah and Delhi-Mumbai routes.
    4. Upgradation of speed to 130kmph on all other Golden Quadrilateral-Golden Diagonal (GQ/GD) routes.
    5. Elimination of all Level Crossings on all GQ/GD route.
- Measures for passenger convenience and safety:
    - Aesthetically designed Vista Dome LHB coach on tourist routes for better travel
    - High density network and highly utilized network routes to have an indigenously developed automatic train protection system, eliminating train collision due to human error

Power infrastructure
- A scheme will be launched to provide **assistance to DISCOMS for infrastructure creation**:
    - Like **pre-paid smart metering**
    - Feeder separation
    - Upgradation of system
- There was a Re-invest conference November 2020 had announced national Hydrogen Energy mission

Smart metering:
- Discoms using smart meters have seen 15-20% average increase in monthly revenue per consumer.
- Energy Efficiency Services Limited (EESL), a Public Sector Undertaking (PSU) under the Ministry of Power, Government of India, is the designated agency to implement the smart metering programme in India.
- Advanced meter devices having the capacity to collect information about energy,

water, and gas usage at various intervals and transmitting the data through fixed communication
- Smart meters minimize human intervention in metering, billing and collection,
- It reduces theft by identifying loss pockets-> meter tampering

National Hydrogen Energy Mission 2021-22
- Focus on generation of hydrogen from green power resources.
- It will help in achieving *175 GW by 2022* **(renewable energy)**
- The usage of Hydrogen -> achieving its emission goals *under Paris agreement*, But will *also reduce import dependency on fossil fuels.*
- Use of Hydrogen -> primarily used in petrochemicals and fertilizer industry*and is* produced largely from natural gas
- Depending on the nature of the method of its extraction, hydrogen is categorized in to three categories ->*namely grey, blue and green.*more focus on increasing production of green and blue hydrogen due to its no carbon emissionand use of carbon offset technology-> mitigation of carbon footprint through alternative technology
- Several organization are exploring a huge scope for investment in this technology which can combat India's twin problems of waste management and energy security.
- NHM will emphasize on *generating green hydrogen* and enabling its commercial use as a transportation fuel.

Financial Capital
- Governement would support the development of a world <u>class Fin-Tech hub at the GIFT-IFSC</u>. (London, New York and Singapore can be counted as global financial centres.)
    - India's first International Financial Services Centre (IFSC) at the Gujarat International Finance Tech City (GIFT City)
    - Government of India operationalized International Financial Services Centre (IFSC) at GIFT Multi Services SEZ in April 2015.
- Setting up a system of Regulated Gold Exchanges: SEBI to be notified as aregulator and Warehousing Development and Regulatory Authority to be strengthened
- Capital infusion of Rs. 1,000 crore to Solar Energy Corporation of India and Rs. 1,500 crore to Indian Renewable Energy Development Agency
- A single Securities Markets Code to be evolved
- A new permanent institutional framework to help in development of Bond market by purchasing investment grade debt securities both in stressed and normal times

International Financial Services Centre Authority(IFSC):
- It has been established on April 27, 2020 under the International Financial Services Centres Authority Act, 2019. An IFSC caters to customers outside the jurisdiction of the domestic economy.
    - It is a statutory authority
    - Such centres deal with flows of finance, financial products and services across borders.
- Headquartered at GIFT City, Gandhinagar in Gujarat
- Prior to the establishment of IFSCA, the domestic financial regulators, namely, RBI, SEBI, PFRDA and IRDAI regulated the business in IFSC.
- Holistic vision in order to promote ease of doing business in IFSC
- The IFSCA is a unified authority for the development and regulation of financial products, financial services and financial institutions in the International Financial Services Centre (IFSC) in India.

What are the services an IFSC can provide?
- Fund-raising services for individuals, corporations and governments
- Asset management and global portfolio diversification undertaken by pension funds, insurance companies and mutual funds
- Wealth management
- Global tax management and cross-border tax liability optimization, which provides a

business opportunity for financial intermediaries, accountants and law firms.

➢ Global and regional corporate treasury management operations that involve fund-raising, liquidity investment and management and asset-liability matching

➢ Risk management operations such as insurance and reinsurance

➢ Merger and acquisition activities among trans-national corporations

Special economic zone (SEZ):

• The special economic zone (SEZ) Act 2005 allows setting up an IFSC in an SEZ or as an SEZ after approval from the central government.

• To avoid multiplicity of controls and clearances; absence of world-class infrastructure, and with a view to attract larger foreign investments in India, the Special Economic Zones (SEZs) Act was passed in 2005.

• It is geographically separated 'enclaves' in which regulations and practices related to business and trade differ from the rest of the country and therefore all the units therein enjoy special privileges.

Facilities and incentives for SEZs:

1. Duty-free import/domestic procurement of goods for development, operation and maintenance of SEZ units.

2. Income tax exemption on export income for SEZ units under the Income Tax Act for first 5 years, 50% for next 5 years thereafter and 50% of the ploughed back (reinvest) export profit for next 5 years.

3. Exemption from Minimum Alternate Tax (MAT)-> to bring "zero-tax paying companies"within the ambit of income tax, applied when the income of person which is found to be less than 15.5% of the book profit under companies act 2013.

4. Single window clearance for Central and State level approvals.

Increasing FDI in Insurance Sector

• To increase the permissible FDI limit from 49% to 74% and allow foreign ownership and control with safeguards.

Deposit Insurance:

• Amendments to the DICGC Act, 1961, to help depositors get an easy and time-bound access to their deposits to the extent of the deposit insurance cover

Company Matters:

• To decriminalize the Limited Liability Partnership (LLP) Act, 2008

• Promoting start-ups and innovators by incentivizing the incorporation of One Person Companies (OPCs):

   o Allowing their growth without any restrictions on paid up capital and turnover

   o Allowing their conversion into any other type of company at any time,

   o Reducing the residency limit for an Indian citizen to set up an OPC from 182 days to 120 days and

   o Allowing Non Resident Indians (NRIs) to incorporate OPCs in India.

• To ensure faster resolution of cases by:

   o Strengthening NCLT framework

   o Implementation of e-Courts system

   o Introduction of alternate methods of debt resolution and special framework for MSMEs

• Launch of data analytics, artificial intelligence, machine learning driven MCA21 Version 3.0 in 2021-22

Inclusive Development for Aspirational India

Agriculture:

• The MSP regime has undergone a sea change to assure price that is at least 1.5 times the cost of production across all commodities

• SWAMITVA (Survey of villages and Mapping with improvised Technology in village areas) Scheme.

- It aims to provide an integrated property validation solution for rural India.
  - The Ministry of Panchayati Raj (MoPR) is the Nodal Ministry for implementation of the scheme.In the States, the Revenue Department / Land Records Department will be the Nodal Department.
- Mapping will be done through technology-> using Drone Surveying technology.
- The scheme seeks to achieve the following objectives: -
  - To bring financial stability to the citizens in rural India by enabling them to use their property as a financial asset for taking loans and other financial benefits.
  - Creation of accurate land records for rural planning.
  - Determination of property tax, which would accrue to the GPs directly in States where it is devolved or else, add to the State exchequer.
  - Creation of survey infrastructure and GIS maps that can be leveraged by any department for their use.
  - To support in preparation of better-quality Gram Panchayat Development Plan (GPDP) by making use of GIS maps.
  - To reduce property related disputes and legal cases

Rural Infrastructure Development Fund (RIDF): to be enhanced to Rs. 40,000 crore from Rs. 30,000 crore

- Government of India created the RIDF in NABARD in 1995-96, with an initial corpus of Rs.2,000crore.
  - Agriculture and related sector,
  - Social sector
  - Rural connectivity

Micro Irrigation Fund (MIF):To double the Micro Irrigation Fund to Rs. 10,000 crore

- MIF with a corpus of Rs. 5000 Crore was created with NABARD during 2018-19.
- It will facilitate the States in mobilizing the resources to provide top up/additional incentives to farmers for incentivising micro irrigation.
- **Benefits of micro Irrigation Fund:**
  - reducing fertilizer usage,
  - labour expenses
  - sustaining soil health
  - delivers water savings of upto 40 per cent over conventional flood irrigation methods
  - Irrigation cost reduced by 20% to 50% with average of 32.3%.
  - Electricity consumption reduced by about 31%.
  - Saving of fertilizers 7% to 42%.
  - Average productivity of fruits and vegetables increased by about 42.3% and 52.8%.
  - Overall income enhancement of farmers in the range of 20% to 68% with average of 48.5%

Operation Green Scheme

- Initially applicable to TOPs (tomatoes, onions, and potatoes)
- Objective of intervention is to protect the growers of fruits and vegetables from making distress sale
- Seeks to stabilize the supply of Tomato, Onion and Potato (TOP) crops and to ensure availability of TOP crops throughout the country
- Now will be enlarged to include All-> TOPS to TOTAL up to dec, 2020-> now limited to only 22 food items
- Ministry of Food Processing Industries has launched the scheme
- Nodal agency-> NAFED (national Agri cooperative marketing federation of India Ltd) for its implementation

Agricultural Market

- 1,000 more mandis will be integrated with e-NAM to bring transparency and

competitiveness.
- NAM (National Agriculture Market) through an Agri-Tech Infrastructure Fund (ATIF) has been established by Government of India in 2015
- It will provide a common e-market platform of regulated wholesale markets in states/UTs
- Aims to connect 600 approximately mandisacross India through a web portal, thus enabling inter-state and intra-state trade of agricultural commodities.
- Helps in *discovering real time price*, based on demand and supply
- The *Agriculture Infrastructure Fund* would be made available to APMCs for augmenting their infrastructure facilities.
- APMCs to get access to the Agriculture Infrastructure Funds for augmenting infrastructure facilities.

Fisheries:
- Seaweed farming: Multipurpose Seaweed Park in Tamil Nadu to promote seaweed cultivation
- Benefits: large scale employment and additional incomes
- Seaweeds are also termed as the 'Medical Food of the 21st Century'
- Seaweeds are abundant along the Tamil Nadu and Gujarat coasts and around Lakshadweep and Andaman & Nicobar Islands.
- Source of food, energy, chemicals and medicines with manifold nutritional, industrial, biomedical, agriculture and personal care applications.

Agricultural infrastructure and Development Cess (AIDC)
- Cess ->a special purpose tax which is levied over and above basic tax
- collected for the agricultural infrastructure development
- why this->private expenditure is not adequate

One Nation One Ration Card scheme
- Department of Food & Public Distribution in collaboration with all States/UTs is implementing a central sector scheme
- Integrated Management of Public Distribution System (IM-PDS)
- Objective-> introduce nation-wide portability of ration card under National Food Security Act (NFSA) through 'One Nation One Ration Card' System
- the ration card holders to lift their entitled food grains from any fair price shop (FPS) of their choice anywhere in the country by using their same/existing ration card.
- The new system, based on a technological solution, will identify a beneficiary through biometric authentication on electronic Point of Sale (ePoS) devices installed at the FPSs, and enable that person to purchase the quantity of food grains to which she is entitled under the NFSA.
- Ration card portability is aimed at providing intra-state as well as inter-state portability of ration cards.
- Two portals are there-> Integrated Management of Public Distribution System (IM-PDS) portal (http://www.impds.nic.in/) provides the technological platform for the inter-state portability of ration cards, enabling a migrant worker to buy food grains from any FPS across the country
- the other portal (annavitran.nic.in) hosts the data of distribution of food grains through E-PoS devices within a state.
- While a person can buy her share of food grains as per her entitlement under the NFSA, wherever she is based, the rest of her family members can purchase subsidised food grains from their ration dealer back home.

Gig economy
- Prevalence of short-term contracts or freelance work, as opposed to permanent jobs.
- It is either a working environment that offers flexibility with regard to employment hours, or... it is a form of exploitation with very little workplace protection
- Workers get paid for the "gigs" they do, such as a food delivery or a car journey, gig means job with a specific time frame

- No protection against unfair dismissal, no right to redundancy payments, and no right to receive the national minimum wage, paid holiday or sickness pay.

Reinvigorating Human Capital

Education -> focus on to implement National Education Policy 2020

- 2019-20, A Higher Education Commission of India.
- A national Digital Educational Architecture (NDEAR)
- National Initiative for School heads andTeachers for Holistic Advancement (NISTHA)

School Education

- 100 new Sainik Schools to be set up in partnership with NGOs/private schools/states
- 750 Eklavya schools to be set up in tribal areas.

Higher Education Commission of India:

- Four structures set up as four independent verticals within one umbrella institution
- First Higher Education Regulatory Council (NHERC) -> Regulation
- National Accrediation Council (NAC) ->Accrediation to institutions
- Higher Education Grant Council-> fund
- General education Council -> frame the expected learning outcomes -> for this *A National higher Education Qualification Framework (NHEQF)* will be formulated by the GEC and it should sync with *National Skills Qualification Framework (NSQF)*to ease the integration of vocational education in to higher education.
- A Central University to come up in Ladakh.

National skill Qualifications Framework

- Recognizing skill proficiency
- Multiple entry and exit in vocational education, job market,
- Increased potential of prior learning.
- Training Inter Training Programme (TITP) between India and Japan to facilitate transfer of Japanese industrial and vocational skills, technique, and knowledge.
- Realignment of existing National Apprenticeship Training Scheme (NATS) towards post-education apprenticeship, training of graduates and diploma holders in Engineering

A national Digital Educational Architecture (NDEAR):

- Strengthen the digital infrastructure for education
- Will support in teaching and learning activities
- Educational planning,
- Governance administrative activities

National Initiative for School heads and Teachers for Holistic Advancement (NISTHA)

- Launched by Department of School Education and Literacy
- Improve learning outcomes at the elementary level through an integrated Teacher Training Programme called NISTHA.
- Integrated training of Principals/heads order thinking skills based teaching learnings.
- The basic objective of this massive training programme is to motivate and equip teachers to encourage and foster critical thinking among students.

Research and Development

- July 2019, National Research Foundation has been launched
- Overall research ecosystem should be strengthened
- National language Translation Mission: to make governance-and-policy related knowledge available in major Indian languages
- The New Space India Limited (NSIL), a PSU under the Department of Space will execute the PSLV-CS51 launch

Deep Ocean Mission

- Ministry of Earth Science is the nodal agency

- objective:
    - Deep sea mining
    - Development of ocean climate change advisory services
    - Exploration and conservation of deep sea biodiversity
    - Harvesting of polymetallic nodules.

Minimum Government, Maximum Governance

- National Commission for Allied Healthcare Professionals Bill-> now Act-> enhance employment opportunities-> specifically allied healthcare workers
    - To ensure transparent and efficient regulation of the 56 allied healthcare professions
- It provides the structure of state and centers medical council
- The forthcoming Census could be the first digital census in the history of India

Banking -> Stressed asset in Bank

- An Asset Reconstruction Company Limited and Asset Management Company would be set up to consolidate and take over the existing stressed debt and then manage and dispose of the assets to Alternate Investment Funds.
- An asset reconstruction company is a special type of financial institution that buys the debtors of the bank at a mutually agreed value and attempts to recover the debts or associated securities by itself.
- The ARCs take over a portion of the debts of the bank that qualify to be recognised as Non-Performing Assets. Thus ARCs are engaged in the business of asset reconstruction or securitisation or both.
- Registered with RBI and draws power from SARFESI act
- An asset management company (AMC) invests pooled funds from clients into a variety of securities and assets.
- SARFESI ACT:
    - It was framed to address the problem of NPAs (Non-Performing Assets)

Major feature of SARFAESI is that it promotes the setting up of asset reconstruction (RCs) and asset securitization companies (SCs) to deal with NPAs accumulated with the banks and financial institutions. The Act provides three methods for recovery of NPAs, viz:

(i) Securitization: process of pooling and repackaging of financial assets (like loans given) into marketable securities

(ii) Asset Reconstruction-> reconstruction is the activity of converting a bad or non-performing asset into performing asset

(iii) Enforcement of Security without the intervention of the Court-> The Act empowers the lender (banker), when the borrower defaults, to issue notice to the defaulting borrower and guarantor, calling to repay the debt within 60 days from the date of the notice.

Dispute Resolution Committee

- Vivad Se Vishwas Scheme to give taxpayers an opportunity to settle long pending disputes
- introduction of a Dispute Resolution Committee -> Anyone with a taxable income up to `50 lakh and disputed income up to `10 lakh shall be eligible to approach the Committee.

Strategic disinvestment policy

Objective:

- Minimising presence of Central Government Public Sector Enterprises
- Infusion of private capital, technology and best management practices-> Will contribute to economic growth and new jobs.
- Helps in financing various social sector and developmental programmes of the government

Strategies:

- Various sectors will be classified as strategic and non-strategic sectors
- The strategic sectors classified are:

i) Atomic energy, Space and Defence
ii) Transport and Telecommunications
iii) Power, Petroleum, Coal and other minerals
iv) Banking, Insurance and financial services

- In strategic sectors, there will be bare minimum presence of the public sector enterprises. The remaining CPSEs in the strategic sector will be privatised or merged or subsidiarized with other CPSEs or closed.
- In non-strategic sectors, CPSEs will be privatised, otherwise shall be closed

ECONOMIC SURVEY

HDI-> Human Development Index

- Three data dimensions: life expectancy, education, and purchasing power parity
- India's rank is 131 in 2019, as per the HDR 2020
- In 2018, it was 129
- But at sub-component wise performance,
  - India's GNI per capita (2017 PPP) has increased from US $ 6427 in 2018 to US $ 6681 in 2019.
  - Life expectancy at birth has increased from 69.4 years in 2018 to 69.7 years in 2019
  - Mean year of schooling and expected year of schooling is remaining the same.
  - However, Planetary Pressures Adjusted HDI (PHDI), India was positioned 8 ranks better than HDI rank

Planetary pressures Adjusted HDI (PHDI)

- For the first time, in HDR 2020, the UNDP introduced a new metric
- to reflect the impact caused by each country's per-capita carbon emissions and its material footprint -> excessive human pressure
- Simply experimental index that adjusts the Human Development Index (HDI) for planetary pressures
- Means the PHDI adjusts the standard HDI by a country's level of carbon dioxide emissions and material consumption, each on a per capita basis.
- material footprint (*global material extraction to domestic final demand of a country*) is the sum of the material footprint for biomass, fossil fuels, metal ores and nonmetal ores

Education

- SamagraSiksha:
  - Covers from pre-school to class 12
  - Objective- equal opportunity and equitable learning
  - Was launched 2018-19
  - Schemes:
    - Focus on improving quality education and learning outcomes by focus on the two Ts-> Teacher and Technology
      - Support to RashtriyaAviskarAbhiyan to promote science and math learning
      - Developed by Ministry of HRD-> presently Ministry of Education
  - Focus on Digital education-> smart classroom, digital boards and DTH channels
      - Support to DIKSHA (Digital Infrastructure for Knowledge Sharing)-> a digital platform which offers teachers, students, and parents engaging learning material prescribed to school curriculum.
      - Launched by Ministry of Education
- Under SamagraShiksha Scheme -> a National Mission to improve learning outcomes at the elementary level through an Integrated Teacher Training Programme called NISHTHA (National Initiative for School Heads' and Teachers' Holistic Advancement)

- National Education Policy 2020:
    - Universalization of education-> from pre-school to secondary level with 100 Gross Enrollment Ratio (GER) in school education by 2030.
    - The Current 10+2 system to be replaced by a new 5+3+3+4 curricular structure corresponding to ages 3-8, 8-11, 11-14, and 14-18 years respectively.
    - Class 10 -12 board examinations to be made easier to test core competencies rather than memorized facts. *(Read the box from survey)*

Other initiatives to deal with the pandemic

- PM eVIDYA-> was announced under AtmaNirbhar Bharat in May 2020
- For digital/online/on-air education to -> equitable access.
- Four components:
    - One nation and one digital infrastructure-> all states/UTs have free access to a single digital infrastructure i.e. DIKSHA.
        - can be accessed through a web portal and mobile application
        - VidyaDaan portal was launched on DIKSHA ->*this portal leverages the DIKSHA platform->*tools to seek and allow contribution/donation of e-learning resources
- One class, one TV channels through Swayam Prabha TV channels:
    - Swayam Prabha DTH channels are meant to support and reach those who do not have access to the internet
    - Extensive use of Radio and podcasts->Shiksha Vani -> from 9 to 12 classes
    - For Differently abled-> Digitally Accessible Information System (DAISY)-> access to education

Other Initiative:

- Online MOOC (massive open online courses)-> courses relating to NIOS (grades 9 to 12 of open schooling) are uploaded on SWAYAM portal-> Study Webs of Active Learning for Young Aspiring Minds (SWAYAM)-> provide one integrated platform and portal for online courses
- National Repository of Open Educational Resources (NROER)-> is an open storehouse of e-content
    - PRAGYATA-> digital education through online/blended/digital education
    - MANODARPAN:
        - initiative for *psychosocial support* -> part of Atmanirbhar Bharat Abhiyan
        - Objective ->*strengthening and empowering the human capital->* increase productivity and efficiency

PradhanMantriKaushalVikashYojna 3.0

- Rolled out in 2020-21
- target to skill 8 lakh candidates including migrants
- It is demand driven with bottom up approach, mapping of job roles
- There will be District skill Committee-> under the guidance of state Skill Development Mission
- Role of District skill committee->
    - preparation of District level plan,
    - mobilization and counselling of candidates,
    - formation of training batches,
    - monitoring of quality assurance
    - and post training support
    - for classes 9 to 12 to expose students to skill development avenues

Employment:

- Unemployment -> ready to work at prevailing work rate but did not get the job
- Number of unemployed = Labour force-work force
- Activity status-> engaged in the economic activities->

- Usual principal status-> 365 days, current weekly status->1 week, current daily status-> one day of that reference week
- Usual Principal status-> majority of the time was the person available for work-> if yes then in the labour force if not the out of labour force. Was the major time spent in work, if yes then he is employed and if not then unemployed
- Current weekly status-> reference period is one week, if one person has worked at least one hour in whole week
- Daily status-> at least one hour or less than four hours spent on work
- Agriculture is largest employment provider-> 42.5 %
- 'Trade, hotel & restaurants'-> 12.6 per cent
- 'Manufacturing'-> 12.1 per cent
- 'Construction'-> 12.1 per cent
- Self-employment -> 52%

Labour reform:
- Nearly 29 Central Labour laws being amalgamated, rationalized and simplified into four labour codes viz.:
    - the Code on Wages, 2019,
    - the Industrial Relations Code, 2020,
    - The Occupational Safety, Health and Working Conditions Code, 2020
    - the Code on Social Security, 2020
- Gig Economy: refer to budget

Measures to improve employment opportunities:

AtmaNirbhar Bharat Rozgar Yojana
- to boost employment in formal sector and incentivize creation of new employment opportunities during post covid era
- is to be operational for the period 2020-2023
- Ministry of Labour

Pradhan Mantri Rojgar Protsahan Yojana (PMRPY)
- was launched in 2016
- objective of the scheme is to promote employment generation.
- implemented by the Ministry of Labour and Employment.
- Under the scheme *employers would be provided an incentive for enhancing employment by reimbursement of the 8.33% EPS contribution made by the employer in respect of new employment.*
- The PMRPY scheme is *targeted for workers earning wages uptoRs. 15,000/- per month.*

Significance of the scheme:PMRPY has a dual benefit –
1. *The employer is incentivised for increasing the employee base in the establishment through payment of EPF contribution of 12% of wage, which otherwise would have been borne by the employer.*
2. *A large number of workers find jobs in such establishments.*

Other measures:
- Under Prime Minister's Garib Kalyan Package (PMGKP) financial assistance was given to building & other construction workers (BOCW) which largely included migrant workers

Water and sanitation

Jal Jeevan Mission:
- Ministry of Jal Shakti
- Supply of potable piped water.
- To individual household tap connections by 2024 to all households in rural India.
- sustainability measures as mandatory -> recharge and reuse through grey water (waste water) management, water conservation, rain water harvesting.
- Is a decentralised, demand driven and community managed program-> involving PRIs

- Goa has become the first state in the country to have 100 percent households with tap water connection

Rural Development

- Reverse migration to Rural area due to covid-19
- Effort was made to strengthen Rural sector-> initiatives were taken as follows:-> strengthening MGNREGA
    - Electronic fund management system
    - Software for Estimate Calculation Using Rural rates of Employment (SECURE)
    - Geo-Information System Based planning
    - Time and Motion study to increase efficiency of estimation of work
    - JanMANREGA-> a mobile application system
    - E –Saksham -> a digital learning platform
    - Project UNNATI to upgrade the skill base of MGNREGA workers

DeenDayalAntyodayaYojna ->National Rural Livelihoods mission

- seeks to alleviate rural poverty
- aims at mobilizing about 9-10 crore households into SHGs
- 'sustainable livelihoods opportunities by building their skills and enabling them to access formal sources of finance
- entitlements and services from both public and private sectors
- promotion of digital finance and deployment of SHG Women as Banking Correspondent Sakhi (BC Sakhi), with the support of banks and Common Service Centres

GaribKalyanRojgarAbhiyan (GKRA)

- was launched on 20th June, 2020
- By Ministry of Rural Development
- One of the major objective-> provision of livelihood opportunities to returning migrants
- was intended to enhance long term livelihood opportunities.
- Through convergence of different programs for the welfare of the people

INITIATIVES UNDER ATMA NIRBHAR BHARAT

- Various initiatives have been taken=>
- National Animal Disease Control Program-> targets *Foot and Mouth Diseases and Brucellosis* by ensuring 100 percent vaccination of cattle, Buffalo, sheep, goat and pig population
- MINISTRY OF FISHERIES, ANIMAL HUSBANDRY & DAIRYING

Operation green->

- from TOPS to TOTAL-
- Implemented by *Ministry of Food Processing Industries*
- To support farmers when *prices of agricultural produce is low*
- Under the short term- price stabilization measures of the scheme, -> provision for 50 per cent subsidy on cost of transportation and storage for evacuation of surplus production from producing area to the consumption center during the glut situation.

One nation and One Ration card scheme (Refer to Budget)

Capital formation of Agriculture:

- Gross Capital Formation (GCF) in the agriculture and allied sector as a proportion to GVA has been *showing a fluctuating trend*
- from 17.7 per cent in 2013-14 to 16.4 per cent in 2018-19, with a dip to 14.7 per cent in 2015-16

Agriculture credit:

- Under AtmaNirbhar Bharat Project-> Agricultural Infrastructure Fund-> development of agriculture infrastructure

- Regional distribution of Agriculture credit is *skewed in favour of southern region*
- Share of NE region in this credit system is *very low*
- Evidence-> as per the data 2020-21, *share of southern state is more than 40 percent* and *NE's share is less than 2 percent.*
- This low coverage of the agricultural credit in NER is *because the total cultivable area in North Eastern States is only about 2.74 per cent.*
- *community ownership of land* is prevalent in most of the NE States->
- These two factors are the reason behind the *low performance of Kisan Credit Card*-> loans are given against the land document

Agriculture Infrastructure Development Fund

- This scheme is operation from *2020-21 to 2029-30*
- *Medium to long term* debt financing facility
- for investment in viable projects for post harvest management infrastructure

PradhanMantriFasalBimaYojana (PMFBY)

- Ministry of **Agri**
- scheme extends coverage for the entire cropping cycle from **pre-sowing to post-harvest including coverage for losses**
- Individual farm level losses arising out of **localized calamities and post-harvest losses are also covered due to perils such as *inundation (flooding), cloudburst and natural fire***
- The scheme completed **five successful years** of implementation on 13th January, 2021
- The prescribed premium is **2%** to be paid by farmers for **all Kharif crops** and **1.5%** for all **rabi crops**. In the case of *annual commercial and horticultural crops, **the premium is 5%.***
- **Minimum Support Price**: The Union Budget for 2018-19 had announced that **MSPs would be kept at the level of 1.5 times of the cost of production**
- The **differential in remuneration** ->*encouraging crop diversification.*
- **PMKISAN**->
  - The **Pradhan Mantri Kisan Samman Nidhi (PM-KISAN)** Scheme
  - was launched in 2019 to **provide income support to all landholder farmer families** across the country with cultivable land
  - Under the Scheme, an amount of **'6000 per year is released in three instalments of 2000'**
  - **directly into the bank accounts** of the beneficiaries.

Animal Husbandry Infrastructure Fund

- Set up under AtmaNirbhar Bharat
- Ministry of Fisheries
- Development of *Dairy Processing and value addition infrastructure*, *meat processing* and *value addition infrastructure* and *animal feed plant*
- will incentivize investments by individual entrepreneurs, private companies including MSME, farmers producers organizations (FPOs)
- The Government of India would also set up a Credit Guarantee fund of 750 crores to be managed by NABARD.
- Credit guarantee would be provided to those *sanctioned projects which are covered under MSME defined ceilings.*
- Guarantee coverage would be up to 25 per cent of the credit facility of borrowers.
- To ease out the application process, an online portal 'ahidf.udyamimitra.in' has been developed by SIDBI -> applicants can apply online to avail loans under this scheme.

Blue Revolution

- The centrally sponsored scheme – Blue Revolution (CSS-BR) was launched in 2015-16 for a 5 year period
- with a central financial outlay of ` 3000 crores to catalyze the *"Integrated, Responsible and Holistic Development and Management of the Fisheries Sector",*

ended in March 2020.

- Government of India in October 2018 approved the establishment of a dedicated *Fisheries and Aquaculture Infrastructure Development Fund (FIDF)*

PradhanMantriMatsya SAMPADA Yojana (PMMSY)

- Was launched in 2020
- Ministry of Fisheries
- aims to *enhance fish production to 220 lakh metric tons by 2024-25* at an average annual growth rate of about 9 per cent.
- will result in doubling export earnings to 1,00,000 crores
- Creation of employment opportunities of about 55 lakhs in the fisheries sector over a period of the next five years.
- intends to increase *aquaculture productivity* to 5 tonnes per hectare
- enhance domestic fish consumption
- attract investments in fisheries sector from other sources

Crop Residue management

- awareness creation about *in-situ crop residue* management
- Replacement of long duration variety with short duration paddy.
- *crop diversification* leading to reduction in area under paddy.
- Distribution of machines for crop management->'Happy Seeder'

Application of technology to help out farmers:

- Improved technologies reached farmers' fields through frontline demonstrations by *KrishiVighyanKendras*(Knowledge and Resource Centres)
- provided *demand driven services and information* to farmers.

Food Processing:

- Bio-fertified varieties food-> to ensure nutritional security through the natural food system
- Meaning of Bio-fertified-> processes by which the nutritional quality of food crops is improved through *agronomic practices, conventional plant breeding, or modern bio-technology*
- Different from the conventional method->bio-fertification-> improve the *nutritional levels in crops during plant growt*h rather than through processing of crops.

Formalization of Micro Food Processing Enterprises

- Centrally Sponsored Scheme
- *Prime Minister-Formalisation of Micro Food Processing Enterprises (PM-FME)* with a total outlay of ` 10,000 crores over the period 2020- 2025.
- adopts **One District One Product (ODOP)**approach
- **Objective**-> States need to **identify one food product per district** keeping in view the existing clusters and availability of raw material-> abundant
- Support for **common infrastructure and branding & marketing** would be for that product
- focus on **waste to wealth products**, **minor forest products**and**Aspirational Districts**
- Amritsar Pickle &Murabba

ODOP (one district one product)

- **District as export hub** has been merged with it
- Identifying district having export potential of a particular commodity
- **Parent ministry-**> Ministry of Commerce
- Addressing the bottlenecks for exporting these products
- **Supporting local exporters**/manufacturers to scale up manufacturing
- Generating local employment

Production linked incentive schemes (PLI):

- Introduced in 10 key sectors like food processing, enhancing India's manufacturing capabilities and improving exports

- The food segments identified includes ready to eat/ready to cook, marine products, processed fruits & vegetables, mozzarella cheese, and innovative/organic products of SMEs.
- The scheme would also support the branding and marketing abroad.

Pradhan Mantri Kisan SAMPADA yojana:
- **Parent ministry->** Ministry of Food Processing Industries (MoFPI)
- Was launched in 2016
- MoFPI introduced an umbrella Scheme for **Agro-Marine Processing and Development of Agro-Processing Clusters**
- Components:
  - Mega Food Parks
  - Integrated cold chain and value addition infrastructure
  - Infrastructure for Agro-processing clusters
  - Creation of forward and backward linkages
  - Expansion of food processing and preservation capacities
  - Operation Green

"Fortification of Rice & its Distribution under Public Distribution System:
- Was approved for a period of 3 years beginning in 2019-20
- To address the issue of **anaemia and micro-nutrient deficiency**
- To promote *nutrition security* in the country

Open market sale scheme (domestic):
- Food Corporation of India (FCI) on the instructions from the Government sells excess stocks out of Central Pool through *Open Market Sale Scheme (Domestic) [OMSS (D)]* in the open market from time to time at predetermined prices.

Ethanol blending
- Government has set **10 per cent blending target for mixing ethanol with petrol by 2022** &**20 per cent blending target by 2030**
- Was launched in the line with the **national Biofuel policy, 2018**
- Ethanol molecules contains oxygen, it allows *engine to more completely combust the fuel-> fewer emission-> less pollution*
- It was launched by *ministry of petroleum*
- Government has also allowed **conversion of surplus stock of rice with FCI and Maize to ethanol so that** these targets of blending can be achieved smoothly.
- **Initially it was limited to sugarcane** now it has been extended to surplus food grains->**maize, jawar, bazraetc**
- 1st generation -> feedstock
- 2nd -> surplus food grain
- 3rd-> algae
- 4th -> biofuel derived from engineered plants

Agricultural reforms-> 3 laws which created controversy
- **Three reforms related to agriculture sector**
  1. Farmers' Produce Trade and Commerce (Promotion and Facilitation) Act
  2. Farmers (Empowerment and Protection) Agreement on Price Assurance and Farm Services Act
  3. The Essential Commodities (Amendment) Act

Farmers' Produce Trade and Commerce (Promotion and Facilitation) Act:
- promotes barrier-free **inter-state and intra-state trade and commerce** outside the physical premises of markets notified under State APMCs.
- It will open **more choices** for the farmer, **reduce marketing costs** for the farmers and **help them in getting better prices**->**reduce the dependency on APMCs**
- by facilitating the setting up of **electronic agricultural trading platfo**rms.
- It will help to create **One India, One Agriculture Market**
- a **price information and market intelligence system** for farmers' produce" and

disseminate it to them-> through portal

APMCs:

- APMC means the **Agricultural Produce & Livestock Market Committee** established under the provisions of APLM Act.
- Under the APMC Act, the states can establish **agricultural markets, popularly known as mandis.**
- The sale of agricultural commodities can occur only in the **mandis through auction.**
- The sales process in mandis is regulated through **commission agents (CAs) who mediate between the farmers and traders**.

Issues:

- lower price realisation
- lack of transparency in the trading process,
- collusion among traders,
- price cartelisation,
- delay in payments (30 to 50 days)
- low quality of mandi infrastructure.
- Nexus between traders and commission agents
- Price information is known from peer, friends and relatives -> close system
- Market cess and commission charge is collected

Farmers (Empowerment and Protection) Agreement on Price Assurance and Farm Services Act:

- legal contract for farmers to enter into **written contracts with companies and produce** for them
- provides for a **farming agreement between a farmers and buyers** (processors, wholesalers, aggregators, wholesalers, large retailers, exporters etc.) before the **production or rearing of any farm produce**.
- **will transfer the risk of market unpredictability** from the farmer to the sponsor
- will act as a **catalyst to attract private sector investment for building supply chains for supply of Indian farm produce** to national and global markets
- **eliminating intermediaries**
- A farming agreement must provide for a **conciliation board as well as a conciliation process for settlement of disputes**
- **provides adequate protection**->**Sale, lease or mortgage of farmers' land is totally prohibited** and farmers' land is also protected against any recovery
- The farmers will **have full power in the contract to fix a sale price of their choice for the produce**

Issues:

- **does not prescribe the formula about price fixation**-> free hand to corporates that means there is a **chance of exploitation**
- **doesn't provide any assurance about Minimum Support Price (MSP) in the contract-farming**

The Essential Commodities (Amendment) Act 2020:

- provides a mechanism for the "regulation" of agricultural foodstuffs, namely cereals, pulses, oilseeds, edible oils, potato, and supplies under **extraordinary circumstances, which include extraordinary price rise, war, famine, and natural calamity of a severe nature**.
- **The reform ends the era of frequent imposition of stock-holding limits** except under extraordinary circumstances
- The Essential Commodities (EC) Act, 1955 -> administered by state
- "Essential commodity" under the EC Act has been defined as a commodity specified under the Schedule.
- Presently seven commodities are included in the Schedule of the EC Act viz., (1) Drugs; (2) Fertilizer, whether inorganic, organic or mixed; (3) foodstuffs, including edible oilseeds and oils; (4) hank yarn made wholly from cotton; (5) petroleum and petroleum products; (6) raw jute and jute textiles; (7) (i) seeds of food-crops and

seeds of fruits and vegetables; (ii) seed of cattle fodder; (iii) jute seed; (iv) cotton seed.

- The Essential Commodities Act, 1955 empowers the Government to regulate essential commodities through **regulation, by licences, permits, control of prices at which bought or sold, prohibiting/ withholding from sale collection of any information/ statistics, inspection of books and accounts etc. for maintaining or increasing their supplies** and for securing their equitable distribution and availability at fair prices.

Amendment

- After amendment it provides that foodstuffs, including cereals, pulses, potato, onions, edible oil seeds and oils **shall only be regulated under extra ordinary circumstances which may include war, famine, extra ordinary price rise and natural calamity of grave nature.**
- Need of amendment of the Essential Commodities Act in order **to boost investment in the sector, particularly for enhancing storage capacity for agricultural produce.**
- Now physical market participants can directly buy from the farmers without the fear of excessive regulation and stock limits under the EC Act. This would **improve the bargaining power of farmers**.
- The move is expected to **attract private investment in the value chain of these commodities**.
- The **private sector has so far hesitated investing in cold chains and storage facilities for perishable item**s as most of these commodities are under the ambit of the EC Act, and can attract sudden stock limits. But now the situation can change.
- Amendment to EC Act would provide a much needed**fillip to the value chain participants as their fears of sudden regulation of stock limit** in these commodities would be adequately addressed. Suggesting that three days' time after purchase of onion from Mandis be allowed for packing, grading etc., before any action is taken in pursuance to the order imposing stock limits.
- The Essential Commodities (Amendment) Act, 2020 **has not curbed the powers of the State Governments to enforce stock limits on essential commodities or take actions on hoarders and profiteers**.
- The state would still exercise all its powers including issuance of permits, licences, etc. for regulating the production, distribution, supply, movement, transportation, etc. of the essential commodities.

Trends

- The contribution of the industrial sector in GDP has been constantly declining since 2011-12
- The overall IIP broadly follows the eight-core index
- eight core index has 40 percent share in IIP:
- Gives monthly data
- IIP has 407 items/item groups
    - Data is compiled and published by Central Statistical office every month
    - CSO operates under Ministry of Statistics and Programme implementation

Index of Eight Core Industries

- This index is compiled and released by Office of the Economic Advisor, Department for promotion of Industry and Internal Trade, ministry of Commerce and Industry.
- Base year 2011-12
- Weightage-> Petroleum (28.04%), Electricity (19.85%), Steel (17.92%)
- Lowest-> Fertilizer-> 2.63%

CPSEs

- We have planned to keep four sectors as strategic sector and minimum presence of the governement must be there
- Non-strategic sectors must be privatized
- Steps need to be taken for healthy performance:
    - completely revamp the Boards of the CPSEs to reorganize their structure

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• enhance their operational autonomy coupled with strong corporate governance norms

Ease of doing business

- As per the Doing Business Report (DBR), 2020, the rank of India in the Ease of Doing Business (EoDB) Index for 2019 has moved upwards to the 63rd position amongst 190 countries from a rank of 77 in 2018.
- India has improved its position in 7 out of 10 indicators, inching up to the international best practices.
- Published by World Bank
- As per the DBR 2020 report, the lead subcomponents of EoDB were 'getting electricity', 'trading across borders' (performed well)
- Poor performance -> whereas the main laggards were 'enforcing contracts', 'registering property', 'revoking insolvency', and 'pay taxes'

Start-up India, Stand-up India":

- Stand up India: objective of this scheme is to facilitate bank loans between Rs.10 lakh and Rs.1 crore to at least one SC or ST borrower and at least one woman borrower per bank branch
- Provides loan for only Greenfield projects
- The action plan is based on the three pillars:
    - "Simplification and Handholding",
    - "Funding Support and Incentives"
    - "Industry-Academia Partnership and Incubation".

Start upInitiatives:

- The Fund of Funds for Startups (FFS) -> with a total corpus of Rs. 10,000 crores was established with contribution spread over the 14th and 15th Finance Commission
- Startup Yatra (an initiative that travels to Tier 2 and Tier 3 cities of India to search for entrepreneurial talent by conducting day long bootcamps)

Initiatives:

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Steel Industry:

- National Steel Policy, 2017 (NSP-17) envisioned significant expansion in production capacity while being globally competitive.
- The NSP-17 aims at achieving a crude steel capacity of 300 million tonnes (MT) and a finished steel capacity of 230 MT with a per capita consumption of 158 kg by 2030-31
- India is the second-largest producer of crude steel only after China.
- India is also the second largest consumer of steel.
- inclusion of 'Speciality Steel' incorporating four different product categories for incentives under the Production Linked Incentive (PLI) scheme
- measures to provide preference to domestically produced iron and steel in government procurement, where aggregates estimate of iron and steel products exceeds ` 25 crores;
- protecting the industry from unfair trade through appropriate remedial measures including imposition of anti-dumping duty and countervailing duty on the products

Revised MSME Classification

Composite Criteria: Investment And Annual Turnover			
Classification	Micro	Small	Medium
Manufacturing & Services	Investment less than ₹ 1 crores and Turnover less than ₹ 5 crores	Investment greater than ₹ 1 crores & less than ₹ 10 crores and Turnover greater than ₹ 5 crores & less than ₹ 50 crores	Investment greater than ₹ 10 crores & less than ₹ 20 crores and Turnover greater than ₹ 50 crores & less than ₹ 100 crores

Source: Ministry of MSME.

- Now no distinctions between Manufacturing and Service- earlier it was there
- In June 2020, GOI has decided in upward revision of the MSMEs definition for medium enterprises ->**now it will be Rs 50 cr of investment and Rs 250 cr of turnover**.
- **Why this revision**=> fear among successful MSMEs that if **they outgrow the size of what has been defined as an MSME, they will lose their entitled benefits.**
- This is why **MSMEs like to remain within the definition rather than grow**.
- By revised definitions no worry about growing their size and **can still avail benefits.**

Facilities available for MSMEs:
- loans within 59 minutes
- Applicants can get loans ranging from ₹1 lakh to ₹10 crore
- The Small Industries Development Bank of India **(SIDBI)** has set up a fintech platform called **PSB Loans in 59 Minutes**,
- in partnership with five other public sector banks, namely the **State Bank of India, Bank of Baroda, Punjab National Bank, Vijaya Bank and Indian Bank.**
- **Cover Mudra yojana too**

CHAMPIONS online portal:
- Online platform for **handholding**
- **CHAMPIONS**-> Creation and Harmonious Application of Modern Processes for Increasing the Output and National Strength
- ICT based technology system aimed at *making the smaller units big* by solving **the Grievances, encouraging, helping and handholding**
- This platform facilitates a **single window solution**
- Three prime objectives:
  - finance, rawmaterials, labour, permissions, etc
  - capture new opportunities in manufacturing and services sectors.
  - sparks, i.e., the bright MSMEs who can withstand at present and become national and international champions

Textile Industry
- GOI is implementing various schemes for the betterment of this industries
  - **Amended Technology Upgraded Fund Scheme-**> it is amended version of TUFS-> modernize and upgrade the technology
  - **Scheme for Integrated Textile Park-**> providing infrastructure facility
  - **Samarth Scheme-**> focusing on **capacity building**
    - Skill
    - Livelihood opportunity by giving employment

Infrastructure:
- National Infrastructure Pipeline (NIP)-> 2019-25
- Both economic and social infrastructure
- Jointly funded by GOI, state Government and Private party
- Private parties are involved in the investment purposes are called PPP-> Public Private Partnership
- GOI has been set up one **Public Private partnership Appraisal Committee** responsible for appraisal of PPP projects in the central sector.
- It was set up in 2006
- Projects more than 100 cr other than port and NHDP-> require an recommendation of Public Private Partnership Appraisal Committee (PPPAC) and then the **Cabinet committee on Economic Affairs** finally gives approval

Civil Aviation
- **Vande Bharat Mission**->
  - to evacuate stranded Indians from abroad
- Port and shipping:
  - **SagarmalaProgramme-> port led development**

- **Ministry of shipping**
  - Four pillars:
    - **Port modernisation**project
    - **Port connectivity** projects
    - **Port-led industrialisation**projects
    - **Coastal community** projects

SagarmalaProgramme- benefits
- to reduce logistics cost of Exports-Imports
- domestic trade with minimal infrastructure investment.
- reducing the cost of transporting domestic cargo
- lowering logistical cost of bulk commodities by locating future industrial capacities near the coast
- improving export competitiveness by developing port proximate discrete manufacturing clusters, etc

Railway
- Third largest network
- **New India and New Railway initiative** -> PPP mode in Indian railway
- Union Budget 20-21 launched **Kisan rail services-**> to provide better market opportunity by **transporting perishables** and agri product, including milk, meat and fish
- National Rail Plan for India – 2030 discussed in budget

TELECOM
- JAM-trinity (JandhanAadhar Mobile) based social sector schemes and other pro-development initiative
- Efforts are being made to address the digital divide by extending inclusive internet access
- The overall teledensity in India stands at 86.6 per cent at the end of November-2020, whereas teledensity in rural and urban areas are 59.1 per cent and 139.0 per cent respectively
- The GoI has taken various initiatives including BharatNet for achieving the goal of Digital India programme.

Bharat Net Project
- flagship mission implemented by Bharat Broadband Network Ltd.(BBNL).
- Currently, it is being implemented by the Department of Telecommunication under the Ministry of Communications.
- affordable broadband services to citizens and institutions in rural areas, in partnership with States and the private sector.

Mineral sector
- Minor minerals -> governed by state governments
- Major minerals -> governed by central governments
- Minor minerals -> stones for building, clay, and sand
- major minerals include all minerals other than mineral oils, petroleum, and natural gas
- 5 atomic minerals (ilmenite, rutile, zircon, uranium, and monazite) ->plz find out where is it available in India?

PM street Vendor's AtmanirbharNidhi (PM SVANidhi):
- Providing **micro credit facility** to street vendors to restart their business post
- micro-credit facility that provides street vendors a collateral-free loan of Rs 10,000 with low rates of interest for a period of one year.
- Ministry of Housing & Urban Affairs launched it

Light House Projects:
- LHPs are model housing projects with houses built with shortlisted alternate technology suitable to the geo-climatic and hazard conditions of the region
- ready to live houses with speed, economy and with better quality of construction

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- Six Technology providers have been selected through rigorous online bidding process for construction of Light House Projects (LHPs) at six different locations in six states.
- Light House Projects under Global Housing Technology Challenge (GHTC) initiative

Global Housing Technology Challenge-India:
- Aims to identify and mainstream a basket of innovative technologies from across the globe for the housing construction sector that are sustainable, eco-friendly and disaster-resilient.
- It aims to demonstrate and deliver ready to live-in houses in minimum time and minimum cost with high-quality of construction in a sustainable manner
- The Ministry of Housing and Urban Affairs has conceptualized a Global Housing Technology Challenge - India (GHTC- India)
- The Prime Minister declared the year 2019-20 as 'Construction Technology Year' while inaugurating GHTC-India in March 2019.
- Affordable Sustainable Housing Accelerator – India (ASHA India):
  - Aims to catalyse research and development in the housing construction sector, building materials
  - It will support the potential future technologies developed in India by the way of incubation and acceleration.

In last conference ->A certification course on innovative construction technologies named NAVARITIH (New, Affordable, Validated, Research Innovation Technologies for Indian Housing).

SERVICE
- The IHS Markit India Services Business Activity Index also known as Services Purchasing Managers' Index (PMI)
  - An indicator of business activity -- both in the manufacturing and services sectors.
- India improved its position from 12th in 2018 to 9th in 2019 in the list of the world's largest FDI recipients according to the latest World Investment Report 2020
  - Published by United Nations Conference on Trade and Development (UNCTAD).
- Services trade activity index
  - Published by WTO
- World Tourism Barometer
  - By the United Nation's World Tourism Organization
- Travel and Tourism Competitiveness Index
  - World Economic Forum
- **Consumer Protection Act 2019:**
  - Objectives-> Empowering consumers and to protect their rights
  - How-> through Consumer Protection Councils, Consumer Disputes Redressal Commissions, Mediation, Product Liability and punishment for manufacture or sale of products containing adulterant / spurious goods.
  - The Act includes establishment of the Central Consumer Protection Authority (CCPA) -> promote, protect and enforce the rights of consumers.
  - every e-commerce entity is required to provide information relating to return, refund, exchange, warranty/guarantee, delivery, modes of payment, grievance redressal, payments, charge-back options, etc. including country of origin
  - enabling the consumer to make an informed decision at the pre-purchase stage on its platform.

Consumer Protection (E-commerce) Rules 2020 ("E-commerce Rules 2020")
- These are the new rules and regulations for e-commerce companies under the Consumer Protection Act 2019.
- The rules will be applicable to all electronic retailers registered in India or abroad but offering goods and services to Indian consumers.
- The violation of the rules will attract penal action under the Consumer Protection

Act, 2019.

- e-commerce players will have to display the total price of goods and services offered for sale along with the break-up of other charges.
- They are also required to mention the 'expiry date' of goods offered for sale and the 'country of origin' of goods and services that are necessary for enabling the consumer to make an informed decision at the pre-purchase stage.
- Marketplaces as well as sellers would be required to have grievance officers who have to respond in a time-bound manner.
- E-commerce companies are not allowed to "manipulate the price" of the goods and services offered on their platforms to gain unreasonable profit and discriminate between consumers of the same class.
- The new rules do not permit any inventory e-commerce entity to "falsely represent itself as a consumer and post reviews about goods and services or misrepresent the quality or the features of any goods and services".

Space sector
- New Space India Limited (NSIL)
    - a Central Public Sector Enterprise under Department of Space
    - was announced in Budget 2019
    - One of the mandates of NSIL is to mass-produce and manufacture the SSLV (SMALL SATELITE LAUNCH VEHICLE) and the more powerful PSLV in partnership with the private sector in India through technology transfers.
- Government of India has also established Indian National Space Promotion and Authorisation Centre (IN-SPACe) for promoting industries and attracting investment in space sector.

BANKING
- A non performing asset (NPA) is a loan or advance for which the principal or interest payment remained overdue for a period of 90 days
- Banks are required to classify NPAs further into Substandard, Doubtful and Loss assets.
- **Substandard assets**: Assets which has remained NPA for a period **less than or equal to 12 months**.
- **Doubtful assets**: An asset would be classified as doubtful if it has remained in the substandard category for a **period of 12 months**.
- **Loss assets**: As per RBI, "Loss asset is considered **uncollectible and of such little value that its continuance as a bankable asset is not warranted**, although there may be some salvage or recovery value."

Insolvency and Bankruptcy Board of India (IBBI)
- was enacted in **2016.**
- **Objective:**
    - To **streamline and speed up the resolution process** of failed businesses.
    - To **consolidate provisions of the existing legislative framework** to form a common forum for debtors and creditors of all classes to resolve insolvency.
    - To stipulate that the resolution process of a stressed company will have to be completed **in a maximum of 270 days**
    - **Insolvency and Bankruptcy Board:**
    - The Board regulates **insolvency professionals, insolvency professional agencies and information utilities** set up under the Code.
    - The Board consists of **representatives of the Reserve Bank of India, and the Ministries of Finance, Corporate Affairs and Law**.
- **Institutions to Facilitate Resolution of Insolvency:**
    - **Insolvency Professionals:**
        - These professionals **administer the resolution process, manage the assets of the debtor, and provide information for creditors to assist them in decision making.**
    - **Insolvency Professional Agencies:**

- • The agencies **conduct examinations to certify the insolvency professionals** and enforce a code of conduct for their performance.
  - • **Information Utilities:**
    - • Creditors will report financial information of the debt owed to them by the debtor.
    - • Such information will include records of debt, liabilities and defaults.
  - • **Adjudicating Authorities:**
    - • The proceedings of the resolution process is **adjudicated by the NCLT (NATIONAL COMPANY LAW TRIBUNAL),** for companies;
    - • and the **Debt Recovery Tribunal (DRT)**, for individuals.
    - • The duties of the authorities will include **approval to initiate the resolution process, appoint the insolvency professional, and approve the final decision of creditors.**
- • **Amendment:**
  - • **government introduced the IBC (Amendment) Act, 2020, that mandated a threshold of at least 10% of home-buyers** (or allottees) **in a project or 100 of the total allottees** for initiating insolvency proceedings against the real estate developer.
- • It means that **a single home-buyer is barred from approaching the National Company Law Tribunal (NCLT)** under Section 7 of the IBC to initiate insolvency proceedings against the real estate developer/builder.
- • Section 3 of the Amendment Act allows **home-buyers to seek the Corporate Insolvency Resolution Process (CIRP)** against builders **only when 100 allottees or at least 10% of allottees** make a joint application to NCLT.
  - • The **allottees should be from the same real estate project.**
  - • Aggrieved allottees drawn from different projects of the same developer cannot form the 100.
- • This was **done to prevent real estate projects from being stalled by few disappointed home-buyers/investors.**

Organizational structure

- • The IBBI has a ten-member board including a Chairman. Following is the structure of the IBBI.
- • One Chairperson
- • Three members from Central Government officers not below the rank of Joint Secretary or equivalent.
- • One nominated member from the RBI.
- • Five members nominated by the Central Government; of these, **three shall be whole**-time members.
- • More than half of the directors of its board shall be independent directors. MS Sahoo was appointed as the first Chairman of IBBI.
- • **Capital to risk-weighted asset ratio (CRAR)** ->**Capital Adequacy Ratio (CAR)**
  - • is the ratio of a **bank's capital** to its risk
  - • CRAR is decided by central banks and **bank regulators** to prevent commercial banks from taking excess leverage and becoming insolvent in the process.
  - • capital adequacy in terms of the riskiness of the assets or loans given.
  - • For example, if the bank has given loans to the government by investing in government securities like government bonds, it need not keep any capital. This is because, the riskiness of loans to government securities is zero and hence, the risk weight for government securities is zero.
  - • The **Basel III norms stipulated a capital to risk-weighted assets of 8% (UPDATE IT AS PER RECENT CHANGE)**

To overhaul the banking structure

Indradhanush plan:

- • revamping Public Sector Banks (PSBs), announced by the Government on

14.8.2015, envisaged capital infusion by the Government of Rs. 70,000 crore.

There are 7 elements of it:
- Appointment
- Bank Board Bureau
- Capitalization
- De-Stressing Public Sector Banks
- Empowerment
- Framework of accountability
- Governance Reforms

- A five member committee under the chairmanship of former ICICI Bank CEO KV Kamath
- RBI had appointed this committee
- recommendations on the financial parameters to be considered in the **restructuring of loans impacted by the Covid 19 pandemic**.

PARA:
- Economic Survey 2016-17 suggests setting up of a **centralised Public Sector Asset Rehabilitation Agency**
- an independent entity that will **identify the largest and most worried NPA accounts held by banks**, **and then buy these out from them**.
- PARA is expected to solve two problems:
  - **speedier settlements** with borrowers ->**take more stringent enforcement** action against them.
  - **expected to raise capital** for its buyouts **by issuing government securities**, tapping the capital markets or receiving a capital infusion from the RBI

OTHER MEASURES TAKEN IN LAST YEAR:
- **Merger and Acquisition**:
  - Consolidation among another 10 PSBs
  - **Monetary transmission**:
  - RBI **deregulated the interest rates** on advances by SCBs (excluding RRBs)
  - the banks were mandated to **link all new floating rate personal or retail loans and floating rate loans extended to external benchmarks such as repo rate, Treasury Bill Rate and** any external benchmark published by Financial Benchmarks India Pvt Ltd (FBIL).
  - FBIL is responsible for all the aspects related to the benchmarks it issues- like- collection and submission of market data
  - In order to ensure transparency, standardisation, and ease of understanding of loan products by borrowers, **banks were also advised to adopt a uniform external benchmark** within a loan category
  - Under the external benchmark system, **the interest reset period for loans was also reduced to three months with a view to pass on the benefit of reduction in policy repo rate**
  - **External benchmark rate**:
  - The Reserve Bank of India has made it mandatory for all banks to **link all new floating rate loans to an external benchmark** with effect from 1st October 2019.
  - The move is **aimed at faster transmission of monetary policy rates**.
  - Earlier system-> Marginal Costs of funds – based lending rate

Co-operative Bank
- ***Revision in the target for priority sector lending***: priority sector lending target for Urban Co-operative Banks has been increased from the present level of **40 per cent to to 75 per cent**
- Urban Cooperative Banks (UCBs) **with assets of `500 crore** and above were brought under the CRILC (**Central Repository of Information on Large Credits)** reporting

framework.

- Accordingly, UCBs shall report credit information, including classification of an account as **Special Mention Account (SMA), on all borrowers having aggregate exposures of `5 crore and above with them to CRILC**.
- **CRILC:** to collect, store, and disseminate credit data to lenders
- CRILC was constituted by RBI
- **Special Mention Accounts->** assets that show symptoms of bad quality in the first 90 days itself or before it is identified as NPA.

Banking Regulation (Amendment) Act, 2020:

- Banking regulation act 2019 was amended
- Now RBI can supervise the UCBs-> appointment of Board
- will enable UCBs to raise capital by issue of equity/ preference/special shares
- RBI has been empowered to sanction voluntary/compulsory amalgamation and to prepare scheme for reconstruction of a UCB with the approval of the Central Government.

Why was this necessary?

- This was felt necessary in the wake of the recent Punjab & Maharashtra Cooperative (PMC) Bank crisis.
- Cooperative banks have 8.6 lakh account holders, with a total deposit of about ₹5 lakh crore.
- Besides, Urban cooperative banks reported nearly 1,000 cases of fraud worth more than ₹220 crore in past five fiscal years.

Long-Term Repo (LTRO) Operations

- liquidity infusing measures by the RBI through **Targeted Long-Term Repo (TLTRO) Operations**
- **Targeted Long-Term Repo (TLTRO) Operations =>**conducted by the RBI to ensure adequate liquidity at the longer period for specific sectors
- LTRO is a tool under which the central bank provides one-year to three-year money to banks at the prevailing repo rate, accepting government securities with matching or higher tenure as the collateral.
- While the RBI's current windows of liquidity adjustment facility (LAF) and marginal standing facility (MSF) offer banks money for their immediate needs ranging from 1-28 days, the LTRO supplies them with liquidity for their 1- to 3-year needs
- Long term funds at low cost
- **Capital injection to banks AND NBFCs**

Status of digital Payment:

- Digital Payments Index (DPI) to capture the extent of digitisation of payments across the country
- Constructed by RBI
- The RBI-DPI comprises of **5 broad parameters to check the status of the digital payment**:
  (i) Payment Enablers (weight 25%),
  (ii) Payment Infrastructure – Demand-side factors (10%),
  (iii) Payment Infrastructure – Supply-side factors (15%),
  (iv) Payment Performance (45%)
  (v) Consumer Centricity (5%).

Price inflation:

Basics

- Headline inflation->**includes food & fuel**
- CPI Core (non-food non-fuel) inflation
- core inflation is less volatile than headline inflation.
- The CPI-IW (CPI – Industrial workers) is compiled and disseminated by the Labour Bureau on a monthly basis.
- It measures **changes in the retail prices of a fixed basket of goods and services**

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being consumed by an average working-class family

- Apart from serving as a guide for policy formulations, these index numbers are utilized for fixing/revising wages, regulating the dearness allowances paid to large number of manual workers and Central/ State Govt. employees
- To capture the latest consumption pattern of working-class family, Labour Bureau has revised the base year of the existing CPI-IW series 2001=100 to a more recent base year 2016=100.

Refinements in CPI-IW base updation 2016

	Old series	New series
Base	2001=100	2016=100
Coverage of States/UTs	25	28
Coverage of Centres	78	88
Coverage of Markets	289	317
Working Class families covered in the base year survey	41040	48384
Number of Items	392	463
Compilation of Indices	Arithmetic Mean of price relatives	Geometric Mean of price relatives

All India group weight distribution for different series of CPI-IW

Groups	Weights (%)		
	1982	2001	2016
Food & Beverages*	57.0	46.2	39.17
Pan, Supari, Tobacco & Intoxicants	3.15	2.27	2.07
Fuel & Light	6.28	6.43	5.5
Housing	8.67	15.27	16.87
Clothing & Footwear**	8.54	6.57	6.08
Miscellaneous	16.36	23.26	30.31
General Index	100.00	100.00	100.00

- When changes in the CPI in the base month have a considerable effect on changes in YoY inflation, this is referred to as base effect.
- base effect is the distortion in a "monthly inflation figure that results from abnormally high or low levels of inflation in the year-ago month.
- A lower base effect or higher momentum has a positive impact on the change in

inflation.

- Core inflation has been viewed by many as the **better measure of inflation for monetary policy purposes**.
- *This is because food and fuel price shocks are transitory as well as mainly supply driven and therefore not a monetary phenomenon*

Rise in Gold prices:
- Gold prices saw sharp spike in prices during 2020. Gold prices rose as investors turned to gold as a safe haven investment amid COVID-19 induced economic uncertainties.
- Global Economic Policy Uncertainty (GEPU) Index is constructed using information from newspaper articles and proxies policy related **economic uncertainty From January 2020 onwards, gold prices have sharply increased with the sharp rise in the GEPU**.
- The Global Economic Policy Uncertainty Index is **a GDP-weighted average of national EPU indices for 20 countries**
- National Pharmaceutical Pricing Authority (NPPA), which is an independent regulator for pricing of drugs
- It ensures availability and accessibility of medicines at affordable prices
- National Pharmaceutical Pricing Authority (NPPA) was constituted vide Government of India Resolution 1997
- as an attached office of the Department of Pharmaceuticals (DoP), Ministry of Chemicals & Fertilizers

NHB RESIDEX->
- The Housing Price Indices (HPIs) are a broad measure of movement of residential property prices
- The National Housing Bank (NHB) RESIDEX captures two housing price indices viz. **HPI@ Assessment Prices and HPI@ Market Prices - Under Construction Properties based on the data available for 50 cities** with quarterly updation.

Measures to control of inflation:
- Banning the export of onion
- Imposition of stock limit on onion under the EC Act w.e.f. 23.10.2020 to prevent hoarding
- Easing of restrictions on imports,
- facilitating imports -> at integrated check-posts, issuance of licenses for imports and reduction in import duties.
- IMPLEMENTATION of Price Stabilization Fund (PSF) Scheme

In 2014-15, the Price Stabilisation Fund (PSF) was established under the Department of Agriculture, Cooperation & Farmers Welfare (DAC&FW) to regulate the cost volatility of essential agricultural commodities, such as onion, potatoes and pulses.

Tax reform:
- Introduced the platform **'Transparent taxation- Honoring the Honest' in August 2020**
- Objective ->
  - greater efficiency, transparency and accountability,
  - To eliminate physical interface between taxpayers and tax officers.
- 3 pillars of tax administration reforms namely:
  - Faceless assessment
  - Faceless appeal
  - Taxpayers' charter

Faceless assessment Scheme, 2019
- **Elimination of face-to-face contact** between the income-tax authorities and the taxpayer can lead to an efficient, non-discretionary, unbiased single window system of assessment.
- In 2020, the scope of this scheme was widened->**bringing all the pending assessment cases across the country** within the purview of the Scheme

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- **declaring that any order passed outside the scheme shall be invalid.**
- It establishes a **National Faceless Assessment Centre** (NFAC) in Delhi
- There are **Regional Faceless Assessment Centers** which are vested with the power to make assessments.

Faceless Appeals Scheme, 2020

- all Income Tax appeals will be finalised in a faceless manner under the faceless ecosystem **with the exception of appeals relating to serious frauds, major tax evasion, sensitive & search matters, International tax and Black Money Act.**
- The Scheme establishes a **National Faceless Appeal Centre (NFApC)** as the apex body for conduct of e-appeal proceedings in a centralized manner.
- Under the **NFApC are Regional Faceless Appeal Centers (RFAC)** to facilitate the e-appeal proceedings.

Taxpayers' charter

- India's Taxpayer Charter **comprises of *commitments by the Income Tax Department and obligations of the taxpayers*->**importance of fair, courteous and reasonable treatment to taxpayer.
- presence of a dedicated institution (or the **independent ombudsman) aimed to take up issues from taxpayers' perspective-> helps in developing trust among taxpayers**
- This ensures that the taxpayers understand their rights and are treated fairly.
- **present tax grievance redressal system consists of**
    - **grievance cells** headed by department officials/ AaykarSewaKendras (ASK)
    - **e-nivaran portal ->**separate and dedicated window for grievance redressal in the Income Tax Business Application
    - **CPGRAMS (Central Public Grievance Redress and Monitoring System).**

Some trends

- Central Debt-GDP Ratio, declined steadily immediately after the enactment of the FRBM Act, 2003, and has sustained at a level during the last decade.
- It is the ratio of a country's public debt to its gross domestic product (GDP).
- The General Government (Centre plus States) Debt-to-GDP ratio exhibit an increasing trend over the last few years.

Trends of total expenditure

Figure 13: Trends in components of Total Expenditure
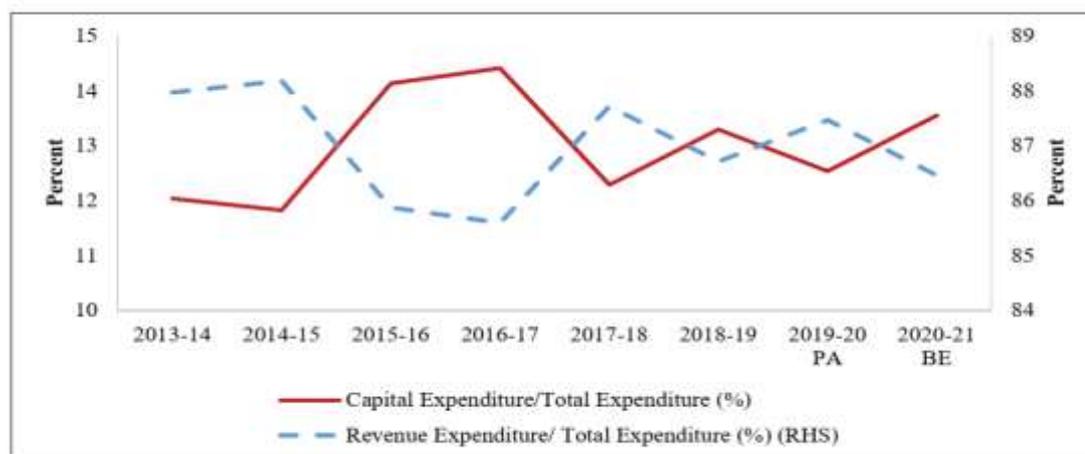
Source: Union Budget Documents & CGA
BE: Budget Estimate, PA: Provisional Actuals

External sector:

- India's current account deficit averaged 2.2 per cent of GDP in the last 10 years.
- Singapore is the top investing country, in terms of FDI equity inflows, while US has taken second position.
- World Economic Outlook, BY the IMF

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- Goods Trade Barometer Index by WTO
- Global Financial Stability Report by IMF
- World Migration Report (WMR) by International Organization of Migration
    - As per WMR 2020, India has the largest number of migrants living abroad (17.5 million) and was the top recipient of remittances of US$ 83.3 billion in 2019

FDI
- Computer software and hardware attracted the highest FDI equity inflows
- Singapore is the top investing country, in terms of FDI equity inflows, while US has taken second position

India's Debt situation:
- ECBs were the largest component of external debt, followed by NRI deposits, trade credit (import financing).
- There is "Laffer Curve" relationship between foreign debt and growth: foreign debt has a positive impact on investment and growth up to a certain threshold level (optimal zone); beyond this level, however, its impact turns adverse

Foreign Exchange Reserves:
- India is the fourth largest foreign exchange reserves holder among all countries
- The rise in the foreign exchange reserves has largely been due to the
    - current account surplus -> contraction in imports rather than increase in competitiveness of exports.
    - The surplus gives adequate space for increased expenditure on investments in FY 2021-22.
- RBI has to confront the classic conundrum of Mundell-Fleming trilemma or impossible trinity – maintain an open capital account, stable exchange rate, and independent monetary policy.

Initiatives taken by Govt to Boosts Exports
- **Trade Facilitation Agreement (TFA),** negotiated at WTO, came into force in 2017.
- A National Committee on Trade Facilitation (NCTF) was, accordingly, constituted in India
- A National Trade Facilitation Action Plan (NTFAP) for 2017-2020 -> ease out the bottlenecks to trade was prepared
- For the period 2020 to 2023, a new NTFAP is under preparation
- India has been at the forefront in undertaking initiatives aimed at maximizing predictability and automation in trade, reflecting in the consistent improvement on the **United Nation's Global Survey on Digital and Sustainable Trade**

Remission of Duties and Taxes on Exported Products (RoDTEP)
- Govt has rolled out a new WTO compliant scheme, namely, for all export goods with effect from 1st January, 2021.
- Export promotion schemes in India like Merchandise export promotion scheme (MEIS) were challenged in WTO in early 2018.
- The final report of the WTO panel observed that MEIS is a "prohibited subsidy" and needs to be withdrawn, against which an appeal has been filed by India.

Trade related logistics
- The Logistics Performance Index (LPI), released by the World Bank
- assesses relative logistics efficiency of countries.
- On this index, India was ranked 44 out of 160 countries in 2018 vis-à-vis rank of 54 in 2014.

India Logistics Platform (iLOG)
- Several IT-based solutions have been deployed
    - **Single Window Interface for Trade (SWIFT)** developed for trade facilitation;
    - Port Community System (PCS) for cargo handling at seaports;
    - Freight Operations Information System (FOIS) by Indian Railways
    - VAHAN (National Vehicle Registration System) by Ministry of Road Transport and Highways.

India and WTO:
- The WTO's Appellate Body (AB) is a permanent body intended by the Dispute

Settlement Understanding (DSU) to resolve appeals on issues of law.
- It is ordinarily composed of seven members having a four-year term, with the possibility of one reappointment.
- Since July 2017, the United States has been stalling AB appointments on the pretext that it has not been functioning in accordance with the DSU norms.
- In the wake of this crisis, around 23 WTO members have created a **Multiparty Interim Arbitration (MPIA) mechanism** that closely replicates the substantive and procedural aspects of **appellate review under the AB.**
- EU, China, Brazil, Australia, New Zealand are some of the key members of MPIA.
- India has not joined MPIA yet.
- India supports the restoration and preservation of the normal functioning of the two-stage binding WTO dispute settlement mechanism.

E commerce:
- WTO members agreed not to impose customs duties on electronic transmissions in 1998 and since then, the moratorium has been extended periodically at the ministerial meetings.
- India and South Africa made a joint submission under the Work Program on E-Commerce titled, **'The E-Commerce Moratorium: Scope and its Impact'** in March, 2020, which, inter alia, arguesthat **reconsideration of the moratorium is important** for developing countries to preserve policy space for their digital advancement
- In response to the failure to obtain a multilateral mandate for rule-making in e-commerce, in January, 2019, a **Joint Statement on e-commerce was issued on behalf of seventy-six WTO members** supporting rule-making on e-commerce.
- **India has not joined** the said plurilateral initiative
- India has introduced **an online portal, ARTIS (Application for Remedies in Trade for Indian industry and other Stakeholders)** – to submit online petitions for different trade remedies like anti-dumping duty, safeguard duty and countervailing duty.
- Directorate General of Trade Remedies (DGTR) has introduced an online portal – ARTIS
- **Issues at WTO concerning India**:
    - Issue of public stockholding for food security purposes.
    - Issue of customs on e-commerce and India's stand of preserving policy space for developing countries for their digital advancement.

Commodities on which there is a favourable trade balance

Table 1: Commodities in which India's Merchandise Trade Balance is Favourable

		Export		Import		Trade Balance	
						(Value in US$ billion)	
S.No.	Commodity	Apr-Nov 2019-20 (R)	Apr-Nov 2020-21 (P)	Apr-Nov 2019-20 (R)	Apr-Nov 2020-21 (P)	Apr-Nov 2019-20 (R)	Apr-Nov 2020-21 (P)
1	Drug formulations, biologicals	10.6	12.4	1.5	1.7	9.0	10.7
2	Marine products	4.8	4.0	0.1	0.1	4.7	3.8
3	Gold and other precious metal jewellery	9.6	4.0	0.5	0.2	9.1	3.8
4	RMG cotton incl. accessories	5.6	3.9	0.4	0.2	5.2	3.7
5	Cotton fabrics, made ups etc.	4.0	3.5	0.4	0.2	3.6	3.3
6	Iron and steel	6.4	7.7	8.0	4.7	-1.6	3.0
7	Iron ore	1.7	2.8	0.1	0.1	1.6	2.7
8	Rice -Basmati	2.5	2.7	0.0	0.0	2.5	2.7
9	Rice (other than Basmati)	1.3	2.6	0.0	0.0	1.3	2.6
10	Petroleum products	28.5	15.4	18.0	13.1	10.6	2.3

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Merchandise trade balance is unfavorable:

	Table 2: Commodities in which India's Merchandise Trade Balance is Unfavourable					
						(Value in US$ billion)
		Export		Import		Trade Balance	
S.No.	Commodity	Apr-Nov 2019-20 (R)	Apr-Nov 2020-21 (P)	Apr-Nov 2019-20 (R)	Apr-Nov 2020-21 (P)	Apr-Nov 2019-20 (R)	Apr-Nov 2020-21 (P)
1	Petroleum: Crude	0.0	0.0	68.0	31.2	-68.0	-31.2
2	Gold	1.2	0.6	20.6	12.3	-19.4	-11.7
3	Coal,Coke and Briquittes Etc.	0.1	0.0	15.6	9.7	-15.5	-9.7
4	Telecom Instruments	3.1	2.2	10.3	9.8	-7.2	-7.6
5	Electronics Components	1.7	1.5	11.7	8.7	-10.0	-7.2
6	Vegetable Oils	0.1	0.3	6.4	6.8	-6.3	-6.5
7	Computer Hardware, Peripherals	0.2	0.2	6.5	6.6	-6.3	-6.4
8	Fertilizers Manufactured	0.1	0.1	5.0	5.5	-5.0	-5.4
9	Plastic Raw Materials	2.4	2.3	7.2	5.2	-4.8	-2.9
10	Aircraft, Spacecraft and Parts	0.9	0.8	7.0	3.6	-6.0	-2.8

VOL - I

- **Stringency index for states in India->** to capture the strictness of lockdown style policies of respective states that primarily restricts people's behaviour

Fiscal policy (FP) stance	Recession (↓ GDP)	Expansion (↑ GDP)	Outcome
Pro-cyclical	Contractionary FP ↓ Govt. Expenditure or /and ↑ Taxes	Expansionary FP ↑ Govt. Expenditure or/and ↓ Taxes	Deepens recessions and amplifies expansions, thereby increasing fluctuations in the business cycle.
Counter-cyclical	Expansionary FP ↑ Govt. Expenditure or/and ↓ Taxes	Contractionary FP ↓ Govt. Expenditure or /and ↑ Taxes	Softens the recession and moderates the expansions, thereby decreasing fluctuations in the business cycle.

- World Rule of Law Index' published by the World Justice Project
- It provides cross country comparison on various aspects of regulatory enforcement.
- Sub-categories
    - **'Due process is respected in administrative proceedings'->**In 2020, India's rank is 45 out of 128 countries
    - **'Government regulations are effectively enforced'** the country's rank is 104
    - **India stands at 89th rank in 'Administrative Proceedings are conducted without unreasonable delay'**
    - **107th in 'Administrative Proceedings are applied and enforced without improper influence'**

Regulatory Quality Index ->
- It captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.
- This is a part of Worldwide Governance Indicators (WGI) of World Bank.

Table 7: India's rank in the World Rule of Law Index (2020)

Particulars	India Rank out of 128
World Rule of Law Index	69
People can Access and Afford Civil Justice	115
Civil Justice is not subject to unreasonable delay[7]	123
Civil Justice is effectively enforced	102
Alternative dispute resolution mechanism is accessible	88

Source: World Justice Project (2020)

- India entered the top 50 innovating countries for the first time in 2020 since the inception of the Global Innovation Index (GII) in 2007, by improving its rank from 81 in 2015 to 48, out of 131 countries in 2020.
- GII is co-published by Cornell University, INSEAD and the World Intellectual Property Organisation, a specialized agency of UN.
- GII has two innovation sub indices-> Innovation input sub-index and Innovation output sub-index.
- Both the two sub-indices have equal weight.
- The innovation input sub-indexes has five pillars:
  - Institutions
  - Human Capital and Research
  - Infrastructure
  - Market Sophistication
  - Business Sophistication
- The innovation output sub-indexes has two pillars:
  - Knowledge and Technological outputs
  - Creative Outputs
  - India performed best on the knowledge & technology outputs (KTO) pillar (rank 27) followed by Market Sophistication pillar (rank 31).
  - India performed lowest on the Infrastructure pillar (rank 75)

Figure 4: India's performance on pillars of the Global Innovation Index 2020 (rank)
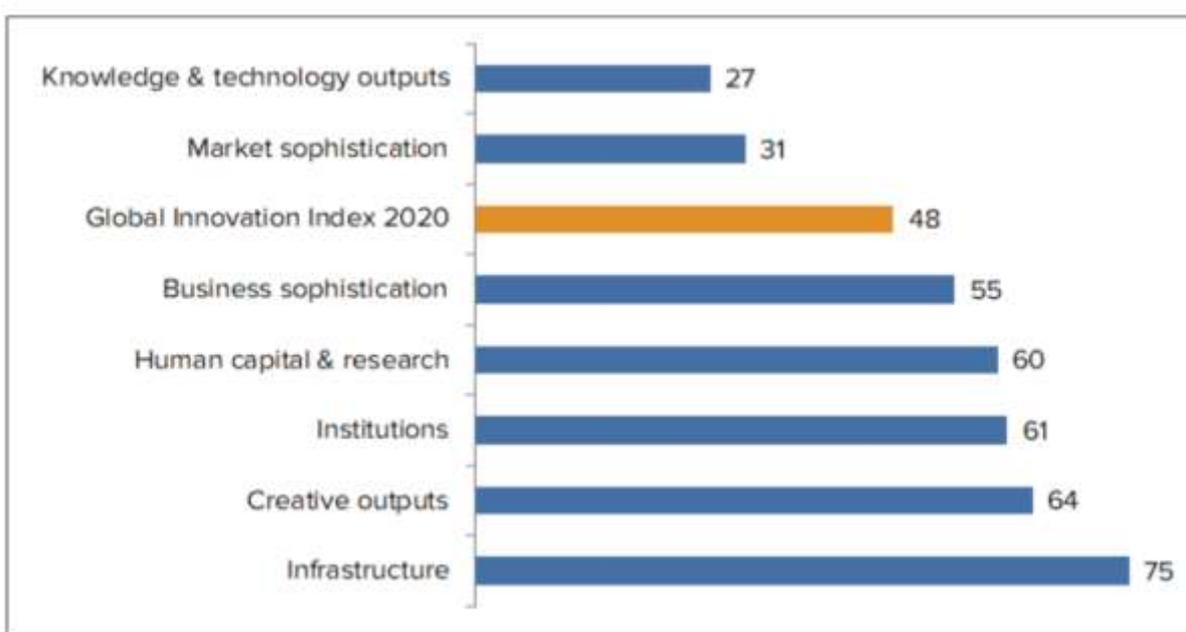
India has had a generous R&D tax incentive framework:
- The Taxation Laws (Amendment) Act 2019 amended the Income Tax Act 1961 and

Finance (No. 2) Act 2019, allowing **domestic companies the option to pay income tax @22 per cent subject to the condition that they will not avail any exemption/incentive.**

- The effective rate for these companies was made 25.17 per cent inclusive of surcharge and cess.
- These companies were also not required to pay Minimum Alternate Tax.

Pradhan Mantri Jan Arogya Yojana:
- The world's largest health insurance/ assurance scheme is centrally sponsored and is **jointly funded by both the central government and the states**.
- provides cover of **5 lakhs per family per year, for secondary and tertiary care hospitalization across public and private** empaneled hospitals in India
- Provides cashless access to health care services for the beneficiary at the point of service.
- No restrictions on family size, age or gender.
- Covers up to 3 days of pre-hospitalization and 15 days post hospitalization expenses such as diagnostics and medicines.

The Bare necessities
- Bare necessities like Roti-Kapada and Makan
- The schemes which are launched for this -> Housing, food securities act and Electricity->Saubhagya scheme
- Saubhagya scheme-> universal household of electrification by providing electricity connection
- To measure the progress in the **delivery of "the bare necessities", the Survey develops a composite index called the Bare Necessities Index (BNI)**
- measures access to "the bare necessities" for households in rural areas, urban areas and at the all India level
- Access to bare necessities is the highest in the States such as Kerala, Punjab, Haryana and Gujarat
- while it is the lowest in Odisha, Jharkhand, West Bengal and Tripura.

Digital Currency
- is a form of currency that is available **only in digital or electronic form**
- not in physical form
- also called digital money, electronic money, electronic currency, or cyber cash
- *Facebook's Libra project was once touted as a new currency for the internet era*

Digital Currency:
- Digital currency is the overall superset that includes virtual currency, which in turn includes cryptocurrencies.
- Compared to virtual currency, a digital currency **covers a larger group that represents monetary assets in digital form**.
- Digital currency can be regulated or unregulated. In the former case, it can be denominated to a sovereign currency—that is, a country's central bank can issue a digital form of its fiat currency notes. On the other hand, a virtual currency often remains unregulated and hence constitutes a type of digital currency.

Virtual Currency
- Virtual currency is currency held within the blockchain network that is not controlled by a centralized banking authority.
- Virtual currency is different than digital currency since digital currency is simply currency issued by a bank in digital form.
- Virtual currency is unregulated and therefore experiences dramatic price movements since the only real force behind trading is consumer sentiment.
- Virtual currency can be defined as an electronic representation of monetary value that may be issued, managed, and controlled by private issuers, developers, or the founding organization.
- Such virtual currencies are often represented in terms of tokens and may remain

unregulated without a legal tender.

Cryptocurrencies

- Cryptocurrencies like bitcoin and ethereum are considered to be a part of the virtual currency group.
- A cryptocurrency uses cryptography technology that keeps the transactions secure and authentic, and also helps to manage and control the creation of new currency units.
- Such cryptocurrencies exist and are transacted over dedicated blockchain-based networks that are open to the common public.
- Decentralized in nature
- The Reserve Bank of India has said it had not banned cryptocurrencies

Payment Infrastructure Development Fund

- Creation of a Rs. 500-crore (update it) Payments Infrastructure Development Fund (PIDF)
- RBI has created
- Develop payment acceptance infrastructure in tier-3 to tier-6 cities (centres), with a special focus on the north-eastern states of the country
- The fund will be operational for three years effective from 1st January, 2021 and may be extended for two more years.
- RBI will make an initial contribution of ₹250 crore to the PIDF, covering half of the fund,
- while the remaining contribution will be from card-issuing banks and card networks operating in the country
- intended to subsidise deployment of payment acceptance infrastructure
- An advisory council (AC) under the chairmanship of RBI deputy governor BP Kanungo has been constituted for managing the PIDF.
- The implementation of targets shall be monitored by the RBI with assistance from card networks, the Indian Banks' Association (IBA) and the Payments Council of India (PCI).
- Multiple payment acceptance devices and infrastructure supporting underlying card payments, such as physical PoS, mPoS, GPRS , public switched telephone network (PSTN) and QR code-based payments will be funded under the scheme.
- Nandan Nilekani committee recommendations: High Level Committee on Deepening of Digital Payments submitted its report to the RBI on May 17, 2019

Secured Overnight Financing Rate

- is a benchmark interest rate for dollar-denominated derivatives and loans that is replacing the London interbank offered rate (LIBOR)
- SOFR is based on transactions in the Treasury repurchase market and is seen as preferable to LIBOR

Kalam Program for Intellectual Property Literacy and Awareness Campaign (KAPILA)

- The Government has launched a campaign named KAPILA for Intellectual Property Literacy and creating patent awareness
    - creating awareness regarding Intellectual Property Rights (IPR) in Higher Education Institutions (HEIs),
    - enabling of IP protection of inventions originating from faculty and students of HEIs,
    - development of Credit Course on IPR,
    - training program on IPR for faculty and students of HEIs
    - sensitization and development of vibrant IP filing system.

RRB

- RBI allowed RRBs to access the liquidity adjustment facility (LAF), marginal standing facility (MSF) and call or notice money market. At present, RRBs are not permitted to access the liquidity windows of the RBI as well as the call or notice market.
- under the Regional Rural Banks Act, 1976
- RRBs are regulated by Reserve Bank of India and are supervised by NABARD.

- RRBs are jointly owned by the Centre, the state government concerned and sponsor banks with the issued capital shared in the proportion of 50%, 15% and 35%, respectively
- was set up on the basis of the recommendations of the Narasimham Working Group (1975)

Liquidity Adjustment Facility

- **It enables banks to borrow money through repurchase agreements (repo)** against the *collateral of Government securities*
- **banks to lend to the RBI using reverse repo contracts**

Marginal Standing Facility

- MSF is a **very short-term borrowing scheme for scheduled commercial banks**.
- introduced by RBI
- to enable smooth monetary transmission in the financial system.
- **MSF rate is generally 1% higher than Repo rate->**MSF banks are allowed to **use the securities that come under Statutory Liquidity Ratio** in the process of availing loans from RBI.
- MSF can be used by a bank after **it exhausts its eligible security holdings for borrowing under other options like the LAF repo**.
- Under MSF, banks can borrow funds from the RBI by pledging government securities within the limits of the SLR.
- **Banks can borrow from the RBI up to 1 % of their Net Demand** and Time Liabilities or liabilities (or deposits) under MSF (increased to 2% later).
- **Now allowed to avail of funds up to an additional one percent of net demand and time liabilities** (NDTL), i.e., cumulatively up to 3 percent of NDTL.
- This facility, which was extended in phases up to March 31, 2021, now up to September 30, 2021

LAF vs MSF

- Repo Rate -> money is lent by Reserve Bank of India to commercial bank
- MSF ->**RBI lends money only to scheduled banks**.
- Repo rate-> short term financing while MSF is for over night loan
- Repo rate-> can't sell govt securities from SLR quota, MSF-> government securities as collateral from SLR

Call/notice money market

- Forms an important segment of the Indian money market.
- **Under call money market, funds are transacted on overnight basis** and under notice money market, funds are transacted for the period between 2 days and 14 days.

Industry

Scheme for Formalisation of Micro food processing Enterprises (FME)

- for the Unorganized Sector
- expenditure will be shared by GOI and the States in ratio of 60:40.

Why:

- 25 lakh unregistered food processing enterprises which constitute 98% of the sector and are unorganized and informal
- Nearly 66 % of these units are located in rural areas and about 80% of them are family-based enterprises

Problems:

- inability to access credit,
- high cost of institutional credit,
- lack of access to modern technology,
- inability to integrate with the food supply chain
- compliance with the health & safety standards

Objectives:

- Increase in access to finance by micro food processing units.

- Increase in revenues of target enterprises.
- Enhanced compliance with food quality and safety standards.
- Strengthening capacities of support systems.
- Transition from the unorganized sector to the formal sector.
- Special focus on women entrepreneurs and Aspirational districts.
- Focus on minor forest produce in Tribal Districts.

Benefits
1. Support to Individual micro units:
    - Micro enterprises will get credit linked subsidy @ 35% of the eligible project cost with ceiling of Rs.10 lakh.
    - Beneficiary contribution will be minimum 10% and balance from loan.
    - On-site skill training & Handholding for DPR and technical upgradation.
2. Support to FPOs/SHGs/Cooperatives:
    - Seed capital will be given to SHGs (@Rs. 4 lakh per SHG) for loan to members for working capital and small tools.
    - Grant for backward/ forward linkages, common infrastructure, packaging, marketing & branding.
    - Skill training & Handholding support.
    - Credit linked capital subsidy.

International News

GAFA tax
- GAFA is an acronym for **Google, Apple, Facebook and Amazon.**
- France first proposed to levy digital tax called as GAFA tax on these digital giants.
- Existing tax norms that are framed envisaging brick and mortar business models are not suitable to regulate online services.

Equalisation Levy
- It is a direct **tax**
- Introduced in India in 2016, with the intention of taxing the digital transactions i.e. the income accruing to foreign e-commerce companies from India
- Currently, not all services are covered under the ambit of equalisation Levy. The following services covered:
    - Online advertisement
    - Any provision for digital advertising space or facilities/ service for the purpose of online advertisement
    - Currently, the applicable rate of tax is 6% of the gross consideration to be paid.
    Example: Rohan has advertised on Facebook to expand his business. He has to pay Rs. 2,00,000 in FY 2017-18 to Facebook for the advertising services availed.
    Solution: Facebook will bill Rohan for an amount of Rs. 2,12,765.9 Rohan will deduct TDS at the rate of 6% of Rs. 2,12,765.9 = Rs. 12,765.9 and pay the balance of Rs. 2,00,000 (Rs. 2,12,765.9 – Rs. 12,765.9) to Facebook.
- The new amendment, effective from April 1, 2020, essentially expands the equalization levy from online advertising to nearly all online commerce activities done in India by businesses that do not have taxable presence in India through applicability of 2% on its revenues.
- The concept of '**Significant Economic Presence**' (SEP) was introduced in India's domestic tax law in 2018, with the intent of bringing income of non-residents operating in the online / digital space (such as e-commerce, online streaming, etc.) within the ambit of India-sourced income.

New PPP:
- The World Bank has released new Purchasing Power Parities (PPPs) for reference year 2017, under International Comparison Program (ICP), that adjust for differences in the cost of living across economies of the World
- The International Comparison Program (ICP) is the largest worldwide data-collection

initiative, under the guidance of UN Statistical Commission (UNSC)
- The Ministry of Statistics and Programme Implementation is National Implementing Agency (NIA) for India, which has the responsibility of planning, coordinating and implementing national ICP activities.

Purchasing power parity (PPP)

- ❖ PPP is an economic theory that compares different countries' currencies through a "basket of goods" approach.
- ❖ According to this concept, two currencies are in equilibrium—known as the currencies being at par—when a **basket of goods is priced the same in both countries, taking into account the exchange rates**.
- ❖ It allows for economists to compare economic productivity and standards of living between countries.
- ❖ Some countries adjust their gross domestic product (GDP) figures to reflect PPP.

FISCAL POLICY

Border Adjustment Tax;

- NITI Aayog favored imposing a border adjustment tax (BAT) on imports to provide a level-playing field to domestic industries
- destination-based cash flow tax (DBCFT).
- It is a <u>value-added tax</u> on imported goods and is also referred to as a border-adjusted tax, destination tax or border tax adjustment.
- Exported goods are exempt from tax while **imported goods sold are subject to the tax.**
- **BAT levies a tax depending on where a good is consumed** rather than where it is produced.

Miscellaneous

- Open Budget Survey
    - India has been placed at 53rd position among 117 nations in terms of budget transparency and accountability,
    - according to Open Budget Survey conducted by International Budget Partnership (IBP).
    - International Budget Partnership (IBP) is an independent non-profit corporation
    - New Zealand tops the chart with a score 87.
    - The survey, covering 117 countries, rates the level of budget transparency across countries on a scale of 0-100, based on several normative, internationally comparable indicators.
- Recently, **NITI Aayog** in partnership with the **Institute of Competitiveness**
- has released the first Export Preparedness Index (EPI) that is EPI 2020
- to examine export preparedness and performance of Indian states.

SWAMIH investment fund:

- SWAMIH investment fund will provide last mile funding to the stressed affordable and middle-income housing projects in the country.
- It has been created for funding stalled projects that are net-worth positive, including those projects that have been declared as Non-Performing Assets (NPAs) or are pending proceedings before the National Company Law Tribunal under the Insolvency and Bankruptcy Code.
    - o SBICAP Ventures, an arm of SBI Capital Markets, is entrusted by the government to manage this AIF.

Fixed Term Employment:

- Ministry of Labour and Employment (Ministry) has notified the draft of the **Model Standing Orders, 2020**
- **Fixed Term Employment** as one of the classifications of a worker
- **It means** contract in which a company or an enterprise **hires an employee for a specific period of time.**
- **Mostly, it is for a year but can be renewed after the term expires depending on**

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requirements.

- His **hours of work, wages, allowances and other benefits shall not be less than that of a permanent worker** doing the same work or work of similar nature.
- He shall be **available for all statutory benefits available to a permanent worker**
- He shall be **available for gratuity**, -> Gratuity refers to a sum of money paid to an employee at the end of a period of employment.

National Beekeeping & Honey Mission (NBHM)

- National Beekeeping & Honey Mission (NBHM)" for 2020-21 to 2022-23
- Central Sector Scheme
- overall **promotion & development of scientific beekeeping**
- production of **quality honey & other beehive products**
- It was launched considering importance of beekeeping and **to achieve goal of Sweet Revolution.**

3 components:

- **Production & productivity improvement** of various crops through pollination
- **Post-harvest management** of beekeeping/ beehive products
- **Research & Technology generation** for different Agro-Climatic and Socio-Economic conditions

VigyanJyotiProgramme

- It will spread the programme for encouraging girls to take interest in science and build a career
- was launched by the Department of Science & Technology (DST) to create a level-playing field for the meritorious girls
- include student-parent counselling, visit to labs and knowledge centres, partners role model interactions, science camps, academic support classes, resource material distribution and tinkering activities.
- encourage them to build a career in STEM
- The programme is currently running successfully in 50 JawaharNavodayaVidyalayas (JNV).

One Nation and One Standard scheme

- To bring uniformity and said labs testing in India should be of global standards
- It was **first deliberated in September, 2019.**
- The purpose is to converge multiple standards with the BIS which is a recognised national body for standardisation in India.
- **Need of it:**
  - National uniformity and standardization in all kinds of public procurement and tendering can be an immediate deliverable
  - The uniform national standards will help in making it mandatory for more products.

Bureau of Indian Standard

- It is the only national body that frames standards.
- It works under the aegis of Ministry of Consumer Affairs, Food & Public Distribution, Government of India.
- **The Bureau of Indian standards (BIS) Act 2016** establishes the Bureau of Indian Standards (BIS) as the National Standards Body of India.

PRISM Scheme

- PRISM (Promoting Innovations in Individuals, Start-ups and MSMEs)
- aims at to support individual innovators which will enable to achieve the agenda of inclusive development
- It is an initiative of the Department of Scientific and Industrial Research (DSIR).
- It is aimed at transforming an individual innovator into a successful technopreneur by promoting, supporting, and funding implementable and commercially viable innovations created for society.
- Under the initiative, an Indian innovator- student, professional and common citizen

– is provided technical, strategic, and financial assistance by DSIR for idea development, prototype development and pilot scaling, and patenting.

SARTHAQ PLAN

- Plan for school education called 'Students' and Teachers' Holistic Advancement through Quality Education (SARTHAQ)'.
  - Developed by the Department of School Education and Literacy.
- States and UTs are given the flexibility to adapt this plan with local contextualisation and also modify as per their needs and requirements
- This plan delineates the roadmap and way forward for implementation of NEP, 2020 for the next 10 years

ANAMAYA INITIATIVE

- It will converge efforts of various Government agencies and organisations to enhance the health and nutrition status of the tribal communities of India.
- It aims to build a sustainable, high-performing health eco-system to address the key health challenges faced by the tribal population of India.
- The Collaborative is a *multi-stakeholder initiative of Tribal Affairs* Ministry supported by **Piramal Foundation** and **Bill and Melinda Gates Foundation (BMGF)**.
- It will begin its operations with 50 tribal, Aspirational Districts (with more than 20% ST population) across 6 high tribal population states.

ACROSSscheme

- "Atmosphere & Climate Research-Modelling Observing Systems & Services (ACROSS)"
- ACROSS scheme pertains to the atmospheric science programs of the Ministry of Earth Sciences (MoES) and addresses different aspects of weather and climate services, which includes warnings for cyclone, storm surges, heat waves, thunderstorms etc.
  - Each of these aspects is incorporated as nine sub-schemes under the umbrella scheme "ACROSS".
- It will be implemented by the Ministry of Earth Sciences through its institutes namely India Meteorological Department (IMD), Indian Institute of Tropical Meteorology (IITM), National Centre for Medium Range Weather Forecasting (NCMRWF), and Indian National Centre for Ocean Information Service(INCOIS).
- The scheme will provide improved weather, climate and ocean forecast and services, thereby ensuring transfer of commensurate benefits to the various services.
- A sizable number of scientific and technical staff along with requisite administrative support, thereby generating employment.
- To ensure last-mile connectivity of the weather based services to the end -user, a large number of agencies like the KrishiVigyanaKendras of Indian Council of Agricultural Research, Universities and local municipalities are roped in thus generating employment opportunities to many people.

STARS scheme

- It would be implemented as a centrally sponsored scheme under the education ministry's department of school education and literacy and would involve setting up of a National Assessment Centre, PARAKH as an independent and autonomous institution.
  - The project is supported by the World Bank.
- The STARS project also includes a Contingency Emergency Response Component (CERC). It will help the government respond to situations leading to loss of learning such as school closures/infrastructure damage, inadequate facilities and use technology for facilitating remote learning etc.
  - The CERC component would facilitate the rapid re-categorization of financing and the utilization of streamlined financing request procedures.
- The STARS project seeks to support the states in developing, implementing, evaluating and improving interventions with direct linkages to improved education outcomes and school to work transition strategies for improved labour market outcomes.
- The overall focus and components of the STARS project are aligned with the

objectives of National Education Policy (NEP) 2020 of Quality Based Learning Outcomes.
- It also aims to strengthen the Union Education ministry's national data systems and strengthening of learning assessment systems.
- It also aims to focus on initiatives of PM e-Vidya, Foundational Literacy and Numeracy Mission and National Curricular and Pedagogical Framework for Early Childhood Care and Education as part of the Atmanirbhar Bharat Abhiyan.

National Monsoon Mission (NMM)
- Ministry of Earth Sciences had launched NMM in 2012 with a vision to develop a state-of-the-art dynamical prediction system for monsoon rainfall on different time scales.
- The responsibility of execution and coordination of this mission to the Indian Institute of Tropical Meteorology (IITM), Pune.
- Climate Forecast System (CFS) of USA was found to be one of the best among the currently available coupled climate models, and its second version (CFSv2) has been implemented at IITM Pune, as the basic modelling system for the above purpose.
- NMM builds a working partnership between the academic and research and development (R&D) organisations, both national and international.

Objectives
- To build a working partnership between the academic and R&D organizations, both national and international, to improve the operational monsoon forecast skill over the country.
- To setup a state-of-the-art dynamical modelling frame work for improving prediction skill of 'seasonal and extended range predictions' and 'short and medium range (up to two weeks) prediction'.

Fifteenth Finance Commission:
- The 15th Finance Commission (Chair: Mr. N. K. Singh) was required to submit two reports.
  - The first report, consisting of recommendations for the financial year 2020-21.
  - The final report with recommendations for the 2021-26.
- The Commission was asked to recommend performance incentives for States in many areas like power sector, adoption of DBT, solid waste management etc.

Vertical devolution:
- It has recommended to maintain the States' share in the divisible pool of taxes to 41% for the five-year period starting 2021-22.
  - The Fourteenth Finance Commission had raised States' share to 42% of divisible revenues, but the Fifteenth Finance panel had reduced the share to 41% in its interim report for 2020-21, citing the conversion of Jammu, Kashmir and Ladakh into Union Territories.
- The 15th Finance Commission has introduced demographic performance of states in 'the need-based' six point criteria recommended for horizontal devolution.
  - Under the changed criteria, the commission has given 15% weight to population, 15% percent to area, 10% to forest and ecology, 45% to income distance, 12.5% to demographic performance and 2.5% for tax effort.

Types of Grants under Fifteenth Finance Commission:
1. **Revenue deficit grants:**to eliminate revenue deficit.
2. **Sector-specific grants:**given to states for eight sectors: (i) health, (ii) school education, (iii) higher education, (iv) implementation of agricultural reforms, (v) maintenance of PMGSY roads, (vi) judiciary, (vii) statistics, and (viii) aspirational districts and blocks.
   - A portion of these grants will be performance-linked.
3. **State-specific grants:**These will be given in the areas of: (i) social needs, (ii) administrative governance and infrastructure, (iii) water and sanitation, (iv) preservation of culture and historical monuments, (v) high-cost physical

infrastructure, and (vi) tourism.

4. **Grants to local bodies:**The grants to local bodies will be made available to all three tiers of Panchayat- village, block, and district.

- Grants to local bodies (other than health grants) will be distributed among states based on population and area, with 90% and 10% weightage, respectively.
- No grants will be released to local bodies of a state after March 2024 if the state does not constitute State Finance Commission and act upon its recommendations by then.

- Urban local bodies have been categorised into two groups, based on population, and different norms have been used for flow of grants to each, based on their specific needs and aspirations. Basic grants are proposed only for cities/towns having a population of less than a million. For Million-Plus cities, 100 per cent of the grants are performance-linked through the Million-Plus Cities Challenge Fund (MCF).

Fiscal Space for Centre:

- Total XVFC transfers (devolution + grants) constitutes about 34 per cent of estimated Gross Revenue Receipts of the Union leaving adequate fiscal space for the Union to meet its resource requirements and spending obligations on national development priorities.

Recommendation of 15th Finance Commission

- A normal ceiling of net borrowing for the states at 4% of GSDP for the year 2021-2022. A portion of this ceiling will be earmarked to be spent on incremental capital expenditure. Additional borrowing ceiling of 0.5% of GSDP will also be provided subject to conditions.
- States will be expected to reach a fiscal deficit of 3% of GSDP by 2023-24, as recommended by the 15th Finance Commission.
- **Under the 15th FC, local bodies grant during the year 2020-21 were also allocated to Fifth and Sixth Schedule Area as well as Mandal/Tehsil and District/Zila Panchayats** in case of rural local bodies and also allocated to **fifty-nine Cantonment Boards in case of the urban local bodies.**
- For the first time, 15th Finance Commission grants were also allocated **for the purpose of improving ambient air quality in million plus cities**/ urban agglomerations
- The Central Government has accepted the recommendations made by the Fifteenth Finance Commission (FC-XV),
    - Grant-in-Aid transfer to States during 2020-21 for Post Devolution Revenue Deficit Grant
    - Grants to Local bodies
    - Disaster Management Grants (50% higher than recommended by the FC-XIV)

SCHEMES

National super-computing Mission:
- to enhance the research capacities and capabilities
- Through a Supercomputing grid, with National Knowledge Network (NKN)
- The Mission is being jointly steered by the Department of Science and Technology (DST) and the Ministry of Electronics and Information Technology (MeitY)
- This is implemented by the Centre for Development of Advanced Computing (C-DAC), Pune, and the Indian Institute of Science (IISc), Bengaluru.
- Launched in 2015, the ambitious Rs 4,500-crore project
- The mission aims at creating a powerful supercomputing capability for the country and offer powerful computational facilities to boost research.
- A National Knowledge Network (NKN), a grid, will connect 70 supercomputers across 75 research institutions with over a thousand researchers using this facility.

PradhanMantriSurakshitMatritvaAbhiyan:
- launched by the **Ministry of Health & Family Welfare** (MoHFW), Government of India
- **Antenatal care**-> aims to provide assured, comprehensive and quality antenatal care, free of cost, universally to all pregnant women
- a systematic approach for **engagement with private sector**
- envisages to improve the quality and coverage of Antenatal Care (ANC) including diagnostics and counselling services as part of the **Reproductive Maternal Neonatal Child and Adolescent Health (RMNCH+A) Strategy**.

SWAYYAT INITIATIVES:
- To promote **Start-ups, Women and Youth Advantage through eTransactions** on **Governmente Marketplace (GeM).**
- This will bring together the key stakeholders within the Indian entrepreneurial ecosystem to Government e-Marketplace the national procurement portal.
- The government also launchedGeM Start-up Runway-an initiative of GeM in association with Start -up India to facilitate Start-ups registered with Start -up India to access the public procurement market and sell innovative products and services to government buyers.
- GeM Start-up Runway seeks to support technology development, spur research and innovation by ensuring a conducive policy environment for industrial diversification and value addition to commodities, and aligns with Government's philosophy to turn Job-seekers into job-creators.
- GeM Start-up Runway will address goals and objectives under United Nations Sustainable Development Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.

DHRUV:
- The PradhanMantri Innovative Learning Programme - DHRUV has been started by Ministry of Human Resource Development, Government of India to identify and encourage talented children to enrich their skills and knowledge.
- In centres of excellence across the country, gifted children will be mentored and nurtured by renowned experts in different areas, so that they can reach their full potential.
- The programme is named after a pole star called DHRUV TARA.
- The main objective of the program is to allow students to realize their complete potential and contribute to the society.
- The program aims to cover two areas namely Science and Arts.
- Around 60 students are selected broadly from Class 9 to Class 12 all over the country.

Pradhan Mantri Van Dhan Yojana:

- The Van DhanYojana or Van Dhan Scheme, a component of The 'Mechanism for Marketing of Minor Forest Produce (MFP) through Minimum Support Price (MSP) & Development of Value Chain for MFP' was launched on 14th April, 2018.
  - o It is an initiative of the Ministry of Tribal Affairs and TRIFED.
- It is an initiative targeting livelihood generation for tribals by harnessing the wealth of forest i.e. Van Dhan. The programme aims to tap into traditional knowledge & skill sets of tribals by adding technology & IT to upgrade it at each stage and to convert the tribal wisdom into a viable economic activity.
- It will be implemented through Ministry of Tribal Affairs as Nodal Department at the Central Level and TRIFED as Nodal Agency at the National Level.
  - o At State level, the State Nodal Agency for MFPs.
- Its crucial steps are enumerated below –
  1. An initiative targeting livelihood generation for tribal gatherers and transforming them into entrepreneurs.
  2. The idea is to set-up tribal community-owned Van DhanVikas Kendra Clusters (VDVKCs) in predominantly forested tribal districts.
  3. A VDVK Cluster shall constitute of 15 tribal SHGs / Van dhanKendras, each comprising of up to 20 tribal NTFP gatherers or artisans i.e. about 300 beneficiaries per Cluster.
  4. 100% Central Government Funded with TRIFED providing Rs. 15 lakhs for each 300 member Van Dhan Kendra Cluster.

Atal Beemit Vyakti Kalyan Yojana (ABVKY)

- The scheme wasintroduced by the Employees' State Insurance Corporation (ESIC) on pilot basis for a period of 2 years w.e.f. 01.07.2018 for providing relief to the Insured Persons (IPs) who have become unemployed. However, to provide benefit to the IPs who have become unemployed during COVID-19 pandemic, the scheme was extended for another one year i.e. from 1st July, 2020 to 30th June, 2021.
- The scheme now provides relief to the extent of 50% of the average per day earning during the last employment.

Eligibility

- Employees covered under Section 2(9) of the ESI Act 1948.
- The Insured Person (IP) should have been rendered unemployed during the period the relief is claimed.
- The Insured Person should have been in insurable employment for a minimum period of two years.
- The Insured Person should have contributed not less than 78 days during each of the preceding four contribution periods.
- The contribution in respect of him should have been paid or payable by the employer.
- The contingency of the unemployment should not have been as a result of any punishment for misconduct or superannuation or voluntary retirement.
- Aadhar and Bank Account of the Insured Person should be linked with insured person database.

PM-Kisan Urja Suraksha Evam Utthaan Mahaabhiyan (PM-KUSUM) Scheme

- PM-KUSUM Scheme is aimed at ensuring energy security for farmers in India, along with honouring India's commitment to increase the share of installed capacity of electric power from non-fossil-fuel sources to 40% by 2030 as part of Intended Nationally Determined Contributions (INDCs).
- Ministry of New and Renewable Energy (MNRE) has launched the Scheme for farmers for installation of solar pumps and grid connected solar and other renewable power plants in the country.
- The proposed scheme consists of three components:
  1. Component-A: 10,000 MW of Decentralized Ground Mounted Grid Connected Renewable Power Plants.

2. Component-B: Installation of 17.50 lakh standalone Solar Powered Agriculture Pumps.
3. Component-C: Solarisation of 10 Lakh Grid-connected Solar Powered Agriculture Pumps.

Innovation of Science Pursuit for Inspire Research (INSPIRE)

- It is an innovative programme sponsored and managed by the Department of Science & Technology for attraction of talent to Science.
- The basic objective of INSPIRE is to communicate to the youth of the country the excitements of creative pursuit of science, attract talent to the study of science at an early age and thus build the required critical human resource pool for strengthening and expanding the Science & Technology system and R&D base.
- A striking feature of the programme is that it does not believe in conducting competitive exams for identification of talent at any level. It believes in and relies on the efficacy of the existing educational structure for identification of talent.
- INSPIRE has three components:
1. Scheme for Early Attraction of Talent(SEATS)
2. Scholarship for Higher Education(SHE)
3. Assured Opportunity for ResearchCareers(AORC)

Pilgrimage Rejuvenation And Spiritual Augmentation Drive (PRASAD) scheme:

- It was launched by the **Ministry of Tourism.**
- Objective of **holistic development of identified pilgrimage destinations.**
- Name of the scheme was changed from PRASAD to **"National Mission on Pilgrimage Rejuvenation and Spiritual, Heritage Augmentation Drive (PRASHAD)**
- After the discontinuation of the HRIDAY scheme of the Ministry of Housing and Urban Development, the **development of Heritage destinations** was included in the PRASAD Scheme, changing it to PRASHAD.

ATAL INNOVATION MISSION

- It is a flagship initiative set up by the NITI Aayog to promote innovation and entrepreneurship across the length and breadth of the country.
- Objectives are to create and promote an ecosystem of innovation and entrepreneurship across the country at school, university, research institutions, MSME and industry levels.
- The Atal Innovation Mission has following two core functions:
  - **Entrepreneurship promotion through Self-Employment and Talent Utilization**, wherein innovators would be supported and mentored to become successful entrepreneurs.
  - **Innovation promotion**: to provide a platform where innovative ideas are generated.

Higher Education Financing Agency (HEFA)

- It is a joint venture of MoE Government of India and Canara Bank for financing creation of capital assets in premier educational institutions in India as part of rising 2022 HEFA's scope is greatly expanded to cover school education, educational institutes under Ministry of health etc.
- HEFA is registered under Section 8 [Not-for-profit] under the Companies Act 2013 as a Union Govt company and as Non–deposit taking Systematically Important (NBFC-ND-SI) with RBI.
- HEFA incorporated on 31st May 2017, is a joint venture of MoE, GOI and Canara Bank with an agreed equity participation in the ratio of 90.91% and 09.09% respectively
- Vision: To enable India's premier educational institutions to excel and reach the top in global rankings by financing building world class infrastructure including R&D Infra.
- Mission: To provide timely finance at competitive interest rates for capital assets creation in India's educational institutions and supplement it with grants by

channelizing CSR funds from the corporate and donations from others.

E-100 pilot project:
- The ambitious project aims to set up a network for production and distribution of ethanol across the nation.
- Government has resolved to meet the target of 20 per cent ethanol blending in petrol by 2025.
    - Earlier the resolve was to achieve the target by 2030 which is now preponed by 5 years.
    - Till 2014, on an average, only 1.5 per cent of ethanol could be blended in India which has now reached about 8.5 per cent.
- A large part of this eightfold increase in ethanol procurement has benefitted the sugarcane farmers of the country.
- Most of the ethanol manufacturing units are mostly concentrated in 4-5 states where sugar production is high but now food grain based distilleries are being established to expand this to the whole country.

Senior care Aging Growth Engine Initiative:
- Ministry of Social Justice and Empowerment virtually launched
- The SAGE portal will be a "one-stop access" of elderly care products and services by credible start-ups.
- To help such persons who are interested in entrepreneurship in the field of providing services for elderly care.
- An amount of Rs. 100 crore has been assigned for the promotion of the silver economy.

SILVER ECONOMY:
- System of production, distribution and consumption of goods and services aimed at using the purchasing potential of older and ageing people and satisfying their consumption, living and health needs.

PradhanMantriSwasthyaSurakshaNidhi (PMSSN)
- Recently, the Union Cabinet has approved the PradhanMantriSwasthyaSurakshaNidhi (PMSSN) as a single non-lapsable reserve fund for share of Health from the proceeds of Health and Education Cess levied under Section 136-b of Finance Act, 2007.
- **Salient features of the PMSSN:**
    - A non-lapsable reserve fund for Health in the Public Account;
    - Proceeds of share of health in the Health and Education Cess will be credited into PMSSN;
    - Accruals into the PMSSN will be utilized for the flagship schemes of the Ministry of Health & Family Welfare namely,
        1. Ayushman Bharat - PradhanMantri Jan ArogyaYojana (AB-PMJAY)
        2. Ayushman Bharat - Health and Wellness Centres (AB-HWCs)
        3. National Health Mission
        4. PradhanMantriSwasthyaSurakshaYojana (PMSSY)
        5. Emergency & disaster preparedness and responses during health emergencies
        6. Any future programme/scheme that targets to achieve progress towards SDGs and the targets set out in the National Health Policy (NHP) 2017.
- Administration and maintenance of the PMSSN is entrusted to Ministry of Health & Family Welfare; andand in any financial year, the expenditure on such schemes of the Ministry would be initially incurred from the PMSSN and thereafter, from Gross Budgetary Support (GBS).
- The major benefit will be: enhanced access to universal & affordable health care through availability of earmarked resources, while ensuring that the amount does not lapse at the end of financial year.

UJALA and SLNP:
- Launched by Prime Minister on January 5, 2015, the Government of India's zero

subsidyUnnatJyoti by Affordable LEDs for All (UJALA) and Street Lighting National Programme (SLNP) marks their sixth anniversary.

- The main objective is to promote efficient lighting, enhance awareness on using efficient equipment which reduce electricity bills and help preserve environment.
- Both the programmes are being implemented by Energy Efficiency Services Limited (EESL), a joint venture of PSUs under the Ministry of Power, Government of India since their inception.
  - Under UJALA, EESL has distributed over 36.69 crore LED bulbs across India (estimated GHG emission reduction of 38.59 million tonnes CO_2 per year.)
  - With SLNP, EESL has installed about 1.14 crore LED streetlights across India (estimated GHG emission reduction of 5.29 million tonnes CO_2 per year)
- They have not only reduced emissions and enabled sustainable development, but have revamped household and public lighting systems, across the country.

YUVA scheme for young writers:

- The 'Young, Upcoming and Versatile Authors' (YUVA) scheme, a mentorship programme to train young authors.
- The scheme is aimed at training 75 aspiring writers below 30 years, who are ready to express themselves and project India and its culture and literature globally.
  - A total of 75 authors will be selected through an All India Contest at MyGov.
- It aims to bring reading and authorship as a preferred profession at par with other job options.
- To impart a positive psychological push to the young minds amidst the impact of the Covid-19 pandemic on the mental health of children.
- Implementing Agency: The National Book Trust (Under Ministry of Education).
- A book or a series of books written by these young authors will be published by NBT and a royalty of 10 per cent will be paid to the authors.
- Their published books will also be translated into other Indian languages to ensure the exchange of culture and literature between different states.

SAKSHAM CAMPAIGN

- 'It is an annual one-month long, people-centric fuel conservation mega campaign of Petroleum Conservation Research Association (PCRA) under the aegis of Ministry of Petroleum and Natural Gas on 16th January.
  - Petroleum Conservation Research Association (PCRA) is a registered society set up under the aegis of Ministry of Petroleum & Natural Gas, Government of India.
  - As a non-profit organization, PCRA is a national government agency engaged in promoting energy efficiency in various sectors of economy.
  - It helps the government in proposing policies and strategies for petroleum conservation, aimed at reducing excessive dependence of the country on oil requirement.

'SAKSHAM's idea is to convince consumers to switch to cleaner fuels and bring in behavioral change to use fossil fuel intelligently.

INTERNATIONAL RELATIONS

Asian Development Bank (ADB)
News Excerpt
The Asian Development Bank (ADB) has agreed to provide a $132.8 million loan to the Indian state of Meghalaya for upgrading the power distribution networkand improving the power quality.

Pre-Connect
  - ➢ The Asian Development Bank (ADB) is a regional development bank established on 19December 1966, headquartered in Manila, Philippines.
  - ➢ ADB was conceived in the early 1960s as a financial institution that would be Asian incharacter and foster economic growth and cooperation in one of the poorest regions in theworld.
  - ➢ The bank admits the members of the United Nations Economic and Social Commission forAsia and the Pacific (UNESCAP) and non-regional developed countries.
  - ➢ From 31 members at its establishment, ADB now has 68 members. 49 members from theAsian and Pacific Region, 19 members from Other Regions.
  - ➢ The ADB was modelled closely on the World Bank, and has a similar weighted votingsystem where votes are distributed in proportion with members' capital subscriptions.
  - ➢ Japan and the United States each hold the largest proportion of shares at 15.571%. Chinaholds 6.429%, India holds 6.317%, and Australia holds 5.773%.

India and ADB
  - ➢ ADB's support to India aims to accelerateeconomic transformation by buildingindustrialcompetitiveness, creating jobs, accelerating growth of low-income states, andaddressingenvironmental and climate change challenges.
  - ➢ Since 1986, ADB has committed 239 sovereign loans totalling $42.26 billion for India.
  - ➢ Cumulative loan and grant disbursements to India amount to $31.79 billion. These werefinanced by regular ordinary capital resources and other special funds.
  - ➢ In 2019, the bank committed a record $3.18 billion for 10 sovereign projects aimed todevelop infrastructure and services in transport, energy, urban services, and agricultureand natural resources.
  - ➢ Improving connectivity and accessibility to services and markets at the state, district, andrural levels remains a key area of ADB's support in India.
  - ➢ Recent grant of loan to Meghalaya will help in modernizing and improving the distributionnetwork; the project will improve the operational efficiency of distribution system and the financial sustainability of distribution business in the state.

Significance
  - ✓ ADB maximizes the development impact of its assistance by facilitating policy dialogues,
  - ✓ providing advisory services, and mobilizing financial resources through co financingoperations that tap official, commercial, and export credit sources.
  - ✓ It provides an alternative to Chinese financial institutions, which is known for its**chequebook diplomacy** that is leveraging the investment made to serve its geopoliticalpurposes.

New START Treaty
Highlights
  - ➢ The New Strategic Arms Reduction Treaty (New START) was signed April 8, 2010, in Prague by the United States and Russia and entered into force on Feb. 5, 2011.

- New START replaced the 1991 START I treaty, which expired December 2009, and superseded the 2002 Strategic Offensive Reductions Treaty (SORT), which terminated when New START entered into force.
- New START continues the bipartisan process of verifiably reducing U.S. and Russian strategic nuclear arsenals begun by former Presidents Ronald Reagan and George H.W. Bush.
- New START is the first verifiable U.S.-Russian nuclear arms control treaty to take effect since START I in 1994.
- The United States and Russia agreed on Feb. 3, 2021, to extend New START by five years, as allowed by the treaty text, until Feb. 5, 2026.
- Originally signed in 2010, the treaty limits each side to 1,550 long-range nuclear warheads, a lower number than under the previous Start deal.
- Each country is allowed, in total, no more than 700 deployed intercontinental ballistic missiles, submarine-launched ballistic missiles, and heavy bombers equipped for nuclear arms.
- Another 100 are allowed if they are not operationally deployed - for example, missiles removed from a sub undergoing a long-term overhaul. Again, this is a significant reduction from the original treaty.

SALT I and ABM treaty
SALT I freezes for 5 years the number of missile launchers held by each country. ABM bans deployment of missile shields

Nuclear Non-Proliferation Treaty (NPT)
Extended in 1995 for an indefinite period **1968**

1972

Accord SALT II
Never came into force
1979

Intermediate-range nuclear forces treaty (INF)
Eliminates missiles with range of 500-5,500 km

Aug 2019

US officially withdraws

Russia announces official demise of treaty

1970

Nuclear Test-Ban Treaty
Bans all nuclear weapons tests, except those underground **1963**

1960

Multilateral treaties in force

Obsolete bilateral treaties

1960

The major US-Russia nuclear treaties

1987

1990

1991

START I
Reduces strategic nuclear weapons (expired in 2009)

Bilateral treaty in force

1993

START II
Never came into force

New START Treaty
Limits deployed nuclear warheads to 1,550 **2010**

2000

EXPIRES on February 5, 2021

2002

Treaty to reduce nuclear arsenals (SORT)
Reduces strategic nuclear warheads by two thirds by end 2012

AFP●

United Nations Human Rights Council (UNHRC)
News Excerpt
China and Russia were elected to the United Nations Human Rights Council, but support for Beijing dropped by more than 20% compared with a 2016 vote and Saudi Arabia failed in its bid to win a seat on the Geneva-based body.
Pre-Connect

✓ The Human Rights Council replaced the former United Nations Commission on Human Rights.

✓ It is an inter-governmental body within the United Nations system responsible for strengthening the promotion and protection of human rights around the globe and for addressing situations of human rights violations and make recommendations on them.

✓ The Council is made up of 47 United Nations Member States which are elected by the UN General Assembly.

✓ It contains the **Universal Periodic Review mechanism** which serves to assess the human rights situations in all United Nations Member States, the **Advisory Committee** which serves as the Council's ―think tank‖ providing it with expertise and advice on thematic human rights issues and the **Complaint Procedure** which allows individuals and organizations to bring human rights violations to the attention of the Council.

✓ The UNHRC, headquartered in Geneva, Switzerland, has two key functions — the council passes non-binding resolutions on human rights issues through a periodic review of all 193 UN member states called the **Universal Periodic Review (UPR)**, besides overseeing expert investigation of violations in specific countries.

✓ UNHRC's structure — drawing a group of nations from the General Assembly through rotation and election via a *"one state, one vote"* principle — has allowed the organisation to be fairly representative.

G20 and Anti-Corruption Working Group

News Excerpt

Kingdom of Saudi Arabia chaired the first ministerial meeting of its kind forthe anti-corruption working group in the G20 countries

Key Points

➢ In June 2010 at the Toronto Summit, the G20 Anti-Corruption Working Group's (ACWG) was set up.

➢ Its primary goal is to prepare "comprehensive recommendations for consideration by leaders on how the G20 could continue to make practical and valuable contributions to international efforts to combat corruption".

➢ The ACWG has led the G20 anti-corruption efforts coordinating the collective and national actions taken by its members.

* The 20th group is the European Union, comprising 28 member countries.

Globally, the G20 represents:

65% World population | 79% World trade | 84% World economy | 79% World carbon emissions

theconversation.com   Source: G20 Studies Centre, The Lowy Institute & The Global Carbon Atlas
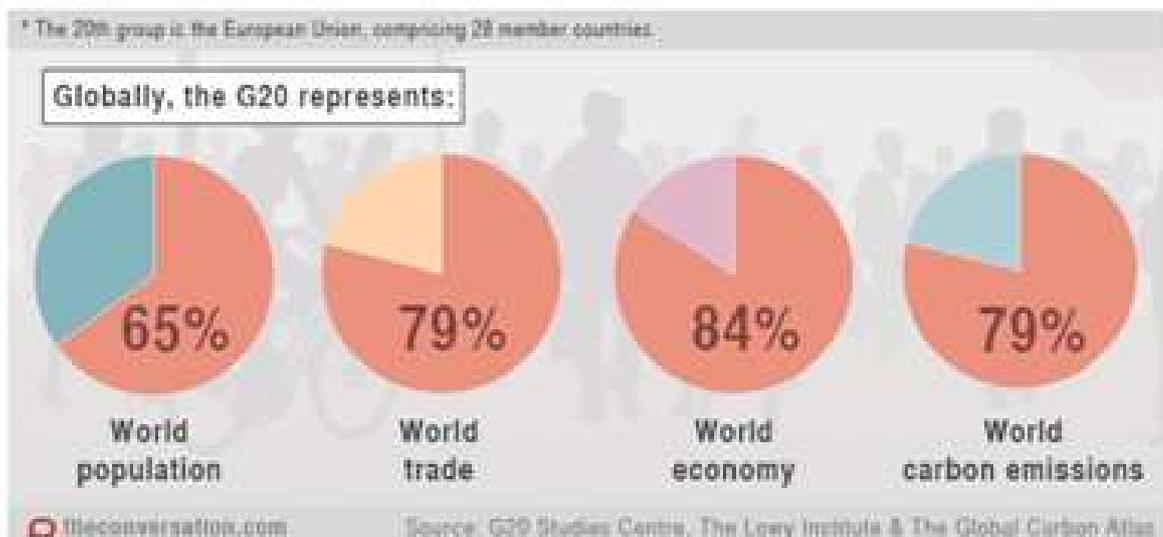
➢ The ACWG actively works with the World Bank Group, the OECD, the UNODC, the IMF, the FATF, as well as with the Business 20 (B20) and the Civil Society 20 (C20).

G-20

➢ Founded in 1999 with the aim to discuss policy pertaining to the promotion of international financial stability. Since inception, the recurring themes covered by G20 summit participants have related in priority to global economic growth,

international trade and financial market regulation

- ➢ G20 has expanded its agenda since 2008 and heads of government or heads of state, as well as finance ministers, foreign ministers and think tanks, have periodically conferred at summits ever since.
- ➢ After the adoption of the UN Sustainable Development Goals and the Paris Climate Agreement in 2015, more "issues of global significance" were added to the G20 agenda: migration, digitisation, employment, healthcare, the economic empowerment of women and development aid.

ILO and India

News Excerpt

India assumed the role of chair of the International LabourOrganisation'sgoverning body for the period of October 2020 till June 2021. It is taking upthe role after a gap of 35 years.

International LabourOrganisation

- India is a founder member of the International Labour Organization, which came into existence in 1919.
- At present the ILO has 186 Members. A unique feature of the ILO is its tripartite character.
- At every level in the Organization, Governments are associated with the two other socialpartners, namely the workers and employers.
- ☐The three organs of the ILO are:
  - o **International Labour Conferences:** - General Assembly of the ILO – Meets everyyear in the month of June. It adopts biennial programme and budget, adoptsInternationalLabour Standards in the form of Conventions and Recommendationsand provides a forum for discussing social, economic and labour related issues.
  - o **Governing Body:** - Executive Council of the ILO. Meets three times in a year in themonths of March, June and November. It is the executive wing of the Organization.
  - o **International Labour Office:** - A permanent secretariat.
- The principal means of action in the ILO is the setting up the International LabourStandards in the form of Conventions and Recommendations. Conventions areinternational treaties and are instruments, which create legally binding obligations on thecountries that ratify them. Recommendations are non-binding and set out guidelinesorienting national policies and actions.
- India has so far ratified 41 Conventions of the ILO, which is much better than the positionexisting in many other countries.
- There are only two conventions which are not ratified by India, namely, Freedom ofAssociation and Protection of Right to Organised Convention and Right to OrganiseandCollective Bargaining Convention.

India and the United Nations

News Excerpt

Permanent Representative to the United Nations T.S. Tirumurtiannouncedthat India's annual resolution on the issue of counter-terrorism was adoptedby consensus in the First Committee of the UN General Assembly.

Pre-Connect

- ➢ First Committee of UN General Assembly, which deals with disarmament, global challenges and threats to peace that affect the international community, adopted two resolutions which were sponsored by India - 'Convention on the Prohibition of the use of Nuclear Weapons' and 'Reducing Nuclear Danger' - under the 'Nuclear weapons' cluster.
- ➢ The 'Convention on the Prohibition of the use of Nuclear Weapons', tabled by India since 1982 in the General Assembly requests the Conference on Disarmament in Geneva to commence negotiations on an international convention prohibiting the use or threat of use of nuclear weapons under any circumstances.
- ➢ It was co-sponsored by more than 75 countries, and was adopted by consensus without a vote.

- The resolution on *'Reducing Nuclear Danger'*, tabled since 1998, draws global attention to the risks of unintentional or accidental use of nuclear weapons and underscores the need for a review of nuclear doctrines. It calls for concrete steps to reduce such risks, including through de-alerting and de-targeting of nuclear weapons.

Resolution on Counter Terrorism

- India, a victim of state-sponsored cross-border terrorism, has been at the forefront in highlighting the serious threat to international peace and security emanating fromacquisition of weapons of mass destruction by terrorist groups.
- Through its annual resolution —Measures to prevent terrorists from acquiring weapons of mass destructionǁ, India has urged greater international co-operation to prevent terrorists from acquiring weapons of mass destruction.
- This resolution, co-sponsored by more than 75 countries, was adopted by consensus without a vote.
- India's call for strengthening national measures to address this issue at the General Assembly also predates the adoption of resolution 1540 by the Security Council, which obliges all states to refrain from supporting by any means non-state actors from developing, acquiring, manufacturing, possessing, transporting, transferring or using nuclear, chemical or biological weapons and their means of delivery.

India and OECD

News Except

India has emerged as the second largest source country both in terms of the **"total"** inflow of new migrants to OECD countries during 2018 and also as regards the number of Indian acquiring citizenship of these countries.

Highlights

- The Organisation for Economic Co-operation and Development (OECD) is an intergovernmental economic organisation with 37 member countries, founded in 1961 to stimulate economic progress and world trade. It is a forum of countries describing themselves as committed to democracy and the marketeconomy, providing a platform to compare policy experiences, seek answers to common problems, identify good practices and coordinate domestic and international policies of its members
- Generally, OECD members are high-income economies with a very high Human Development Index (HDI) and are regarded as developed countries.
- The OECD's headquarter is in Paris, France. The OECD is funded by contributions from member countries at varying rates.

India-Pakistan and GI tag

News Excerpt

Pakistan has decided to file its opposition in the European Union in response to India's application for an exclusive Geographical Indications (GI) tag to Basmati rice in the 27-member bloc.

NEEDS NO INTRODUCTION, BUT PROTECTION

- Geographical Indication (GI) tag is used for product of a **specific geographical origin**
- GI tag points to **qualities or reputation** of a particular product that is due to its origin
- **Traditional geographical area of Basmati cultivation:** Punjab (both in India and Pakistan), Haryana, western UP, Uttarakhand, J&K, Himachal Pradesh, Delhi
- GIs are also about **culture, traditions, heritage** and traditional practices of people and countries
- It also **prevents unauthorized use** (cultivation,manufacture, and marketing) of a registered GI product by other countries
- **Basmati** – India/ Pakistan world famous aromatic and **long grain rice** — has so far not got GI tag

Once a product gets GI tag, it confers it a legal protection

INDIA'S famous GIs
- Banarasi silks
- Darjeeling tea
- Pashmina shawls
- Chanderi silk
- Nilgiri tea
- Malabar pepper
- Nagpur orange
- Kancheepuram silks
- Coorg coffee
- Assam tea

Highlights

- Indian Basmati Rice enjoys a premium in the export market as it is known for its fragrance, long grain and genuineness.
- A geographical indication or GI is a sign used on products that have a specific

geographical origin and possess qualities or a reputation that are due to that origin.

➢ It is a kind of trademark in the international market.

➢ Geographical Indications are part of the intellectual property rights that comes under the Paris Convention for the Protection of Industrial Property.

➢ GI tag belong to the region and people making the product. These people are provided special protection under EU's GI law.

➢ In May 2010, APEDA got GI certification for Basmati. The GI tag applies for the region located in Indo-Gangetic Plains (IGP) below the foothills of the Himalayas, spread across 7 states (Himachal Pradesh, J&K, Punjab, Haryana, Uttarakhand, Western UP (26 districts) and Delhi).

QUAD (Quadrilateral Security Dialogue)

News Excerpt

The second ministerial meeting of the four-nation Quadrilateral SecurityDialogue (Quad) in Tokyo has been followed by a decision to include Australiain the Malabar 2020 naval exercise after a gap of 13 years.

Highlights

● The Quadrilateral Security Dialogue (QSD, also known as the QUAD) is an informal strategic forum between the United States, Japan, Australia and India.

● The idea was first mooted by Japanese Prime Minister Shinzo Abe in 2007 at the ASEANsummit.

● In November 2017, India, the US, Australia and Japan gave shape to the long-pending "Quad" Coalition on the sidelines of 31st ASEAN and 12th East Asia Summits.

● The second ministerial meeting of the four-nation Quadrilateral Security Dialogue (Quad) was held in Tokyo on October 6, 2020.

● Malabar naval exercise features the Quad partners.

Asia Pacific Economic Cooperation (APEC)

News Excerpt

Recently, leaders from the Asia-Pacific Economic Cooperation forum, including former US President Donald Trump, pledged to work towards free, open and non-discriminatory trade and investment to revive their coronavirus-battered economies.

The leaders cast aside differences to issue their first joint statement, in which they agreed to further deepen regional integration by working towards a massive free trade agreement involving all the 21 APEC economies.

Highlights

➢ The Asia-Pacific Economic Cooperation (APEC) is a regional economic forum established in 1989 to leverage the growing interdependence of the Asia-Pacific. The APEC process is supported by a permanent secretariat based in Singapore.

➢ The 21 economies cover 37 percent of the global population, 48 percent of the world's trade volume and 60 percent of global gross domestic product.

➢ APEC's 21 members aim to create greater prosperity for the people of the region by promoting balanced, inclusive, sustainable, innovative and secure growth and by accelerating regional economic integration.

➢ APEC ensures that goods, services, investment and people move easily across borders. Members facilitate this trade through faster customs procedures at borders; more favourable business climates behind the border; and aligning regulations and standards across the region.
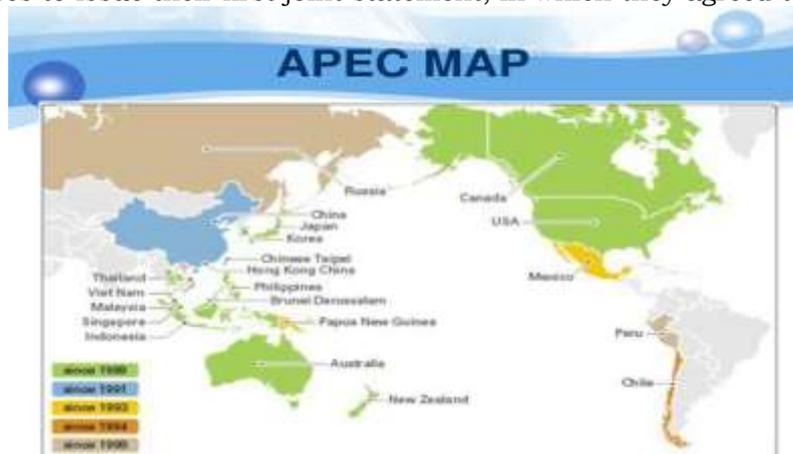
Regional Comprehensive Economic Partnership (RCEP)

News Excerpt

Recently, 15 countries solidified their participation in the Regional Comprehensive Economic Partnership (RCEP). Even as India opted to stay out after walking out of discussions, the new trading bloc has made it clear that the door will remain open for India to return to the negotiating table.
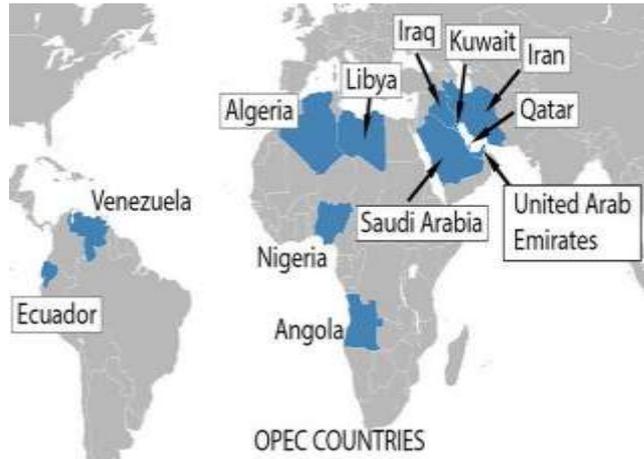
Highlights

- Described as the "largest" regional trading agreement to this day, RCEP was originally being negotiated between 16 countries — ASEAN members and countries with which they have free trade agreements (FTAs), namely Australia, China, Korea, Japan, New Zealand and India.

OPEC COUNTRIES

- The purpose of RCEP was to make it easier for products and services of each of these countries to be available across this region.
- It also includes provisions on intellectual property, telecommunications, financial services, e-commerce and professional services.
- Although the RCEP was an ASEAN initiative, it is regarded by many as a China-backed alternative to the Trans-Pacific Partnership (TPP), a proposed deal that excluded China but included many Asian countries.
- Members of the RCEP make up nearly a third of the world's population and account for 29% of global gross domestic product.

Riyadh Initiative on the Future of the WTO (the Riyadh Initiative)

The **Riyadh Initiative on the Future of the WTO (the Riyadh Initiative)** was launched by the Saudi G20 Presidency (the Presidency), building on the commitment from G-20 Leaders, to provide an additional opportunity for members to work constructively towards the necessary reform of the WTO. By identifying common ground of WTO objectives and trade policy principles under the Riyadh Initiative, the G20 can play an important role in providing political support for reform discussions.

OPEC+

News Excerpt

OPEC+ has finally managed to reach a production cut agreement after several days of increased internal dissent. In its statement, the group reiterated a continued commitment to a stable market, the mutual interest of producing nations, the efficient, economic and secure supply to consumers, and a fair return on invested capital.

Highlights

- OPEC+ refers to the group of 24 crude producers comprising 14 OPEC members and 10 non-OPEC members including Russia.
- OPEC plus countries include Azerbaijan, Bahrain, Brunei, Kazakhstan, Malaysia, Mexico, Oman, Russia, South Sudan and Sudan.
- Saudi and Russ ia, both have been at the heart of a three-year alliance of oil producers known as OPEC Plus — which now includes 11 OPEC members and 10 non-OPEC nations — that aims to shore up oil prices with production cuts.
- OPEC with 14 members controls 35% of global oil supplies and 82% of proven reserves. These figures increase to 55% and 90% respectively with the addition of 10 non-members to form the OPEC+ group. This enables the OPEC+ group to have substantial control of oil prices around the world economy.

Advisory Committee on Administrative and Budgetary Questions

News Excerpt

In a significant victory for India at the United Nations, Indian diplomat VidishaMaitra was elected to the U.N. Advisory Committee on Administrative and Budgetary Questions

(ACABQ), a subsidiary organ of the General Assembly.

Highlights

● The Advisory Committee on Administrative and Budgetary Questions (ACABQ) is a subsidiary of the General Assembly responsible for "expert examination of the programme budget of the United Nations".

● Established by a UN General Assembly resolution in 1946

● The Advisory Committee is an expert Committee of sixteen Members elected by the General Assembly for a period of three years, on the basis of a broad geographical representation.

● Members serve in a personal capacity and not as representatives of Member States.

● The 193-member General Assembly appoints members of the Advisory Committee. Members are selected on the basis of broad geographical representation, personal qualifications and experience.

● The Chairman and Vice-Chairman of the Committee are elected by the Members of the Advisory Committee.

● It meets in New York in closed sessions: Meeting records and press releases are not issued

● It reports to the General Assembly on:
- Proposed programme budget
- UN Accounts
- Specific topics relating to the budget and finances of the organization

Major functions of ACABQ
- To examine and report on the budget submitted by the Secretary-General to the General Assembly;
- To advise the General Assembly concerning any administrative and budgetary matters referred to it;
- To examine on behalf of the General Assembly the administrative budgets of the specialized agencies and proposals for financial arrangements with such agencies;
- To consider and report to the General Assembly on the auditors' reports on the accounts of the United Nations and of the specialized agencies.

Information Fusion Centre for Indian Ocean Region

News Excerpt

At the Navy's Information Fusion Centre for the Indian Ocean Region (IFC-IOR) which is meant to promote Maritime Domain Awareness, three more International Liaison Officers (ILO) are expected to join soon. ILOs from France, Japan and the U.S. have already joined the centre.

Highlights
- IFC-IOR is established with the vision of strengthening maritime security in the region and beyond, by building a common coherent maritime situation picture and acting as a maritime information hub for the region.
- The IFC has been established at Gurugram, India and is collocated with Information Management and Analysis Centre which is jointly administered by the Indian Navy and Indian Coast Guard.
- Its task is to go beyond the bilateral and collate, fuse and disseminate intelligence on 'White Shipping' in the Indian Ocean.
- Establishment of IFC- IOR would ensure that the entire region is benefitted by mutual collaboration and exchange of information and understanding the concerns and threats which are prevalent in the region.
- In addition to utilising the collective wisdom and resources towards addressing myriad challenges in the region, IFC-IOR will help interface and integrate, wherein, all partners and stakeholders would benefit from each other's best practices and expertise.
- India has launched its own Indian Ocean Region-Information Fusion Centre (IFC-IOR), which has established linkages with over 18 countries and 15 maritime security agencies.
- Information sharing can be done through direct communication and by sharing

agreements between the respective maritime agencies or could find new mechanisms to work with regional information fusion centers.

> The information Exchange at the IFC-IOR would be initially undertaken by virtual means, using telephone calls, faxes, emails and video conferencing over internet. Subsequently, to enable better interconnection, quicker analysis of information and provide timely inputs, the IFC-IOR would host Liaison Officers from partner countries. Additionally, towards enhancing capability building, the IFC-IOR would undertake conduct of exercises and training capsules in maritime information collection and sharing.

Global Alliance for Vaccines and Immunization (GAVI)

News Excerpt

Recently the Union Health Minister was nominated by the Global Alliance for Vaccines and Immunisation (GAVI) as a member on its board. The GAVI Board is responsible for strategic direction and policy-making, oversees the operations of the Vaccine Alliance and monitors programme implementation.

Highlights

> The Bill and Melinda Gates Foundation and a group of founding partners brought to life an elegant solution to encourage manufacturers to lower vaccine prices for the poorest countries in return for long-term, high-volume and predictable demand from those countries. In 2000, that breakthrough idea became the Global Alliance for Vaccines and Immunization.

> GAVI is an international organisation that was created in the year 2000 to improve access to new and underused vaccines for numerous vaccine-preventable diseases for children who live in the world's poorest countries.

> GAVI now vaccinates almost half of the world's children, giving it tremendous power to negotiate vaccines at prices that are affordable for the poorest countries and to remove the commercial risks that previously kept manufacturers from serving them.

> The GAVI Board provides a forum for balanced strategic decision making, innovation and partner collaboration.

> GAVI launched the COVID-19 Vaccines Advance Market Commitment (COVAX AMC) as the first building block of the COVAX Facility. The GAVI COVAX AMC is the innovative financing instrument that will support the participation of low- and middle-income economies in the COVAX Facility – enabling access to donor-funded doses of safe and effective COVID-19 vaccines.

Refugee Crisis in Bangladesh

News Excerpt

Bangladesh started moving a second group of Rohingya Muslim refugees to a low-lying BhasanChar island in the Bay of Bengal, despite opposition from rights groups worried about the new site's vulnerability to floods.

Highlights

> Since 2017, more than 700,000 Rohingya refugees from Myanmar have fled to Bangladesh. This Rohingya refugee crisis is among the largest, fastest movements of people in recent history.

> The Rohingya, a mostly-Muslim minority ethnic group in predominantly Buddhist Myanmar (Rakhine state), are escaping what the United Nations has described as genocidal violence that follows decades of persecution and human rights abuses.

Current Status

> Today, about 860,000 stateless Rohingya refugees live in the world's largest and most densely populated.

> Despite this help, the Rohingya people remain at risk, and their future is uncertain. Without recognized refugee status in Bangladesh or legal citizenship in Myanmar, they are citizens of nowhere.

> Essentially stateless, without legal rights and protection, Rohingya children and families are vulnerable to human trafficking, child labour, child marriage, gender-based violence, and other forms of exploitation and abuse.

> The influx of almost 1 million Rohingya profoundly affected local communities — already among the poorest in Bangladesh. The refugee population is now almost

triple that of the host community.
➤ The crisis has also acquired a security dimension with concerns being raised over the infiltration of Islamic extremism amongst the Rohingyas, who have grown increasingly desperate over their plight. The massive refugee outflow has created a serious humanitarian crisis that carries implications on regional stability and security.

India's approach towards the refugee crisis

➤ Geopolitics, security and economic interests and humanitarian concerns were key in moulding India's Rohingya response during this phase.
➤ In the second phase, apart from geopolitics, humanitarian concerns and non-interference in internal affairs, two other factors appeared to have driven the Indian approach—the growing security concerns and the need for diplomatic balancing between Bangladesh and Myanmar.
➤ Delhi's approach in the third phase was probably driven by the need to find a role for itself in finding a resolution to the crisis by strengthening its quiet diplomacy. The phase began soon after China stepped in with its "three-step solution" to the Rohingya crisis and the subsequent signing of the repatriation agreement between Bangladesh and Myanmar. Delhi's assessment perhaps was shaped by its calculation that any delay in stepping up its role might allow other players to leverage the situation for geopolitical gains, at the cost of its own interests.

India and UNSC

News Excerpt

India will sit in the 15-nation UNSC for the 2021-22 term as a non-permanent member. It is the eighth time that the country has had a seat on the powerful horseshoe table.

Highlights

➤ The Security Council is one of the UN's six main organs, and is aimed at maintaining international peace and security.
➤ The Security Council consists of five permanent members (China, France, Russian Federation, United Kingdom of Great Britain and Northern Ireland and United States of America) and 10 non-permanent members elected by the General Assembly for a term of two years.
➤ The permanent members have the veto rights whereas the non-permanent members have no veto rights.
➤ In accordance with rule 92 of the rules of procedure, the election is held by secret ballot and there are no nominations. Under rule 83 of the rules of procedure, the non-permanent members of the Security Council are elected by a two-thirds majority. As stipulated in the rules of procedure, a retiring member is not eligible for immediate re-election.
➤ On 17 June, India was elected to the UN Security Council with 184 of the total 192 votes
➤ India had last assumed the role of a non-permanent member at the UNSC in 2011-12. Prior to that, it was a non-permanent member for 1950-51, 1967-68, 1972-73, 1977-78, 1984-85 and 1991-92.
➤ On January 1, India, Norway, Kenya, Ireland and Mexico will join non-permanent members Estonia, Niger, Saint Vincent and the Grenadines, Tunisia and Vietnam and the five permanent members China, France, Russia, U.K. and the U.S.
➤ India will be UNSC President in August 2021 and will preside over the council again for a month in 2022
➤ The presidency of the council is held by each of the members in turn for one month, following the English alphabetical order of the member states' names.
➤ The presidency of the council is held by each of the members in turn for one month, following the English alphabetical order of the member states' names.

Draft Arctic Policy

News Excerpt

The Government of India is in the process of formulating an Arctic Policy.

Pre-Connect

- The Arctic is commonly understood to refer to the region above the Arctic Circle, north of latitude 66° 34' N, which includes the Arctic Ocean with the North Pole at its centre.
- Much of this Ocean falls within the jurisdiction of five Arctic littoral states—Canada, Denmark (Greenland), Norway, Russia and the USA (Alaska). Three other Arctic nations, Finland, Sweden and Iceland along with the five littorals form the Arctic Council.
- India was accorded the status of an Observer to the Arctic Council in 2013, one of the thirteen countries in the world to have done so. \
- The fact that this status was renewed in 2018 reflects India's contribution to Arctic studies and research.
- India's Arctic policy will rest on five pillars:
  - Science and research
  - Economic and human development cooperation
  - Transportation and connectivity
  - Governance and international cooperation
  - National capacity building
- This Policy shall be implemented through an Action Plan and an implementation and review mechanism based on timelines, prioritisation of activities and allocation of resources. The implementation will involve all stakeholders including academia, research community, business and industry.

Solidarity and stability deal of gulf leaders

News Excerpt

Gulf leaders have signed a "solidarity and stability" agreement towards ending the diplomatic rift with Qatar at a summit in Saudi Arabia.

Highlights

GCC is a political, economic, social, and regional organisation which was established by an agreement concluded in 1981 between Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and UAE in view of their special relations, geographic proximity, similar political systems based on Islamic beliefs, joint destiny and common objectives.

Palk Bay Fishing Conflict

News Excerpt

Four fishermen from Ramanathapuram district are the latest casualties in the decades-old Palk Bay fisheries conflict between India and Sri Lanka.

Pre-Connect

- The Palk bay, which is 137 kilometers in length and varies from 64 to 137 Kilometers in width, is divided by the International Maritime Boundary Line (IMBL). Bordering it are five Indian districts and three Sri Lankan districts.
- The narrow strip of water, separating the state of Tamil Nadu in India from the Northern Province of Sri Lanka, has historically provided rich fishing grounds for both countries. However, the region has become a highly contested site in recent decades, with the conflict taking on a new dimension since the end of the Sri Lankan Civil War in 2009.
- Multiple issues have compounded to bring tensions to a near crisis point, with serious ramifications for internal and bilateral relations.
- These issues include ongoing disagreement over the territorial rights to the island of Kachchatheevu, frequent poaching by Indian fisherman in Sri Lankan waters, and the damaging economic and environmental effects of trawling.

International Organization of Securities Commissions

News Excerpt

International Financial Services Centres Authority (IFSCA) said it has become an **associate member of the International Organization of Securities Commissions**.

The International Organization of Securities Commissions (IOSCO)

- The International Organization of Securities Commissions (IOSCO) is the international body that brings together the world's securities regulators and is recognized as the global standard setter for the securities sector.
- IOSCO was created in 1983, when 11 securities regulatory agencies from North and

South America agreed to build their inter-American regional association into an international cooperative body. Currently, its membership regulates more than 95% of the world's securities markets in more than 115 jurisdictions; securities regulators in emerging markets account for 75% of its ordinary membership.

➢ The Secretariat remained in Montreal until 1999 when it was then moved to Madrid.

➢ IOSCO develops, implements and promotes adherence to internationally recognized standards for securities regulation.

➢ The IOSCO works closely with the G20 and the Financial Stability Board in setting up the standards for strengthening the securities markets and global regulatory reform agenda.

➢ By providing high quality technical assistance, education and training, and research to its members and other regulators, IOSCO seeks to build sound global capital markets and a robust global regulatory framework.

➢ In 1998 IOSCO adopted a comprehensive set of Objectives and Principles of Securities Regulation (IOSCO Principles), now recognized as the international regulatory benchmarks for all securities markets.

➢ The IOSCO Objectives and Principles of Securities Regulation have been endorsed by Financial Stability Board as one of the key standards for sound financial systems.

International Financial Services Centres Authority (IFSCA)

➢ The first International Financial Services Centre (IFSC) in the country has been set up at the Gujarat International Finance Tec-City (GIFT) in Gandhinagar.

➢ To regulate such institutions, the government established IFSCA on April 27 last year with its head office in Gandhinagar.

➢ As the dynamic nature of business in the IFSCs requires a high degree of inter-regulatory coordination within the financial sector, the IFSCA has been established as a unified regulator with a holistic vision in order to promote ease of doing business in IFSC and

➢ provide world class regulatory environment.

➢ The main objective of the IFSCA is to develop a strong global connect and focus on the needs of the Indian economy as well as to serve as an international financial platform for the entire region and the global

➢ economy as a whole.

➢ The membership of IOSCO would provide IFSCA the platform to exchange information at the global level and regional level on areas of common interests.

➢ Further, the IOSCO platform would enable IFSCA to learn from the experiences and best practices of the regulators of other well established financial centers.

Open Sky Treaty

News Excerpt

In November 2020, the Trump administration withdrew the United States from the Open Skies Treaty. In January 2021, the Russian government said it will take steps to follow suit.

Open Skies Treaty

➢ Open Skies Treaty (OST) is a 34-member accord that allows participants to fly unarmed reconnaissance flights over any part of their fellow member states.

➢ First proposed in 1955 by former US President Dwight Eisenhower as a means to deescalate tensions during the Cold War, the landmark treaty was eventually signed in 1992 between NATO members and former Warsaw Pact countries following the demise of the Soviet Union.

➢ It went into effect in 2002 and currently has 35 signatories along with one non-ratifying member (Kyrgyzstan).

➢ The OST aims at building confidence among members through mutual openness, thus reducing the chances of accidental war.

➢ Under the treaty, a member state can "spy" on any part of the host nation, with the latter's consent. A country can undertake aerial imaging over the host state after giving notice 72 hours before, and sharing its exact flight path 24 hours before.

➢ The information gathered, such as on troop movements, military exercises and missile deployments, has to be shared with all member states.

Sino-India Disengagement

➤ India-China reported the first such violent clash since 1975, even though over the past few years there have been frequent stand-offs along the disputed border.

   o In 2020, India faced the most serious national security crisis since the Kargil War in 1999.

➤ On the intervening night of May 5 and May 6, Indian and Chinese troops had a scuffle at PangongTso in Ladakh, and also a clash between troops took place at Naku La in North Sikkim on May 9.

➤ On May 18, China accused India of "trespass" and building "illegal" infrastructure on the LAC.

➤ On the intervening night of June 15 and June 16, 20 Indian soldiers were killed after a violent face-off with the Chinese People's Liberation Army in Galwan during the "deescalation" process.

➤ On June 19, China's government said it claimed the entire Galwanvalley, including to areas that are currently on India's side of the LAC.

➤ In recent development, troops from both sides have started disengaging from the PangongTso area in eastern Ladakh. (Resolve through talks - the nine-month military standoff along the LAC in Ladakh)

➤ China will pull its troops on the north bank towards the east of Finger 8. Similarly, India will also position its forces at its permanent base at the Dhan Singh Thapa post near Finger 3. Similar action will be taken by both the parties in the south bank area as well.

➤

➤ Both sides have also agreed that the area between Finger 3 and Finger 8 will become a nopatrolling zone temporarily, till both sides reach an agreement through military and diplomatic discussions to restore patrolling. Further, all the construction done by both sides on the north and south banks of the lake since April 2020 will be removed.

Why does the Kailash Range matter?

➤ On August 30, 2020, the Special Frontier Force (SFF) troops secured Kailash Ridge as a pre-emptive operation.This action proved a game-changer.

➤ The Karakoram Range ends on the northern side of the PangongTso. The Kailash Range originates from the southern bank and runs northwest to southeast for over 60 km.

➤ The Kailash Ridge is characterised by rugged, broken terrain with heights varying between 4,000-5,500m, and its key features include Helmet Top, Gurung Hill, Spanggur Gap, Muggar Hill, Mukhpari, Rezang La and Rechin La. The Ridge dominates Chushul Bowl; an important communications centre.

Recalibration of India-Russia ties

• Recently, India's Foreign Secretary is on a two-day trip to Russia to add momentumto bilateral ties.

• The two counties share a Special and Strategic Partnership. Apart from close cooperation on defence, the two sides have jointly worked in fields like oil and gas, nuclear energy, space, science, and technology.

• Notwithstanding the threat of sanctions from the US, India would be receiving five S-400 air defence systems from Russia, which reflects the thrust India puts on its engagement with Russia.

• The two countries are closely working on UNSC reforms and have a converging view

of many issues of regional and global significance.

- India's relations with the U.S. and Russia stand on their own merits and all the major powers recognise fully India's tradition of an independent foreign policy.
- Russia is an important Pacific power.In September 2019, Prime Minister Modi referred to Vladivostok as a junction between Eurasia and the Indo-Pacific.
- The Chennai-Vladivostok Maritime Corridor which will further link to the Northern Sea Route and the Pacific will create a connectivity continuum that will bind India and Russia together from the Arctic to the Indian Ocean.
- Moreover, India does not see the Indo-Pacific Region as a club of limited members nor as a new theatre for geostrategic contestation. It includes all nations in this geography as also others beyond who have a stake in it aimed at Security and Growth for All in the Region (SAGAR).

Myanmar's military coup

- ➢ Myanmar, also known as Burma, is in South East Asia. It neighbours Thailand, Laos, Bangladesh, China and India.
- ➢ The country gained independence from Britain in 1948. It was ruled by the armed forces from 1962 until 2011, when a new government began ushering in a return to civilian rule.
- ➢ The military is now back in charge and has declared a year-long state of emergency. Military commander-in chief Min Aung Hlaing has taken power.
- ➢ UN Secretary-General António Guterres said it was a "serious blow to democratic reforms".
- ➢ The protests over the coup have been the largest since the so-called Saffron Revolution in 2007, when thousands of monks rose up against the military regime.
- ➢ **Impact on India's Act East policy:** India has stepped up its strategic engagement with Myanmar because of insurgent groups from the Northeast which have set up base in Myanmar. India shares 1643 km long ka boundary with Myanmar.
- ➢ Apart from strategic concerns, India has cultivated several infrastructure and development projects with Myanmar, which it sees as the "gateway to the East" and ASEAN countries. These include the India-Myanmar-Thailand Trilateral highway and the Kaladan Multimodal transit transport network, as well as a plan for a Special Economic Zone at the Sittwe deep-water port (Rakhine province).
  - o The location of the port, which will play a central role in connecting the Northeast region to the sea.

India-Ukraine Defence Cooperation

- ➢ India has an extensive bilateral relationship with Ukraine, spanning all spheres of cooperation. India was one of the first countries to recognize Ukraine.
- ➢ India offers training programs to Ukraine under ITEC (Indian Technical and Economic Cooperation) program, which offers training or capacity building programs in different centers of excellence in India.
- ➢ At present, the biggest ongoing defence cooperation between the two countries is the upgrade of nearly 100 AN-32 aircraft of the Indian Air Force by Ukrainian firm Antonov.India has also procured gas turbine engines from Ukraine to power many Navy vessels.
- ➢ Ukraine is keen to offer India its multi-purpose medium transport aircraft, N-178. Aside from this, Ukraine has also been focusing on unmanned aerial systems (UAS) and anti-unmanned aerial vehicles (UAV).Their PD-2 range of unmanned aerial systems and the RAM 11 combat loitering UAS are on offer.
- ➢ Both nations share strong cooperation in the aerospace industry and are now in the process of negotiation with IAF and Indian partners.

Afghanistan Peace Plan

- ➢ The Joe Biden administration has proposed a new peace plan to the Afghan government and the Taliban, seeking to bring violence to a halt and form an interim Government.
- ➢ The proposal includes many elements like an UN- led conference of representatives of Russia, China, Pakistan, Iran, India and the U.S. "to discuss a unified approach

to support peace in Afghanistan".
- o This is a big opportunity, given the fact that India has been losing leverage in Afghanistan ever since the Taliban came back to battle in 2004, getting stronger and stronger.India, which has never publicly opened talks with the Taliban, has remained hopeful that the U.S. will retain some forces in Afghanistan in order to ensure leverage and interest in the reconciliation process.
  - o India hopes to have a role in setting the terms especially concerning terrorism, violence, women's rights and democratic values.
- ➢ Afghanistan derives its political significance because of its geo-strategic position i.e. it is situated at the crossroads of ancient civilizations – Indian, European, Chinese.
- ➢ As a landlocked country neighboring China, Pakistan, Iran and Central Asian countries, Afghanistan has significant geostrategic and geopolitical importance. It is the only country in the region which gives open access to the United States and NATO Allies.
- ➢ Taliban represents the Pashtuns, which is the biggest and most dominant ethnic tribe and has ruled Kabul in the past. The Taliban have also recently been taking recruits from all ethnicities, including the Hazaras, who are Shia Muslims.
- ➢ Insecurity and instability in Afghanistan would destabilize the region and provide fertile ground for terrorist groups, posing a threat to all nations.India has a major stake in the stability of Afghanistan since it has invested considerable resources in Afghanistan's development.

Airborne Assaults on Saudi Oil Installation
- ➢ A drone attack struck an oil installation in Saudi Arabia's capital of Riyadh, ignited blaze at the oil facility deep in the kingdom's territory.
- ➢ Yemen, one of the Arab world's poorest country, has been devastated by a civil war. The conflict has its roots in the Arab Spring of 2011, when an uprising forced the country's long-time authoritarian president, Ali Abdullah Saleh, to hand over power to his deputy, Abdrabbuh Mansour Hadi.
- ➢ Fighting began in 2014 when the Houthi Shia Muslim rebel movement took advantage of the new president's weakness and seized control of northern Saada province and neighbouringareas.The Houthis went on to take the capital Sanaa, forcing MrHadi into exile abroad.
- ➢ Saudi Arabia leads a military coalition which intervened in Yemen in March 2015 against Houthi forces, which ousted the internationally-recognised Yemeni government from power in Sanaa in late 2014. The world's worst humanitarian crisis (the war has killed about 130,000 people — including more than 12,000 civilians).
- ➢ The Iran-aligned Houthis have stepped up attacks into Saudi Arabia, the world's top oil exporter.
- ➢ While Houthi-claimed attacks on Saudi Arabia rarely cause damage, strikes on major oil facilities in the kingdom, the world's largest oil exporter, raise the risk of a disruption in world oil supplies.
- ➢ In the fall of 2019, a drone and missile attack struck two key Saudi oil installations and halted about half of the country's oil supplies.
- ➢ The kingdom is facing more frequent airborne assaults as Saudi-led coalition forces battle Iran-backed Houthi rebels across the southern border in Yemen.

India-US Trade issues and challenges
- ➢ Effective June 2019, President Donald Trump removed India from GSP, a U.S. trade and development program, for failure to provide "equitable and reasonable" market access. GSP provides nonreciprocal, duty-free tariff treatment to certain products imported from qualifying developing countries.
- ➢ After India lost its eligibility for a U.S. trade preference program, India imposed higher tariffs of 10% to 25%, affecting about $1.32 billion of U.S. exports (2019 data), such as nuts, apples, chemicals, and steel. The two sides are challenging each other's tariffs in the WTO.
- ➢ The United States and India are competitive in certain services industries. Barriers to U.S. firms' market access include India's limits on foreign ownership and local

presence requirements. A key issue for India is U.S. temporary visa policies, which affect Indian nationals working in the United States.

➢ Sanitary and phytosanitary (SPS) barriers in India limit U.S. agricultural exports. The United States questions the scientific and risk-based justifications of such barriers. Each side also sees the other's agricultural support programs as market-distorting; India's view of its programs from a broad food security lens complicates matters.

➢ India remained on the Priority Watch List of the U.S. 2020 Special 301 report, which cited India's insufficient progress in addressing IP challenges and noted concerns over India's treatment of patents, high IP theft rates, and lax trade secret protection.

➢ Bilateral trade is about 3% of U.S. world trade. It is more consequential for India; in 2019, the United States was India's largest goods export market (17% share), and third-largest goods import supplier (7%), after China (14%) and the European Union (9%). U.S.-India foreign direct investment (FDI) is limited, but growing. Defense sales also are significant in bilateral trade.

➢ Regional Integration: Both India and the United States are absent from the Indo-Pacific region's two major trade pacts. India negotiated, but opted not to join, the Regional Comprehensive Economic Partnership (RCEP), signed by China and 14 other countries in November 2020. India cited concerns about RCEP's fairness and balance, and reportedly also was concerned about the effects of opening its markets to Chinese exports. The United States withdrew from the proposed Trans Pacific Partnership (TPP) in 2017.

➢ India also has long sought to join the Asia-Pacific Economic Cooperation (APEC), composed of the United States, China, and 19 other economies, but its willingness to make sufficient economic reforms to join is uncertain.

➢ The United States and some developed countries also are critical of India, China, and others for self-designating as developing countries to claim special and differential treatment under WTO rules— criticisms that these countries refute.

Vaccine passports

➢ Israel became the first country to introduce a certification system that allows those who have been vaccinated against Covid-19 to access certain facilities and events.

➢ The idea is modelled on the proof of vaccination that several countries required even before the pandemic. For example, travellers from many African countries to the US or India are required to submit proof that they have been vaccinated against diseases such as yellow fever.

➢ WHO's position that national authorities and conveyance operators should not introduce requirements of proof of Covid-19 vaccination for international travel as a condition for departure or entry, given that there are still critical unknowns regarding the efficacy of vaccination in reducing transmission.

➢ In addition there are privacy concerns of the digital data.

➢ In addition to those like the ones issued by the Israeli government, several associations and non-profits have been issuing their own versions for international travel.

➢ **key function**
   1. Vaccine passports have been envisaged as digital documents.
   2. It will perform is that of digitising vaccination records across countries.

International North South Transport Corridor

➢ India has proposed the inclusion of strategically located Chabahar Port in the International North South Transport Corridor (INSTC) that proposes to connect the country with Russia via Iran juxtaposing BRI in Eurasian region.

➢ The INSTC project was originally decided between India, Iran and Russia in 2000 in St Petersburg and later came into force in the year 2002 after being ratified by the three countries. Since then, 11 more nations joined the project: Armenia, Azerbaijan, Belarus, Bulgaria (observer status), Kazakhstan, Kyrgyzstan, Oman, Syria, Tajikistan, Turkey, and Ukraine.

➢ It envisions a 7,200-km-long multi-mode network of ship, rail and road route for transporting freight.

- It is one of the key connectivity corridors in the region where Russia has proposed greater Eurasian connectivity.
- India has also welcomed the interest of Uzbekistan and Afghanistan to join the multilateral corridor project. Establishing an eastern corridor through Afghanistan would maximize its potential, which is in the interest of India's Afghan policy.
- The Central Asian region is part of India's "extendedneighbourhood" and of great geostrategic value to India, especially as New Delhi is trying to balance China's huge presence in the region.

Significance

- It will cut down the transportation costs of goods as well the transportation time.
- It will help India to gain smooth access into Central Asia and beyond.
- India-Central Asia relationship will strengthen.
- In addition, India-Russia trade relations will also get new energy with the help of INSTC.

India-Bangladesh Bilateral relations

- The country as a "key neighbour" and a "valued partner" not only "in South Asia but also in the broader Indo-Pacific region". India's ties with Bangladesh "transcend even India's strategic partnership".
- India and Bangladesh share 4096.7 km. of border, which is the longest land boundary that India shares with any of its neighbours.
- India and Bangladesh share 54 common rivers. A bilateral Joint Rivers Commission (JRC) has been working since June 1972 to maintain liaison between the two countries to maximize benefits from common river systems.
- Bangladesh is India's biggest trade partner in South Asia.
- Both nations signed the second addendum to the Protocol on Inland Water Transit and Trade (PIWTT).
- New Initiatives like conducting a trial run of container cargo through Chattogram port to Agartala, adding two new Protocol routes to inland waterways connecting Tripura to Bangladesh national waterways, handing over 10 broad gauge locomotives, commencing movement of container and parcel trains and forming a joint venture in the energy sector.
- Petrapole–Benapole is the most important border post between the two countries.
- Bangladesh government had declared its Chittagong and Mongla ports as Port of Call to facilitate India's uninterrupted international and domestic trade activities through waterways in Bangladesh.

Current state of bilateral ties

- Bangladesh is the largest recipient of Made-in-India vaccines.
- Bangladesh is an active partner of the Belt and Road Initiative (BRI) that creates unease in Delhi.
- Enhanced cooperation in connectivity. For example, Countries agreed to an early operationalization of the Bangladesh-Bhutan-India-Nepal (BBIN) initiative Motor Vehicles Agreement through the expeditious signing of the Enabling MoU for Bangladesh, India and Nepal to commence the movement of goods and passengers.

International Arms Transfers: SIPRI Report

- A report has been released by the Stockholm International Peace Research Institute (SIPRI) on global arms transfer regime. Report cited that India's arms imports fell by 33% between 2011-15 and 2016-20.It has come at a time the country has taken measures to cut dependence on imported military hardware.
- India was the biggest importer of Russian military hardware during the last five years, accounting for 23% of Russia's total exports. India's imports of US arms also fell 46%.
- India's top three arms suppliers during 2016-20 were Russia (accounting for 49% of India's imports), France (18%) and Israel (13%).
- According to Sipri, India accounted for 0.2% of the share of global arms exports during 2016-20, making the country the world's 24th largest exporter of major arms.
- This represents an increase of 228% over India's export share of 0.1% during the

previous five-year period - 2011-15. Myanmar, Sri Lanka and Mauritius were the top recipients of Indian military hardware.

➢ But the US, the world's largest arms exporter, saw its exports rise. Its global share of arms exports went up from 32% to 37% between 2011-15 and 2016-20.

➢ The five largest arms exporters in 2016-20 were the US, Russia, France, Germany and China, while the top importers were Saudi Arabia, India, Egypt, Australia and China.

Issue of illegal influx from Myanmar

➢ The MHA has written to the Chief Secretaries of Nagaland, Manipur, Mizoram and Arunachal Pradesh to take appropriate action as per law to check illegal influx from Myanmar into India

➢ MHA reiterated that the State governments have no powers to grant refugee status to any foreigner and India is not a signatory to the United Nations Refugee Convention of 1951 and its 1967 Protocol.

➢ A Free Movement Regime (FMR) exists between India and Myanmar under which every member of the hill tribes, who is either a citizen of India or a citizen of Myanmar and who is resident of any area within 16 km on either side of the Indo-Myanmar Border (IMB) can cross the border with a border pass (with one-year validity) issued by the competent authority and can stay up to two weeks per visit.

➢ Under the 1951 UN Convention on the Status of Refugees and the subsequent 1967 Protocol, the word refugee pertains to any person who is outside their country of origin and unable or unwilling to return owing to well-founded fear of persecution for reasons of race, religion, nationality, membership of a particular social group or political opinion.

➢ Non-refoulement means no refugee shall be returned in any manner to any country where he or she would be at risk of persecution.

➢ In terming Rohingyas in India as "illegal" (in contrast to calling them refugees in Bangladesh) and pledging to send them back to Myanmar, India is going against the principle of "non-refoulement", to which it is bound as a signatory to other international treaties such as the International Covenant on Civil and Political Rights.

First Quad Summit

➢ The first meeting of the Quad foreign ministers was held in 2019 in New York.
   o The first ever leadership summit of the members of the 'Quad'.

➢ Since its first senior official-level meeting in 2007, the Quadrilateral Security Dialogue (the Quad) among Japan, the United States, India, and Australia has operated both as a meeting format for senior officials to discuss regional security issues and as the basis for a single naval exercise and a single tabletop exercise.

➢ Destabilization in the region has led to a growing convergence in foreign policies among the four states, with a focus on securing a free and open Indo-Pacific, taking joint action against terrorism, and promoting a rules-based system.

➢ It will also provide a boost for India's pharmaceutical prowess, opportunities for technology partnerships, and more avenues for regional cooperation on development projects and financing infrastructure.

IBSA Women's Forum Meeting

➢ The Sixth India-Brazil-South Africa (IBSA) Women's Forum meeting was held virtually and led by the Ministry of Women and Child Development, Government of India.

➢ The summit shed light on how the year 2020 has seen that the rights of women and girls gaining prominence, universality with more urgency than ever before.

➢ IBSA Trilateral Cooperation Forum is a unique platform which brings together India, Brazil and South Africa, three large democracies and major economies from three different continents.

➢ Established in June 2003, IBSA is a coordinating mechanism amongst three emerging countries, three multi ethnic and multicultural democracies.

➢ The principles, norms and values underpinning the IBSA Dialogue Forum are participatory democracy, respect for human rights, the Rule of Law and the

strengthening of multilateralism. IBSA lays efforts in the South-South cooperation beyond the conventional areas of exchange of experts and training.

South China Sea: Whitsun Reef

➢ China's aggressive expansion in the South China Sea has found a new ground, Whitsun Reef, which comes under the Philippines' Exclusive Economic Zones (EEZ).

    ○ China claims the Whitsun reef falls under their nine-dash line.

➢ The Whitsun Reef belongs tothe Spratly archipelago, theterritory of which is claimed by Brunei, China, Malaysia, the Philippines, Taiwan, and Vietnam.

➢ China considers the Spratly archipelago to be its territory. Based on unverified historical accounts, Beijing has long cited the ' Nine-dash line' to back its claim to the majority of the South China Sea.

➢ China and the Philippines, along with other Southeast Asian countries, have long been part of disputes over sovereign claims over the region's islands, reefs and seabeds.

➢ In January 2013, the Philippines formally led the arbitration proceedings against this claim at the Hague, and in 2016, the court ruled in favour of the Philippines and declared the nine-dash line to be unlawful under the United Nations Convention on the Law of the Sea (UNCLOS). The landmark ruling infuriated China, which rejected it as "ill-founded" and continues to maintain presence in the undisputed territories.

Freedom of Navigation Operations

➢ Recently, The US Navy announced that their warship has sailed 130 nautical miles inside India's exclusive economic zone (EEZ), without any intimation to India.

➢ Under UNCLOS, member states have the right to conduct military manoeuvres and movements within the 200 nm EEZ of a state. Indeed, they have the right of "innocent passage" where they can come into the territorial waters within just 12 nm of the country, if they sail straight through without turning on their weapons-related sensors.

➢ Simple transit is permitted to all countries but, as per the United Nations Convention for the Law of the Sea, no military operation or economic activity is permitted without the permission of the littoral nation.

➢ According to UNCLOS, the EEZ is an area beyond and adjacent to the territorial sea, subject to the specific legal regime under which the rights and jurisdiction of the coastal State and the rights and freedoms of other States are governed by the relevant provisions of this Convention.

➢ India ratified the UNCLOS in 1982, the US is not a signatory.

➢ Freedom of Navigation Operations (FONOPs) are operations by U.S. naval and air forces that reinforce internationally-recognized rights and freedoms by challenging excessive maritime claims.

➢ FONOPs include passages lead by the US Navy through waters claimed by coastal nations as their exclusive territory.

➢ FONOPs reaffirm the US policy of exercising and proclaiming its navigation and over flight rights and freedoms across the globe.

Deepening NATO's Dialogue with India

➢ The North Atlantic Treaty Organization also called the North Atlantic Alliance, is an intergovernmental military alliance between 30 European and North American countries.

➢ The organization implements the North Atlantic Treaty that was signed on 4 April 1949.

➢ NATO constitutes a system of collective defense whereby its independent member states agree to mutual defense in response to an attack by any external party.

➢ NATO's Headquarters are located in Haren, Brussels, Belgium, while the headquarters of Allied Command Operations is near Mons, Belgium.

➢ Today, NATO Alliance represents 30 nations, one billion people, and half of the world's economic and military might.

➢ It is the most successful Alliance in history, because of unity, values and its ability to adapt as the world changes.NATO is not only a military Alliance, but also a

political Alliance.

➢ Freedom, democracy and the rule of law are at the core of the NATO Alliance. As the world's largest democracy, these values matter to India, too. Protecting our values and way of life is our shared global responsibility. So, it makes sense for NATO and India to deepen dialogue to protect the international rules-based order and address jointly shared challenges to the security.

➢ Many NATO Allies have well established partnerships with India and they are enhancing their engagement in the Indo-Pacific. At the same time, India is increasing its contacts with Europe and the United States.

➢ In recent times India has certainly sought to end its prolonged political neglect. The deepening maritime partnership with France since 2018 is an example. Joining the Franco-German Alliance for Multilateralism in 2019 is another.

BIMSTEC

➢ The BIMSTEC came into being on 6 June 1997, through the Bangkok declaration.

➢ In 2004, the members decided to hold the Summit every two years as far as possible, and four Summits have been held — in 2004, 2008, 2014 and 2018 — so far.

➢ Headquartered in Dhaka, BIMSTEC is an inter-regional grouping that seeks to foster regional and economic cooperation among nations in the littoral and adjacent areas of the Bay of Bengal — India, Thailand, Myanmar, Nepal, Bangladesh, Sri Lanka and Bhutan.

➢ The BIMSTEC region is home to roughly 22 per cent of the global population with a combined GDP of over $2.7 trillion.

➢ India was a part of the 17th BIMSTEC meet on 1st April. Sri Lanka was the host nation.

➢ Some key agreements signed by BIMSTEC members includes a convention for combating terrorism, transnational organised crime and illicit drug trafficking. However, this awaits ratification.

➢ Another is theBIMSTEC Grid Interconnection, signed during the BIMSTEC Summit in Kathmandu, Nepal, in 2018, which aims to promote an optimal power transmission in the BIMSTEC region.

➢ In a recent virtual meeting of the Foreign Ministers BIMSTEC finalised a major Connectivity master plan for the Bay of Bengal region.

➢ The meeting also endorsed three MoUs/agreements relating to convention on Mutual Legal Assistance in Criminal matters, cooperation between diplomatic and training academies and establishment of BIMSTEC Technology Transfer Facility in Colombo.

➢ For India, BIMSTEC is a platform to fulfill India's key foreign policy priorities of 'Neighborhood First' and 'Act East.'

➢ BIMSTEC has been slow on the come-up because unlike bodies like the EU or ASEAN, it is based on consensus-building which takes time.The BIMSTEC established its Permanent Secretariat only after 17 years.

➢ Other weaknesses of BIMSTEC is a great amount of flexibility in the conduct of its process without having a proper Charter and vision documents.

India-UK Virtual Summit

➢ Prime Minister of India and Prime Minister of United Kingdom held a Virtual Summit in May 2021.
   o The UK is India's second largest partner in research and innovation collaborations.

➢ An ambitious "Roadmap 2030" was adopted at the Summit to elevate bilateral ties to a "Comprehensive Strategic Partnership".
   o It also includes extension of the UK-India Education and Research Initiative (UKIERI) to conclude its important work in bringing higher education and research sectors, and the people who work in them, closer together.

➢ India-UK launched an "Enhanced Trade Partnership" (ETP) to unleash the trade potential between the 5th and 6th largest economies of the world and by setting an ambitious target of more than doubling bilateral trade by 2030.

➢ India and the UK launched a comprehensive partnership on migration and mobility

that will facilitate greater opportunities for the mobility of students and professionals between the two countries.

➤ Significant new cooperation on Maritime Domain Awareness, which includes new agreements on maritime information sharing, an invitation to the UK to join India's Information Fusion Centre in Gurgaon and an ambitious exercise programme which includes joint trilateral exercises.

Israel-Palestine Conflict

➤ Britain took control of the area known as Palestine after the ruler of that part of the Middle East, the Ottoman Empire, was defeated in WW1.

➤ The land was inhabited by a Jewish minority and Arab majority.

➤ Tensions between the two peoples grew when the international community gave Britain the task of establishing a "national home" in Palestine for Jewish people. For Jews, it was their ancestral home, but Palestinian Arabs also claimed the land and opposed the move.

➤ Between the 1920s and 40s, the number of Jews arriving there grew, with many fleeing from persecution in Europe and seeking a homeland after the Holocaust of WWII.

➤ Violence between Jews and Arabs, and against British rule, also grew.

➤ In 1947, the UN voted for Palestine to be split into separate Jewish and Arab states, with Jerusalem becoming an international city. That plan was accepted by Jewish leaders but rejected by the Arab side and never implemented.

➤ In 1948, unable to solve the problem, British rulers left and Jewish leaders declared the creation of the state of Israel. Hundreds of thousands of Palestinians fled or were forced out of their homes in what they call Al Nakba, or the "Catastrophe".

➤ By the time the fighting ended in a ceasefire the following year, Israel controlled most of the territory.

➤ Jordan occupied land which became known as the West Bank, and Egypt occupied Gaza.

➤ Jerusalem was divided between Israeli forces in the West, and Jordanian forces in the East.

➤ In another war in 1967, Israel occupied East Jerusalem and the West Bank, as well as most of the Syrian Golan Heights, and Gaza and the Egyptian Sinai Peninsula.

➤ For India, which voted against the creation of Israel in historic Palestine in 1947 in the UN General Assembly, ties with Israel have transformed since the early 1990s.

➤ The balancing began with India's decision to normalise ties with Israel in 1992, which came against the backdrop of the break-up of the Soviet Union, and massive shifts in the geopolitics of West Asia on account of the first Gulf War in 1990.

➤ In February 2018, PM Modi became the firstIndian Prime Minister to visit Israel. His itinerary did not include Ramallah. Thus, India had —dehyphenated‖the Israel-Palestine relationship, and deals with each separately.

➤ Even in the present conflict, India, a non-permanent member, attempted a delicate balancing act by reaffirming its traditional support for the Palestine cause without abandoning its new friend Israel.

Farazd B Gas Field

➤ After chasing India to develop the field for 13 years, Iran announced that it will develop the offshore gas field, which runs along the country's maritimeborder with Saudi Arabia.

➤ The field holds 23 trillion cubic feet of in-place gas reserves, of which about 60 per cent is recoverable. It also holds gas condensates of about 5,000 barrels per billion cubic feet of gas condensates. Farzad-B's recoverable reserves are about half of total reserves of India, so that made it a big deal.

➤ India's total gas consumption in FY21 was about 166 MMSCMD.

➤ The 3,500 square kilometer Farsi block sits in a water depth of 20-90 metres on the Iranian side of the Persian Gulf.

➤ ONGCVidesh Ltd (OVL), the overseas investment arm of state owned Oil and Natural Gas Corp (ONGC), had in 2008discovered a giant gas field in the Farsi offshore

exploration block.

➢ India needs gas and Iran remains one of the best options as geographically, Iran is closest to India of all the countries in the Persian gulf region.

India-Oman

➢ Oman is a key partner for India in the Indo- Pacific region which provides an anchor for the Persian Gulf as well as eastern and southern Africa.

➢ Oman is a maritime power and India needs its support in the region to counter growing Chinese foothold in the region. India is concerned with China's acquisition of strategic assets in the region including setting its base at Port Doraleh in Djibouti.

➢ In 2018, Oman has given India an access to the key Port of Duqm for military use and logistical support.

➢ Oman and India have been conducting joint military exercises to foster defence cooperation. For example, Biennial Naval exercise "Naseem Al Bahr", Joint military exercise "Al Nageh".

➢ Oman is the only country in the region with which India has bilateral institutionalized exercises in all the three defence services on a biennial basis.

➢ Recently, India has renewed two key defence pacts with Oman, related to military cooperation and maritime security.

China's 17+1 Cooperation Forum

➢ Lithuania decided to quit China's 17+1 cooperation forum with central and eastern European states that includes other EU members.

➢ The 17+1 initiative is a China-led format founded in 2012 in Budapest with an aim to expand cooperation between Beijing and the CEE(Central and East Europe) member countries, with investments and trade for the development of the CEE region.

➢ The framework also focuses on infrastructure projects such as bridges, motorways, railway lines and modernisation of ports in the member states.

➢ The initiative includes twelve EU member states and five Balkan states — Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Macedonia, Montenegro, Poland, Romania, Serbia, Slovakia and Slovenia.

➢ The platform is largely seen as an extension of China's flagship Belt and Road initiative (BRI).

➢ China's narrative towards the 17+1 initiative is about improving its relations with the European countries that are less developed as compared to the Western European states.

Armistice Agreement

➢ The UN Command, led by the United States, found that North and South Korea were both guilty of violating armistice agreements following a recent incident involving gunfire along the Demilitarized Zone between the two countries.

➢ The 1953 Korean Armistice Agreement was a ceasefire agreement which brought a halt to the Korean War in 1953.

➢ Since the armistice was enforced, there have been several violations of it from both North and South Korea, leading to persistent tensions between the two countries.

➢ India played a "much-overlooked but significant role" in bringing the Korean conflict to an end.

➢ A Neutral Nations Repatriation Committee (NNRC) was set up, with India at the helm. Prisoners of the Korean War who refused to return to their countries would be placed under the protection of the NNRC.

India-Bhutan Bilateral Relations

➢ Diplomatic relations between India and Bhutan were established in 1968 with the establishment of a special office of India in Thimphu.

➢ The basic framework of India-Bhutan bilateral relations is the Treaty of Friendship and Cooperation signed in 1949 between the two countries and revised in February 2007.

➢ Government of India has consistently supported the socio-economic development of

Bhutan. Hydro-power cooperation between the two countries is an example of win-win cooperation.

➤ Key areas of cooperation include agriculture and irrigation development, ICT, health, industrial development, road transport, energy, civil aviation, urban development, human resource development, capacity building, scholarship, education and culture.

➤ India is Bhutan's largest trading partner.

➤ The biggest issue between India and Bhutan will remain how to deal with China. The Doklam crisis has brought home many realities for the Bhutanese establishment. One of the most important factor is that Doklam, which has long been discussed as part of a possible "package solution" to the Bhutan-China border dispute, could become apoint of India-China conflagration, with Bhutan becoming a hapless spectator in the middle.

G7 Summit

➤ The leaders of the Group of Seven (G7) rich nations are expected to sign the 'Carbis Bay Declaration', a landmark global health declaration aimed at preventing future pandemics.

➤ The Group of 7 (G7) is an informal group of seven countries — the United States, Canada, France, Germany, Italy, Japan and the United Kingdom, the heads of which hold an annual summit with European Union and other invitees.

➤ Together the member countries represent 40% of global GDP and only 10% of the world's population.

➤ The G7 draws its roots from a meeting between the current G7 members, excluding Canada that took place in 1975. At the time, the global economy was in a state of recession due to the OPEC oil embargo.

➤ Unlike other bodies such as NATO, the G7 has no legal existence, permanent secretariat or official members.

➤ It also has no binding impact on policy and all decisions and commitments made at G7 meetings need to be ratified independently by governing bodies of member states.

➤ The UK holds the G7 presidency for 2021.

➤ This year, India, South Korea and Australia have been invited to attend the G7 summit as participating guests.

➤ The G7 Summit has been the birthplace for several global initiatives. Their efforts led to the formation of the Global Fund, an innovative financing mechanism that has disbursed more than $45 billion in aid and, according to its website, has saved the lives of over 38 million people. More recently, the Global Apollo Program was launched out of the 2015 G7 summit meeting. Designed to tackle climate change through clean energy research and development.

➤ At a G7 summit in 1985, member countries subsequently signed the Plaza Accords, an agreement that had major ramifications for global currency markets.

India & G7

➤ During Prime Minister Manmohan Singh's tenure, India attended the G8 Summit five times.

➤ Since 2014, India has participated twice in the G7 meeting. India had been invited by the G7 French presidency in 2019 to the Biarritz Summit as a "Goodwill Partner".

➤ Earlier US President had suggested that G7 be called "G10 or G11", and proposed that the grouping meet in September or November '2020. But, due to the pandemic and the US election outcome, that did not happen.

➤ India has long called for reforming global institutions and groupings to reflect modern-day geopolitical realities. US offer to expand G7 fitted into New Delhi's idea of being part of the global high table.

The Antarctic Treaty

➤ The 1959 Antarctic Treaty celebrated its 60th anniversary. Negotiated during the middle of the Cold War by 12 countries with Antarctic interests, it remains the only example of a single treaty that governs a whole continent.

➤ The Antarctic Treaty was signed in Washington on 1 December 1959 by the twelve countries whose scientists had been active in and around Antarctica during 1957-

58.

- ➢ It entered into force in 1961 and has since been acceded to by many other nations. The total number of Parties to the Treaty is now 54 (as of June 2021). India is also a party.
- ➢ It is also the foundation of a rules-based international order for a continent without a permanent population.
- ➢ Principal provisions include promoting the freedom of scientific research, the use of the continent only for peaceful purposes, and the prohibition of military activities, nuclear tests and the disposal of radioactive waste.

The Financial Action Task Force (FATF)

News Excerpt: The Financial Action Task Force (FATF) has refused to take Pakistan out of the 'Grey List' yet again. Recently it said that Pakistan had failed to take appropriate action against UN-designated terrorists such as 26/11 accused Hafiz Saeed and JeM chief MasoodAzhar.

- ➢ The Financial Action Task Force (FATF) is the global money laundering and terrorist financing watchdog.
- ➢ The Financial Action Task Force (FATF) was established in July 1989 by a Group of Seven (G-7) Summit in Paris, initially to examine and develop measures to combat money laundering.
- ➢ In October 2001, the FATF expanded its mandate to incorporate efforts to combat terrorist financing, in addition to money laundering. In April 2012, it added efforts to counter the financing of proliferation of weapons of mass destruction.
- ➢ The FATF currently comprises 37 member jurisdictions and 2 regional organisations, representing most major financial centres in all parts of the globe.
- ➢ FATF has issued global, binding standards to prevent the misuse of virtual assets for money laundering and terrorist financing. The standards ensure that virtual assets are treated fairly, applying the same safeguards as the financial sector.

FATF Grey and Black list

- ➢ The FATF 'grey list' comprises countries that FATF thinks should be under "increased monitoring" even as they engage with FATF "to address strategic deficiencies in their regimes to counter money laundering, terrorist financing, and proliferation financing".
- ➢ The Grey list at present has 19 countries including Myanmar, Mauritius, Cambodia, Panama, Barbados, Cayman Islands & Syria. Pakistan has continued on this list since June 2018.
- ➢ The FATF blacklist (sometimes referred to as the OECD blacklist) is a list of countries that the organization considers non-cooperative in the global effort to combat money laundering and the financing of terrorism. By issuing the list, the FATF hopes to encourage countries to improve their regulatory regimes and establish a global set of AML/CFT (Anti-Money Laundering and Combating the Financing of Terrorism) standards and norms.
- ➢ The current FATF blacklist includes two countries: North Korea and Iran.
- ➢ Like the blacklist, countries on the FATF grey list represent a much higher risk of money laundering and terrorism financing but have formally committed to working with the FATF to develop action plans that will address their AML/CFT deficiencies.

ENVIRONMENT

Biosphere Reserves
MAB-Man & Biosphere Network

- An intergovernmental scientific programme
- Objective: To establish a scientific basis for the improvement of relationships between people and their environments.

12 biosphere reserves of India which have been recognized internationally under Man and Biosphere Reserve program:

Nilgiri (First to be included)

Gulf of Mannar	Sunderban
Nanda Devi	Nokrek
Pachmarhi	Similipal
Achanakmar - Amarkantak	
Great Nicobar	Agasthyamala
Khangchendzonga	**Panna Biosphere Reserve**

Nilgiri Biosphere Reserve

- First BR in India to be included in MAB
- States- Tamil Nadu>Karnataka>Kerala .
- Rainfall- 50cm to 700cm
- Temp- 0 degree C to 41 degree C
- Mudumalai Wildlife Sanctuary, Wyanaad Wildlife Sanctuary Bandipur National Park, Nagarhole National Park, Mukurthi National Park and Silent Valley
- Rivers: Bhavani, Moyar, Kabini (Cauvery Tributaries)
- Vegetation- Moist Evergreen, Semi Evergreen, Thorny, Savannah Woodland, Sholas Grasslands, 3300 species of flowers,
- Fauna: Nilgiritahr, Nilgirilangur, slender loris, blackbuck, tiger, gaur, Indian elephant
- Nilgiri Elephant Corridor- Sigur Plateau (Connects Western & Eastern Ghats, Near Mudumalai National Park.
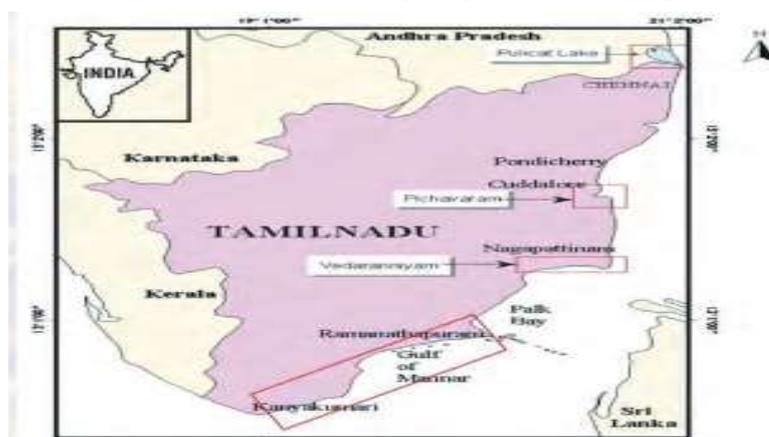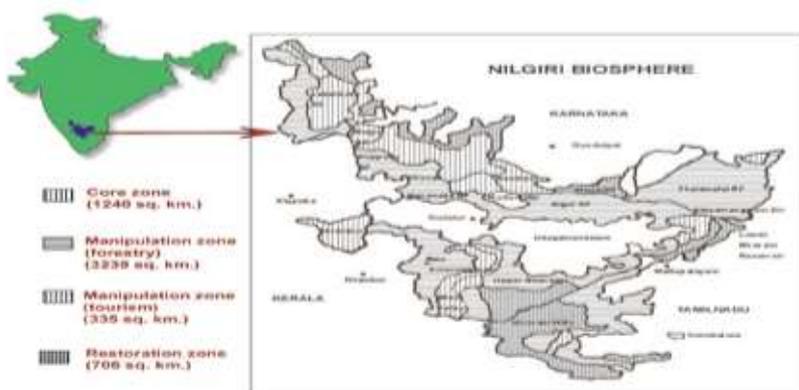
Gulf of Mannar Biosphere Reserve

- Location: from Rameswaram to Kanyakumari
- Vegetation: coral reef, seagrass bed and mangroves
- Fauna: Dugong i.e., Dugong dugon and, also, sea turtles
- the last refuge of an invertebrate, the unique 'living fossil' Balanoglossus that links vertebrates and invertebrates.

- crustaceans, molluscs, echinoderms, fishes, turtles and many other mammals

Agasthyamala Biosphere Reserve

- Location: Western Ghats, Kerala & Tamil Nadu
- Three WLS are there- Shendurney, Peppara and Neyyar&KalakadMundanthurai Tiger reserve
- Vegetation: tropical wet evergreen rainforest,
- tropical and deciduous rainforest, grasslands, and forests.
- Kani Tribe aka Kanikaran tribe- one of the most ancient tribe resides in this area
- River: Thamiraparani
- 2,254 species of higher plants including about 405 endemics, cardamom, jamune, nutmeg, pepper, plantain
- Fauna: nilgiritahr, Tigers, Sloth Bears, and Indian pangolin. Lion-tailed Macaque, Srilankan Frogmouth, Asian Elephants

Great Nicobar

- Location: southernmost island of the Nicobar Islands
- Vegetation: tropical evergreen forest ecosystems
- Fauna: Crab-eating Macaque, Nicobar Tree Shrew, Dugong, Nicobar Megapode, Serpent Eagle, salt water crocodile, marine turtles and Reticulated Python

Panna Biosphere Reserve

- Location: Vindhya Mountain Range Panna&ChhatarpurDist
- River: Ken
- Ken-Betwa river interlinking project also there
- It is also a Tiger reserve
- Vegetation: Dry Deciduous forestinterspread with grassland areas.
- Fauna: Indian deers, chital and chowsingha, Tiger, Blue Bull andchinkara, White necked stork, Barheaded goose, Honey Buuzzard, 5 Species of Vulture
- It also has World Heritage site of the Khajuraho Group of Monuments.
- Bulit by Chandela Dynasty (950-1050 AD)
- Hindu & Jain temple
- Nagara Style architecture

Achanakmar – Amarkantak

- Location: Chhattisgarh and Madhya Pradesh
- River: Narmada, the Johila and the Son
- Vegetation: Mostly Tropical Moist Deciduous Forests &Dry Deciduous forest
- Fauna: Four horned antelope, Indian wild dog, Saras crane, Asian white-backed vulture, Sacred grove bush frog, Tigers, Panthers, Bears, Chitals, Sambars, Barking Deer, Bison, Blackbuck, chinkara

Pachmarhi

- Location: Satpura range
- River: Tawa Reservoir, Denwa River
- Vegetation: Tropical moist deciduous forests, tropical dry deciduous and central Indian sub-tropical hill forests
- Fauna: Gaura, Bears, tigers, Leopards, Giant Squirrel, Crested Serpent Eagle,

Simlipal

- Biosphere Reserve + Tiger Reserve + National Park, Also part of Elephant Reserve
- abundance of semul (red silk cotton trees) that bloom here.
- Part of Mayurbhunj Elephant Reserve
- River: twelve rivers cut across the plain area, all of which drain into the Bay of Bengal. The prominent among them are Burhabalanga, PalpalaBandan, Salandi, Kahairi and Deo.
- Vegetation: tropical semi-evergreen forests, tropical moist deciduous forests, dry deciduous hill forests, high level sal forests and sprawling meadows.
- Fauna: Tiger, Elephant, Gaur, Chausingha, leopard, sambar, barking deer, gaur, jungle

cat, wild boar, four-horned antelope, giant squirrel and common langur. Grey hornbill, Indian pied hornbill and Malabar pied hornbill are also found here
- Baheripani waterfall, Joranda waterfall

Sunderban
- Includes Sunderban Tiger Reserve and &Sunderban National Park, Halliday island, Lothian Island Wildlife Sanctuaries
- UNESCO World Heritage site (Sunderban National Park), an 'Important Bird Area'
- Now also a Ramsar site
- Sunderban Considered as largest delta in World
- Considered as largest contiguous mangrove-patch on globe
- River: Muriganga, Harinbhahga, Raimangal, Saptamukhi, Thakuran, Matla and Goasaba
- Vegetation: moist tropical seral forest with beach and tidal forests
- Fauna: largest population of Estuarine crocodile
- Tigers, Leopards, Rhinoceros, Wild Buffaloes,Wild Hogs, Wild Cats, Barasinga, Spotted Deer, Hog Deer, Barking Deer, and Monkeys
- Fishing Cat, Common otter, Water Monitor lizard, Gangetic Dolphin, Snubfin, River Terrapin, marine turtles like Olive Ridley

Nanda Devi
- Includes Nanda Devi and Valley of Flowers National Parks
- Elevation- (1,800 to 7,817 m
- River: an eastern tributary of Dhauli Ganga which flows into the Alaknanda River at Joshimath.
- Vegetation: dry deciduous forests in the lower elevations to alpine meadows above the timber line.
- Fauna: Snow Leopard, Himalyan Black Bear, Brown Bear, Musk deer, Bharal/Blue Sheep

Nokrek
- Location: Meghalaya Plateau
- Rivers: Ganol, Dareng, Simsang River (Originates in north of this BR)
- Evergreen and semi-evergreen deciduous forests dominate the landscape:
- Fauna: a large population of Hoolock gibbon, the only ape found in India, red panda, Asiatic Elephants, Clouded Leopard

Khangchendzonga
- plains, valleys, lakes, glaciers and spectacular, snow-capped mountains
- Elevation- 1,220m to 8,586m
- Vegetation- sub-tropical to alpine ecosystems.
- Eighty six per cent of the core lies in the Alpine zone and the remaining portions are located in the Himalayan wet temperate and sub tropical moist deciduous forest.
- Mixed World Heritage Site
- Fauna: high-altitude pheasants — Monal Pheasants, Tragopan Pheasants and Blood Pheasants (the State Bird) — are also found in the reserve
- Red Panda, Snow Leopard, Himalayan Black Beer and herbivores species of Musk deer, Great Tibetan Sheep, Blue Sheep, Boral and Barking Deer

Cold Desert Biosphere Reserve
- Location: From Ladakh to Kinnaur in HP
- Elevation- ranging from 3000 – 5000m
- It is on the leeward side of the Himalayas, which makes it a rain-shadow zone
- It includes Pin Valley National Park and surroundings, Chandratal and Sarchu, and the Kibber Wildlife Sanctuary in H.P
- Vegetation: Mainly Grasslands, various medicinal plants are found
- Fauna: Woolly Hare, Tibetan Gazzle, Snow Leopard, Himalayan Black Bear, Himalayan Brown Bear, Snow Leopard, Red Fox, Tibetan Wolf, Himalayan Ibex, Himalayan Marmot, Himalayan Blue Sheep, Red Billed Chough, ChukarPatridge, Snow Patridge, Blue Rock

Pigeon, Snow Pigeon, Himalayan Snowcock, Lammergeier, Himalayan Griffon, Golden Eagle

Wetlands

- Ramsar: an **intergovernmental treaty** adopted in **1971**
- **Montreux Record-** Register of wetland sites on the List of Wetlands of International Importance where changes in ecological character have occurred, are occurring, or are likely to occur as a result of technological developments, pollution or other human interference.
    - **Keoladeo National Park (Rajasthan) and**
    - **Loktak Lake (Manipur).**
- **Chilika Lake** (Odisha) was placed in the record but later removed from it.

Ramsar Definition of Wetlands: Wetlands are "areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres."

Indian Definition of Wetland: All wetlands, irrespective of their location, size, ownership, biodiversity, or ecosystem services values, can be notified under the Wetlands Rules, except:

a) River channels;
b) Paddy fields;
c) Human-made water bodies specifically constructed for drinking water purposes; aquaculture, salt production, recreation purposes, irrigation purposes
d) Wetlands falling within areas covered under the **Indian Forest Act, 1927; Forest (Conservation) Act, 1980; State Forest Acts and amendments thereof;**
e) Wetlands falling within areas covered under the **Wildlife (Protection) Act, 1972** and amendments thereof; j)
f) Wetlands falling within areas covered under the **Coastal Regulation Zone Notification, 2011**and amendments thereof
- Largest Ramsar Site in India- Sunderban>Vembanad>Chilika
- Smallest Ramsar site in India- Renuka

Ashtamudi Wetlands

- An extensive estuarine system, the second largest in Kerala State.
- It lies in the Kollam district.
- This is the **second largest wetland in Kerala** with a palm shaped extensive water body and eight prominent arms (eight Braids), adjoining the Kollam town
- Also called the gateway to the backwaters of Kerala
- Famous for its houseboat and backwater resorts.
- Two Rivers: Kallada&Pallichal
- It supports a number of **mangrove species** as well as over 40 associated plant species, and 57 species of birds
- National Waterway 3 passes through it.

Sasthamkotta Lake

- Wetland Type: Freshwater lake
- The largest freshwater lake in Kerala state in the southwest of the country, spring-fed and the source of drinking water for half a million people in the Kollam district.
- The ancient Sastha temple is an important pilgrimage centre.
- River :kallada replenishes water in this lake
- a larva called "cavaborus" abounds and eliminates bacteria in the water, thus contributing to its exceptional purity.
- Notable Species: Butter Catfish, Day's Glassy Perchlet, Malabar mystus
- Vulnerable Species: Gunther's catfish, Wallago Catfish

Kolleru Lake

- A natural eutrophic lake, situated between the two major river basins of the Godavari and the Krishna
- Kolleru is also a Wild Life sanctuary

- Atapaka Bird Sanctuary is located on Kolleru Lake
- It provides habitat for a number of resident and migratory birds, including declining numbers of the vulnerable Grey Pelican
- Endangered Species: Great Adjutant
- Vulnerable Species: Grey Pelican, lesser Adjutant

Bhoj Wetland

- The wetland consist of two Lake – The Upper lake and the Lower lake.
- The wetland consists of two man-made lakes--the upper lake and the lower lake.
- Source of water supply for the Bhopal City
- The "Upper Lake" was created in the 11th century by construction of an earthen dam across the Kolans River.
- The Upper Lake is surrounded by Van Vihar National Park on the south, human settlements on the east and north, and agriculture fields on the west.
- Sarus Crane (IUCN- VU)- Largest Bird of India is sighted here
- The lower was constructed nearly 200 years ago, largely from leakage from the Upper, and is surrounded by the city of Bhopal.
- The Upper lakes are very rich in biodiversity, particularly for macrophytes, phytoplankton, zooplankton, both natural and cultured fish species, both resident and migratory birds, insects, and reptiles and amphibians.
- The upper lake is the principal source of drinking water for the city of Bhopal.
- The lower lake meets out the requirement of raw water and enhances the beauty of the city.

Bhitarkanika

- It is a part of Bhitarkanika Wildlife Sanctuary.
- The site's Gahirmatha beach is said to host the largest known Olive Ridley sea turtle nesting beach in the world,
- It also has the **highest density of saltwater crocodile in the country**.
- It is a major breeding and wintering place for many resident and migratory water birds and is the east coast's major nursery for brackish water and estuarine fish fauna.

Chilka Lake

- Brackish lake separated from the Bay of Bengal by a long sandy ridge and subject to sea water exchange, resulting in extreme seasonal fluctuations in salinity in different sections of the lake
- Rivers: 52 rivers, Daya and Bhargavi
- The site is an important area for breeding, wintering and staging for 33 species of waterbirds.
- Nalbana Bird Sanctuary
- Irrawaddy Dolphin **(CR)-** Considered to be the only place in India to have Irrawaddy Dolphin
- Placed on the Montreux Record in 1993 due to problems caused by siltation and sedimentation which was choking the mouth of the lake; removed from the Record in 2002 following rehabilitation efforts for which the Chilika Development Authority received the Ramsar Wetland Conservation Award for 2002.

Loktak lake

- It is designated as a Ramsar wetland site on 23 march 1990.
- It is the largest freshwater lake in the North- eastern region of the country.
- Keibullamjao is the only floating National Park in the World floats over it.
- Famous for Phumdis
- Also Listed under Montreux Record
- **Notable Species:** Manipur Brow Antlered Deer or Sangai- Endangered
- Manipur Brow Antlered Deer, Hog Deer, Dhole, Red Jasper Barb, Keeled Box Turtle

Renuka Wetland

- Protection Status : Wildlife Sanctuary
- Wetland Type : Freshwater lake and marshes

- • *A natural Wetland*
- • Prominent vegetation ranges from dry deciduous like Shorea Robusta, Terminaliatomentosa, Dalbergiasissoo to hydrophytes.
- • There are 103 species of birds of which 66 are residents, e.g. Crimson-breasted barbet, Mayna, Bulbul, Pheasants, Egrets, Herons, Mallards and Lapwing.
- • Sambhar, Barking deer and Ghorals are also abundant in the area.
- • Endangered Species : Golden Mahseer

Tsomoriri Lake
- • A freshwater to brackish lake lying at 4,595m above sea level, with wet meadows and borax-laden wetlands along the shores.
- • One of the highest Ramsar site in the world
- • The site is said to represent the only breeding ground outside of China for one of the most endangered cranes, the Black-necked crane (Grusnigricollis), and the only breeding ground for Bar-headed geese in India.
- • The Great Tibetan Sheep or Argali (Ovisammonhodgsoni) and Tibetan Wild Ass (Equus kiang) are endemic to the Tibetan plateau, of which the Changthang is the westernmost part.
- • Notable Species: Black necked Crane
- • Vulnerable: Common Pochard, Black-necked Crane

Sukhna Lake
- • A man made lake
- • Recently declared as Wetland under Wetland (Conservation and Management) Rule 2017 (Wetland Rules)
- • situated at foothills of Shivalik Hills and was designed to collect runoff water from the Hills.
- • It was also declared as a living entity

In News:

- • **MaguriMotapung:**
- • Oil well exploded here
- • Just 10km away from Dibru-Saikhowa BR
- • It is also an IBA
- • A Mandrin Duck was seen here recently which was not there for more than a century.
- • Notable species: Golden Mahsheer, Read Headed Vulture (CR), White Bellied heron (CR)

Asan Conservation Reserve

There is Asan River stretch till Yamuna

Uttarakhand's first Ramsar Site

Due to Asan barrage→ Bird Habitat Created

Birds: 330 Species

- • Red-headed vulture, white-rumped vulture, Baer's pochard

49 fish species, endangered Putitoramahseer

Kabartal Wetland
- • Bihar has got its first Ramsar site
- • also known as KanwarJheel
- • important stopover along the Central Asian Flyway,
- • Five critically endangered species
- • Red-headed vulture, white-rumped vulture, Indian vulture , Baer's pochard, sociable lapwing

Lonar Lake
- • Location: Deccan Plateau
- • formed by a meteorite impact onto the basalt bedrock
- • Closed Basin→ Salt content high

- anaerobes, cyanobacteria and phytoplankton
- 160 species of birds including the vulnerable Asian woollyneck and common pochard
- It turned pink due to a large presence of the salt-loving 'Haloarchaea' microbes,
- It is a notified **National Geo-heritage Monument.**

Sur Sarovar

- also known as Keetham Lake
- An artificial Lake→ to supply water to the city of Agra in summer,
- greater spotted eagle, sarus crane, catfish *Wallagoattu.*
- important for bird species which migrate on the Central Asian flyway,
- Sloth Bear

Tso Kar

- Changthang region of Ladakh.
- includes two connected lakes, the freshwater Startsapuk Tso and the larger hypersaline Tso Kar;
- saker falcon, Asiatic wild dog or dhole, snow leopard, **black necked crane breeding ground**
- important stopover ground for migratory birds along the Central Asian Flyway

PROTECTED AREAS

Arunachal Pradesh

1. Dibang Wildlife Sanctuary—**Not a Tiger reserve- as local tribes opposed it**

Location- Eastern Himalayas- 1800-5000 m above mean sea level

Vegetation- Temperate and alpine type

Fauna- Goral, Takin, Serow and Musk Deer, Red panda, Asiatic black bear

River- Dibang

Part of Dihang-Dibang Biosphere Reserve

Tiger??→ It is an entire block and tigers will move from one part to another

Dibang Valley→ the local aboriginal community of IduMishmis considers tigers as their elder brothers.

Tigers->Common Leopard→ Clouded Leopard-> Snow Leopard

- Arunachal Pradesh has large contiguous forests over 136,000 km, which include Pakke Tiger Reserves, Tale Valley Wildlife Sanctuary, Mouling National Park, D'Ering Wildlife Sanctuary, Mehao Wildlife Sanctuary, Dibang Wildlife Sanctuary, and Kamlamg and Namdapha Tiger Reserve.

Arunachal Pradesh

2. **Namdapha National Park & Tiger Reserve**

Climate- Sub tropical, 200-4571 m elevation,,,due to this tropical and mountain type climate exist here

Vegetation→ Rainfall high→ Tropical Evergreen Forests→

Fauna→This is a zone of confluence of Indian Sub-Continent Biogeography region and the Indo-China Biogeography→ Very rich in faunal diversity of different types.

Fig. 2 Wildlife Protected Areas in Arunachal Pradesh

Noa-Dihing **River**

4 CATS- TIGERS & 3 LEOPARDS
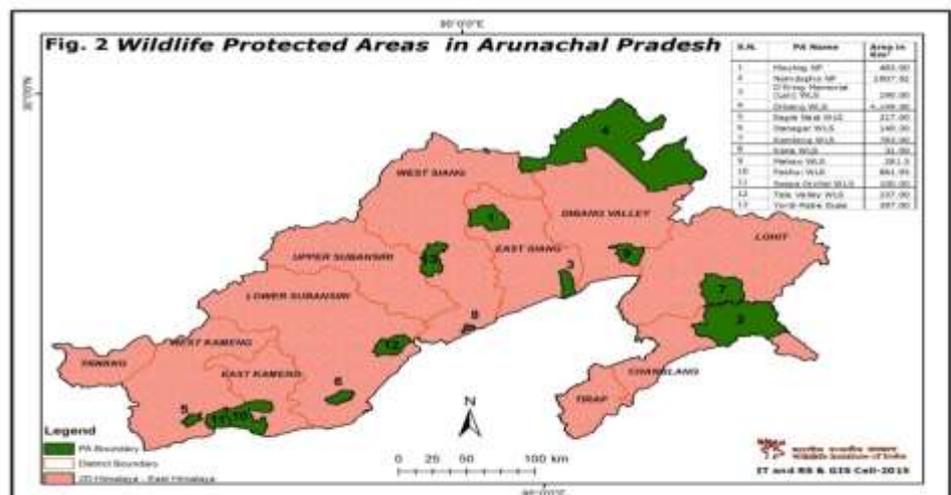
Fauna→tiger, leopard (coomon, clouded and snow), elephant, red panda, deer and even the **endangered hoolock gibbon.**

white-bellied heron, snowy-throated babbler, white-winged wood duck, pied falconet, fulvettas, scimitar babblers and five species of hornbills.

Kamlang Wildlife Sanctuary

- Location- Adjacent to Namdaphanatioal Park, Lohit district
- 50th Tiger Reserve
- Elevation- 500 m to a lofty 4500 m above sea level.
- River- Kamlang- tributary of Brahamputra
- Vegetation: evergreen forests to windswept alpine meadows
- Fauna: hoolock gibbon, tiger, leopard, capped langur, red panda, takin, Hoolock gibbons, the only apes found in India, are common in the area; other primates like capped langur, Assamese macaque, stump-tailed macaque
- Great Hornbill, the range-restricted Brown Hornbill and the Oriental Pied Hornbill.
- Barking deer, sambar and serow
- **Meghamalai in Tamil Nadu is declared as the 51st Tiger reserve in India in 2021**

Pakhui WLS/Pakke Tiger Reserve

- Location: bounded to the north and west by the River Bhareli (known as Kameng in Arunachal Pradesh), to the east by the River Pakke in the **foothills of Eastern Himalayas**
- Vegetation- lowland semi-evergreen, evergreen and Eastern Himalayan broadleaf forests
- Fauna→ tiger, leopard and the clouded leopard, and canids like the wild dog and Asiatic jackal. The elephant, barking deer, Indian bison and sambar deer are the most commonly spotted herbivores here.
- **Most Important—Great Hornbill (State Bird of AP)**
- Part of Eastern Himalaya Biodiversity Hotspot
- Why IN news? Due to highway construction

1. DibruSaikhowa National Park

- A National Park as well as a Biosphere Reserve
- Also Important Bird Area (IBA)- 382 Species + Migratory birds
- The park is renowned for natural regeneration of Salix trees/Indian Willow
- Location: Between Arunchal Hills and Patkai Hills, **Around 120 m elevation**

Wildlife Protected Areas in Assam

- River: Brahamputra&Dibru
- Vegetation: semi wet evergreen forests, tropical moist deciduous forest, bamboo, cane brakes and grasslands.
- The region originally comprised a tropical rainforest but after the disastrous earthquake of 1950, it underwent major geomorphological changes and the rainforest eventually gave way to deciduous forests.
- Primarily Meant for conservation of **White winged wood duck** (Endangered) Found in Assam and Arunachal Pradesh

- Fauna: Tiger, Elephant, Leopard, Gangetic Dolphin, Sambar, Barking Deer, **Feral Horses (Descendants of Horses escaped during World War II)**

Kaziranga National Park
- more than 70% of One Horned Rhinoceros in the world
- 60% of India's wild buffalo population
- only population of the Eastern Swamp deer
- **World Heritage Site, Tiger Reserve, Important Bird Area**
- Location: river Brahmaputra on the North and the KarbiAnglong hills on the South.
- River: Brahamputra
- Vegetation: alluvial inundated grasslands, alluvial savanna woodlands, tropical moist mixed deciduous forests, and tropical semi-evergreen forests.
- Fauna: Big 5- **One horned Rhino, Swamp Deer, Wild Buffalo, Tiger, Elephant**, Bengal Florican, Hornbills
- Highest density of One Horned rhinoceros- Pobitora WLS
- NH37 passes through it

Manas NP
- **National Park, Biosphere Reserve, World Heritage site, Tiger Reserve, Bird Area, Elephant Reserve**
- Location: Himalayan foothill bhabar area, contiguous with the Royal Manas National Park in Bhutan.
- River: Manas
- Vegetation: alluvial grasslands and tropical evergreen forests, Moist and Dry Deciduous forests
- Fauna: 200 species of butterflies, 476 bird species (White-Bellied Heron, Bengal Florican, Slender-Billed Vulture, White Rumped Vulture, King Vulture) **CE, Big Five**, Pygmy hog, *60 mammal species*
- Pygmy hog reintroduction going on in Manas-

Nameri Tiger Reserve
- Location: Foothills of Eastern Himalayas
- National Parks also and part of Sonitpur Elephant resevre
- **Contiguous area with Pakke Tiger Reserve in Arunachal pradesh**
- River: **JiaBhareli**, Tributary of Brahamputra
- **Vegetation**: Tropical Evergreen, semi evergreen, moist deciduous, grasslands
- Fauna: Elephant Country, Tiger, Golden Mahseers, Leopards, dhole, sambars, Barking Deers, wild boars, Indian Bison etc
- White winged wood duck- (E)

Orang NP
- Also known as the mini Kaziranga National Park,
- Location: Northern Park of river Brahamputra
- River: Brahamputra, Dhansiri River, Belsiri River and Pachnoi River.
- Vegetation: Moist Deciduous Forest, Eastern Wet Alluvial Grassland, Eastern Seasonal Swamp Forest, Savannah Grasslands, Degraded Grassland, Moist Sandy area and Dry Sandy area.
- Fauna: Rhinoceros, Tiger, Maljuria Elephants (male elephants in group), Hog Deer, Wild Pig, Civet Cat, Porcupine and Gangetic Dolphin.
- Bengal Florican (2nd.highest concentration)

DehingPatkai Wildlife Sanctuary
- Assam Govt decided to make it a National Park
- It is inside DehingPatkai Elephant Reserve
- River- Dehing
- Vegetation- Tropical Wet Evergreen Forests. Deciduous, semi evergreen
- Species- Chinese pangolin, flying fox, wild pig, sambar, barking deer, gaur, serow and Malayan giant squirrels.
- Assamese macaque- Near Threatened species.

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- only sanctuary in India which is home to seven different species of wild cats - tiger, leopard, clouded leopard, leopard cat, golden cat, jungle cat and marbled cat.

KeibulLamjao national Park
- Location: **LoktakLake**
- **Also Ramsar Site**
- Vegetation: '*Phumdi*' (a Manipuri word meaning floating mats of soil and vegetation)
- Fauna: Eld's deer or brow-antlered deer (Cervuseldieldi), or**Sangai**also called the dancing deer. hog deer, wild boar, large Indian civet, jungle cat and otter
- characterized by many floating decomposed plant materials locally called**phumdis.**

Nokrek
- Location: Meghalaya Plateau- Garo Hills
- Rivers: Ganol, Dareng, Simsang River (Originates in north of this BR)
- Evergreen and semi-evergreen deciduous forests dominate the landscape:
- Fauna: a large population of Hoolock gibbon, the only ape found in India, red panda, Asiatic Elephants, Clouded Leopard
- Famous for Siju Caves- bat Caves

Khangchendzonga
- plains, valleys, lakes, glaciers and spectacular, snow-capped mountains
- Elevation- 1,220m to 8,586m
- Vegetation- sub-tropical to alpine ecosystems.
- Eighty six per cent of the core lies in the Alpine zone and the remaining portions are located in the Himalayan wet temperate and sub tropical moist deciduous forest.
- Mixed World Heritage Site
- Fauna: high-altitude pheasants — Monal Pheasants, Tragopan Pheasants and Blood Pheasants (the State Bird) — are also found in the reserve
- Red Panda, Snow Leopard, Himalayan Black Beer and herbivores species of Musk deer, Great Tibetan Sheep, Blue Sheep, Boral and Barking Deer.

Dachigam- stands for ten villages
- Name in the memory of ten villages which were relocated for the formation of this park.
- Location: **2990 meters from the sea level. Between Great Himalaya &PirPanjal range**
- River: Catchment area of Dal Lake
- Climate- temperate zone
- Vegetation: **Himalayan moist temperate evergreen, moist deciduous and shrubs, deodar, pine and oak**
- Fauna: home of the hangul, or Kashmir stag.
- leopard, snow leopard, black bear, brown bear, jungle cat, Himalayan marmot, musk deer, serow and red fox.

Hemis
- Location: Karakoram-West Tibetan Plateau- **Between Great Himalaya & Zaskar range**
- River: bounded on the north by the banks of the Indus River
- **Snow Leopard (Vulnerable) capital of the world:** Hemis, **Ladakh**
- Vegetation: majorly alpine vegetation, dense pine forests, alpine shrubs and vast meadows.
- Fauna:Snow Leopards, Shapu, Wild Sheeps, Ibex and Goats. Some of the most endangered animal species that reside here are LadakhUrial, Tibetan Argali, Bharal, Tibetan Wild Ass, Dholes, etc

Nanda Devi
- Location: **peak of Nanda Devi (7816 m),** Part of Chamoli, Pithoragarh, and Bageshwar districts
- **World Heritage Site by UNESCO**
- River: an eastern tributary of Dhauli Ganga which flows into the Alaknanda River at Joshimath.
- Vegetation: dry deciduous forests in the lower elevations to alpine meadows above the timber line.

- Fauna: Himalayan Musk Deer, Snow leopard, Black bear. Bharal, tahr

Rajaji
- Location: Foothills of the Shivalik Range of Himalayas.
- River: Ganga and Song
- Vegetation: Grassland, Moist, Northern Dry Deciduous and Khair-Sissoo forests, woodland, Pine forests in higher reaches.
- Fauna: Elephant, Tiger, Panthers, Spotted Deer, Sambhar, Wild Boar, Barking deer, Goral

Great Himalayan
- Location: Kullu Region, from 1500-6000 m
- **tag of World Heritage site on 23rd June 2014.**
- River: Tirthan River, Parvati River
- Vegetation: Subtropical to temperate to Alpine
- Fauna: **Western Tragopan**, Chir Pheasant, Asiatic Black Bear, Himalayan Musk Deer Snow Leopard,Blue Sheep, Serow and Himalayan Tahr.

MP PROTECTED AREAS

Protected Areas in Madhya Pradesh

Bandhavgarh National Park
- Also a Tiger Reserve
- Bandhavagarh fort- Bandahav- Brother, fort gifted to lakshmana by Lord Rama
- Location: **Northern Edge of Satpura Range**
- River: **more than 20 streams** which merges into Son river
- Vegetation: **tall grasslands to thick Sal forest (Deciduous forest type)**
- Fauna: Asiatic Jackal, Bengal Fox, Sloth Bear, Striped Hyena, Leopard and Tiger, Wild Pigs, Nilgai, Chinkara and **Gaur,** White Tigers of Rewa
- In MP, Elephants are missing, but a group of elephants have recently migrated to this Bandhavgarh NP and has stayed there.

Kuno National Park
- From a WLS to National Park
- Location: Morena Plateau
- River: Kuno river
- Vegetation: dry deciduous forest, Kardhai, Salai, Khair
- Fauna: nilgai, chital, sambhar and chinkara, black buck etc
- Identified as the reintroduction site for Asiatic lion by WII
- Cheetah re-introduction plan also going on

Kanha National Park

- Tiger Reserve in 1973.
- **largest National Park in Central India.**
- Location: *Maikal range* of the *Satpura hills*,
- River: Banjar river (main tributary of the Narmada River)
- Vegetation: evergreen **Sal forests, deciduous forests**
- Fauna: Bengal tiger, Indian leopards, sloth bear, hard goundbarasingha and Indian wild dog. swamp deer is *endemic*
- **State animal of Madhya Pradesh - Hard Ground Barasingha (Swamp deer or *Rucervusduvaucelii*)** is found **exclusively** in Kanha Tiger Reserve.

Panna National Park

- Declared as 'UNESCO Biosphere Reserve'. 2020
- Also a Tiger Reserve
- Famous for Panna diamond mining
- Location: Vindhya Hill. Spread over Panna and Chhatarpur districts
- River Ken—From south to north/ Ken Betwa link project also lies in this Park.
- Vegetation: Dry Deciduous forestinterspread with grassland areas.
- Fauna: Indian deers, chital and chowsingha, Tiger, Blue Bull and chinkara, White necked stork, Barheaded goose, Honey Buuzzard, **5 Species of Vulture**

Pench (Jawaharlal Nehru)

- Also a tiger reserve
- Important Bird Area
- Location: b/w MP & Maharashtra, Seoni and Chhindwara districts in MP & Nagpur in Maharashtra
- River: Pench river
- Vegetation: **topical dry deciduous forest.**
- Fauna: **tiger, leopard, jungle cat, wild dog, hyena, sambar, spotted deer, Indian gaur, neelgai, four-horned antelope, barking deer, wild boar**

Tadoba

- Location: Chimur hills, Chandrapur district in Maharashtra
- Maharashtra's **oldest and largest national park.**
- Tadoba' is derived from the name of God "Tadoba" or "Taru," which is praised by local tribal people of this region.
- Tadoba National Park + Andhari WLS= TadobaAndhari Tiger Reserve
- River: Andhari river
- Vegetation: Tropical Dry Deciduous Teak Forests-Teak prominent
- Fauna:Sloth Bear and Wild Dogs, Tigers, Indian leopards, Sloth bears, Gaur, Nilgai, Dhole, Striped Hyena, Small Indian Civet, Jungle Cats, Sambar, Spotted Deer, Barking Deer, Chital, Marsh Crocodile, Indian Python, Indian Cobra, Grey-headed Fish Eagle, Crested Serpent Eagle, Peacock, Jewel Beetles, Wolf Spiders, et

Keoladeo Ghana

- one of the world's most important breeding and feeding grounds of birds.
- Siberian Crane come to the sanctuary during the winter season.
- Also a Ramsar Site, World Heritage Site
- Location: Bharatpur Rajasthan
- River: Gambhir River, considered lifeline of the sanctuary.
- Vegetation: wetlands, woodlands, scrub forests, grasslands
- Fauna: Sambhar , Chital , Nilgai, Wild boar, black bucks, Hare, Porcupine
- park lies on the Central Asian Flyway of the Asia Pacific Global Migratory Flyway, it is a staging / wintering ground for a large number of migratory waterfowls that breed in the Palearctic region (Europe, Asia north of the Himalayan foothills, **northern Africa**, and the northern and central parts of the Arabian Peninsula.)

Ranthambhore

- Location: junction of the Aravali and Vindhya hill ranges.
- Also a Tiger Reserve
- River: bounded to the north by the Banas River and to the south by the Chambal River
- Just Adjacent to this is Ramgarh Sanctuary→ Going to be 52ⁿᵈ TR in India
- Vegetation: Tropical dry deciduous
- Famous Dhak tree, also called Flame of the forest
- Fauna: Bengal tiger, Indian leopard, wild boar, sambar, striped hyena, sloth bear, southern plains graylangur, rhesus macaque, mugger crocodile and chital.

Sariska

- **Location:**Aravali Hills
- Also a Tiger Reserve
- Kankadwari fort- Dara Shikoh was imprisoned by Aurangjeb in this fort
- 10th century **Neelkanth temples.**
- **River:** Ruparel River runs through the middle of the Tiger Reserve in North South direction.
- Vegetation: grasslands, dry deciduous forests, sheer cliffs and rocky landscape
- **Fauna:** Leopard, Wild Dog, Jungle Cat, Hyena, Jackal, and Tiger. Sambar, Chitel, Nilgai, Chausingha, Wild Boar and Langur. peafowl, and harbours quail, sand grouse, golden- backed woodpeckers and crested serpent eagles, among other species
- Tiger relocation has happened in this park

Desert

- River: No perennial river
- Vegetation: thorn forest, open grassland, throny bushes
- Fauna: Rajsthan state bird- Great Indian Bustard, State Animal- Chinkara, State tree- Khejri, State Flower- Rohida occur naturally. migratory raptors such Himalayan and Eurasian Griffon Vultures, Eastern Imperial Eagle, and the Saker Falcon. Various species of animals such as black buck, chinkara and desert fox inhabit the Park. **Indian gazelle**

Bhitarkanika

- Also a ramsar site
- Location: Gahirmatha Beach and Marine Sanctuary lies to the east
- River: Brahmani, Baitarani, Dhamra, Pathsala
- Vegetation: second largest mangrove ecosystem in India
- Fauna: harbours the **largest number of saltwater crocodile population in the Indian sub-continent**. Saltwater Crocodile (Crocodylusporosus), White Crocodile, Indian python, King Cobra, black ibis, darters and many other species of flora and fauna monkeys, jackals, common langur, otter, sambar deer, jungle cat, fox, Mongoose, wolf, fishing cats, hyena

Simlipal

- Biosphere Reserve + Tiger Reserve + National Park, Also part of Elephant Reserve
- abundance of semul (red silk cotton trees) that bloom here.
- Location: Eastern End of Eastern Ghats
- River: twelve rivers cut across the plain area, all of which drain into the Bay of Bengal. The prominent among them are Burhabalanga, PalpalaBandan, Salandi, Kahairi and Deo.
- Vegetation: tropical semi-evergreen forests, tropical moist deciduous forests, dry deciduous hill forests, high level sal forests and sprawling meadows.
- Fauna: Tiger, Elephant, Gaur, Chausingha, leopard, sambar, barking deer, gaur, jungle cat, wild boar, four-horned antelope, giant squirrel and common langur. Grey hornbill, Indian pied hornbill and Malabar pied hornbill are also found here
- Baheripani waterfall, Joranda waterfall,

Papikonda

- Location:Eastern Ghats (Andhra Pradesh)
- River: origin of various small streams and rivulets which drain and enrich the perennial River Godavari
- Vegetation: Southern Tropical Dry Deciduous type
- Fauna: Tiger, Leopard, Hyena, Indian gaur, sambar, barking deer, chowsinga, spotted deer, fresh water crocodile, Indian Golden gecko
- A unique dwarf breed of goat known locally as the "kanchumekha" originates in this region.

Bandipur

- shares its boundary with 3 other National park namely Nagarahole National Park, Wayanad National Park and Mudumalai National park
- Location: Part of Nilgiri BR, Western Ghat Mountains
- River: Kabini, Nugu, Moyar
- Vegetation: Dry Deciduous & Moist Deciduous
- NH 766
- Fauna: **second highest Tiger population, largest habitat of Wild Elephants in South Asia**. gaur (a type of bull), sambhar, chital, mouse deer, four-horned antelope, wild dogs, wild boar, jackal, sloth bear, panther, malabar squirrel, porcupines and the black-knapped hare. Birds like jungle fowl and green pigeon are also found here.
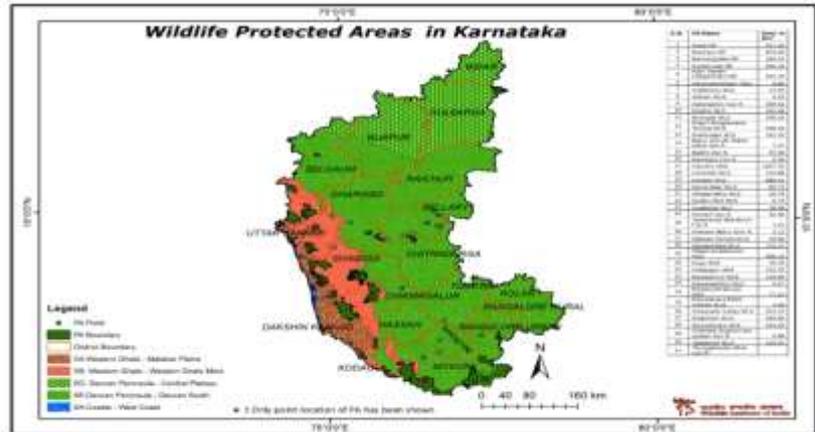
Nagarahole (Rajiv Gandhi)

- National Park & Tiger Reserve
- Location: Western Ghats & Part of Nilgiri BR.
- River: Nagarhole, There is Kabini River also which separates Nagarhole with Bandipur National Park
- Vegetation: Moist Deciduous forest- Teak and Rosewood
- Fauna: Asian elephants, chital (spotted deer), Indian mouse deer, gaur, stripe-necked and ruddy mongooses, grey langur, bonnet macaque, Asian wild dog, leopard, tiger, sloth bear

Kudremukh

- Kudremukh is also the second-highest peak in Karnataka (1894 m).
- Location: Dakshina Kannada, Udupi and Chikmagalur districts of the state of Karnataka. Nestled in the Western Ghats.
- River: Tunga and Bhadra rivers &Nethravathi
- Vegetation: Green Shola Forests, grasslands,
- Fauna: deer, wild boars, sambars, bison, **tiger, leopard, wild dog, Malabar giant squirrel, common langur, sloth bear, gaur, sambar, spotted deer, barking deer and the sloth bear. 195 Species of Birds.**
- There is a temple of goddess bhagawathi, and a varaha image 1.8m

Bannerghatta

- Location: Near Bangalore- A wildlife hub near main city
- **Bannerghatta Biological Park carved out of the Bannerghatta National Park (BNP)**
- River: Suvarnamukhi stream
- Vegetation: Dry Deciduous forests, scrubs etc

- Fauna: elephants, gaur, leopard, jackal, fox, wild boar, sloth bear, Sambar, Chital, spotted deer, barking deer, common langur, bonnet macaque, porcupine and hares

Periyar National Park

- Tiger Reserve, Elephant Reserve
- Location: Southern part of Western Ghats
- River: **Periyar&Pamba**
- Vegetation: **tropical evergreen, semi evergreen, moist deciduous forests and grasslands- 1966 species of floweringplants**
- Fauna: Tiger, Elephant, Lion-tailed macaque, NilgiriTahr, great Malabar Hornbill (Bird), Monitor Lizards, Sambars, Gaur, Leopard, Wild dog, Barking deer, Mouse deer,

Silent Valley

- Part of Core of Niligiri Biosphere Reserve- One of the few rainforests in India- 271-451cm rainfall
- Location: Nilgiri Mountains, Bounded from all sides with ridges, 900 M to 2,300 M
- River: Kunthi
- Vegetation: tropical evergreen forest --> subtropical broad leaved hill forest →montane wet temperate forest and Grassland.
- Fauna: **Dragonflies, Damselfies**
- Lion-tailed Macaque, NilgiriLangur, Bonnet Macaque, Tiger, Leopard (Panther), Leopard Cat, Jungle Cat, Fishing Cat, Common Palm Civet, Small Indian Civet, Brown Palm Civet, Ruddy Mongoose, Stripe necked Mongoose, Wild Dog, Sloth Bear, Otter, Flying Squirrel, Malabar Giant Squirrel, Indian Pangolin (Scaly anteater), Porcupine, Wild Boar, Sambar, Spotted Deer, Barking Deer, Mouse Deer, Gaur and Elephant. 1000 species of flowering plants, 100+ orchids

Wayanad WLS

- Part of Niligiri BR
- River: Kabini
- Vegetation: Moist Deciduous forests, semi-evergreen forests
- Fauna: Elephant, Gaur, Tiger, Panther, Sambar, Spotted deer, Barking deer, Wild boar, Sloth bear, Nilgirilangur, Bonnet macaque, Common langur, Wild dog, common otter, Malabar giant squirrel
- Having largest population of Tigers in Kerala

Mudumalai

- Location: trijunction of Karnataka, Kerala & Tamil Nadu, Part of Nilgiri BR
- River: Moyarriver, also separates it from Bandipur National Park
- Vegetation: Elephant Grass, Tropical Evergreen forest, Moist mixed deciduous, Moist Teak forest, Dry teak forest, Secondary grass lands, Shrubs and Swamps
- Fauna: Tiger, Asian Elephant, Indian Gaur, Spotted Deer, Common Langur, Malabar Giant Squirrel, Wild Dog, Jungle Cat, Malabar grey hornbill, Malabar pied hornbill,

Annamalai/Indira Gandhi National Park

- Location: Annamalai Hills
- Waterbody: Sholyar dam, Parambikulam dam
- Vegetation: Wet evergreen forests, semi evergreen forests, moist deciduous, dry deciduous, dry thorn and shola forests, grasslands
- Fauna: Elephant, gaur, tiger, panther, sloth bear, wild boar, wild dog, Nilgirilangur, lion-tailed macaque, sambar, four horned antelope, chital, the trogar, pied hornbill and several eagles.

Sathyamangalam Tiger Reserve

- **Location:** Coimbatore, A link b/w Eastern Ghats and Western Ghats also part of an elephant corridor across both the Eastern and Western Ghats
- **River:** Catchment area for Bhavani and Moyar
- **Vegetation:** Semi evergreen, dry mixed deciduous,
- **Fauna:** Tiger, elephant, gaur, black buck, four horned antelope, leopard, hyena, deer,

bison and wild dog
- White backed & Red necked vultures also

Important Species

IUCN

- Multi stakeholder- govt + civil society
- key indicator for the **SDGs** and Aichi Targets
- **IUCN Red List** of Threatened Species, is the world's most comprehensive inventory of the global conservation status of plant and animal species.

IMPORTANT SPECIES

IUCN CLASSIFICATION

Tiger	Gharial
Elephant	Crocodile
Leopard	Dugong
Lion	Gaur
Snow leopard	Dhole
Rhinoceros	Wild buffalo
Red panda	Indian pangolin
Musk deer	Black Panther
Gangetic dolphin	Olive Ridley turtle
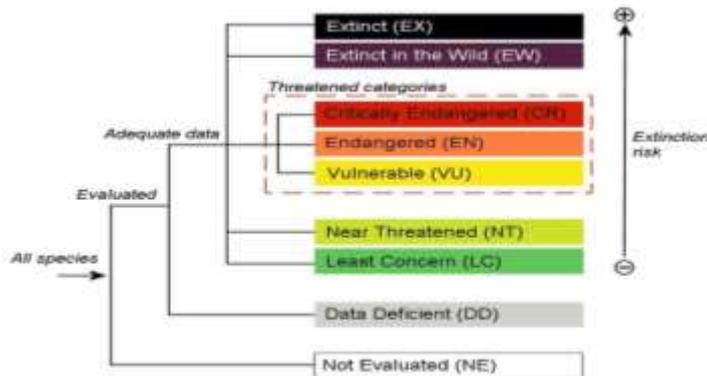
IUCN CRITERIA
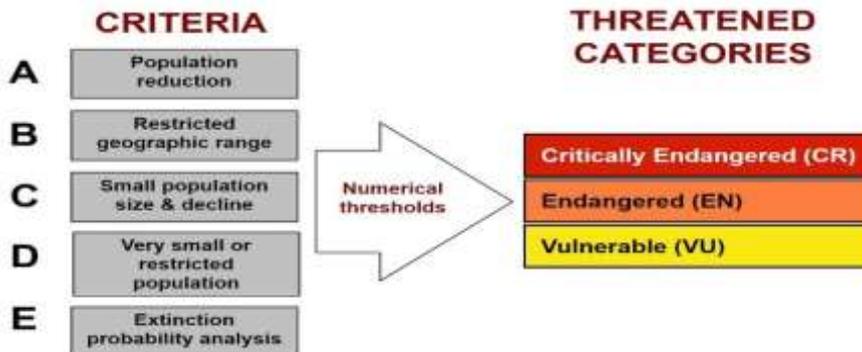
Tigers

- Population: Western Ghats>Central & Eastern Ghats>Northern Part>North East
- Generally found in- tropical and sub tropical forests, evergreen forests, mangrove swamps and grasslands.
- Nepal, Bhutan, Bangladesh etc
- Number of Tiger Reserves in India: 51, SrivilliputhurMegamalai-Latest in Tamil Nadu
- Madhya Pradesh (526)>Karnataka (524)>Uttarakhand (442)
- **Conservation Status: WPA- Schedule 1, IUCN- Endangered, CITES- Appendix 1**
- **Related things:** mSTRIPES: It records the track a forest official walks and geotags the sightings of tigers and even other animals or signs which helps in the estimation,"
- Conservation Assured/Tiger Standards(CA/TS): a set of criteria which allows tiger sites to check if their management will lead to successful tiger conservation
- TX2: A global commitment to double the world's wild tigers by 2022.

Tiger Map
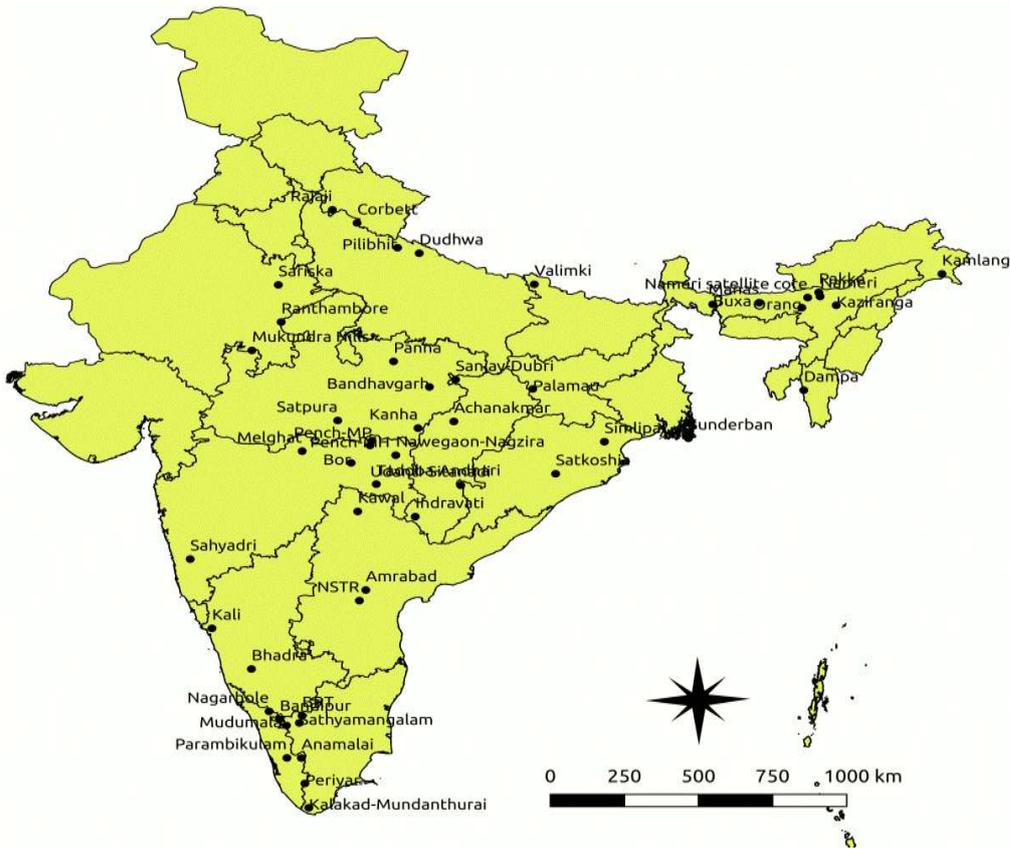
Elephants

- Only about 27,000 wild elephants remain in India
- India is home to over 50 per cent population of Asian elephants in the world
- Habitat: scrub forests, tropical evergreen forests, and deciduous forests, Grasslands
- Karnataka has the highest number of elephants (6,049), followed by Assam (5,719) and Kerala (3,054).
- **Conservation Status: IUCN- Endangered, WPA: Schedule 1, CITES- Appendix 1**
- Surakshya Portal: To manage Human-Elephant conflict and mange conflict on real time basis.

Elephant Map

African Elephants
- Declared Endangered in march 2021
- African Forest Elephant- CR
- Savannah Elephant- En

Leopard
- Conservation Status:
- IUCN- Vulnerable (2019 Assessment)
- WPA- Schedule 1
- CITES- Appendix 1
- Habitat: tropical rainforests to temperate deciduous and alpine coniferous forests. It is also found in dry scrubs and grasslands,.
- Exception- Absent in mangroves and desert
- Central & Eastern Ghats>Western Ghats>Shivalik & Gangetic Plain> North East
- Madhya Pradesh>Karnataka> Maharashtra

Snow Leopard
- Habitat in India: Jammu and Kashmir, Ladakh Himachal Pradesh, Uttarakhand and Sikkim and Arunachal Pradesh

Habitat: steep, rugged terrains with rocky outcrops and ravines. This type of habitat provides good cover and clear view to help them sneak up on their prey.
- Conservation Status:
- IUCN- Vulnerable (2017-Endangered)
- WPA: Schedule 1
- CITES: Appendix 1

Clouded Leopards
- Habitat: tropical evergreen rainforests but can also be found in dry tropical forests and mangrove swamps
- In India- Mostly in North East Region- Sikkim, northern West Bengal, Meghalaya subtropical forests, Tripura, Mizoram, Manipur, Assam, Nagaland and Arunachal Pradesh.
- State animal of Meghalaya
- Conservation Status:
- IUCN- Vulnerable
- WPA- Schedule 1
- CITES- Appendix 1

Rhinoceros/One Horned Rhino
- Habitat: alluvial flood plains and areas containing tall grasslands along the foothills of the Himalayas
- Habitat at Present: Indo-Nepal terai and northern West Bengal and Assam. (Earlier it was also there in Gangetic plains)
- the largest of all the Asian rhinos
- Rhino Vision 2020: Launched by Assam Forest Department in partnership with WWF-India, the International Rhino Foundation and US Fish & Wildlife Service in 2005
- aims at increasing the number and range of rhinos in Assam through wild-to-wild translocations from Kaziranga National Park and Pobitora Wildlife Sanctuary to potential Protected Areas including Manas National Park, Burachapori Wildlife Sanctuary, Laokhowa Wildlife Sanctuary, and Dibru-Saikhowa National Park.
- Conservation Status:
- IUCN: Vulnerable
- WPA: Schedule 1
- CITES: Appendix 1

Lion
- Habitat- Found only in Gir forest
- Asiatic lions were once distributed upto the state of West Bengal in east and Rewa in Madhya Pradesh, in central India
- Difference b/w asiatic&african lion- Slightly smaller than African, a longitudinal fold of skin running along its belly

- Around 500 lions are there
- Conservation Status:
- IUCN- Endangered
- WPA- Schedule 1
- CITES- Appendix 1

Cheetah

Asiatic Cheetah	African Cheetah
IUCN- Critically Endangered	IUCN- Vulnerable
Only Few cheetahs remaining in Iran (40-50)	6500-7000
Extinct in India since 1952	
Smaller in size compared to African Cheetah	Bigger in size
More fur, red eyes, smaller head, longer neck	Reintroduction plan going on→ Kuno National Park in MP PLANNED, Now NTCA suggested Nauradehi WLS
CITES- Appendix I, WPA- Schedule I	CITES- Appendix I, WPA- Schedule I

Gangetic Dolphin
- Habitat: Assam, Uttar Pradesh, Madhya Pradesh, Rajasthan, Bihar, Jharkhand and West Bengal.
- River: Ganga, Chambal, Ghaghra, Gandak, Brahamputra, Son, Kosi&Kulsi
- Nepal &bangladesh also have Gangetic Dolphin
- These dolphins are blind—so they hunt through ultrasonic sounds- also known as echolocation
- National Aquatic animal of India
- Around 2000 population
- Conservation Status:
- IUCN- Endangered
- WPA- Schedule 1
- CITES- Appendix 1

Irrawady Dolphin
- Habitat: Found in coastal areas in South & South East Asia
- Irrawaddy River (Mayanmar), the Mahakam (Indonesian Borneo) and the Mekong (China).
- Found in Chilika Lake in India
- Conservation Status
- IUCN: Endangered
- WPA: Schedule I
- CITES: Appendix I

Crocodile
- Three Types-
- 1.Gharial 2. Mugger 3. Saltwater Crocodile
- 1. Gharial
- Habitat- fresh water system
- Occurs in India and Nepal Only
- Rivers: Gandak, Girwa, Son, Chambal, Ramganga, Mahanadi
- Conservation Status:
- IUCN- Critically Endangered
- WPA- Schedule 1
- CITES: Appendix 1

2. Mugger
- Habitat- commonly found in freshwater environments such as rivers, lakes, hill streams, and village ponds. Can Live in fresh water as well as coastal saltwater lagoons
- Almost entire India
- Mugger crocodiles dig burrows to help maintain and protect them from ambient

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temperature changes.
- a top predator and keystone species
- Conservation Status:
- IUCN- Vulnerable
- WPA- Schedule 1
- CITES- Appendix 1

3. Saltwater Crocodile
- Habitat: Sunderbans, Bhitarkanika, Andaman & Nicobar Islands
- It is also known as maneater
- Conservation Status:
- IUCN- Least Concern
- WPA- Schedule 1
- CITES: Appendix **1**

Black Panther
- A variant of Leopard
- Found mainly in Karnataka and a few have been sighted in Kaziranga also

Gaur/Indian Bison
- Habitat: Central Indian Highlands, Eastern Ghats (Odisha) up till North-East and Western Ghats to the Nilgiris plateau.
- State Animal of Goa & Bihar
- tallest species of wild cattle found in India and largest extant bovine.
- 54th Infantry Division of Indian Army made Gaur as their mascot.
- In 2020, the first population estimation exercise of the Indian Gaur (Bison) was carried out in the Nilgiris Forest Division, Tamil Nadu.
- IUCN- Vulnerable
- WPA- Schedule 1
- CITES- Appendix 1

Musk Deer- कस्तूरी मृग
- Habitat- Western Himalayas, Sikkim, Generally in alpine forests, bamboo, rhododendron forests
- Very famous for the musk pod which the male deer carries in its abdomen
- Also called as white bellied Musk deer
- Large canines protruding from the mouth
- Communicate through olfaction- smell
- State Animal of Uttarakhand
- IUCN status- Endangered
- WPA- Schedule 1
- CITES- Appendix 1

Habitat

Species of Deers in India

Name of Species	Spotted Dear/Chital	Sambar	Barasingha
Habitat	From base of Himalayas to South India, Not in North East India	From base of Himalayas to South India, From Rajasthan to North East	Kanha Tiger Reserve
Unique Feature	State Animal of Telangana	State animal of Odisha Largest of all deer species found in India	State Animal of MP Hard Ground Swamp Deer
IUCN	Least Concern	Vulnerable	Vulnerable
WPA	Schedule III	Schedule III	Schedule I
CITES	N/A	N/A	Appendix I

Species of Deers in India

Name of Species	Sangai	Hog Deer
Habitat	Loktak lake	Northern Belt- From Corbett to Forests of Assam
Unique Feature	State animal of Manipur	Runs like a hog with its head down without the traditional leaps of a deer.
IUCN	Endangered	Endangered
WPA	Schedule I	Schedule I
CITES	Appendix I	Appendix I

Lion tailed Macaque
- Endemic to Western Ghats mostly in evergreen Forests
- Avoids Human
- States: Karnataka, Kerala, Tamil Nadu
- Conservation Status:
- IUCN- Endangered Species
- WPA- Schedule I
- CITES- Appendix I

Nilgiritahr
- State animal of Tamil Nadu
- Endemic to Western Ghats- Kerala & Tamil Nadu
- Eravikulam National Park in Anamalai hills, Kerala, is home to the largest population of the Nilgiritahr, with more than 700 individuals.
- **Adult males of NilgiriTahr** species develop a light grey area or **"saddle" on their backs** and are hence called **"Saddlebacks"**
- **MukurthiNational** Park park was created to protect its keystone species, the NilgiriTahr.
- **Conservation Status:**

- IUCN: Endangered
- WPA: Schedule I

Kharai Camels

- Also Known as swimming canals
- Habitat- Only Gujarat
- Primary Food- Mangroves- So they swim in the sea to get mangroves
- Communities- FakiraniJats&Rabaris
- It has the ability to survive in two ecosystem- Land & marine– Ecotonal Species
- Conservation Status:
- IUCN- Endangered
- WPA- Schedule I
- CITES-

Golden Langur

- **Habitat:** Found in semi evergreen forest & mixed deciduous forests in India & Bhutan
- Hair ranges from dark golden to creamy buff and their faces are black and hairless except for a long pale beard
- Fur changes according to season
- Confined within the foothills of Bhutan (North), Manas river (East), Sankosh river (West), and Brahmaputra river (South).
- **Conservation Status:**
- IUCN: Endangered
- WPA: Schedule I
- CITES: Appendix I

Pygmy Hog

- build its own home, or nest, complete with a 'roof'.
- also an **indicator species**. Its presence reflects the health of its primary habitat, the tall, wet grasslands of the region.
- Habitat- Earlier it was found from Uttar Pradesh, Nepal, Bengal to Assam, Now confined in Assam
- Recently introduced in Manas National Park in Assam.
- **Conservation Status:**
- IUCN: Endangered
- WPA: Schedule I
- CITES: Appendix I

Namdapha Flying Squirrel

- Habitat- Namdapha Tiger Reserve in Arunachal Pradesh- From 100 – 350 m→ Tropical Forests
- Among 25 most wanted lost species under "Search for Lost Species" initiative
- **Conservation Status:**
- IUCN- Critically Endangered
- WPA-
- CITES-

Indian Pangolin

- toothless and nocturnal! When threatened, they curl up into a tight ball.
- also known as scaly anteaters, are the only known mammals with large keratin scales covering their skin
- Habitat- In the entire country, South of Himalayas except North East India
- Chinese Pangolin in North Eastern States
- Conservation Status:
- IUCN- Endangered (Chinese Pangolin- Critically Endangered)
- WPA- Schedule I

- CITES- **Appendix II**

Indian Caracal

- India's second wild cat species to go extinct after Cheetah.
- Habitat- Rajasthan, Gujarat and Madhya Pradesh
- The iconic ears are what give the animal its name — caracal comes from the Turkish karakulak, meaning 'black ears'
- Roughly less than 50 members remaining in wild
- decline of its population is attributable mainly to loss of habitat and increasing urbanisation
- **National Board for Wildlife has included Caracal in the list of critically endangered species**.
- Conservation Status:
- IUCN- Least Concern
- WPA: Schedule I
- CITES- Appendix I

Dugong

Habitat type: warm latitudes of the Indian and western Pacific Oceans

Habitat- Gulf of Mannar, PalkBay, Gulf of Kutch and Andaman and Nicobar islands

It is like a sea cow- Herbivores

dugong never enters freshwater and is therefore the only exclusively marine mammal that is herbivorous.

- Conservation Status:
- IUCN- Vulnerable
- WPA- Schedule 1
- CITES- Appendix 1

Wild Dog/Dhole

- Names- Dhole, Asiatic wild dog, Indian wild dog, red dog
- Habitat type: Deciduous, evergreen, alpine, temperate
- In India: Western Ghats, Central India, north east
- Population: Less than 2500
- Conservation status:
- IUCN- Endangered
- WPA- Schedule 2
- CITES- Appendix II

Indian Pangolin

- Habitat: tropical forests as well as open land, grasslands and degraded habitats,
- widely distributed in India, except the arid region, high Himalayas and the North-East.
- Also in Bangladesh, Pakistan, Nepal and Sri Lanka
- Conservation Status:
- IUCN- Endangered
- WPA- Schedule 1
- **CITES- Appendix 2**

Olive Ridley Turtles

- Considered as the smallest and most abundant of all sea turtles
- Habitat: Warm waters of Indian Ocean, Pacific and Atlantic
- Famous for mass nesting- Arrribada
- Three rives in Odisha- **Dhamara, Devi and Rushikulya. The** place where Olive ridleyturtles nest.
- The coast of Orissa in India is the largest mass nesting site for the Olive-ridley, followed by the coasts of Mexico and Costa Rica.
- Conservation Status:

- IUCN- Vulnerable
- WPA- Schedule 1
- CITES- Appendix 1

Fishing Cat

- **It is nocturnal,**
- Apart from fish also preys on frogs, crustaceans, snakes, birds, and scavenges on carcasses of larger animals.
- **Habitat:**Sunderbans, foothills of Himalayas along the Ganga & Brahmaputra, Western Ghats
- **State Animal of West Bengal**
- **Conservation Status:**
- IUCN- Vulnerable
- WPA- Schedule I
- CITES: Appendix II

Bustards

- GIB, Macqueen's Bustard, Lesser Florican, Bengal Florican

Great Indian Bustard

- Habitat: Western & Central India, Eastern Pakistan
- Favours- arid &Semi arid grasslands, It avoids irrigated area
- Endemic to Indian subcontinent
- State Bird of Rajasthan
- Under Species Recovery program under the Integrated Development of Wildlife Habitats
- Conservation Status:
- IUCN: Critically Endangered
- WPA: Schedule I
- CITES- Appendix I
- CMS: Appendix I

Bengal Florican

- Habitat: Uttar Pradesh, Assam & Arunachal Pradesh- mainly in grasslands
- Cambodia, Nepal
- A rare species known for its mating dance
- **Conservation Status:**
- IUCN: Critically Endangered
- WPA: Schedule I
- CITES- Appendix I
- CMS: Appendix I

Vultures

- 9 Species of Vulture are there in India
- 4 critically endangered

Vultures- 9 Species in India

Critically Endangered	Least Concern Endangered	Near Threatened
White Rumped Vultures **Slender billed vulture** **Long billed vulture** **Red Headed Vulture**	**Egyptian Vulture** **Indian Griffon Vulture**	**Himalayan Griffon Vulture** **Cinerous Vulture** **Bearded Vulture**
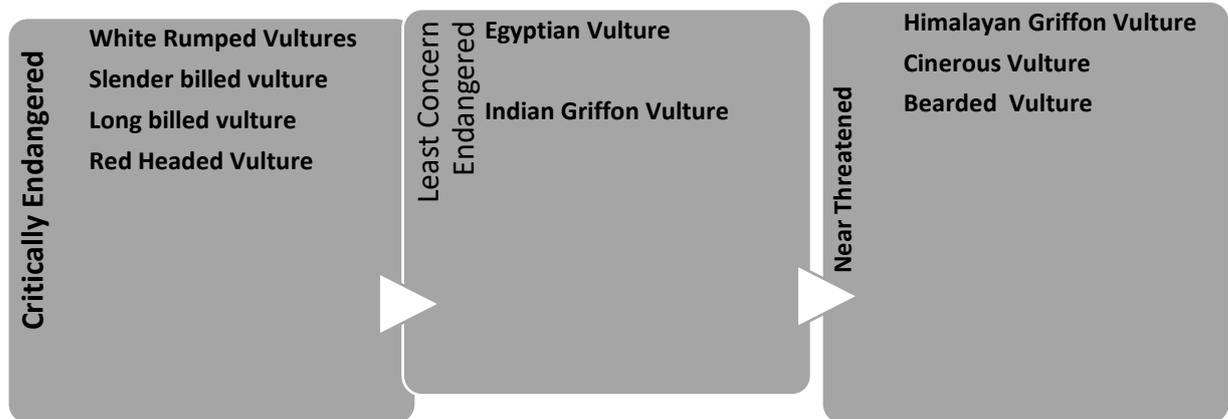
Sarus Crane

- Tallest flying bird in the world
- State Bird of Uttar Pradesh
- **Non Migratory Crane**
- **Largest Population- Keoladeo Ghana National Park**
- **It is** omnivorous
- **Habitat:** northern and central India, Terai Nepal and Pakistan.
- **Conservation Status:**
- IUCN: Vulnerable
- WPA: Schedule IV
- CITES- Appendix II
- CMS: Appendix II

Conditions Favourable for Coral Reefs:

Tropical Water:

Corals hate cold water so not present on western coasts of continents

Shallow water:

Clean salt water: In sunderbans we have regular influx of fresh water and that too muddy water—lot of sediments

- National Waterways in India:
- National Waterways act came into effect in 2016 and proposed around 106 more NW
- So total number now becomes 111

Artificial Lakes in India

- Harike
- Asan Barrage
- East Calcutta Wetlands
- Ropar
- Kanjli
- NandurMadhmeshwar- Maharashtra
- Pong dam

IMPORTANT CONVENTIONS RELATED TO ENVIRONMENT

Important Convention in News

- United Nations Global Commission on Adaptation
- Partnership for Action on Green Economy (PAGE)
- MARPOL

- London Convention/Protocol-1972-Marine Pollution/ 'GloLitter Partnerships Project'.
- Ramsar
- CBD
- CITES
- COP 26
- NCAVES India Forum 2021
- Stockholm Convention on POPs
- United Nations Convention to Combat Desertification.
- Nairobi Convention
- **Basel Convention**
- **Global e waste Monitor 2020 Report**

Convention on Biological Diversity
- Parties : 196
- ● It is **legally binding**
- Objectives:
- The conservation of biological diversity
- The sustainable use of the components of biological diversity
- The fair and equitable sharing of the benefits arising out of the utilization of genetic resources
- India enacted Biological Diversity Act to give effect to the provisions of the convention.
- US is not a member, also vatican is not a member

CBD
- Cartegena Protocol: an international treaty governing the movements of living modified organisms (LMOs) resulting from modern biotechnology from one country to another.
- Nagoya Protocol: an international agreement which aims at sharing the benefits arising from the utilization of genetic resources in a fair and equitable way.
- Both these protocols have been ratified by India

Ramsar Convention
- International treaty focusing on specific ecosystem i.e wetlands
- Around 171 parties
- It's not like regulatory regime
- six international organization partners:
- Birdlife International
- IUCN
- Wetlands International
- WWF
- International Water Management Institute
- Wildfowl and Wetlands Trust

United Nations Global Commission on Adaptation
- Multistakeholder partnership- govt, business, political leaders, scientific community etc
- Ban Ki-moon leads the group with co-chair of the Bill & Melinda Gates Foundation, and World Bank CEO.
- Aims to inspire heads of state, government officials, community leaders, business executives, investors and other international actors **to prepare for and respond to the disruptive effects of climate change with urgency, determination and foresight.**
- **India, China, Bangladesh part of this commission.**
- **It** publishes Publishes Global Call for Leadership on Climate Resilience.

Partnership for Action on Green Economy (PAGE)
- Launched in 2013 at Rio+20 (**The United Nations Conference on Sustainable**

Development 2012, Rio de Janeiro)
- Brings together five UN agencies→ UNEP, ILO, UNDP, UN Industrial Development Organization, UN Institute for Training and Research
- represents a mechanism to coordinate UN action on green economy and to assist countries in achieving and monitoring the emerging SDG
- PAGE inspires, informs and enables countries at various stages of their policy development.
- **India is a PAGE partner country.**
- SDG 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.

MARPOL- **International Convention for the Prevention of Pollution from Ships**
- Treaty covers prevention of pollution of the marine environment by ships from operational or accidental causes.
- developed by the IMO with an objective to minimize pollution of the oceans and seas, including dumping, oil and air pollution.
- **India is a signatory to MARPOL.**
- Prevention of Pollution by – Oil, sewage, garbage, air pollution, Harmful substances & Noxious liquid substance in bulk
- Recently in News: IMO has banned ships from using fuels with a sulphur content above 0.5 per cent, compared with 3.5 per cent previously in **arctic region.**
- **new limits are monitored and enforced by national authorities of countries that are members of MARPOL**

International Maritime Organization
- **International Maritime Organization-**
- Specialized agency of UN
- Responsible for measures to improve the safety and security of international shipping and to prevent pollution from ships.
- India is a member
- main role is to create a **regulatory framework** for the shipping industry that is **fair and effective, universally adopted** and **universally implemented.**
- Hong Kong convention- Recycling of ships, India has acceded to this convention also

London Convention/Protocol-1972
- Aka "Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter
- one of the first global conventions to protect the marine environment from human activities and has been in force since 1975.
- India not a party

COP 26
- **02 July 2021**
- Namdapha Flying squirrel- Schedule II of WPA
- Sarus Crane- Schedule IV
- Keystone Species: Those organisms which are termed as essential for the survival of an ecosystem.
- Is there any fixed group of species which have been classified as Keystone species?→ No
- Caracal: IUCN- Least Concern, India- Critically Endangered declared by NBWL
- US is not a party to CBD

CONVENTIONS & PROTOCOLS

A convention is formal agreement between states and is usually an instrument negotiated under an international organisation.

A protocol is one of the ways in which a convention can be modified.

The amendments by protocols are not binding on all the states that have ratified the original convention. The amendments by the protocols are only binding to the states that ratify the new protocol.

Integrated Development of Wildlife Habitats (IDWH).
- Centrally sponsored scheme
- 3 components
- 1. Recovery program for critically endangered habitats and species
- 2. Protection of wildlife outside Pas
- 3. Support to Protected areas

1. Recovery program for critically endangered habitats and species
- Big Five: Snow leopard, Clouded Leopard, Asiatic Lion, Swamp Deer, Indian Rhinoceros
- Latest ones: Red Panda, Caracal, Northern River Teraapin, Arabian Sea humpback whale

National Board for Wildlife
- Statutory Organization constituted **under the WPA, 1972.**
- It is **chaired by the Prime Minister** and its vice chairman is Minister of Environment
- It approves projects (including government projects) in and around the protected areas (national parks, wildlife sanctuaries, etc.).
- It is an advisory board and advises the central government on policy matters concerned with wildlife conservation in the country.
- **No alteration of boundaries of the protected areas is possible without the NBWL's approval**.

Animal Welfare board of India
- A**nimal Welfare Board** of India
- under Section 4 of the Prevention of Cruelty to Animals Act, 1960
- under the stewardship of Late Smt. Rukmini Devi Arundale, well known humanitarian.
- ensuring that animal welfare laws in the country are diligently followed,
- to provide grants to Animal Welfare Organizations and
- advising the Government of India on animal welfare issues
- The Board grants recognition to the newly started Animal Welfare Organisations (AWOs).

United Nations Convention to Combat Desertification
- The sole legally binding international agreement linking environment and development to sustainable land management
- **Focus:** Dry lands- arid, semi-arid and dry sub-humid areas
- **UNCCD 2018-2030 Strategic Framewor**k: to achieve Land Degradation Neutrality (LDN)
- LDN: *A state whereby the amount and quality of land resources, necessary to support ecosystem functions and services and enhance food security, remains stable or increases within specified temporal and spatial scales and ecosystems.*
- ***India Ratified in 1996- 25 Years ago***
- ***Nodal Agency:*** *MoEFCC*

CITES- Convention on International Trade in Endangered Species of Wild Fauna and Flora
- Result of resolution adopted at IUCN meeting in 1963
- 183 Parties (include countries or regional economic integration organizations).
- Objective: To ensure that international trade in specimens of wild animals and plants does not threaten their survival.
- Secretariat is Administered by UNEP.
- **Legally binding on parties but don't take the place of national laws,** rather it provides a framework
- Three Appnedices- For I & II, any addition or removal only at COP, while in Appendix III, unilateral decision can be taken

CITES- Convention on International Trade in Endangered Species of Wild Fauna and

Flora

- Appendix I- trade is prohibited except for scientific & educational purposes
- Appendix II- Trade regulated by permit
- Appendix III- If any party to the convention ask for help from other countries to prevent unsustainable exploitation of species
- **Stockholm Convention on POPs**
- **Persistent Organic Pollutants (POPs) are organic chemical substances, that is, they are carbon-based. They possess a particular combination of physical and chemical properties such that, once released into the environment, they:**
- remain intact for exceptionally long periods of time (many years);
- become widely distributed throughout the environment as a result of natural processes involving soil, water and, most notably, air;
- **accumulate in the fatty tissue of living organisms including humans, and are found at higher concentrations at higher levels in the food chain**; and are toxic to both humans and wildlife.
- **Pesticides**: aldrin, chlordane, DDT,, hexachlorobenzene

Stockholm Convention on POPs

- **global treaty** to protect **human health and the environment** from POPs.
- India ratified in 2006
- Aims to eliminate or restrict the production and use of persistent organic pollutants (POPs
- **POP-** chemical substances that persist in the environment, bio-accumulate through the food web, and pose a risk of causing adverse effects to human health and the environment".
- India has recently prohibited manufacture, use, trade, import, export of 7 chemicals including Pentachlorobenzenes
- Funding provided by GEF

- **Annex A** – Chemicals listed under this annexure are to be eliminated by the member states (Some exceptions are given.)
- **Annex B** – Chemicals listed under this annexure are to be restricted for their use. (Some exceptions are given.)
- **Annex C** – Unintentionally produced chemicals are to be reduced with measures for ultimate elimination under this annexure.

Global Environment Facility

- GEF was established with the **Rio Earth Summit** of 1992.
- The GEF is jointly managed by the **United Nations Development Programme** (UNDP), the **World Bank**, and the **United Nations Environment Programme (UNEP).**
- GEF funds are available to developing countries and countries with economies in transition to meet the objectives of the international environmental conventions and agreements.
- GEF support is provided to government agencies, civil society organizations, private sector companies, research institutions, among the broad diversity of potential partners, to implement projects and programs in recipient countries.for projects related to climate change, biodiversity, the ozone layer, etc.
- **Source of Fund- Donor Countries—Including India.**
- It is a **financial mechanism for 5 major international environmental conventions:**
  The **United Nations Framework Convention on Climate Change** (UNFCCC),
  - **The United Nations Convention on Biological Diversity** (UNCBD),
  - The **Stockholm Convention on Persistent Organic Pollutants** (POPs),
  - The **United Nations Convention to Combat Desertification** (UNCCD), and
  - The **Minamata Convention on Mercury.**

Nairobi Convention

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- a partnership between governments, civil society and the private sector, working towards a prosperous Western Indian Ocean Region with healthy rivers, coasts and oceans.
- Objective: Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region
- entered into force in 1996,
- **India is not a member**

Basel Convention

- Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal",
- **international treaty** that aims to **reduce the movement of hazardous waste between countries**. .
- focuses on **preventing transfer of hazardous waste from developed to less developed countries**.
- **India is a member of the Basel Convention.**
- **Non-parties cannot transport hazardous** waste to and from each other unless specially agreed. Basel Convention states such transportation, illegal.
- It applies **Prior Consent Approval** procedure to regulate the transboundary movement of the hazardous and other wastes.
- **does not address the movement of radioactive waste.**

Convention on Migratory Species

- Bonn Convention- International treaty on the conservation of migratory species of wild animals
- **Two Appendices**
- **Appendix I-** Migratory species in danger of extinction
- **Appendix II-** Migratory species in need of conservation
- India is a member of Bonn Convention since 1983
- Mascot of CMS COP 13 is Great Indian Bustards.
- India President of CMS in 2023

Global e waste Monitor 2020 Report

- Released by United Nations University
- a global think tank and postgraduate teaching organisation headquartered in Japan.
- Amount of e-waste→ Asia>America>Europe
- **E-Waste rules in India Highlights:**
- bring producers under the ambit of the Extended Producer Responsibility or EPR, together with the targets.
- Producers have been made accountable for e-waste collection and e-waste exchange as well.
- Compact Fluorescent Lamp (CFL) and other mercury-containing lamps have been brought under the purview of the rules
- **restrictions on import of e-waste** containing hazardous materials.

Glo Litter Partnership Project

- Launched by IMO & FAO with initial support from govt of Norway
- Objective: To help the maritime transport and fishing sectors to adapt to a low-plastic future.
- It aims to assist developing countries to apply best practices for prevention, reduction, and control of marine plastic litter from those sectors.
- Total 30 Countries in the project.
- **India is also one of the participating countries.**

World Sustainable Development Summit

- annual flagship event of The Energy and Resources Institute (TERI).
- earlier known as Delhi Sustainable Development Summit.
- Objective: to bring together global leaders and thinkers in the fields of sustainable development, energy and environment sectors on a common platform.

- **Participants:** governments, business leaders, academicians, climate scientists, youth, and civil society in the fight against climate change.

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'State of the Global Climate report 2020'.
- It has been released by World Meteorological Organisation.
- Certain Observations:
- 2011-2020 **was the warmest decade on record**
- **six years since 2015 have been the warmest on record.**
- **GHG concentration has continued to increase in 2019 & 2020**

World Meteorological Organisation
- Intergovernmental Organisation
- 192 member states including **India**
- Specialized agency of UN
- originated from the **International Meteorological Organization (IMO),**
- Reports Published by:
- Status of World Climate
- Greenhouse Gas Bulletin

TRAFFIC: The Wildlife Trade Monitoring Network
- A NGO working globally on trade in wild animals and plants in the context of both biodiversity conservation and sustainable development.
- Alliance of the World Wide Fund for Nature (WWF) and the International Union for the Conservation of Nature (IUCN).
- Works in association with National govts and CITES
- aims to ensure that trade in wild animals and plants and wildlife trafficking do not cause a threat to the conservation of nature.
- helped in the establishment of SAWEN (South Asian wildlife enforcement network),- 8 Asian countries

UN-FAO
- Specialized agency of UN
- International Year of Millets 2023 have also been endorsed by FAO.
- World Food Program of FAO won Nobel prize in 2020- It was launched during the director generalship of Dr BinayRanjan Sen.
- **India** released a **commemorative coin of Rs. 75 denomination** to mark the **75th Anniversary of the FAO**
- Hyderabad wins Global „Tree City" status

UN-FAO
- Initiatives Taken:
- Globally Important Agricultural Heritage Systems (GIAHS).
- Monitors the Desert Locust situation throughout the world.
- The Codex Alimentarius Commission or CAC is the body responsible for all matters regarding the implementation of the Joint FAO/WHO Food Standards Programme.
- Food Price Index (FFPI) is a measure of the monthly change in international prices of a basket of food commodities.

UN-FAO
- **Flagship Publications:**
  – The State of World Fisheries and Aquaculture (SOFIA).
  – The State of the World's Forests (SOFO) Every @ years

- **The State of Food Security and Nutrition in the World (SOFI).**
  - The State of Food and Agriculture (SOFA).
  - The State of Agricultural Commodity Markets (SOCO).

International Energy Agency
- Autonomous Intergovernmental Organisation
- Focus: 4E's- Economic Development, Energy Security, Environment Protection & Engagement Worldwide
- India became an Associate member in 2017
- Report- World Energy Outlook Report
- 30 members at present. TO become a member, one country has to become a member of OECD.
- However, all OECD countries are not the members of IEA

BOMBAY NATURAL HISTORY SOCIETY
- One of the non-governmental organisation in India engaged in conservation & biodiversity research
- BNHS is the partner of Birdlife International in India.
- Designated as a scientific and industrial research organisation by the department of science & technology
- Its logo is Great Hornbill
- It has Developed Internet of Birds platform where birds species can be identified with the help of Artificial Intelligence

Natural Capital Accounting and valuation of Ecosystem Project (NCAVES)
- It seeks to advance the theory and practice of environmental and ecosystem accounting in Brazil, China, India, Mexico and South Africa.
- Funded by European Union
- implemented jointly by the UN Statistics Division (UNSD), UN Environment Programme (UNEP) and Secretariat of the Convention on Biological Diversity (CBD).
- aims to assist the five participating partner countries, to advance the knowledge agenda on environmental-economic accounting, in particular ecosystem accounting.
- being implemented by the MoSPI with collaboration of Ministry of Environment, Forest and Climate Change (MoEF&CC) and the National Remote Sensing Centre (NRSC).

Blue Flag Program
- Being Run by FEE- Foundation for Environmental Education
- Basically this is an eco tourism model
- India is now in the league of 50 "BLUE FLAG" countries
- Parameters: clean and hygienic bathing water, facilities/amenities, a safe and healthy environment, and sustainable development of the area
- 8 Beach in India received Blue Flag certification

BEAMS (Beach Environment & Aesthetics Management Services)
- India has also launched India's own eco-label BEAMS (Beach Environment & Aesthetics Management Services) under ICZM (Integrated Coastal Zone Management) project.
- launched by the **Society of Integrated Coastal Management (SICOM)** and the Union Ministry of Environment, Forest and Climate Change (MoEFCC).
- Objective:
- Abate pollution in coastal waters,

- Promote sustainable development of beach facilities,
- Protect & conserve coastal ecosystems & natural resources,
- Strive and maintain high standards of cleanliness,
- Hygiene & safety for beachgoers in accordance with coastal environment & regulations.

Society of Integrated Coastal Management

- has been established under the aegis of the Ministry of Environment, Forests and Climate Change.
- The national project management unit of India in strategic planning, management, execution, monitoring and successful implementation of the ICZMP-Phase-I.

Central pollution control board (CPCB).

BIOTECHNOLOGY

First 'truly complete human genome' sequenced

- In what could be the largest improvement to the human reference genome since its initial release 20 years ago, researchers from Telomere-to-Telomere (T2T) consortium, an international collaboration of around 30 institutions havesequenced the "first truly complete human reference genome".
- This could mark a new era of genomics where no region of the genome — the entire human genetic code — is beyond reach. The complete sequence of humangenomedubs the new sequence "T2T-CHM13".
- In 2001, Celera Genomics and International Human Genome Sequencingpublished the first drafts of the human genome and revolutionised genomics. But there were gaps: As per Nature, sequencing was not truly complete and about 15%was missing owing to technological limitations.
- Subsequently, scientists solved some puzzles, but the most recent human genome, which geneticists have used as a reference since 2013 (Genome ReferenceConsortium Human Build 38 patch release 13 (GRCh38.p13)), still lacked 8% ofthe full sequence.
- Human genome is the complete set of the DNA. DNA strands are like a four-letter language — four chemical units or bases that are the alphabet.
- The 'letters' combine specifically with 'letters' in the opposite strand to form 'words', encoding information.
- All these 'words' are stored in the chromosomes in human cells. If a human genome were a book, it would have around 3-billion words (base pairs) across 22 chapters (chromosomes).
- Human genome weregiving information on human journey through time with a detailed blueprint for building every human cell that would give health careproviders new powers to treat prevent and cure diseases.

Genome India Project

- It is ambitious gene mapping by Department of Biotechnology (under the Department of Science and Technology).
- It involves 20 leading institutions including the Indian Institute of Science in Bengaluru and a few IITs.
- The Centre for Brain Research, an autonomous institute of IISc, Bengaluru will serve as the nodal point of the project.
- The first stage of the project will look at samples of 10,000 persons from all over the country to form a grid that will enable the development of a Reference Genome.

Who is an Indian?

- The Indian subcontinent has been the site of huge migrations. Scientists associated with the project recognise that while the first migrations were from Africa, later too there were periodic migrations by various populations, making this a very special case of almost all races and types intermingling genetically.
- This can be seen as "horizontal diversity".
- Moreover, later, there has been endogamy or inter-marriage practiced among distinct groups, resulting in some diseases passed on strictly within some groups and some other traits inherited by just some groups.
- This is what scientists term "vertical diversity". Studying and understanding both diversities would provide the bedrock ofpersonalised healthcare for a very large group of persons on the planet.

IndiGenprogramme

- Recently, IndiGenprogramme, the Council of Scientific and Industrial Research's
- (CSIR) resource, was completed.
- IndiGenprogrammeaims to undertake whole genome sequencing of 1000 Indian

individuals representing diverse ethnic groups from India. It is funded by the CSIR India (autonomous body).

- Its objective is to create a pilot dataset to enable genetic epidemiology of carrier genetic diseases towards enabling affordable carrier screening approaches in India.
- It is also seen as a precursor to a much larger exercise involving other government departments to map a larger swathe of the population in the country.
- The project involved the Hyderabad-based Centre for Cellular and Molecular Biology (CCMB) and the CSIR-Institute of Genomics and Integrative Biology (IGIB).

Indian Initiative on Earth Biogenome Sequencing (IIEBS)

- Recently, Jawaharlal Nehru Tropical Botanic Garden and Research Institute (JNTBGRI) was selected to take part in IIEBS.
- IIEBS aims to decode the genetic information of all known species of plants and animals in the country.
- The National Institute of Plant Genome Research, New Delhi is the coordinating centre involving a total of 24 institutes.
- The whole genome sequencing of 1,000 species of plants and animals will be taken up in the initial phase of IIEBS to be completed over a period of five years at an estimated cost of ₹440 crore.
- The project is part of the Earth BioGenome Project.

About Earth BioGenome project

- It is a global effort launched in 2018, involving scientific partners and funders from around the globe.
- It aims to sequence, catalogue and characterise genomes of all of Earth's eukaryotic biodiversity over a period of ten years.
- Vision- Create a new foundation for biology to drive solutions for preserving biodiversity and sustaining human societies.

Mapping genomes in the Indian Ocean

- A 30-member team of scientists and researchers from the National Institute of Oceanography (NIO) in Panajiand another 30 crew members onboard its research vessel SindhuSadhanawill spend the next three months traversing the course of over 10,000 nautical miles in the Indian Ocean on a research project to reveal the internal working of the body of the ocean at a cellular level.
- The first-of-its-kind research project in the country is aimed at understanding the biochemistry and the response of the ocean to climate change, nutrient stress and increasing pollution.
- The research project that flagged off at Visakhapatnam on 11 March 2021 was see the team of 30 scientists and researchers — including six women — course the Indian Ocean from India's east coast, all the way to Australia, then onward towards Port Louis in Mauritius and up to the border of Pakistan, off India's west coast, gathering samples for genome mapping of microorganisms in the Indian Ocean.
- The researchers will collect samples from various stretches of the ocean at an average depth of about 5 km.

Objective

- Trace metals like cadmium or copper are supplied to oceans via continental runoffs, atmospheric deposition, hydrothermal activities and continental shelfinteraction.
- They are essential for ocean productivity. Scientists say that it is important to understand the interactions of trace metals with marine biota "for having a holisticunderstanding about nutrient cycling and productivity of the oceans".
- The samples will be collected and the bacteria will be stored at -60 degrees Celsius with the help of liquid nitrogen.
- While some samples will be tested at six laboratories on board the vessel, several samples will be brought back to NIO for study and analysis over the next threeyears.

Human cells grown in monkey embryos

- Researchers at the Salk Institute for Biological Studies in the US have for the first time grown human cells in monkey embryos. The results of their work werepublished in the

journal Cell on 15 April 2021. While the results might implyprogress for this particular field of research called "chimera research", they have alsoignited a debate about how ethical studies of this kind are.

- By integrating human cells into the embryos of macaque monkeys, researchers have created what is called a chimeric tool. Chimeras are organisms that are madeup of the cells of two distinct species, in this case humans and monkeys.
- In this study, the monkey embryos containing human stem cells stayed alive and grew outside the body for a period of 19 days.

What's the purpose of chimeric research?

Researchers believe that this ability to grow cells of two different species together offers scientists a powerful tool for research and medicine, advancing currentunderstanding about early human development, disease onset and progression and ageing.

Further, research of this kind could also help in drug evaluation and address the critical need for organ transplantation.

Researchers note how chimeric tools provide a new platform to study how certain diseases arise.

For instance, a particular gene that is associated with a certain type of cancer could be engineered in a human cell.

Some rare hybrid animals exist naturally and were probably the result of unintentional cross breeding between animals of different species.

In 2014, a rare hybrid animal called "Geep" was born in an Irish farm. Geep was a hybrid between a goat and a sheep, a result of the two mating.

Mules are another example of a hybrid animal that is the result of mating between a female horse and a male donkey.

As per the Mule Museum, these hybrid animals are the result of intentional breeding by humans, which they first undertook in the ancient times. While mulescan live a long healthy life, they are infertile which means that they cannot have offspring of their own.

Intentional genomic alteration (IGA)

The US Food and Drug Administration (FDA) approved a first-of-its-kind intentional genomic alteration (IGA) in a line of domestic pigs referred to as Gal Safe pigs.

These pigs may be used for food and human therapeutics, the FDA has said. This will be the first time that the regulator has approved an animal biotechnologyproductfor both food and biomedical purposes

Developed by a company called Revivicor, they are the first genetically altered animals the FDA has approved for both human consumption and medical use.

Intentional genomic alteration in animalsmeansmaking specific changes to the genome of the organism using modern molecular technologies that are popularlyreferred to as "genome editing" or "genetic engineering". However, there are othertechnologies that can be used to make IGAs in animals.

The FDA allowed IGA in GalSafe pigs to eliminate a type of sugar found in mammals called alpha-gal.

This sugar is present on the surface of these pigs' cells and when they are used for products such as medicines or food (the sugar is found in red meats such as beef, pork and lamb), the sugar makes some people with Alpha-gal Syndrome (AGS) more susceptible to developing mild to severe allergic reactions.

NATIONAL GUIDELINES FOR GENE THERAPY

- Indian Council of Medical Research (ICMR) published "National Guidelines for Gene Therapy-Product Development and Clinical Trials".
- Gene Therapy refers to the process of introduction, removal or change in contentof an individual's genetic material with the goal of treating the disease and apossibility of achieving long term cure. It is classified into 2 types:
- Germ-line gene therapy: The concept of germ-line gene therapy is to introduce gene modified cells into the germline, that can be transmitted vertically across generations.
- Germline gene therapy is prohibited in India, due to ethical and social considerations.
- Germ cells are cells that create reproductive cells called gametes. They are found only in the reproductive glands (ovaries in females and testes in males.).

- Somatic cell gene therapy: It affects the targeted cells/tissue/organs in the patient, and is not passed on to subsequent generations.
- It is legal in India. This also includes genome modification as done in CRISPR-related and other technologies. It has two categories:

Key guidelines

Applicability: All stakeholders in the field of gene therapy including researchers, clinicians, regulatory committees, industry, patient support groups etc.

General Principles: Must safeguard human rights, safety and dignity. Principle of Essentiality, Voluntariness, Non-exploitation, Risk Minimization etc. need to befollowed.

Mechanism for Review and Oversight:

- Proposed establishment of Gene Therapy Advisory and Evaluation Committee (GTAEC). It is mandatory for all institutions and entities engaged in development ofGTPs to establish an Institutional Bio-safety committee (IBSC).
- Research involving development of new GTPs needs to obtain approvals from IBSC and Ethics Committee (EC).
- Biological material from humans can be procured only from clinics/hospitals that have an Ethics Committee.
- All clinical trials are mandated to be registered with Clinical Trials Registry-India (CTRI). It is an online public record system for registration of clinical trials being conducted in India.

GENE THERAPY COULD DELAY AGEING

- Scientists in Beijing have developed a new gene therapy which can reverse some of the effects of ageing in mice and extend their lifespans, findingswhich may one day contribute to similar treatment for humans.
- The method, involves inactivating a gene called kat7 which the scientists found to be a key contributor to cellular ageing.
- The team used the CRISPR/Cas9 method to screen thousands of genes for those which were particularly strong drivers of cellular senescence, the term used to describe cellular ageing.
- Kat7 is one of tens of thousands of genes found in the cells of mammals. The researchers inactivated it in the livers of the mice using a method called a lentiviral vector.

GENE EDITING

- The 2020, Nobel Prize in Chemistry was awarded jointly to Emmanuelle Charpentierand Jennifer A. Doudnafor discovering the CRISPR-Cas9 genetic scissors, which allows scientists to 'cut-paste' inside a genetic sequence.
- Clusters of Regularly Interspaced Short Palindromic Repeats (CRISPR) are specific segments in the bacterial DNA that contain palindromic repeats interspaced with pieces of DNA (called spacer) that bacteria snip off from attacking viruses.
- RodolpheBarrangoudiscovered that CRISPR is the natural defence mechanism of Bacteria against virus attack.

Cas9: It is a CRISPR-associated (Cas) endonuclease, or enzyme, that acts as "molecular scissors" to cut DNA at a location specified by a guide RNA.

CRISPR-Cas9 is a unique genome editing technology that enables geneticists and medical researchers to edit parts of the genome by removing, adding or altering sections of the DNA sequence.

STEM CELL THERAPY

Recently, Stem cells offered a ray of hope in battle against covid-19.

More about research

- This approach involves intravenous injection of mesenchymal stem-cells (MSC) from a human placenta into a covid-19 patient to boost body's immune response against infection.
- MSCs are pluripotent stem cells found in bone marrow. Pluripotent stem cells have the ability to differentiate into almost all cell types.

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- Stem-cells have strong anti-inflammatory and immunomodulatory properties, which can prevent lung inflammation in severe cases of COVID-19.
- It could help build up regenerative cells in the lungs, which could protect the epithelial cells of the lungs, prevent lung damage and help patients recover.

National Guidelines for Stem Cell Research (NGSCR) in 2017

Indian Council of Medical Research (ICMR) released the NGSCR in 2017. It aims to ensure that all research with human cell is conducted in an ethical andscientifically manner.

The guidelines focus on:

Monitoring mechanism and regulatory pathway for basic, clinical research and product development based on categories of research and level of manipulation.

Procurement of gametes, embryos and somatic cells for derivation and propagation of any stem cell lines, their banking and distribution.

Prohibitions under Guidelines: Research related to human germ line gene therapy and reproductive cloning

In vitro culture of intact human embryos beyond 14 days of fertilization orformation of primitive streak whichever is earlier

DNA TECHNOLOGY (USE AND APPLICATION) REGULATION BILL, 2019

Parliamentary Standing Committee on Science and Technology has expressed concerns over some of the provisions of The DNA Technology (Use and Application)Regulation Bill, 2019.

The first attempt to regulate use and application of DNA technology was made in 2003 with the constitution of a DNA Profiling Advisory Committee. A draft bill was accordingly prepared. After many revisions, the Bill was introduced in LokSabhain 2018, but it lapsed.

In 2019, it was reintroduced and was referred to Parliamentary Standing Committee.

DNA Profiling and Sampling is the process where a specific DNA pattern, called a profile, is obtained from a person.

The biological material used to determine a DNA profile include blood, semen, saliva, urine, faeces, hair, teeth, bone, tissue and cells.

Key provisions of the Bill

It provides for the regulation of use of DNA technology for establishing the identity of certain persons.DNA testing is allowed only in respect of matters listed in the Schedule to the Bill, like:

Matters of offences under Indian Penal Code,

Civil matters such as paternity suits and

For establishment of individual identity

National DNA Data Bank and Regional DNA Data Banks

Establishment of a National DNA Data Bank and Regional DNA Data Banks. DNA laboratories are required to share data prepared by them with the National and

Regional DNA Data Banks.

Bill provides for removal of the DNA profiles of the following persons:

A suspect if a police report is filed or court order given.

An undertrial if a court order is given.

On written request, for persons who are not a suspect, offender or undertrial.

DNA Regulatory Board

Establishment of a DNA Regulatory Board to supervise the DNA Data Banks and laboratories.

The Secretary, Department of Biotechnology will be ex officio Chairperson of the Board.

Board will comprise additional members including: Experts in the field of biological sciences;

Director General of the National Investigation Agency andDirector of the Central Bureau of Investigation.

Functions of the Board include, advising governments on all issues related to establishing DNA laboratories or Data Banks, granting accreditation to DNAlaboratories etc.

Penal provisions for offences like unauthorised disclosure, obtaining, use and access of DNA

samples, destruction, alteration, contamination or tampering withbiological evidence etc.

Government Initiatives

National Biotechnology Development Strategy 2015-2020 (NBDS)

DBT had earlier announced the First National Biotechnology Development strategy in 2007 which provided an insight into the enormous opportunities. After this, NBDS was launched in 2015 with an aim to establish India as a world class bio manufacturing hub. It aims to achieve:

Launching Four Major Missions – Healthcare, Food and Nutrition, Clean Energy and Education backed with significant investments for the creation of new biotech products

Create a strong infrastructure for R&D and commercialization and empower India's human by creating a Life Sciences and Biotechnology Education Council

Creating a Technology Development and Translation network across the country with global partnership

To revitalize the knowledge environment at par with the growing bioeconomy, focus of biotechnology tools for inclusive development etc.

The Mission will be implemented by Biotechnology Industry Research AssistanceCouncil (BIRAC).

The mission entails an investment of over 1500 crore by Government of India for five years with 50% cost for the program coming the World Bank loan.

National Biopharma Mission

- It is an Industry-Academia Collaborative Mission for accelerating discovery research to early development for biopharmaceuticals.
- The World Bank assisted INNOVATE IN INDIA (i3) program under this mission aims to create an enabling ecosystem to promote entrepreneurship and indigenous manufacturing in the sector. The focus of the mission is to:
- Develop new vaccines, bio-therapeutics, diagnostics and medical devices to address the rising burden of diseases.
- Bring isolated centers of excellence (Academia) together, enhance regional capabilities and strengthen the current bioclusters network in terms of capacities as well as quantity and quality of output.
- To develop platform technologies for product validation, link institutions to strengthen clinical trial networks, promote partial de-risking for novel products, andbuild capacities in emerging areas such as bioethics, bioinformatics etc.

Promotion of Biotechnology in North Eastern Region of India

In 2009-10 DBT had also set up a North Eastern Region – Biotechnology Program Management Cell (NER-BPMC) for coordinating and promotingthe biotechnological activities in the NER with annual investment of180 crores.

How can Biotechnology be used to address various issues in India? Food security:

- Biotechnology can help make crops more productive and tolerantof other stress like pest, insect etc. helping to feed the next billion people. Foodscan also deliver enhanced nutrition, such as Golden Rice with additional vitaminA from the International Rice Research Institute. Making crops resistant to pestattacks (Bt Cotton and BtBrinjal).
- Adapting to Climate change: India faces drought conditions in different states where biotechnology can act as boon by developing drought resistant crops.
- Tackling diseases: Biotechnology offers some of the most promising and targeted ways to find solutions to threats like Zika virus and the rise of antibioticresistantbacteria.
- Bioenergy: There has been increase in use of bioethanol and biodiesels in India. These fuels are derived from living organisms such as plants and their by-products, microbes or animal waste.
- Advancement in drugs: More recently, the meteoric growth of the Indian pharmaceutical industry is a result of process innovation that has given the countrya cost advantage in the manufacture of drugs.
- Biofortification: Biofortification is the process by which the nutritional quality of food crops is improved through agronomic practices. Biofortificationdiffers from conventional fortification in that biofortification aims to increase nutrientlevels in crops during plant

growth rather than through manual means during processing of the crops.

Animal Biotechnology: Biotechnological techniques are used to improve the productivity of livestock and also for development of affordable new generationvaccinesand diagnostics against a plethora of animal diseases. Embryo TransferTechnologyis one such technology which has been developed in India.

Bioremediation: It is a waste management technique in which microorganisms (e.g., bacteria, fungi), plants (termed phytoremediation), or biological enzymes areused to consume and break down environmental pollutants, in order to clean apolluted site. Example: oil zappers.

Stem cell therapy: It is also known as regenerative medicine whichpromotes the reparative response of diseased, dysfunctional or injuredtissue using stem cells or their derivatives.

XENOBOTS

- Scientists in the United States have created the world's first "living machines". These are tiny robots built from the cells of the African clawed frog, that can movearound on their own.

- They have named the millimetre-wide robots "xenobots" — after the species of aquatic frog found across sub-Saharan Africa from Nigeria and Sudan to SouthAfrica, Xenopuslaevis.

- The xenobots can move toward a target, perhaps pick up a payload (like a medicine that needs to be carried to a specific place inside a patient) and heal themselves after being cut.

- It could help the development of useful soft robots that can heal themselves when Damaged. Because they are made of living tissue, they also decay once they stop working.

GM CROPS

Recently, environmentalists agitated and asked centre to take a concrete stand over the safety of GM crops.

A GM Crops (also called transgenic crop) has a novel combination of genetic material obtained through the use of modern biotechnology mainly usingrecombinant DNA (rDNA) technology.

Position of India in GM crops

- Only the Bt cotton with the Cry 1 Ac gene (Bollgard I) is commercialised in India.

- India is at the 4th global position in hectarage under GM crops.

- Bt cotton greatly contributed to a significant increase in farm income and India's transformation from a cotton importer into an exporter.

- Other GM crops currently under process includes BtBrinjal, GM mustard etc.

GM Crops

- Bt cotton, the only GM crop that is allowed in India, has two alien genes from the soil bacterium Bacillus thuringiensis (Bt) that allows the crop to develop a protein toxic to the common pest pink bollworm.

- HtBt, on the other, cotton is derived with the insertion of an additional gene, from another soil bacterium, which allows the plant to resist the common herbicideglyphosate.

- In Btbrinjal, a gene allows the plant to resist attacks of fruit and shoot borer.

- In DMH-11 mustard, developed by Deepak Pental and colleague in the South Campus of University of Delhi, genetic modification allows cross-pollination in a crop that self-pollinates in nature.

- Across the world, GM variants of maize, canola and soyabean, too, are available.

What is the legal position of genetically modified crops in India?

In India, the Genetic Engineering Appraisal Committee (GEAC) is the apex body that allows for commercial release of GM crops.

In 2002, the GEAC had allowed the commercial release of Bt cotton. More than 95 per cent of the country's cotton area has since then come under Bt cotton.

Use of the unapproved GM variant can attract a jail term of 5 years and fine of Rs1 lakh

under the Environmental Protection Act,1986.

'Network Project on Transgenic in Crops' (presently Network Project on Functional Genomics and Genetic Modification in Crops) was launched by ICAR in 2005 for development of GM crops in case of pigeonpea, chickpea, sorghum, potato, brinjal, tomato and banana for different traits and the material is in different stagesof development.

Policy framework for GM Crops

Codex Alimentarius Commission (Codex): It is the joint FAO/WHO intergovernmental body responsible for developing the standards, codes ofpractice, guidelines and recommendations that constitute the Codex Alimentarius,meaning the international food code.

Codex developed principles for the human health risk analysis of GM foods in 2003.

Genetic Engineering Appraisal Committee (GEAC): Since 1989 GEAC under the

Ministry of Environment, Forest and Climate Change has been responsible for approving commercial cultivation of GM crops as well as the manufacture, importandselling of processed foods made from GM ingredients.

Rules for the Manufacture, Use, Import, Export and Storage of Hazardous Microorganisms/Genetically Engineered Organisms or Cells 1989 (known as 'Rules, 1989') under the Environment (Protection) Act, 1986: These rules and regulations cover the areas of research as well aslarge scale applications of Genetically Modified Organism (GMOs) andproducts made there from throughout India.

GM food imports require approvals under two laws. Environment Protection Act of 1986 and the Food Safety and Standards Act of 2006.

ICT

Hughes India selected for satellite broadband

- The current definition of broadband in India is the minimum download speed of 512 kbps. The government has selected Hughes Communications India to connect 5,000 village panchayatsinborder and Naxal-affected states as well as in island territories with satellite broadband under BharatNet project by March 2021.
- The 5,000-gram panchayats are located in north-eastern states, including Manipur, Meghalaya, Tripura, Mizoram, Arunachal Pradesh, and the Galwan Valley in EasternLadakhas well as in Andaman and Nicobar and Lakshadweep that lack terrestrial connectivity, such as fiber or cable, Hughes said in a statement on 13 October 2020.
- The BharatNet network (BharatNet is a project of national importance to establish, by 2017) being created by Bharat Broadband Nigam Limited (BBNL), is to provide affordable high-speed broadband access to rural citizens and institutions of all theGramPanchayatsof the country.
- Under the agreement, Hughes India will enable Internet service for each gram panchayatusing capacity from ISRO's GSAT-19 and GSAT-11 satellites with theHughes Jupiter System, the de facto standard for satellite broadbandimplementations, in use on more than 40 satellites worldwide.

PM-WANI approved

- The Union Cabinet on 9 December 2020 decided to launch a PM- Wi-Fi Access Network Interface to unleash a massive WIFI network in India. With this, public data centres will be opened across the country. There willbeno licence, fee or registration for it, Ravi Shankar Prasad said. ThePublic Wi-Fi Access Network Interface will be known as PM-WANI.
- The Union Cabinet chaired by the Prime Minister has given its approval for the proposal of DoT for setting up of Public Wi-Fi Networks by PublicData Office Aggregators (PDOAs) to provide public Wi-Fi service through Public Data Offices (PDOs) spread across length and breadth of the country to accelerate proliferation of Broadband Internet services through Public Wi-Fi network in the country.
- The proposal will promote growth of public Wi-Fi networks in the country.

INDIA'S FIRST AIRLINE TO OFFER IN-FLIGHT WI-FI

- Vistara has started offering in-flight Wi-Fi internet on Boeing 787-9 Dreamliners. The offer is effective from 18 September 2020 on flightsbetween Indira Gandhi International Airport (Del) in Delhi and LondonHeathrow (LHR).
- With this, Vistara has become the first Indian airline to offer the service. As part of Vistara's introductory offer the service will beavailablefree of cost to all flyers for a limited period.
- Vistara is also planning to introduce the in-flight Wi-Fi internet service on its Airbus A321neo aircraft as well.

Submarine Optical Fibre

- The Cabinet on 9 December 2020 approved provision of Submarine Optical FibreCable Connectivity between mainland (Kochi) and Lakshadweep Islands.
- The 11 islands that will be covered include- Kavaratti, Kalpeni, Agatti, Amini, Andrott, Minicoy, Bangaram, Bitra, Chetlat, KilthanandKadmat. The estimated cost of implementation will be about Rs. 1072 crore including operational expensesfor 5 years.
- The Project would be funded by Universal Service Obligation Fund.
- The submarine connectivity project will have vital role for delivery of e-Governance services at the doorstep of citizens, potential development of fisheries, coconutbased industries and high-value tourism, educational development in term of teleeducationand in health care in terms of telemedicine facilities.
- The Lakshadweep Islands have the potential to become a hub of logistic services.
- Bharat Sanchar Nigam Ltd. (BSNL) has been nominated as Project Execution Agency and Telecommunications Consultant India Ltd. (TCIL) as the Technical Consultant of the Project to assist Universal Service Obligation Fund, Department of Telecommunications.
- Lakshadweep comprising a number of Islands is situated in the Arabian Sea and of immense strategic significance for India.
- Presently, only medium of providing telecom connectivity to Lakshadweep is through satellites, but the bandwidth available is limited to1 Gbps.

What OTT platforms

- The government has brought video streaming over-the-top (OTT) platforms such as Netflix, Amazon's Prime Video, Hotstar, and others under the ambit of theMinistry of Information and Broadcasting on November 2020.
- These platforms were so far under the purview of the Ministry of Electronics and Information Technology.
- With a market size of nearly Rs 500 crore at the end of March 2019, the online video streaming platforms may become a Rs 4000-crore revenue market by the end of 2025, according to reports. At the end of 2019, India had as many as 17 crore OTTplatform users.
- OTT, or over-the-top platforms, are audio and video hosting and streaming services which started out as content hosting platforms, but soon branched outinto the production and release of short movies, feature films, documentaries andweb-series themselves.
- These platforms offer a range of content and use artificial intelligence to suggest users the content they are likely to view based on their past viewership on theplatform.
- So far in India, there are no laws or rules regulating OTT platforms as it is a relatively new medium of entertainment. Unlike television, print or radio which follows guidelines released by governments, OTT platforms, classified as digitalmedia or social media, had little to no regulation on the choice of content they offered, the subscription rates, certification for adult movies and others.
- The Online Curated Content Providers or OCCPs had also proposed a Digital Curated Content Complaints Council along with the self-regulatory mechanism asa part of its proposed two-tier structure. The proposal, however, was shot down bythe Ministry of Information and Broadcasting, which will now oversee these platforms.
- The central government's move to bring the OTT platforms under the I&B ministry could also mean that these platforms would have to apply for certification and approval of the content they wish to stream.

India's first Lithium refinery

- India's first Lithium refinery which will process Lithium ore to produce batterygradematerialwill be set up in Gujarat, state government officials said on December2020.
- Manikaran Power Limited, one of the country's largest power trading and renewable energy company will be investing over Rs 1,000 crore to set up thisrefinery. Lithium is a rare element not usually found in India.
- The company will be importing Lithium ore from Australia and will be processing it here.
- Last year, Manikaran Power had collaborated with Australian firm Neometalsto tap the Mount Marion Lithium mine in Western Australia.
- This Lithium ion battery manufacturing plant is expected to become operational by January or February 2021.

India to tap 'Lithium Triangle'

- India has visited to the `Lithium Triangle' nations (Argentina, Bolivia & Chile), to meet its target of having Electric Vehicles by 2030.
- In 2019, the government has formed `KABIL' consortium which has three stateownedcompanies: National Aluminum Company (NALCO), Hindustan Copper (HCL)and Mineral Exploration Corp Ltd., (MECL).
- Purpose of this consortium has been set up to help in the process of acquiring this most strategic mineral globally.
- This mineral is required not only for the EVs but is used in other sectors including space launchers, solar panels, mobile phones and laptops and hi-tech military platforms including submarines for the Indian Navy.
- KABIL will help in processing the mineral once acquired from any of the three countries in South America.
- The 2019 Nobel Prize in Chemistry was jointly awarded to Stanley Whittingham, John GoodenoughandAkira Yoshino for work that led tothe development of lithium-ion batteries, which are used in most mobilephones, smartphones, tablets, laptops and power banks, among otherdevices.
- The first commercially viable Li-ion battery was created by Yoshino in 1985 who developed on Whittingham and Goodenough's work.

Lithium Sulfur (Li-S) batteries

- Researchers at the Indian Institute of Technology (IIT) Bombay and Shiv Nadar University (Chennai) claim to have developed a technology forproduction of environment friendly Lithium-Sulfur (Li-S) batteries inAugust 2020 which will be three times more energy efficient and cost effective than Lithium-ion batteries commonly used at present.

- According to the team, the Li-S battery technology leverages principles of green chemistry, incorporating usage of by-products from the petroleum industry (Sulfur), agro-waste elements and copolymers such as cardanol (a by-product of cashew nut processing) and eugenol (clove oil) ascathodic materials.
- The new battery technology synthesises a bio-based molecule, capable of commercial-scale production.

India own cloud storage platform

- India now has its own cloud storage platform, DigiBoxx. A potential alternative to Google Drive, Dropbox, and Microsoft OneDrive, the indigenous cloud service isseen as a step that furthers the initiative of 'Atmanirbhar Bharat.'

- The homegrown data storage and management platform has been launched by NITI Aayog on December 2020 and it will provide affordable services to both regular usersas well as businesses. All the data will be encrypted and stored in servers in India.
- The most interesting feature of the service DigiBoxxis that it allows users to share files even when they don't have a DigiBoxx account.
- The feature has been named InstaShareandallows users to share up to 2GB of content for free.
- One free tier with 20GB storage. A second tier with 5TB space at Rs 30 per month for individuals and freelancers.

India joins GPAI as founding member

- India on 15 June 2020 has joined the Global Partnership on Artificial Intelligence (GPAI) as a founding member to support responsible and human-centric development and use of artificial intelligence (AI).
- With this, India has joined the league of leading nations and economies including the US, the UK, EU, Australia, Canada, France, Germany, Italy, Japan, Mexico,New Zealand, Republic of Korea, and Singapore for launch of GPAI.
- "GPAI is an international and multi-stakeholder initiative to guide the responsible development and use of AI, grounded in human rights, inclusion, diversity,innovation, and economic growth".
- The first-of-its-type initiative for evolving better understanding of challenges and opportunities around AI using the experience and diversity of participating countries,the alliance will look to bridge the gap between theory and practice by supportingadvanced research and applied activities on AI-related priorities.
- GPAI will be supported by a secretariat, to be hosted by the Organisationfor Economic Cooperation and Development (OECD) in Paris, as well asbytwo Centers of Expertise -- one each in Montreal and Paris.
- India recently launched National AI Strategy and National AI Portal, and has also started leveraging AI across various sectors such as education,agriculture, healthcare, e-commerce, finance, and telecommunications.
- "By joining GPAI as a founding member, India will actively participate in the global development of artificial intelligence, leveraging upon itsexperience around use of digital technologies for inclusive growth".

Free-space Quantum Key Distribution (QKD)

- For the first time in the country, Indian Space Research Organisation (ISRO) has successfully demonstrated free-space Quantum Communication over a distance of300 m on 22 March 2021.
- The free-space QKD was demonstrated at Space Applications Centre (SAC), Ahmedabad, between two line-of-sight buildings within the campus. Theexperiment was performed at night, in order to ensure that there is no interference of the direct sunlight.
- The experiment is a major breakthrough towards ISRO's goal of demonstrating Satellite Based Quantum Communication (SBQC), where ISRO is gearing up to demonstrate the technology between two Indian ground stations.
- A number of key technologies were developed indigenously to accomplish this major feat, which included the use of indigenously developed NAVIC receiver fortimesynchronization between the transmitter and receiver modules, and gimbal mechanism systems instead of bulky large-aperture telescopes for optical alignment.
- The Quantum Key Distribution (QKD) technology underpins Quantum Communication technology that ensures unconditional data security by virtue ofthe principles of quantum mechanics, which is not possible with the conventional encryption systems.
- The conventional cryptosystems used for data-encryption rely on the complexity of mathematical algorithms, whereas the security offered by quantum communication is based on the laws of Physics.
- Therefore, quantum cryptography is considered as 'future-proof', since no future advancements in the computational power can break quantum-cryptosystem.
- In last year's budget session (2020), the Finance Minister of the Government of India

proposed that ₹8,000 crorebe set aside to develop quantum science andtechnology. The detailed project report for a National Mission on QuantumTechnology and Applications (NM-QTA) has been drawn out and finalised, and in the next couple of months, this mission might get approval.

What is 5G?

- 5G or fifth generation is the latest upgrade in the long term evolution (LTE) mobile broadband networks.
- The first generation of networks allowed only mobile voice calls to be made, while the second generation allowed mobile voice calls as well as sending of short textmessages.
- It was the third generation or 3G network which allowed web browsing on mobile devices, the speed and latency of which improved with fourth generation or 4G networks.
- The 5G networks will have even faster speeds with latency down to between 1-10 milliseconds.
- Latency is the time a device takes to communicate with the network, which stands at an average of up to 50 milliseconds for 4G networks across the world.

What are spectrum auctions?

- Devices such as cellphones and wireline telephones require signals to connect from one end to another. These signals are carried on airwaves, which must be sent atdesignated frequencies to avoid any kind of interference.
- The Union government owns all the publicly available assets within the geographical boundaries of the country, which also include airwaves. With the expansion in the number of cellphone, wireline telephone and internet users, the need to provide more space for the signals arise from time to time.
- To sell these assets to companies willing to set up the required infrastructure to transport these waves from one end to another, the central government through theDoT auctions these airwaves from time to time.
- These airwaves are called spectrum, which is subdivided into bands which have varying frequencies.
- All these airwaves are sold for a certain period of time after which their validity lapses, which is generally set at 20 years.

NSM to enter final phase

- The second phase of the National Supercomputing Mission (NSM) will be completed by September 2021, taking India's total computational capacity to 16 Petaflops.
- Launched in 2015, the ambitious Rs 4,500-crore project is led jointly by the Ministry of Electronics and Information Technology and Department of Scienceand Technology.
- The mission aims at creating a powerful supercomputing capability for the country and offer powerful computational facilities to boost research.
- The Centre for Development of Advanced Computing (CDAC) and Indian Institute of Science (IISc) were entrusted to spreadhead the seven-year mission, ending in2022.
- A National Knowledge Network (NKN), a grid, will connect 70 supercomputers across 75 research institutions with over a thousand researchers using this facility.
- In the first phase, PARAM Shivay, PARAM Shakti, PARAM Brahma, PARAM YuktiandPARAM Sanganakwere deployed at IIT (BHU), IITKharagpur, Indian Institute of Science Education and Research, Pune, and Jawaharlal Nehru Centre for Advanced Research.

PARAM Ambar

- The Indian Space Research Organisation (ISRO) on 25 November 2020 strengthened its supercomputing capacity after adding a 1.65-Petaflops PARAMAmbar to its network.
- PARAM Ambar (Advanced Machine for Basic Atmospheric Research) offers high throughput storage of 2 Petabytes and archival capacity of 1 Petabytes. PARAM Ambaris one of the space agency's largest operational computational facilities.
- Developed by Pune-headquartered Centre for Development of Advanced Computing (C-

DAC), the supercomputer will serve disaster management agencies in a big way.
- It will also be used for climate modelling, carrying out research related to atmospheric and oceanic processes, and for real-time weather forecasting.

National Atomic Timescale
- Prime Minister on 4 January 2020 dedicated the National Atomic Timescale and BhartiyaNirdeshakDravyaPranalito the nation and laid the foundation stone of the National Environmental Standards Laboratory through video conference.
- The conclave was organised by the Council of Scientific and Industrial Research-National Physical Laboratory (CSIR-NPL), New Delhi, on its 75th year of inception.TheNPL is one of the oldest laboratories in the country.
- The NPL has adopted an international practice for production of Indian Certified Reference Material (CRMs) Trademarked as BhartiyaNirdeshakDravya.
- India has become self-reliant in measuring the time within the range of a nanosecond. This will be a big help for organisations like ISRO which are working withcutting edge technology.
- The timescale will also help in strengthening India's role in Industry 4.0. This will also enhance India's share in the global market for technologies related to airquality and emission technology.

Finding value in e-waste
- The value of e- is also the source of challenge when it comes to processing it. Researchers say that e-waste has a gold grading (defined as a proportion of gold in milled ore) almost waste three times more than that of mined ore.
- Currently, e-waste is processed in one of two ways — pyrolysis (thermal decomposition of material at a high temperature) and liquid method (where amixture of highly corrosive methods are used to extract the materials). Thesemethods are both energy-intensive and usually have some form of harmful effluents.
- A couple of years ago, researchers at the Indian Institute of Science (IISc), Bengaluru came up with cryo-milling, where materials are cooled down usingliquid nitrogen and then broken down using a grinder.
- The e-waste is ground into fine particles and you can separate the polymer and metal with water. The plastic extracted here can be reused, along with the metal,cryo-milling adds tremendous value to e-waste recycling.

HEALTH AND DISEASES

Bright side of viruses
What is a Virus?
- The word "virus" originated in the Sanskrit term vish, or visa, and the Zoroastrian vīsa—all meaning poison. Most viruses consist of three key building blocks: RNA, proteins and lipids. These three units self-assemble to form a virus.
- The viral self-assembly is based on weak interactions between the proteins, RNA and lipids.
- The lipids form a protective coat around the virus and help keep its components together. But the lipid outer layer is the weakest link in the virus' structure.
- Together these act like Velcro to keep the self-assembled viral particle intact. Since there are no strong bonds holding the three units together, the virus can be broken up without the use of harsh chemicals.

Does viruses are important
- Viruses are important to human beings and are, in fact, necessary for the survival of our species.
- The most numerous biological entities on earth, they are the means of transferring genes between different species, which increases genetic diversity and drives evolution—nearly 10% of the human genome is made of bits of virus DNA.
- Viruses are a key part of what make us human. They can be considered to be a life

form, because they carry genetic material, reproduce, and evolve through natural selection. Despite the recent bad name they have gotten, viruses can be incredibly useful for us humans.

- Bacteriophage—a kind of virus—actively kills harmful bacteria, especially in the mucus membranes in our noses and our guts. Biologists have engineered viruses to form vaccines against Hepatitis B, and are trying to get viruses to engineer cells that may provide cures for diseases such as emphysema and cystic fibrosis.

Characteristics of Viruses

- Viruses have lack a cell structure considered necessary to count as life. Because they possess some but not all such qualities, viruses have been described as "organisms at the edge of life".

- As nature's microscopic zombies, viruses straddle the divide between the living and the dead.

- Viruses have two other key characteristics: they can only live and propagate by infiltrating a host cell and they jump from species to species. Both these characteristics are what make viruses dangerous.

Biological and computer viruses

- Biological and computer viruses have a lot in common. Both are much simpler than their hosts;

- a bio virus will have a few thousand genomic base pairs, as compared to three billion of a human cell, and

- a computer virus may contain as few as six lines of code compared to the tens of millions of lines of codes of an operating system. Both are nothing without their host.

- They need a host to survive and replicate by sending copies of themselves through coughs and sneezes, or emails and messages, as the case might be. Both kill by decreasing host performance.

- Both conceal themselves inside their hosts, making detection very difficult from white blood cells or from basic virus detection programs.

Corona Virus

- On 31 December 2019, China informed the World Health Organization (WHO) of a cluster of cases of pneumonia of an unknown cause in Wuhan City in Hubei province.

- A few patients in Wuhan had been suffering from respiratory illnesses such as pneumonia since early December.

- On 9 January 2020, WHO issued a statement saying Chinese researchers have made "preliminary determination" of the virus as a novel coronavirus in a person with pneumonia.

- Coronaviruses are a large family of viruses with some causing less severe common cold to more severe diseases such as severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS).

Classifying coronaviruses

- Broadly, coronaviruses (CoV) are the largest group of viruses that belong to the Nidovirales order, which includes Coronaviridae among three others.

- Coronavirinae are one of the two subfamilies of Coronaviridea, with the other is being Torovirinae.

- Coronavirinae can be further subdivided into alpha, beta, gamma and delta coronaviruses.

- While there are hundreds of coronaviruses, there are seven that we know can infect humans.

- Out of the seven, two are alpha coronaviruses (229E and NL63) and four are beta coronaviruses (OC43, HKU1, MERS and SARS-CoV).

SARS and MERS

- The SARS coronavirus is thought to be an animal virus from an as-yet-uncertain animal reservoir, perhaps bats, that spread to other animals (civet cats) and first infected humans in the Guangdong province of southern China in 2002.

- The MERS coronavirus was passed on from dromedary camels to humans in Saudi

Arabia in 2012.

- On 11 January 2019, China shared the whole genome sequence data with WHO and submitted them to the Global Initiative on Sharing All Influenza Data (GISAID) platform to allow researchers across the world to access the data.

WHO names a new disease

- On 11 February 2020, the World Health Organization officially announced COVID19 as the name for the disease caused by the novel coronavirus.
- The "CO" in COVID stands corona, while "VI" is for virus and "D" for disease. The number 19 stands for the year 2019 when the outbreak was first identified.
- The WHO had to come up the name in line with the 2015 guidelines between the global agency, the World Organisation for Animal Health and the Food and Agriculture Organization.
- The Coronavirus Study Group of the International Committee on Taxonomy of Viruses, which had assessed the novelty of the human pathogen, has named the virus as "Severe acute respiratory syndrome coronavirus 2", or "SARS-CoV-2".
- Geographic locations, people's names, species of animal or food, references to culture, population, industry or occupation, and terms that incite undue fear among people.

Diseases named on geographic location

- There are a few disease names that mentions the geographic location — cities, countries or regions — where the disease was first identified.
- The Ebola virus disease derives its name from the location from where the virus was first identified — Yambuku in the Democratic Republic of the Congo which is about 100 km from the Ebola River.
- Likewise, Zika gets its name from the location from where the virus was first identified in rhesus monkeys — Uganda's Zika forest. The virus spread to humans in Uganda and Tanzania five years after it was discovered in 1947.
- Japanese encephalitis (first case documented in 1871 in Japan), Middle East Respiratory Syndrome, Spanish Flu, Rift Valley fever, and Lyme disease are other examples where the disease name carries the location name.

Name of the Person

- A couple of diseases carry the name of the person who first identified the disease.
- Chagas disease is named after the Brazilian physician Carlos Chagas, who discovered the disease in 1909.
- Similarly, the Creutzfeldt-Jakob disease refers to the persons who described the disease (German neurologist Hans Gerhard Creutzfeldt and in 1920 and shortly afterward by Alfons Maria Jakob).

Name of Animal

- Some diseases carry the name of animals — bird flu (H5N1) and swine flu (H1N1). The 2009 H1N1 pandemic was commonly referred to as swine flu.
- It is important to note that the 2009 pandemic virus was not completely derived from swine. The virus contains a combination of flu genes from bird, swine, and human flu types. Calling the 2009 pandemic virus as swine flu caused a major impact on the pork industry.

Coronavirus a global pandemic

- The World Health Organization (WHO) declared COVID-19 a global pandemic on 11 March 2020 as the new coronavirus, which was unknown to world health officials just three months ago.
- A pandemic is the worldwide spread of a new infectious disease. It stretches over a larger area, infects more people and causes more deaths than an epidemic. In 2009 a pandemic of swine flu killed 14,286 people worldwide.

What is an outbreak?

- When more cases of a disease than expected are recorded in one area an outbreak is

declared. The area could be a small community or extend to several countries.

- An outbreak could even be a single case of a contagious disease new to a community or not seen for a long time. An outbreak can last for a few days, weeks or even several years.
- Outbreaks can be transmitted through person-to-person contact, animal-to-person contact, or from the environment.

What is endemic?

- An endemic is an outbreak that occurs at a predictable rate in a certain area or among a set population.
- Chickenpox is classed as endemic as it occurs at a high but predictable rate among youngsters. Endemics remain at a steady state, but do not disappear from a population.

What is an epidemic

- An epidemic will see a disease rapidly spread among a large number of people in a given population. During an epidemic the disease will normally spread in two weeks or less.
- Epidemics may be the consequence of disasters of another kind, such as tropical storms, floods, earthquakes and droughts.
- There have been 14 epidemics since 2010, including the Ebola epidemic in West Africa, which killed 11,300 people between 2013 and 2016. In 2003 the Sars outbreak was classed as an epidemic - it killed nearly 800 people.
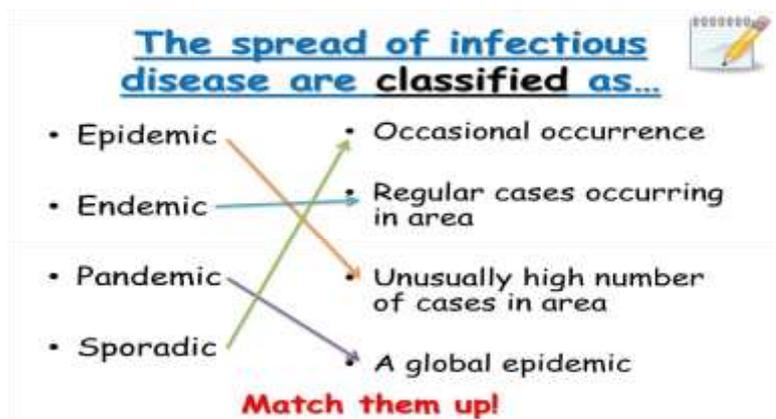
Pandemics in 20th Century

- The Spanish Flu (caused by an A (H1N1) virus), estimated to have caused up to 50 million deaths in 1918-1919.
- The other two pandemics were the Asian Flu caused by an A (H2N2) virus in 19571958 and the Hong Kong Flu caused by an A (H3N2) virus IN 1968.

Pandemics in 21th Century

- The 2009 swine flu (H1N1) affected nearly 61 million people in the US. Other global pandemics have also followed a similar pattern.
- The Severe Acute Respiratory Syndrome (SARS) of 2003 and the Middle East Respiratory Syndrome (MERS) of 2012 are classical examples.
- This historical perspective on influenza pandemics in India notwithstanding, it is imperative to take action against the ongoing COVID-19 pandemic.

Stage of Transmission

- On 13 March 2020, the Indian Council of Medical Research (ICMR) announced that it would start testing influenza patients without any travel history or contact with novel coronavirus disease (COVID-19) for signs of community transmission, terming it "inevitable".
- It is one of the levels of transmission defined by the World Health Organization (WHO). Simply put, community transmission means that a virus is circulating in the community and can affect people with no history of travel to affected areas or of contact with an infected person.
- Experts at the ICMR said there were four states of the disease.
- Stage 3 is community transmission and
- Stage 4 is when it turns into an epidemic.

Herd immunity

- The UK's Government Chief Scientific Adviser Sir Patrick Vallance hinted at a strategy that would allow the novel coronavirus to infect 60% of the country's population so that a degree of "herd immunity" could be achieved.
- Herd immunity refers to preventing an infectious disease from spreading by immunising a certain percentage of the population. Even in such a situation, the immunised persons protect the non-immunised by acting as a barrier — which is herd immunity.
- To estimate the extent of spread and immunity, epidemiologists use a measure called the 'basic reproductive number' (R0).
- This indicates how many persons will be infected when exposed to a single case; an R0 of more than 1 indicates one person can spread the infection to multiple persons.
- Scientific evidence shows that a person with measles can infect around 12-18 persons; and a person with influenza can infect around 1.2-4.5 persons, depending on the season.
- On the basis of the available evidence from China, and according to various experts, R0 COVID-19 ranges between 2 and 3.

Herd immunity threshold

- Mathematically, it is defined on the basis of a number called "herd immunity threshold", which is the number of immune individuals above which a disease may no longer circulate.
- The higher the R0, the higher the percentage of the population that has to be immunised to achieve herd immunity.
- Polio has a threshold of 80% to 85%, while measles has 95%.
- With the current data for COVID-19, experts have estimated a threshold of over 60%.
- That means more than 60% of the population needs to develop immunity to reach the stage of herd immunity.

Incubation

- The incubation period is the time it takes for symptoms to appear after a person is infected.
- This time can be critical for prevention and control, and it allows health officials to quarantine or observe people who may have been exposed to the virus.
- The new coronavirus has an incubation period of two to 14 days, symptoms appearing about five days after infection in most cases.
- During the incubation period, people may shed infectious virus particles before they exhibit symptoms, making it almost impossible to identify and isolate people who have the virus.

Fatality rate

- The case fatality rate is the number of deaths divided by the total number of confirmed cases.
- Eventually, scientists hope to have a more comprehensive number called the infection fatality rate, which includes everyone who was infected with the virus.
- The WHO estimates the fatality rate of the new coronavirus to be about 3%, based on current data, but experts suggest 1% is more realistic.

Containment

- The virus's high transmission rate has made it difficult to effectively contain the outbreak.
- Containment refers to the use of any available tools to mitigate the spread of a disease.

Co-morbidities

- Several health conditions including uncontrolled diabetes and hypertension, cancer, morbid obesity, lung diseases, compromised immune systems put patients at greater risk for contracting the infection, and also have poor clinical outcomes.
- Special attention to prevent the disease and prevent mortality in these groups is the concern of health managers.

Positivity rate

- The percentage of people who test positive among all those who are tested.
- If positivity rate is high, it is possible that only high risk groups are being tested.
- A low positivity rate can also indicate that not enough testing is being done.

Infection fatality rate

- It is the number of deaths occurring in all infected people in a particular population.
- This includes those who might have the COVID-19 infection, but have not been tested for it.
- Given that the number of tests is not high, experts have clarified that this is not a useful metric to have in this pandemic.

Case fatality rate

- This is the number of deaths occurring among confirmed cases of COVID-19.
- Since these two figures are available with a certain amount of reliability, it is actually CFR that is being referred to when there is a loose reference to fatality rate.

Cytokine storm

- An immune reaction triggered by the body to fight an infection is known as a cytokine storm when it turns severe.
- The body releases too many cytokines, proteins that are involved in immunomodulation, into the blood too quickly. While normally they regulate immune responses, in this case they cause harm and can even cause death.
- Experts have noticed a violent cytokine storm in several individuals who are critical with COVID infection.
- These cytokines dilate blood vessels, increase the temperature and heartbeat, besides throwing bloodclots in the system, and suppressing oxygen utilisation.

Flattening the curve

- Reducing the number of new COVID-19 cases, day on day. The idea of flattening the curve is to ensure that the health infrastructure is not overwhelmed by a large number of cases.

Why coronaviruses are so bad

- They have a high substitution rate
- Coronaviruses have, like many RNA viruses, a high substitution rate (though the rate is lower than some other viruses that have caused pandemics, like HIV or hepatitis C).
- This higher substitution rate means that coronaviruses can rapidly exploit situations in which they come into contact with new hosts (i.e., humans).
- They mutate rapidly
- One reason coronaviruses mutate so rapidly is that they possess the longest genomes of all known RNA viruses.
- With more sections in their genome, there are more potential errors when the virus copies itself, which increases the production of new strains (which may explain the recent finding that there are likely to be multiple Covid-19 strains).
- They are highly susceptible to recombination
- One of the ways viral strains emerge is through recombination, which is when multiple viruses interact in the same organism (e.g., humans) during replication.
- Research predating the emergence of Covid-19 has shown that, of all the many coronavirus strains that are out there, a human coronavirus known as HCoV-HKU1 is among those most highly susceptible to recombination.
- It is also one of the coronaviruses most closely related to Covid-19, along with SARS and MERS: all are members of the subset of betacoronaviruses.
- They replicate in multiple species
- Coronaviruses are also exceptionally adaptive and able to replicate in different species.
- Some viruses, like smallpox, can only infect one species.
- They've been around (and evolving) for a long time
- Finally, molecular clock analysis is a technique that uses the mutation rate of viruses

to determine when separate strains branched off from common ancestors.

- When an analysis was done on one of the four known human coronavirus (HCoV229E, which causes the common cold), scientists discovered that it has been present in the human population for centuries.
- They were even able to estimate the specific year that it emerged: 1053 AD, which is when it likely branched off from a viral ancestor to become its own strain.
- They're heavier than other viruses
- And, finally, the good news. While Covid-19 spreads through the air on respiratory droplets, there is one fact limiting how far the virus can travel: its weight. Coronaviruses are physically larger and heavier than other known respiratory viruses.

How does it infect someone

- It begins with the "spike" that gives coronaviruses their name. A coronavirus is surrounded by a fatty outer layer ("envelope") and on the surface of this layer is the "corona" (crown) of spikes made of protein.
- On the surface of human cells is an enzyme called Angiotensin Converting Enzyme-2 (ACE2), which acts as the receptor that enables SARS-CoV2 to launch its attack.
- The virus's spike protein binds to the receptor, then fuses with the cell surface, and releases its genetic material (RNA in the case of SARS-CoV2) into the cell.
- The coronavirus that causes SARS, called SARS-CoV, uses the same ACE2 receptor to invade a cell. Once inside, the virus replicates itself by using the cell's molecular mechanism.
- Any treatment being developed or researched will look to inhibit these activities at one stage or the other.

TEST

Different types of coronavirus tests

- Genetic tests
- Most tests look for bits of the virus' genetic material, and require a nasal swab that is taken by a health professional and then sent to a lab.
- This is considered the most accurate way to diagnose an infection, but it's not perfect: The swab has to get a good enough sample so any virus can be detected.
- These tests usually take hours to process at the lab so you likely won't get results back for at least a day, though a handful of rapid tests take about 15 minutes on site. Other genetic tests use saliva, instead of a swab.

Antigen tests

- A newer type of test looks for proteins found on the surface of the coronavirus, rather than the virus itself.
- These antigen tests are just hitting the market, and experts hope they'll help expand testing and speed up results.
- Antigen tests aren't as accurate as genetic tests, but are cheaper, faster and require less specialized laboratory equipment. They still require a nasal swab by a health professional.
- A recently approved test from Abbott Laboratories takes 15 minutes and can be performed at schools, offices and other locations.

Antibody tests

- Antibody tests look for proteins that the body makes to fight off infections in a patient's blood sample. Antibodies are a sign that a person previously had COVID-19.
- Scientists don't yet know if antibodies protect people from another infection, or how long that protection might last.
- So antibody tests are mostly useful for researchers measuring what portion of the population was infected.

'FELUDA' TEST APPROVED

- The Drugs Controller General of India (DCGI) approved 'Feluda', the Tata Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR) test powered by the CSIR-

IGIB, for commercial launch, Union Ministry of Science and Technology's CSIR has said in a statement.

- The test was approved as per the guidelines set by the Indian Council of Medical
- Research (ICMR), which has been spearheading the battle against COVID-19 in India.
- The test makes use of an indigenous, "cutting-edge" CRISPR technology to detect the genomic sequence of the coronavirus.
- The newly approved test is the first diagnostic test in the world to deploy a specially-adapted Cas9 protein for the successful detection of SARS-CoV-2, the novel coronavirus which causes COVID-19.

How India tests for Covid-19

- The Indian Council of Medical Research (ICMR) recently approved ELISA test kits for Covid-19 developed by two companies.
- These were the first ELISA test kits approved other than those that use the ICMR's own technology, and add to the basket of choices for testing for Covid-19.
- ELISA:- Developed in 1974, ELISA stands for enzyme-linked immuno-sorbent assay. It detects whether a person's immune system has produced antibodies against a particular infection — such as HIV.
- The test is called "enzyme-linked" because it uses enzymes to detect presence of antibodies in a blood sample.
- An ELISA test is of two types depending on the antibodies tested for — immunoglobulin G (IgG) and immunoglobulin M (IgM).
- IgG detects antibodies developed in later stage of infection, and IgM detects antibodies produced in early stages of infection

RT-PCR

- While ELISA is expected to relatively inexpensive and is fast, its use is limited to making population-based estimates that can inform policy decisions.
- For individual diagnosis and treatment of Covid-19, the test used worldwide is RT-PCR (real time-polymerase chain reaction). Earlier it was also used for Ebola and Zika diagnosis.
- In India, RT-PCR remains the final confirmatory test for Covid-19.
- The test involves taking swabs from the nasal and oral tracts, extracting the viral RNA in a printer-like machine and amplifying it to detect SARS-CoV-2, the virus that causes Covid-19.

Rapid antibody test

- This, too, looks for antibodies in the blood, takes hardly 20-30 minutes, and is the cheapest.
- But a rapid test involves a high risk of false results — it may detect antibodies against of some other infection and show that the sample is positive for Covid-19. Hence this test is only used for population surveys.
- If a person tests positive through a rapid test, he has to undergo a confirmatory RT-PCR test before treatment. ELISA is more accurate than a rapid test.
- Rapid antibody test involves taking a blood sample from the finger and putting it in a testing template. Plasma or serum can also be used to test instead of blood.

TrueNat

- This is a privately designed test that works on the same principle as RTPCR, but with a smaller kit and with faster results.
- TrueNat, designed by MolBio Diagnostics Pvt Ltd, Goa, is commonly used for tuberculosis and HIV testing.
- Recently, the ICMR approved TrueNat for screening and confirmation for Covid-19.
- If a sample test negative, it has to be treated as negative; if it tests positive, a second test called Rdrp (RNA dependent RNA polymerase) gene confirmatory assay has to be performed.
- The TrueNat machine is small and portable, mostly running on batteries, and provides result within 60 minutes.

Rapid antigen test

- On 16 June 2020, the Indian Council of Medical Research (ICMR) approved one more kind of test for diagnosis of Covid-19.
- The rapid antigen detection test is to be used in specified settings, and kits from only one manufacturer have got approval.
- It is a test on swabbed nasal samples that detects antigens (foreign substances that induce an immune response in the body) that are found on or within the SARS-CoV-2 virus.
- In India, the ICMR has allowed the use of antigen detection kits developed by the South Korean company S D Biosensor, which has a manufacturing unit in Manesar.
- The kit, commercially called Standard Q COVID-19 Ag detection kit, comes with a with an inbuilt Covid antigen test device, viral extraction tube with viral lysis buffer and sterile swab for sample collection.

Rapid tests

- On 2 April 2020, the Indian Council of Medical Research (ICMR) issued an interim advisory on the use of "rapid tests" — serological or blood tests in "hotspots", before pulling it down hours later.
- Serology tests are blood-based tests that can be used to identify whether people have been exposed to a particular pathogen. Serology-based tests analyse the serum component of whole blood.
- The serum includes antibodies to specific components of pathogens, called antigens. These antigens are recognized by the immune system as foreign and are targeted by the immune response.
- Blood has two components, a matrix called plasma and the blood cells. The plasma minus the components of whole blood that cause it to clot is known as serum.

How pooled testing works

- Faced with criticism about insufficient testing and the reality of limited resources, India has decided go for pooled testing in districts where no cases have been reported.
- It is a method of testing several samples together with the same technique (RTPCR) that is being currently used to test individual samples.
- Samples taken from the nose or throat are pooled together by suspending them in a solution in laid-down proportions. The remaining samples are then labelled and kept separate.
- Pooled samples are subjected to a test; if it is negative then all samples in the pool are cleared. If it is not, then individual samples are tested to find out which one is positive.

Atman AI developed for Covid-19

- The Defence Research and Development Organisation (DRDO) and Centre for Artificial Intelligence and Robotics (CAIR) have created an artificial intelligence (AI) algorithm to help detect Covid-19 from chest X-rays.
- According to its developers, the tool named Atman AI used for Chest X-ray screening has shown an accuracy rate of 96.73 per cent.

Therapy
What is convalescent plasma therapy?

- Convalescent plasma therapy, which was recently allowed by the US Food and Drug Administration (FDA) for investigation purposes – clinical trials etc in a regulated way – , involves transfusion of the blood plasma of a frecovered patient into another patient.
- Plasma is the matrix on which the blood cells float. It also houses crucial components of immunity known as antibodies. Antibodies are the immediate warriors who fight an invading pathogen – an antigen – to defeat it.
- Once that is done, some blood cells function as memory cells so that they can identify and defeat the same enemy if and when it invades again by quickly producing the same antibodies.
- Convalescent plasma therapy banks on the age-old concept of passive immunity when antibodies for some diseases, such as diphtheria, were developed in horses and injected into humans.

- Active immunity is what is achieved by introducing an attenuated pathogen (such as the BCG vaccine) into the body to generate an immune response. The other kind of immunity is passive immunity.
- Activated T cells last for a few weeks if transfused from another person and for a few hours to a few days if transfused from an animal.
- Such transfusion of antibodies or lymphocytes to confer immunity is called passive immunity.
- T-cells are blood cells that have a crucial role in immunity.

Essential Covid-19 drugs in India

- The government is monitoring the supply of various essential drugs used in the treatment of Covid-19, ministry of chemicals and fertilisers said on 19 May 2021. The ministry noted that all drugs used in the management of Covid-19 were now available in India by ramping up production and increasing the imports.
- Protocol drugs
- Remdesivir
- Enoxaparin
- MethylPrednisolone
- Dexamethasone
- Tocilizumab
- Ivermectin

Non-protocol drugs

- Favipiravir
- Amphotericin
- Apixaban

Remdesivir

- The drug remdesivir has been under the spotlight as a possible treatment for critical cases of novel coronavirus disease (COVID-19).
- Globally, it is one of the four possible lines of treatment being investigated in the Solidarity trials under the aegis of the World Health Organization (WHO).

What is remdesivir?

- It is a drug with antiviral properties that was manufactured by US-based biotechnology company in 2014, to treat Ebola cases.
- It was also tried in patients of MERS and SARS, both caused by members of the coronavirus family, but experts said it did now show promising results back then.
- Coronaviruses have a single-strand RNA as their genetic material. When the novel coronavirus SARS-CoV2 enters a human cell, an enzyme called RdRP helps the virus replicate. Remdesivir works by inhibiting the activity of (RNA dependent RNA polymerase (RdRp).
- Hydroxychloroquine, an anti-malarial drug, is undergoing multiple trials to assess if it can be used to treat severe COVID-19 cases.
- It works by decreasing the acidity in parts of the cell where the virus is present, thereby inhibiting it.
- Again, ritonavir and lopinavir are two antiviral drugs used for treatment of HIV.
- These too work by inhibiting the virus;s RNA. Specifically, they target the enzyme that helps the virus split proteins.
- In HIV patients, these two antiviral drugs work together to decrease the viral load in blood.

Favipiravir

- Favipiravir is an antiviral given to inhibit viral replication. It is used as an antiinfluenza drug.

- First manufactured by Japan's Fujifilm Toyama Chemical Ltd, it is manufactured in India by Glenmark Pharmaceutical and Strides Pharma.
- It is being used for moderately symptomatic to severely ill Covid patients, but access is not easy.

Tocilizumab
- This is an immunosuppressant commonly used to treat for rheumatoid arthritis.
- It was first tried in Lilavati Hospital on a 52-year-old patent, whose health did not improve as he had reached an advanced stage.

Itolizumab
- This drug is commonly used for the skin disorder psoriasis, rheumatoid arthritis, multiple sclerosis, and autoimmune disorders. In India, Biocon launched it in 2013.
- It is being trailled in Mumbai and Delhi on moderately to severely ill Covid patients.

Doxycycline + ivermectin
- Doxycycline is an antibiotic used to fight infection in the urinary tract, eye, or respiratory tract.
- Ivermectin is an anti-parasite drug for treatment of scabies, head lice, and filariasis.
- The combination is used to treat Covid patients with acute symptoms.

Ayurvedic drugs for Covid patients
- The Ayush ministry on 7 May 2021 said it has launched a massive nationwide campaign to distribute its proven poly herbal ayurvedic drug AYUSH 64 and Sidha medicine KabasuraKudineer for the benefit of Covid patients in home isolation.
- AYUSH-64 is an Ayurvedic formulation which was developed by the Central Council for Research in Ayurvedic Sciences (CCRAS).
- CCRAS is the apex body for research in Ayurveda under the Ministry of Ayush, for management of Malaria. AYUSH-64, a drug developed for curing malaria in 1980.
- AYUSH-64 is recommended in National Clinical Management Protocol based on ayurveda and yoga which is vetted by National Task Force on Covid Management of ICMR and Guidelines for Ayurveda Practitioners for Covid-19 patients in home isolation.
- KabasuraKudineer is included in Guidelines for Siddha Practitioners for Covid 19 issued by the ministry of Ayush.

DRDO's new oral drug for Covid-19
- Defence Minister Rajnath Singh and Health Minister Dr Harsh Vardhan on 17 May 2021 released the first batch of the indigenously developed anti-Covid-19 drug, 2deoxy-D-glucose or '2-DG'.
- The national drug regulator, Drugs Controller General of India (DCGI), had cleared the formulation on 1 May 2021 for emergency use as an adjunct therapy. in moderate to severe Covid-19 patients.

The formulation
- 2-DG has been developed by the Institute of Nuclear Medicine and Allied Sciences (INMAS), New Delhi, a lab of the Defence Research and Development Organisation (DRDO), in collaboration with Hyderabad-based pharma company Dr Reddy's Laboratories (DRL), the Ministry of Defence had said in a release earlier this month.

What is a social vaccine?
- A social vaccine is a metaphor for a series of social and behavioural measures that governments can use to raise public consciousness about unhealthy situations through social mobilisation.
- Social mobilisation can empower populations to resist unhealthy practices, increase

resilience, and foster advocacy for change.

- A social vaccine addresses barriers and facilitators of behaviour change, whether attitudinal, social, cultural, or economic, and supplements information, education, and communication (IEC) with targeted social and behaviour change communication (SBCC) strategies.

- Uganda and Thailand used these strategies effectively during the HIV/AIDS pandemic to bring down the incidence of HIV infection, before highly active antiretroviral treatment (HAART) was introduced in 1995.

Initiatives

WEF's COVID action platform

- With the coronavirus epidemic hurting economic activities globally, the World Economic Forum on 11 March 2020 launched a new platform with the support of the World Health Organisation (WHO) to convene the global business community for a collective action on the COVID-19 response.

- This is the first initiative of its kind that aims to convene the business community for collective action, protect people's livelihoods and facilitate business continuity, and mobilise support for the COVID-19 response.

- The "COVID Action Platform" has been created with the support of the WHO and is open to all businesses and industry groups, as well as other stakeholders including governments, aiming to integrate their efforts for a joint action.

- The three priorities for this platform would be to galvanise the global business community for collective action; protect people's livelihoods and facilitate business continuity; and mobilise cooperation and business support for the COVID-19 response.

What is 'One Health'?

- According to the World Health Organisation, 'One Health' is an approach to designing and implementing programmes, policies, legislation and research in which multiple sectors communicate and work together to achieve better public health outcomes.

- The concept of 'One Health', which recognises that health of human beings is connected to health of animals and environment, is gaining importance as most of the contagious diseases affecting humans are zoonotic (animal to man origin) in nature.

- The concept of One Health can be effectively implemented for reducing incidence of emerging zoonotic threats like COVID-19.

- Climate scientists argue and epidemiologists agree that 'One Health' is a key principle for the control of zoonotic diseases, antimicrobial resistance, food safety and vector-borne diseases.

- One Health is the collaborative efforts of multiple disciplines working locally, nationally, and globally, to attain optimal health for people, animals and our environment, as defined by the One Health Initiative Task Force.

What is eVIN?

- Prime Minister, on 24 November 2020, informed that the government is using eVIN – Electronic Vaccine Intelligence Network in association with the United Nations Development Program (UNDP) to identify primary beneficiaries and vaccine distribution networks.

- Electronic Vaccine Intelligence Network is an indigenously developed technology that digitises vaccine stocks and monitors the temperature of the cold chain through a smartphone application.

- The innovative eVIN was first launched across 12 states in 2015 to support better vaccine logistics management at cold chain points.

- eVIN supports the central government's Universal Immunization Programme by providing real-time information on vaccine stocks and flows, and storage temperatures across all cold chain points across states and Uts.

COVAX alliance

- Abbreviated as COVAX, the COVID-19 Vaccines Global Access is a worldwide initiative aimed at providing equitable access to anti-Covid vaccines.
- COVAX is co-led by the Coalition for Epidemic Preparedness Innovations (CEPI), Global Alliance for Vaccines and Immunisation (Gavi) and the World Health Organization (WHO), alongside key delivery partner UNICEF.
- It aims at accelerating the development and manufacture of COVID-19 vaccines and to guarantee fair and equitable access for every country in the world.

What is vaccine tourism?

- Recently, reports emerged of a Dubai-based tour operator offering a 24-day package tour from Delhi to Moscow, which included two shots of the Russian Sputnik-V vaccine.
- In India, the term "vaccine tourism" became popular late last year when reports emerged of several tour operators offering packages to the US with the additional benefit of a vaccine shot. Meanwhile, South Africans are said to be flying to Zimbabwe, Canadians and South Americans are travelling to the US for jabs, while tour operators in Europe are offering trips to Russia for Sputnik V shots.
- Union Tourism Minister Prahlad Patel said, "There may be no need for anyone from India to go abroad for vaccination since all eligible Indians will be vaccinated in the country by the end of this year – that too, at the most reasonable rates possible."

CORONAVIRUS VACCINE TRACKER

WHAT IS VACCINE NATIONALISM?

The rush by some rich countries to pre-book large number of coronavirus vaccines under development has led to the coinage of the term vaccine nationalism

- Since production capacities are limited and vaccines yet to be developed, such large pre-bookings can potentially prevent many countries from accessing a vaccine for several months

VACCINE

Four types of vaccines

- Whole virus vaccines - Whole virus vaccines use a weakened (attenuated) or deactivated form of the pathogen that causes a disease to trigger protective immunity to it.
- Protein subunit vaccines - Rather than injecting a whole pathogen to trigger an immune response, subunit vaccines (sometimes called a cellular vaccines) contain purified pieces of it, which have been specially selected for their ability to stimulate immune cells.
- Nucleic acid vaccines - Nucleic acid vaccines use genetic material (could be DNA or

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RNA) from a disease-causing virus or bacterium (a pathogen) to stimulate an immune response against it.

- Viral vector-based vaccines - Viral vector-based vaccines differ from most conventional vaccines in that they don't actually contain antigens, but rather use the body's own cells to produce them.
- They do this by using a modified virus (the vector) to deliver genetic code for antigen, in the case of COVID-19 spike proteins found on the surface of the virus, into human cells.

DNA-based vaccine

- As the world collectively battles the Covid-19 pandemic, scientists are now looking towards developing a DNA vaccine which can train the human immune system to ward off the infection, before it even takes root. Referred to as third-generation vaccine, a DNA-based vaccine uses engineered DNA to induce a response against the virus.
- According to the World Health Organisation, this "radical new approach" offers several advantages over traditional vaccines, which include "improved vaccine stability, the absence of any infectious agent and the relative ease of large-scale manufacture." The technology, still in its nascent stage, has been developing rapidly in the recent times.
- If approved, Gujarat-based pharmaceutical major, Zydus Cadila, will become the first DNA vaccine. According to official sources, Zydus Cadila is likely to apply for emergency use authorisation for its Covid-19 vaccine ZyCoV-D in a few days.
- Apart from adults, data is also being collected on if the vaccine can be administered to children belonging to the age group of 12 to 18 years.

Moderna's Covid vaccine gets India nod

- Moderna Inc.'s covid-19 vaccine on 29 June 2021 became the first messenger RNA jab and the fourth overall to be authorized for emergency use during the pandemic, with the Drugs Controller General of India granting its local partner Cipla Ltd an import licence.
- With this approval, Moderna's coronavirus vaccine would be the fourth COVID-19 jab to be available in India after Covishield, Covaxin, and Sputnik.
- Before India, the Moderna vaccine was approved in more than 40 countries like the US, Japan, Singapore, South Korea, Israel, Qatar, the UK, etc.
- It is one of the four vaccines that have received the "green pass" after European Medicines Agency's (EMA) approval.

How do Covishield work?

- Covishield is the Indian variant of AZD1222, the vaccine developed by AstraZeneca and University of Oxford. Pune-based Serum Institute of India (SII) developed and manufactured Covishield through a licence from AstraZeneca and Oxford.
- It is a "non-replicating viral vector" vaccine, which means it makes use of another weakened and genetically modified virus — in this case a common cold chimpanzee virus — to help the body develop immunity against the coronavirus.
- The vaccine carries just the code to make the spike protein (the spike on the virus's surface).
- The body's immune system is supposed to recognise this protein as a threat, and work on building antibodies against it.

How do Covaxin work?

- Covaxin, developed by Hyderabad-based Bharat Biotech in collaboration with the National Institute of Virology, uses a different platform.
- It is an "inactivated" vaccine, which means it uses the killed SARS-CoV-2 virus, which has no potential to infect or replicate once injected and just serves to boost an immune response.
- Covaxin is expected to target more than just the spike protein — it also aims to develop an immune response to the nucleocapsid protein (the shell of the virus that encloses its genetic material).

How Corbevax is different

- India has placed an advance order to block 300 million doses of a new Covid-19 vaccine, Corbevax, from Hyderabad-based company Biological E.
- Corbevax is a "recombinant protein sub-unit" vaccine, which means it is made up of a specific part of SARS-CoV-2 — the spike protein on the virus's surface.
- The spike protein allows the virus to enter the cells in the body so that it can replicate and cause disease. However, when this protein alone is given to the body, it is not expected to be harmful as the rest of the virus is absent.
- The body is expected to develop an immune response against the injected spike protein.
- Therefore, when the real virus attempts to infect the body, it will already have an immune response ready that will make it unlikely for the person to fall severely ill.

What is mRNA vaccine?

- The Moderna and Pfizer vaccines use the same technology, based on messenger RNA, or mRNA.
- Such vaccines make use of the messenger RNA molecules that tell the body's cells what proteins to build.
- A coronavirus vaccine based on mRNA, once injected into the body, will instruct the body's cells to create copies of the spike protein. In turn, this is expected to prompt the immune cells to create antibodies to fight it.
- These antibodies will remain in the blood and fight the real virus if and when it infects the human body.

What is a nasal vaccine and how does it work?

- Bharat Biotech on 23 September 2020 signed a licensing agreement with Washington University School of Medicine in St Louis, US for a novel "chimpadenovirus", single dose intranasal vaccine for Covid-19.
- In nasal approach, the vaccine dose is given via nose, rather than orally or through the arm.
- As the target is to deliver a dose which goes right into the respiratory pathways, the vaccine is either injected through a specific nasal spray or through aerosol delivery.
- The nasal vaccine targets immune cells present in the mucosal membrane and tissue- which provides systematic as well as mucosal immunity present in other sites such as lungs and the intestines.
- Hence, a nasal vaccine may be more capable of inoculating crowds against the deadly infection and prevent even mild symptoms from developing.

Vaccine wastage in India

- Vaccine wastage is an expected component of any large vaccination drive, and a vaccine is procured from the maker with an estimated wastage. For each vaccine type, the wastage has to be within recommended limits.
- It is broadly divided into two categories: wastage in unopened vials, and in opened vials. Wastage in unopened vials can occur due to six broad reasons: if the expiry date has been reached; if the vaccine is exposed to heat; if the vaccine has been frozen; breakage; missing inventory and theft; and while discarding unused vials returned from the vaccination site.
- Wastage in opened vials can occur due to five broad reasons: while discarding remaining doses at the end of the session; not being able to draw the number of doses in a vial; submergence of opened vials in the water; suspected contamination; and poor vaccine administration practices.
- Wastage occurs at three levels: during transportation; during cold chain point; and at a vaccination site — both at service and delivery levels.

Vaccine passports

- Israel became the first country to introduce a certification system that allows those

who have been vaccinated against Covid-19 to access certain facilities and events.
- The idea is modelled on the proof of vaccination that several countries required even before the pandemic.
- Travellers from many African countries to the US or India are required to submit proof that they have been vaccinated against diseases such as yellow fever.

EU's new 'vaccine passport' programme
- Covishield manufactured by Serum Institute of India is not among the vaccines which have been approved by the European Medicines Agency's (EMA) for the "vaccine passport" programme that allows free movement of people in and out of Europe.
- The EU Digital Covid Certificate, or the "green pass" as it is popularly known, has been created to restore freedom of travel for the public and remove the barriers on entry placed due to the pandemic.
- With the new vaccine passport system coming into effect across EU from 1 July 2021.
- The EMA list only includes four vaccines now—Vaxzevria (Oxford-AstraZeneca), Comirnaty (Pfizer-BioNTech), Spikevax (Moderna) and Janssen (Johnson & Johnson). None of the three vaccines which have been approved for use in India till date — Covishield, Covaxin and Sputnik V — feature on the list.

Covid-19 vaccine indemnity
- Indemnity protects the producers from being sued in case their Covid19 vaccine shows any adverse effects. The vaccine producers are demanding indemnity as they manufactured the vaccine in a very short period of time to fight the pandemic and their vaccines may show unknown side effects.
- It must, however, be noted that grant of indemnity doesn't mean that the beneficiaries cannot demand compensation in case of any adverse events, but grant of indemnity sets the bar high.
- The Indian drug regulator has not yet granted vaccine indemnity to any of the three Covid-19 vaccines currently in the market -- Covishield, Covaxin and Sputnik V.

VARIANTS

Homoeo drug
- A homoeopathic drug, Arsenicum album 30, has become a subject of debate after several states recommended it for prophylactic (preventive) use against Covid-19.
- This was after the Ministry of AYUSH listed the drug among "preventive and prophylactic simple remedies" against Covid-19.
- Arsenicum album is made by heating arsenic with distilled water, a process repeated several times over three days.
- The health hazards of arsenic contamination in water are well known: long-term exposure to the metal can cause skin cancer, pulmonary and cardiovascular diseases.
- The homoeopathic drug has less than 1% arsenic. Arsenicum album is considered to correct inflammation in body. It takes care of diarrhoea, cough and cold.
- Arsenicum album is used commonly by homeopaths to treat anxiety, restlessness, cold, ulcerations, burning pains. It is taken in powder form or as a tablet.

Different variants
- Different variants are characterised by mutations — or alterations in the virus's genetic material.
- An RNA virus, such as SARS-CoV-2, is made of about 30,000 base pairs of amino acids, placed like bricks next to each other.
- An alteration in any of these base cause a mutation, effectively changing the shape and behaviour of the virus.
- The Delta variant contains multiple mutations in the spike protein. At least four mutations are important.

- There are thousands of different variants of Covid circulating across the world. Viruses mutate all the time and most changes are inconsequential. Some even harm the virus. But others can make the disease more infectious or threatening.
- Those which are most potentially concerning are called "variants of concern" and kept under the closest watch by health officials. Currently, the ones which are classified under the aforesaid category include:
- Alpha: The UK or Kent variant (also known as B.1.1.7) that is prevalent in Britain — with more than 200,000 cases identified — and has spread to more than 50 countries and appears to be mutating again.
- Beta: The South Africa variant (B.1.351) has been identified in at least 20 other countries, including the UK.
- Gamma: The Brazil variant (P.1) has spread to more than 10 other countries.
- Delta: The variant was first detected in India (B.1.617.2) of which more than 3,000 cases have been seen across the UK.

What is the Delta variant of Covid-19?
- Multiple SARS-CoV-2 variants are circulating globally. One of these is the B.1.617 lineage, detected in India earlier this year. Early evidence suggests that its sublineage B.1.617.2, known as the Delta variant, is more transmissible than contemporary lineages.
- The World Health Organizaton (WHO), which has given it the label Delta, has categorised it as a variant of concern (VOC).
- It has said it continues to observe "significantly increased transmissibility" and a "growing number of countries reporting outbreaks associated with this variant".
- WHO classifies a variant as a VOC when it is associated with an increase in transmissibility or detrimental change in Covid-19 epidemiology; increase in virulence; or decrease in the effectiveness of public health measures or available diagnostics, vaccines, therapeutics.

Delta variant mutates into Delta Plus
- The highly infectious Delta variant (B.1.617.2) of Covid-19 that first surfaced in India is feared to have mutated into a more virulent version called AY.1 or Delta Plus — one that is possibly capable of resisting even the monoclonal antibodies cocktail currently being prescribed as a cure.
- The new Delta plus variant has been formed due to a mutation in the Delta or B.1.617.2 variant. It is not yet a variant of concern (VoC) in India, due to low incidence.
- One of the emerging variants is B.1.617.2.1 or AY.1 is characterized by the acquisition of K417N mutation.
- The mutation is in the spike protein of SARS-COV-2, which helps the virus enter and infect the human cells.

What are monoclonal antibodies?
- To fight a viral infection, our bodies create proteins known as antibodies. Monoclonal antibodies are artificial antibodies that mimic the activity of our immune systems.
- They are produced through a process that involves extracting specific antibodies from human blood and then cloning them.
- These monoclonal antibodies are designed to target a virus or a specific part of one — for instance, REGEN-COV2 is a cocktail of two monoclonal antibodies developed to target the SARS-CoV-2 spike protein.
- The monoclonal antibodies bind to specific parts of the spike protein, blocking its ability to infect healthy cells. Besides Covid-19, monoclonal antibodies have been used in the treatment of cancers as well as Ebola and HIV.
- REGEN-COV2 is available in India through a tie-up between Swiss drug giant Roche and Indian company Cipla.

Currently designated Variants of Interest:

WHO label	Pango lineages	GISAID clade	Nextstrain clade	Earliest documented samples	Date of designation
Eta	B.1.525	G/484K.V3	21D	Multiple countries, Dec-2020	17-Mar-2021
Iota	B.1.526	GH/253G.V1	21F	United States of America, Nov-2020	24-Mar-2021
Kappa	B.1.617.1	G/452R.V3	21B	India, Oct-2020	4-Apr-2021
Lambda	C.37	GR/452Q.V1	21G	Peru, Dec-2020	14-Jun-2021

Ultraviolet light

- Ultraviolet light has a long history as a disinfectant and the Sars-CoV-2 virus, which causes Covid-19, is readily rendered harmless by UV light.
- The question is how best to harness UV light to fight the spread of the virus and protect human health as people work, study, and shop indoors.
- The virus spreads in several ways. The main route of transmission is through person-to-person contact via aerosols and droplets emitted when an infected person breathes, talks, sings or coughs.
- The virus can also be transmitted when people touch their faces shortly after touching surfaces that have been contaminated by infected individuals.
- UV can be used to reduce the risk of transmission through both routes. UV lights can be components of mobile machines, whether robotic or human-controlled that disinfect surfaces.
- Electromagnetic radiation, which includes radio waves, visible light and X-rays, is measured in nanometres, or millionths of a millimetre. UV irradiation consists of wavelengths between 100 and 400 nanometres, which lies just beyond the violet portion of the visible light spectrum and are invisible to the human eye.
- UV is divided into the UV-A, UV-B and UV-C regions, which are 315-400 nanometres, 280-315 nanometres and 200-280 nanometres, respectively.
- The ozone layer in the atmosphere filters out UV wavelengths below 300 nanometres, which blocks UV-C from the Sun before it reaches Earth's surface.
- UV-A as the sustanning range and UV-B as the sun-burning range. High enough doses of UV-B can cause skin lesions and skin cancer.
- UV-C contains the most effective wavelengths for killing pathogens. UV-C is also hazardous to the eyes and skin.
- Artificial UV light sources designed for disinfection emit light within the UV-C range or a broad spectrum that includes UV-C.

How UV kills pathogens

- UV photons between 200 and 300 nanometres are absorbed fairly efficiently by the nucleic acids that make up DNA and RNA, and photons below 240 nanometres are also well absorbed by proteins.
- These essential biomolecules are damaged by the absorbed energy, rendering the genetic material inside a virus particle or microorganism unable to replicate or cause an infection, inactivating the pathogen.
- It typically takes a very low dose of UV light in this germicidal range to inactivate a pathogen.
- The UV dose is determined by the intensity of the light source and duration of exposure. For a given required dose, higher intensity sources require shorter exposure times, while lower intensity sources require longer exposure times.

Macular degeneration

- People with age-related macular degeneration – an eye disorder caused by an overactive immune system -- are at greater risk of developing severe complications and dying from Covid-19, according to a study.
- Complement, one of the immune system's oldest branches may be influencing the severity of Covid-19 disease, said the researchers at Columbia University in the US.
- The findings, published in the journal Nature Medicine, suggest that existing drugs that inhibit the complement system could help treat patients with severe disease.

OTHER DISEASES

The Guillain Barre Syndrome

- In a rare complication, some patients infected with Covid-19 have been found suffering from Guillain Barre Syndrome (GBS). In India, such cases have been reported since August 2020.
- Guillain Barre Syndrome is a very rare autoimmune disorder. The immune system, in an attempt to kill the coronavirus, accidentally starts attacking the peripheral nervous system. The peripheral nervous system is a network of nerves that lead from the brain and spinal cord to different parts of the body. Attacking them can affect limb functions.
- The syndrome's first symptoms are a tingling or itching sensation in the skin, followed by muscle weakness, pain and numbness. The symptoms may emerge first in feet and hands.
- A person then starts experiencing reflex loss and paralysis, which may be temporary, but can last for 6-12 months or longer.
- GBS is caused by bacteria or viral infection. In the past, patients of Middle East Respiratory Syndrome showed GBS symptoms, as did those infected with Zika, HIV, Herpes virus and Campylobacter jejuni.
- Intravenous immunoglobulin (IVIG) and sometimes plasma therapy helps recovery in patients with GBS.
- Some patients may develop severe complications and require intensive care treatment or ventilator support

What is Cat Que virus?

- In a study published in July 2020 in the Indian Journal of Medical Research, scientists from the Pune-based Maximum Containment Laboratory and ICMRNational Institute of Virology have noted the presence of antibodies against the Cat Que virus (CQV) in two human serum samples.
- The presence of the Cat Que virus has been largely reported in Culex mosquitoes in China and in pigs in Vietnam.
- For CQV, domestic pigs are considered to be the primary mammalian hosts. Antibodies against the virus have been reported in swine reared locally in China, which indicates that the virus has formed a "natural cycle" in the local area and has the ability to spread in pigs and other animal populations through mosquitoes.
- A paper published in the journal Vector Borne and Zoonotic Diseases in 2015 says that CQV belongs to the Simbu serogroup and infects both humans and economically important livestock species.

India's first pneumococcal vaccine launched

- Union Health Minister Dr Harsh Vardhan on 28 December 2020 launched India's first fully indigenously developed pneumococcal vaccine "Pneumosil".
- Serum Institute of India, the largest vaccine manufacturer in the world by doses, developed Pneumosil through a collaboration spanning over a decade with PATH and Bill and Melinda Gates Foundation.
- Pneumococcal disease has been categorised as a major contributor to the underfive mortality rate across the world.

- The Pneumosil vaccine works by targetting the pneumococcal bacterium. The pneumococcal bacterium causes pneumonia and other serious life-threatening diseases. These diseases are meningitis and sepsis.
- It is estimated that the pneumococcal bacterium causes around four lakh deaths in children under five years of age each year worldwide.

What is brucellosis

- As the novel coronavirus pandemic continues, the health commission of Lanzhou City in China announced that a leak in a biopharmaceutical company last year caused an outbreak of brucellosis disease.
- Brucellosis is a bacterial disease that mainly infects cattle, swine, goats, sheep and dogs. Humans can get infected if they come in direct contact with infected animals or by eating or drinking contaminated animal products or by inhaling airborne agents.
- According to the WHO, most cases of the disease are caused by ingesting unpasteurised milk or cheese from infected goats or sheep.
- Symptoms of the disease include fever, sweats, malaise, anorexia, headache and muscle pain.
- Human to human transmission of the virus is rare.

Types of malaria

- A not very common type of malaria, Plasmodium ovale, has been identified in a jawan in Kerala.
- The soldier is believed to have contracted it during his posting in Sudan, from where he returned nearly a year ago, and where Plasmodium ovale is endemic.
- Malaria is caused by the bite of the female Anopheles mosquito, if the mosquito itself is infected with a malarial parasite. There are five kinds of malarial parasites —
- Plasmodium falciparum, Plasmodium vivax (the commonest ones), Plasmodium malariae, Plasmodium ovale and Plasmodium knowlesi.
- Therefore, to say that someone has contracted the Plasmodium ovale type of malaria means that the person has been infected by that particular parasite.
- In India, out of 1.57 lakh malaria cases in the high-burden states of Odisha, Chhattisgarh, Jharkhand, Meghalaya and Madhya Pradesh in 2019, 1.1 lakh cases (70%) were cases of falciparum malaria, according to a statement by the Health Ministry on December 2020.
- In 2018, the National Vector-borne Disease Control Programme (NVBDCP) estimated that approximately 5 lakh people suffered from malaria (63% were of Plasmodium falciparum)
- Scientists said P ovale rarely causes severe illness and there is no need for panic because of the case detected in Kerala.
- Dr V S Chauhan, emeritus professor at the International Centre for Genetic Engineering and Biotechnology, New Delhi, said P ovale is very similar to P vivax, which is not a killer form.
- It is termed ovale as about 20% of the parasitised cells are oval in shape.

African swine fever

- The porcine industry in Assam suffered major losses during the COVID-19 lockdown, which was followed by an outbreak of African Swine Fever (ASF) that has killed more than 17,000 pigs in Assam and over 4,500 in Arunachal Pradesh.
- African Swine Fever (ASF) does not affect humans but can be catastrophic for pigs. The current outbreak of ASF in India is the first time that the disease has been reported in the country.
- ASF is a severe viral disease that affects wild and domestic pigs typically resulting in an acute haemorrhagic fever. The disease has a case fatality rate (CFR) of almost 100 per cent.
- It is important that determination of ASF is made through laboratory testing and it is differentiated from Classical Swine Fever (CSF), whose signs may be similar to ASF, but is caused by a different virus for which a vaccine exists.

Chapare virus

- A rare Ebola-like illness that is believed to have first originated in rural Bolivia in 2004 can spread through human-to-human transmission, researchers from the US Centers for Disease Control and Prevention (CDC) have discovered.
- The biggest outbreak of the 'Chaparevirus' was reported in 2019, when three healthcare workers contracted the illness from two patients in the Bolivian capital of La Paz.
- The Chapare hemorrhagic fever (CHHF) is caused by the same arenavirus family that is responsible for illnesses such as the Ebola virus disease (EVD).
- According to the CDC website, arenaviruses like the Chapare virus are generally carried by rats and can be transmitted through direct contact with the infected rodent, its urine and droppings, or through contact with an infected person.
- The virus, which is named Chapare after the province in which it was first observed, causes a hemorrhagic fever much like Ebola along with abdominal pain, vomiting, bleeding gums, skin rash and pain behind the eyes.

What is a bulk drug park?

- Himachal Pradesh is one of the states vying for the allotment of a bulk drug park under a central government scheme announced earlier this year for setting up three such parks across the country.

What are bulk drugs or APIs?

- A bulk drug, also called an active pharmaceutical ingredient (API), is the key ingredient of a drug or medicine, which lends it the desired therapeutic effect or produces the intended pharmacological activity.
- For example, paracetamol is a bulk drug, which acts against pain. It is mixed with binding agents or solvents to prepare the finished pharmaceutical product, ie a paracetamol tablet, capsule or syrup, which is consumed by the patient.

What are KSMs and DIs?

- APIs are prepared from multiple reactions involving chemicals and solvents. The primary chemical or the basic raw material which undergoes reactions to form an API is called the key starting material, or KSM. Chemical compounds formed during the intermediate stages during these reactions are called drug intermediates or DIs.

Why is India promoting bulk drug parks?

- India has one of the largest pharmaceutical industries in the world (third largest by volume) but this industry largely depends on other countries, particularly China, for importing APIs, DIs and KSMs.

History of nerve agent Novichok

- Two years after coming in the spotlight after the alleged poisoning of former Russian spy Sergei Skirpal and his daughter YuliaSkirpal in Britain, the Sovietera nerve agent Novichok is back in the news.
- This time it is reported to been used to poison Russian opposition leader and anticorruption activist Alexei Navalny.
- Navalny, who is one of Putin's fiercest critics, fell ill on a flight back to Moscow from Siberia on 20 August 2020. Tests performed at the German hospital showed the presence of Novichok.

How was the Novichok agent developed?

- During the Cold War, in the Soviet Union, the nerve agents were being developed under extreme secrecy, as part of a programme codenamed 'FOLIANT'.
- The first chemical weapon developed by the Foliant scientists was given the code name 'Novichok', which in Russian means 'newcomer'.

- Like other binary nerve gases, Novichok too is absorbed through the lungs or skin and interferes with the nervous system, leading to paralysis.
- Nerve gases block the action of acetyl cholinesterase, an enzyme that catalyzes the breakdown of acetyl choline and of some other choline esters that function as neurotransmitters.
- Consequently, muscles go into a state of uncontrolled contraction, which is a sign of paralysis or seizure like state. It can turn fatal if the paralysis extends to the cardiac and respiratory muscles.
- In November 2019, the Organisation for the Prohibition of Chemical Weapons (OPCW) added Novichok to its list of banned toxins, in one of the first major changes to the treaty since it was signed in the 1990s.

What is Disease X?

- The scientists who helped discover the Ebola virus in 1976 has warned against an unknown number of new and potentially fatal viruses faced by humanity among which is 'Disease X'.
- In 2018, the World Health Organisation (WHO) published its global plan for accelerating research and development during health emergencies and also included "Disease X" in its '2018 R&D Blueprint'.
- The 2018 R&D Blueprint prioritized nine diseases for R&D which consists of Covid-19, Crimean-Congo haemorrhagic fever, Ebola virus disease and Marburg virus disease, Lassa fever, Middle East respiratory syndrome coronavirus (MERSCoV) and Severe Acute Respiratory Syndrome (SARS), Nipah and henipaviral disease, Rift Valley fever, Zika and the latest addition "Disease X ("X" stands for unexpected)". All these diseases lack an effective drug or vaccine.

Mucormycosis aka Black Fungus

- Mucormycosis is a deadly fungal infection found in some Covid-19 patients with uncontrolled diabetes and prolonged intensive care unit (ICU) stay. The infection which is also known as 'Black Fungus' affects the brain and the lungs.
- Mucormycosis, known colloquially as the black fungus, is a rare but dangerous fungal infection caused by a group of moulds known as mucormycetes, which are present naturally in the environment.
- They only cause serious complications when a patient has pre-existing health problems or has taken medication that compromises the immunity system.
- The fungal spores commonly enter through inhalation and affect the sinuses or lungs. They can also enter through an open cut or wound and infect the skin.

First ever case of Green Fungus

- A 34-year-old Covid-19 survivor was diagnosed with Green Fungus infection in Madhya Pradesh's Indore and was shifted to Mumbai by air ambulance for treatment. The patient was found to have Green Fungus (Aspergillosis) infection in his sinuses, lungs and blood, a first ever case reported in India.
- Green Fungus is Aspergillosis, an infection caused by Aspergillus, a common mold (a type of fungus) that lives indoors and outdoors. Most people breathe in Aspergillus spores every day without getting sick.
- It is not that the fungal infection gives colour shades in the body. Its name is because the colour appears during its culture in the lab while testing it.
- Fungus show colour in their culture. There are black, yellow, green and white fungus but these are all specimens of mucormycosis, cinderella and aspergillus.
- Mucormycosis gives black colour, while cinderella gives white and aspergillus gives green and yellow colour in different species.

What is a notifiable disease?

- Mucormycosis or 'black fungus', which is being found in a rising number of Covid-19 patients across India, has been declared a notifiable disease under the Epidemic Act

1897 in many states, including Telangana and Uttarakhand.

- A notifiable disease is an illness that is required by law to be informed to government authorities. This is applicable to private establishments. This helps the government to form a bank of data about the disease and monitor it, which helps in providing early warnings about outbreaks.

- The responsibility to declare any disease as a 'notifiable' disease lays with the state governments.

- Registered medical professionals need to notify such diseases in a proper form within three days, or notify verbally via phone within 24 hours depending on the urgency of the situation. This means that all government hospitals, private hospitals, laboratories, and clinics will have to report cases of the disease to the government.

- This helps the government to track the disease and formulate a plan of action to tackle it.

- Over the years, the Centre has notified many diseases including cholera, diphtheria, encephalitis, leprosy, meningitis, pertussis (whooping cough), plague, tuberculosis, AIDS, hepatitis, measles, yellow fever and malaria dengue.

- Why bird flu virus has so many strains

- Two different subtypes of the bird flu virus or avian influenza have been detected in Himachal Pradesh – the H5N1 avian influenza in migratory water birds at Pong Dam Lake and the H5N8 subtype in dead poultry birds found dumped near the Chandigarh-Solan highway.

- At least 131 different subtypes of influenza A virus have been detected in nature, all but two of which can infect birds.

- The influenza A virus has two proteins on its surface – hemagglutinin (H) and neuraminidase (N) – both of which have 18 and 11 different subtypes respectively, leading to different combinations such as H3N2 and H7N9. There are some strains which only infect birds, while others can infect birds as well as mammals such as pigs, dogs, horses and also humans.

- Wild aquatic birds are the natural hosts for most of these subtypes, but the infection generally does not cause sickness in these birds. Poultry birds such as chickens are more adversely affected.

- Mostly, humans have only experienced infections by three different H types (H1, H2 and H3), and two different N types (N1 and N2).

- Presently, two subtypes, H1N1 and H3N2, circulate among human beings, causing the seasonal flu epidemics. Since these strains are well adapted to humans, they are referred to as human flu rather than bird flu.

- Whenever a new flu A virus establishes itself in humans, it can cause a pandemic, and four such pandemics have occurred since 1918, including the Spanish flu (H1N1), the 1957-58 Asian flu (H2N2), the 1968 Hong Kong flu (H3N2) and the 2009 swine flu (caused by a newer version of the H1N1).

Why does the flu A virus have so many strains?

- Influenza A virus mutates constantly. This is because firstly, it is an RNA virus with a segmented genome, i.e. it has eight separate strands, which makes its copying prone to errors or mutations. This 'antigenic drift' results in slight but continuous mutations in the surface proteins, which is the reason why flu vaccines have to be updated regularly.

- Secondly, when a cell happens to be infected with two different flu A viruses, their genes can easily get mixed up. "This mixing, known as reassortment, is a viral version of sex, writes Carl Zimmer in 'A Planet of Viruses'.

- And sometimes, on very rare occasions, reassortment can combine genes from avian and human viruses, creating a recipe for disaster," he adds. According to him, the virus which caused the swine flu pandemic in 2009 was a result of reassortment of four different strains, including a strain which had been infecting pigs since 1918.

H10N3 bird flu detected in human

- A 41-year-old man in China's eastern province of Jiangsu has been confirmed as the first human case of infection with a rare strain of bird flu known as H10N3, Beijing's

National Health Commission (NHC) has said.

- The man, a resident of the city of Zhenjiang, was hospitalized on 28 April 2021 and diagnosed with H10N3 on 28 May 2021.
- Little is known about the virus, which appears to be rare in birds, according to the Food and Agriculture Organisation (FAO), and does not cause severe disease.
- The World Health Organization (WHO) said while the source of the patient's exposure to the H10N3 virus was not known and no other cases were found among the local population, there was no indication of human-to-human transmission yet.
- In February, Russia reported the first human infection with the H5N8 virus that caused huge damage on poultry farms across Europe, Russia and East Asia last winter.

SPACE

MICROSAT R AND KALAMSAT V2

- India on 24 January 2019 successfully launched military satellite Microsat-R and students-built nano-satellite "Kalamsat-V2" from Sriharikota spaceport by PSLV C44.
- PSLV-C44 is the first mission of PSLV-DL and is a new variant of the PSLV.
- Aluminium tank for the first time in the fourth stage of the launch of PSLV C 44

Microsat-R

- It is a military satellite and imaging satellite, It was launched on 274 km in SSPO
- It was made by Defence Research and Development organisation (DRDO)

Kalamsat-V2

- First satellite build and design by private entity 'Space Kids India' from Tamil Nadu
- It is the world's lightest and first ever 3D-printed satellite (1.2 kg), 453 km in Circular orbit

MISSION SHAKTI

- Mission Shakti is India's anti-satellite (A-SAT) weapon programme led by Defence Research and Development Organisation (DRDO) and the Indian Space Research Organisation (ISRO).
- On March 27, 2019 India conducted Mission Shakti, an anti-satellite missile test, from the Dr. A P J Abdul Kalam Island launch complex.
- This was a technological mission carried out by DRDO.
- An anti-satellite (A-SAT) weapon was launched and targeted an Indian satellite which had been decommissioned.
- India is only the 4th country to acquire such a specialised and modern capability, and Entire effort is indigenous.

Ways to demonstrate ASAT capabilities

- There are other ways to demonstrate ASAT capabilities such as "fly-by tests" and Jamming but India has used the particular technology of Kinetic Kill?
- The test was done in the lower atmosphere to ensure that there is no space debris.
- Whatever debris that is generated will decay and fall back onto the earth within weeks.
- Operation Burnt Frost – USA ASAT programme (2008)

EMISAT

- EMISAT is the country's first electronic surveillance satellite, launched by India's Polar Satellite Launch Vehicle (PSLV-C45) (1 April 2019).
- EMISAT was launched along with the 28 international customer satellites from Satish Dhawan Space Centre (SDSC) SHAR in Sriharikota.
- It is a very powerful electronic intelligence/surveillance satellite which has been developed in India jointly by ISRO and Defence Research and Development Organization (DRDO). EMISAT will be used for electronic signals intelligence (ELINT).
- EMISAT, weighing 436 kg, is intended for electromagnetic spectrum measurement.
- It has been developed by DRDO (DLRL Hyderabad) under Project KAUTILYA.
- It has been developed for monitoring radar network by India.
- It is modelled after a famous Israeli spy satellite called SARAL (Satellite with ARgos and ALtika).
- This flight marked the first mission of PSLV-QL, a new variant of PSLV with four strap-on motors.
- ELINT capabilities are among the most highly-classified and closely-guarded aspects

of operation for military satellites with the countries that already operate such spacecraft.

First ever in Launch

- First time ISRO is launching satellites in three different orbits.
- The four strap-on motor rockets are from the PSLV-QL range.
- This is the first time it has been envisaged to provide a microgravity environment for research organizations and academic institutes to perform experiments.
- The PSLV-C45 is also the first launch to use solar panels to make the fourth stage last longer in orbit.
- Using the solar panels in the fourth stage, the PSLV can provide power to attached payloads almost indefinitely.
- PSLV-C45 is the First Launch Vehicle to Use Solar Propulsion.

What is Project KAUTILYA?

- The Defence Ministry's annual report of 2013-14 mentioned about Project Kautilya — for Space Borne ELINT System which involves the development of Electronic Intelligence payload for integration on an indigenous minisatellite.
- The ELINT includes recordings and analysis of intercepted signals and helps create an RF signature of radar which can, in turn, be used for locating and quickly identify the radar in subsequent encounters.

EOS-01

- The Indian Space Research Organisation (Isro) has successfully launched the Earth Observation Satellite (EOS-01) on 7 November 2020.
- The EOS-01 was launched along with nine international customer satellites (one from Lithuania and four each from Luxembourg and USA) on board the PSLV-C49.
- With EOS-01, ISRO is moving to a new naming system for its earth observation satellites. EOS-01 was initially named RISAT-2BR2, and was supposed to be the third of the three-spacecraft constellation (RISAT-2B, RISAT-2BR1) aimed at providing all- weather round-the-clock service for high-resolution images.
- EOS-01 intended for applications in agriculture, forestry and disaster management support. It was launched along with the customer satellites under a commercial agreement with NewSpace India Limited (NSIL), Department of Space.
- For the launch of EOS-01, ISRO would be using a new variant of its PSLV rocket (DL) after Microsat-R satellite. The fourth stage acts like another satellite, with a life span of about six months.

NISAR satellite

- The Indian Space Research Organisation (Isro) has completed the development of radar capable of producing extremely high-resolution images for a joint earth observation satellite mission (world's most expensive Earth imaging satellite) with the National Aeronautics and Space Administration (Nasa).
- The Nasa-Isro Synthetic Aperture Radar (NISAR) is collaboration between the Indian and US space agencies for a dual-frequency S and L-band SAR for earth observation.
- The S-Band SAR was shipped from the Space Applications Centre at Ahmedabad in Gujarat to the jet propulsion laboratory (JPL) at Pasadena in Los Angeles County, California, to be integrated with Nasa's L-Bank SAR payload.
- NISAR will be the first satellite mission to use two different radar frequencies (L-band and S-band) to measure changes in our planet's surface less than a centimeter across.
- Since 1979, Isro has launched over 30 earth observation satellites.

PSLV-C50/CMS-01 mission successful

- The Indian Space Research Organisation (Isro) on 17 December 2020 marked its second successful mission of the year by launching country's 42nd communication satellite CMS-01. PSLV-C50 carrying CMS-01 lifted off into the cloudy skies over Sriharikota.
- It was PSLV's 52nd flight from the Sriharikota spaceport and the rocket's 22nd flight with an XL variant of strap-ons.

- PSLV-C50 successfully injected the satellite into a geosynchronous transfer orbit (GTO).
- CMS-01, which has a lifespan of seven years, is envisaged to provide services in the extended-C band of the frequency spectrum. The extended-C band coverage would include the Indian mainland and Andaman-Nicobar and Lakshadweep islands.
- On 17 December 2020 launch was the 77th launch vehicle mission from Sriharikota spaceport.

PSLV-C51 launched Amazonia-1

- For the first time, a Brazilian satellite was launched by an Indian rocket from Sriharikota spaceport on 28 February 2021. This also marked Indian Space ResearchOrganisation's (ISRO) first launch of 2021.
- PSLV-C51 rocket, which is the 53rd mission of PSLV (Polar Satellite Launch Vehicle), launched Amazonia-1 of Brazil as primary satellite and 18 co-passenger payloads (USA also) from the first launchpad of the Sriharikota spaceport in Nellore district of Andhra Pradesh.
- These co-passenger satellites include Satish Dhawan Sat (SD SAT) from Chennai-based Space Kidz India (SKI).
- An earth-observation satellite called Amazonia-1 from Brazil, is the first commercial venture for NewSpace India Limited, the new marketing arm of ISRO that was created two years ago.

Sounding rocket launched

- The Indian Space Research Organisation (ISRO) has launched a sounding rocket (RH-560) to study attitudinal variations in the neutral winds and plasma dynamics from Sriharikota spaceport on 12 March 2021.
- ISRO has developed a series of sounding rockets called Rohini series, important among them being RH-200, RH-300 and RH-560, number in the name indicating the diameter of the rocket in mm
- Sounding rockets are one or two stage solid propellant rockets used for probing the upper atmospheric regions and for space research.
- At present, Isro has three versions of sounding rockets- RH-200, RH-300-Mk-II and RH-560-Mk-II capable of carrying 8-100kg payload and reach an altitude of 80 to 475km.
- Isro started launching indigenously made sounding rockets from 1965, and experience gained was of immense value in the mastering of solid propellant technology.

Sri Shakti Satellite

- SriShakti Satellite is developed by the students of Sri Shakthi Institute of Engineering and Technology of Coimbatore. This is a nanosatellite that weighs only 460 grams.
- It will be launched under Indian National Space Promotion and Authorisation Centre called IN-SPACe.
- ISRO would launch the satellite developed by two other institutions from Chennai and Nagpur along with Sri Shakhthi satellite in its UNITYSat.
- The institute is a member of the satellite network open ground state and made a ground station.
- After installing Sri Shakti Sat Ground Station together with Community for Space Programme Development, Serbia, Sri Shakthi institute became a member of the Satellite Networked Open Ground Station (SATNOGS) project.
- The active period of the satellite is six months but the signals would be sent for another three years.
- As the satellite would be placed at 500km to 575km above the earth, it would cross India twice in a day.

Satellite types according to mass:

- Large satellites: More than 1,000 kg
- Medium-sized satellites: 500-1,000 kg

Small satellites:
- Minisatellite: 100-500 kg
- Microsatellite: 10-100 kg
- Nanosatellite: 1-10 kg
- Picosatellite: Less than 1 kg

Standards are currently being developed in experimental format for picosatellites,such as Pocket Qubes, Sun Cubes or Tube Sats.

Indian Regional Navigation Satellite System (IRNSS)
- On 11 November 2020, India became the fourth country (US, Russia and China) in the world to have its independent regional navigation satellite system recognised by the International Maritime Organisation (IMO) as a part of the World Wide Radio Navigation System (WWRNS).
- The navigation system can now replace GPS in the Indian Ocean waters upto 1500 km from the Indian boundary.
- The IMO is the United Nations' specialised agency responsible for the safety and security of shipping and the prevention of marine and atmospheric pollution by ships.

The Maritime Safety Committee (MSC) of the IMO recognised the IRNSS as a component of the World-wide Radio Navigation System (WWRNS) during its 102nd session held virtually from 4 November 2020 to 11 November 2020.

What is GPS?
- Global Positioning System is a network of 30+ satellites controlled by the US. While the system was developed for military, it has now been put to commercial use.
- These satellites are located at an altitude of 20,000 km and work via radio signals. While the acronym GPS has come to denote all navigation systems, the names are different for other countries.
- Russia's system is called GLONASS. Europe has Galileo, and China has Beidou. The Japanese system is called Quasi.
- The Indian navigation system, which is the most recent of them all, has been named NAVIC (Navigation with Indian Constellation) or Indian Regional Navigation Satellite System (IRNSS).

Raavana-1
- Sri Lanka's first ever satellite 'Raavana-1', designed and developed by twoSri Lankan engineers, was successfully placed into orbit.
- It was launched from International Space Station (ISS) along with two other BIRDS 3 satellites from Japan and Nepal.
- The '*Birds project*' is an acronym for '*Joint Global Multi-Nation Birds Satellite project*', which is a cross-border interdisciplinary satellite project fornon-space faring countries supported by Japan.
- The Birds 3 project is led by Japan's *Kyushu Institute of Technology* and involves students from Sri Lanka, Nepal and Japan.

Space object tracking centre inaugurated
- The Indian Space Research Organisation (Isro) on 16 December 2020 formally declared
- its SSA (Space Situational Awareness) Control Centre in Bengaluru operational.
- In view of the ever-growing population of space objects and the recent trend towards

mega-constellations, SSA has become an integral and indispensable part of safe and sustainable space operations, Isro said adding it has been carrying out SSA activities, mainly focused on safeguarding India's space assets for the last few decades.

- The supporting infrastructure includes additional observation facilities for space object monitoring, and a control centre for centralized SSA activities.
- The NEtwork for space object TRacking and Analysis (NETRA) project is initiated as a first step towards meeting this goal, its main elements are radar, an optical telescope facility, and a control centre.
- The R&D activities will encompass space object fragmentation and break up modelling,space debris population and micrometeoroid environment modeling, Space Weather studies, Near Earth Objects and planetary defence studies etc.

Space Situational Awareness (SSA)

- Space Situational Awareness (SSA) means different things to different people, but in its broadest view refers to a knowledge of our near-space environment. This includes both a natural and man-made component.
- SSA is a term that has become prominent lately due to several collisions of orbiting space objects.
- In the broadest sense, Space Situational Awareness may be defined as a knowledge of the energy and particle fluxes in near-Earth space, natural and artificial objects passing through or orbiting within this space, including the past, present and future state of these components.

The realm of near-Earth space may be left rather vague at this stage. It is definitely within cis-lunar space, but extends to an Earth-radius of at least 100,000 km to include nearly all man-made objects currently in orbit.
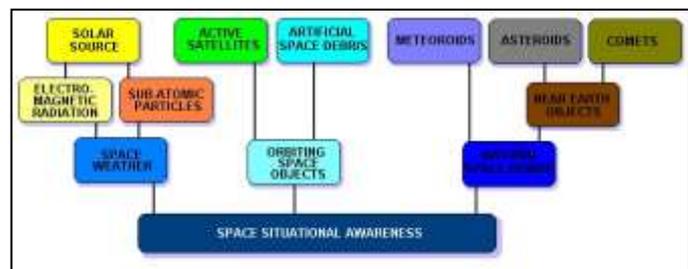
Project NETRA'

- Indian Space Research Organisation (ISRO) initiated 'Project NETRA' – an early warning system in space to detect debris and other hazards to Indian satellites in 2019.
- The space agency says our SSA will first be for low-earth orbits or LEO which have remote-sensing spacecraft.
- Under NETRA, or Network for space object Tracking and Analysis, the ISRO plans to put up many observational facilities: connected radars, telescopes; data processing units and a control centre.
- They can, among others, spot, track and catalogue objects as small as 10 cm, upto a range of 3,400 km and equal to a space orbit of around 2,000 km.
- With this the ISRO, which has placed satellites to track the earth from above, will also start training its eyes on space from earth.

Orbital Space Debris

- Orbital space debris (also referred to as artificial or man-made space debris) is basically any space object or hardware fragment that no longer has a usefulfunction. (Note that some satellites are launched and put in orbital storage until required.
- These are obviously not pieces of space debris, even though they are currently non-functional).
- The production of space debris started with the launch of the first artificial satellite, Sputnik-1, in October 1957.
- Typically, every space launch produces around 100 pieces of debris, from launch vehicles which remain in orbit, to discarded shrouds, to smaller fragments produced by pyrotechnic devices used to separate the satellite from launch vehicle

Kessler syndrome

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The Kessler syndrome (also called the Kessler effect collisional cascading, or ablation cascade), proposed by NASA scientist Donald J. Kessler in 1978,is a theoretical scenario in which the density of objects in low Earth orbit (LEO) due to space pollution is high enough that collisions between objects could cause a cascade in which each collision generates space debris that increases the likelihood of further collisions.

- One implication is that the distribution of debris in orbit could render space activities and the use of satellites in specific orbital ranges difficult for many generations.
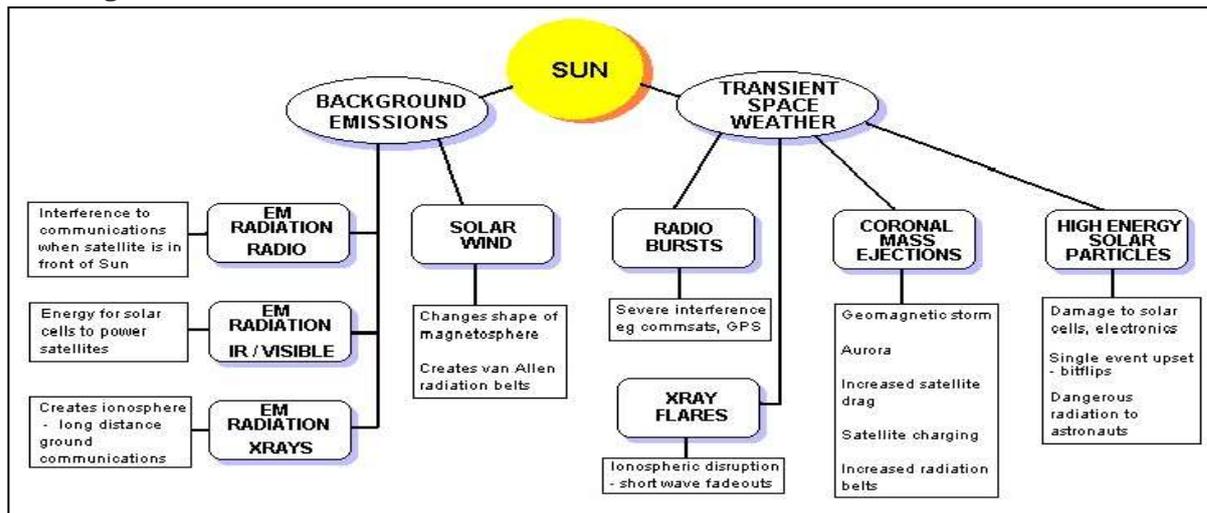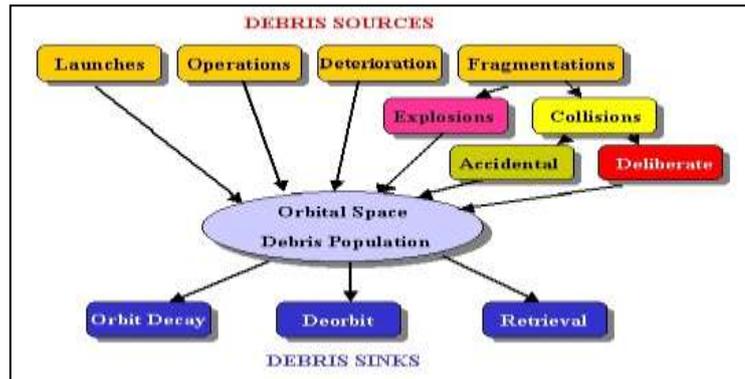
SPACE WEATHER

The source of most of our space weather is the Sun. We can separate this into a background and a transient component.

Orbiting space objects (OSO)

- Orbiting space objects (OSO) consist of active satellites and space debris. The latter are a mixture of defunct satellites, launch vehicles and pieces of space hardware produced by operational activities, deterioration and fragmentation.
- A large part of SSA for OSO consists of the tracking of these objects with the aim of creating a catalog of such objects.
- The catalog then forms the basis of orbital evolution and conjunction assessment; the latter with the aim of protecting active assets from collision.
- In the future this will also extend to the minimisation of space debris production through collisions.

NATURAL SPACE DEBRIS

- At the beginning of the space age, there was considerable concern about the natural meteoroid flux and its possible impact (literally) on satellites that were placed in Earth orbit.
- Some of the first scientific sensors on early satellites were meteoroid detectors.
- Fortunately the natural space debris flux transiting orbit is small enough not to cause serious problems, although a few Space Shuttle windows were replaced due to impacts from small pieces of natural debris (most window replacements however,were due to artificial space debris impacts).

Miss collision of Cartosat-2F

- India's 700 kg cartography satellite Cartosat-2F and Russia's 450 kg Kanopus-V

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satellite had a near miss in outer space on 27 November 2020 morning, said Roscosmos, Russia's state space corporation.

- Both the satellites were as close as 224 metres.
- Kanopus is an Earth observation satellite with a launch mass of 450 kg mini-satellite mission of the Russian Space Agency.
- The CARTOSAT-2F was launched from the first lanuch pad at Sriharikota on
- 12 January 2018 and is still operational.
- 1 kilometer is an ideal distance between satellites in orbit, whereas 224 meters is scary and can be counted as a near miss.

First military drills in space

- France has begun its first military exercises in space to test its ability to defend its satellites, in a sign of the growing competition between world powers in Earth's orbit.
- Michel Friedling, the head of France's newly created Space Command, called the exercises a "stress test of our systems" and said they "were a first for the French army and even a first in Europe."
- Codenamed "" in a nod to the first French satellite Asterix from 1965, the drills will simulate the monitoring of a potentially dangerous space object, as well as a threat to a satellite.

- The Russian satellite Louch-Olymp allegedly approached the Athena-Fidus satellite in what French authorities called "an act of espionage."
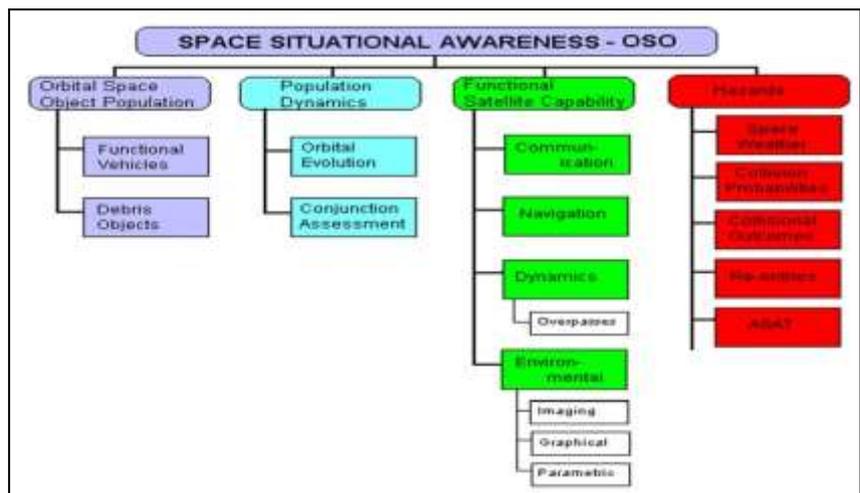
IN-SPACe

Government has launched the Indian Space Promotion and Authorisation Centre (IN-SPACe) to promote private investment and innovation in the space sector on 24 June 2020. IN-SPACe will facilitate and support the Private Sector in the following ways:

1. Provide technical support
2. Share cash intensive facilities
3. Allow to establish temporary facilities in DOS premises
4. Allow to bid for requirements coming from NSIL
5. Partner in science and space exploration missions

IN-SPACe is the Institutional and Regulatory mechanism established by Government to facilitate greater private participation. Financial provisions are not covered under this mechanism. Private players can participate in:

1. Building satellites
2. Building launch vehicles
3. Carry out launches
4. Develop Applications & provide space based services
5. Develop subsystem and systems for space sector activities

Why private participants

- Indian industry had a barely three per cent share in a rapidly growing global space economy which was already worth at least $360 billion.
- Indian industries do not have the resources or the technology to undertake independent space projects of the kind that US companies such as SpaceX have

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been doing, or provide space-based services.

- Additionally, the demand for space-based applications and services is growing even within India, and ISRO is unable to cater to this.

How ISRO gains

- There are two main reasons why enhanced private involvement in the space sector seems important. One is commercial, and the other strategic. IN-SPACe is the second space organisation created by the government in the last two years.
- The role of NSIL so that it would have a demand-driven approach rather than the current supply-driven strategy.

ARIIA 2020

- IIT Madras, Bombay and Delhi have emerged as the top three institutes of national importance in the 'Atal Ranking of Institutions on Innovation Achievements (ARIIA) 2020'. The rankings were released on 18 August 2020.
- Around 674 institutions had participated in the ARIIA Rankings this year compared with 496 Institutions last year.
- The ARIIA was instituted in 2019 by the ministry of education to rank educational institutions and universities primarily on innovation related indicators.
- The six parameters include programmes and activities on IPR, innovation, start-up and entrepreneurship, pre incubation and incubation infrastructure, annual budget spent on promoting and supporting innovation and entrepreneurship activities, courses on innovation, IPR and entrepreneurship development, intellectual property, technology transfer and commercialisation and successful start-ups and funding innovation and start-ups.

Gaganyaan

- The human spaceflight module of Gaganyaan will be launched after the second unmanned mission planned in 2022-23, Union minister Jitendra Singh said on 10 Feb 2021.
- It was initially envisaged that the Rs 10,000 crore Gaganyaan mission aims to send a three-member crew to space for five to seven days by 2022 when India completes 75 years of independence.
- "First unmanned mission is planned in December 2021.
- Second unmanned flight is planned in 2022-23, followed by human spaceflight demonstration.

Vyommitra

- On 22 January 2020, Vyommitra, a "half-humanoid" being developed by the Indian Space Research Organisation (ISRO), announced herself in Bengaluru.
- She is the prototype for a half-humanoid that will eventually fly to space on an unmanned mission, aiming to lay the ground for ISRO's manned mission Gaganyaan in 2022.
- ISRO's Vyommitra (vyoma = space, mitra = friend) is also being called a half-humanoid since she will only have a head, two hands and a torso, and will not have lower limbs.
- The humanoid is under development at a robotics laboratory at the Vikram Sarabhai Space Centre.
- The most recent mission with a dummy astronaut was in March 2019, when a mannequin called Ripley was flown on the Dragon crew capsule, launched on a SpaceX Falcon rocket, and sent to the International Space Station.
- An artificial intelligence robot ball called CIMON (Crew Interactive Mobile Companion) was deployed on the ISS by Airbus.
- Int-ball, a floating camera robot, was deployed on the ISS by JAXA space agency.
- Kirobo, a humanoid robot astronaut built in Japan, was flown to the ISS along with the first Japanese commander of the ISS, Koichi Wakata, to serve as the astronaut's assistant in conducting experiments on the space station.
- A Russian humanoid robot, Fedor, was sent to the ISS in 2019 to carry out mechanical functions on the space station.

Green propulsion for Gaganyaan

- Indian Space Research Organisation was developed 'green propulsion' for its ambitious human space flight mission, 'Gaganyaan', Chairman K Sivan said on 26 December 2020.
- It may be adopted for use in every stage of a rocket. ISRO has made space grade lithium-ion batteries and this technology is useful for mass adoption of electric vehicle.
- Eco-friendly solid propellant based on Glycidyl Azide Polymer (GAP) as fuel and Ammonium Di-Nitramide (ADN) as oxidizer at the laboratory level, which will eliminate the emission of chlorinated exhaust products from rocket motors.
- In addition, ISRO is also carrying out various technology demonstration projects involving green propellant combinations such as Hydrogen Peroxide (H_2O_2), Kerosene, Liquid Oxygen (LOX), Liquid Methane, ADN-Methanol-water, ADN-Glycerol-water etc.
- ISRO has already begun the move towards environment-friendly and green propellants with the acceptance of Liquid Oxygen (LOX)/Liquid Hydrogen (LH2) and LOX/Kerosene based propulsion systems for launch vehicles, and use of electric propulsion for spacecraft.
- The LOX/LH2 combination is already being used in the cryogenic upper stages of GSLV and GSLV Mk-III launch vehicles.
- ISRO has successfully developed ISROSENE, which is a rocket grade version of kerosene as an alternative to conventional hydrazine rocket fuel.
- ISRO has successfully demonstrated electric propulsion system for station keeping operations in the South Asia Satellite, launched on May 5, 2017.

India-France sign agreement for Gaganyaan

- Space agencies of India and France on 15 April 2021 inked an agreement for cooperation for the country's first human space mission Gaganyaan.
- France announced a new space cooperation agreement with ISRO from the Human Space Flight Centre (HSFC) in the city. Under this agreement, France will be contributing to India's Gaganyaan human spaceflight programme.
- The Gaganyaan orbital spacecraft project was kicked started in August 2018. It originally intended to send an astronaut from Indian soil to mark the 75th anniversary of the country's independence in 2022. Test flights will carry an instrumented humanoid robot.
- The capsule will orbit at an altitude of 400 kilometres for seven days before splashing down in the Arabian Sea off the coast of Ahmedabad.
- ISRO is targeting the first unmanned mission under the Gaganyaan project in December. This launch was to take place in December last year. This mission will be followed by another unmanned mission. The third leg is the main module.

ASTROSAT

AstroSat makes rare discovery

- AstroSat, India's first multi- wavelength satellite, has detected an extreme ultraviolet (UV) light from a galaxy which is 9.3 billion light-years away from Earth, the Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune said on 24 August 2020.
- AstroSat, has detected extreme-UV light from a galaxy, called AUDFs01, 9.3 billion light-years away from Earth.
- This team comprised scientists from India, France, Switzerland, the USA, Japan and The Netherlands recognized this unique discovery.
- AstroSat with a lift-off mass of 1515 kg was launched on 28 September 2015 into a 650 km orbit inclined at an angle of 6 deg to the equator by PSLV-C30 from Satish Dhawan Space Centre, Sriharikota. The minimum useful life of the AstroSat mission is expected to be 5 years.

VENUS MISSION

FRANCE TO TAKE PART IN VENUS MISSION

- Isro is scheduled to launch its Venus mission in 2025 and France will participate in it, French space agency CNES said on 30 September 2020.
- The VIRAL (Venus Infrared Atmospheric Gases Linker) instrument co-developed with the Russian federal space agency Roscosmos and the LATMOS atmospheres, environments and space observations laboratory attached to the French national scientific research centre CNRS has been selected by the Isro after a request for proposals.
- CNES will coordinate and prepare the French contribution, the first time a French payload will be flown on an Indian exploration mission.
- France is one of the three nations with whom India collaborates in the strategic sectors of nuclear, space and defence -- the other two being the US and Russia.
- In March 2018, the two countries also issued a 'Joint Vision for Space Cooperation'. India and France are also working on Isro's human space mission Gaganyaan project, which aims to send three Indians to space by 2022.

Life signature on Venus

- An announcement by an international team of astronomers about the discovery of phosphine gas in the atmosphere of Venus on 14 September 2020 triggered global excitement about the possibility of the presence of lifeforms on the neighbouring planet.
- Apart from being produced in industrial processes, phosphine, a colourless but smelly gas, is known to be made only by some species of bacteria that survive in the absence of oxygen.
- In a paper published in Nature Astronomy, a team of scientists have reported traces of phosphine in a concentration of approximately 20 parts per billion, thousands to millions of times more than what could otherwise be expected.
- The international scientific team first spotted the phosphine using the James Clerk Maxwell Telescope in Hawaii and confirmed it using the Atacama Large Millimeter/submillimeter Array (ALMA) radio telescope in Chile.

Missions Related to Venus:

- ISRO Shukrayaan: The Indian Space Research Organisation (ISRO) is also planning a mission to Venus, tentatively called Shukrayaan
- Akatsuki (Japanese 2015)
- Venus Express (European Space Agency 2005)
- NASA's Magellan (1989)

MOON MISSION

Chandrayaan-2 orbiter likely to last for 7 years

- The life of the orbiter of Chandrayaan-2 was initially envisaged for a year but the Indian Space Research Organisation (ISRO) expects it to last for seven years, Union minister Jitendra Singh said on 17 March 2021.
- Chandrayaan-2 was a highly complex mission to develop and demonstrate the key technologies for end-to-end lunar mission capability, including soft-landing and roving on the lunar surface. The mission comprised an orbiter, lander and rover.
- Planned to land on the South Pole of the Moon, Chandrayaan-2 was launched on 22 July 2019.

- The lander Vikram had hard-landed on 7 September 2019, crashing India's dream to become the first nation to successfully land on the lunar surface in its maiden attempt.
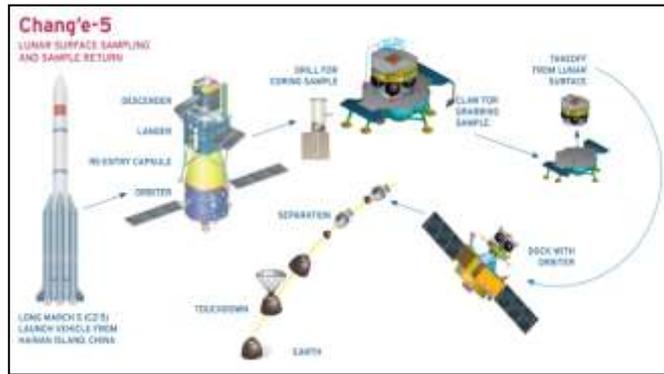
Chandrayaan-2 captures Sarabhai Crater

- Chandryaan-2 has captured images of the Moon and one of the craters has been named after Vikram Sarabhai (Sarabhai's birth centenary year completed on 12 August 2020), the father of the Indian space programme.
- The Sarabhai Crater is around 250 to 300 kilometres east of the crater where the Apollo 17 and Luna 21 Missions had landed.
- Planned to land on the South Pole of the Moon, Chandrayaan-2 was launched on 22 July 2019. However, the lander Vikram hard-landed on 7 September 2019, crashing India's dream to become the first nation to successfully land on the lunar surface in its maiden attempt.
- The orbiter of the mission is working fine and has been sending data.

Space Bricks

- The Indian Institute of Science (IISc) and the Indian Space Research Organisation (Isro) has developed a sustainable process for making brick-like structures on the Moon on 14 August 2020. This project began as early as on 30 January 2020. It could be a significant step forward in space exploration.
- It exploits lunar soil, and uses bacteria and guar beans to consolidate the soil into possible load-bearing structures.
- The cost of sending one pound (0.453592 kg) of material to outer space is about Rs 7.5 lakh. The process developed by the IISc and Isro team uses urea — which can be sourced from human urine — and lunar soil as raw materials for construction on the moon's surface. This decreases the overall expenditure considerably.
- Some microorganisms can produce minerals through metabolic pathways. One such bacterium, called Sporosarcina pasteurii, produces calcium carbonate crystals through a metabolic pathway called the ureolytic cycle: it uses urea and calcium to form these crystals as byproducts of the pathway.
- Researchers of IISc and ISRO, first mixed the bacteria with a simulant of lunar soil, then added urea and calcium sources along with gum extracted from locally-sourced guar beans.

China's Chang'e-5

The Chang'e 5 lunar mission is the Chinese National Space Administration's (CNSA) effort to send a robotic spacecraft to the moon to collect samples (1731 gram) and return them to Earth (landed in Inner Mongolia Autonomous Region in the early hours of 17 December 2020 for scientific study. It's China's first attempt at a sample-return mission, and will be the first probe to bring back material from the moon since the Soviet Union's Luna 24 mission in 1976.

The mission comprises a lunar orbiter, a lander and an ascent probe that will lift the lunar samples back into orbit and return them back to Earth.

Chang'e 5 is part of the CNSA's Chang'e lunar exploration program. Named for a Chinese goddess of the moon, the series of missions aims to steadily increase their technological capabilities, laying the groundwork for future human landings.

Chang'e 5 is one of four active spacecraft China has on the lunar surface at the moment.

Chang'e 3 lander, which arrived in 2013

Chang'e 4 lander and Yutu 2 rover, which landed together on the far side of the moon in January 2019.

Chang'e-1 lunar probe, the moon-orbiting satellite, was launched on Oct. 24, 2007.-
Chang'e-2, was launched on Oct. 1, 2010.

Tidal locking

- Only one side of the spherical moon is ever visible from Earth – it wasn't until 1959 when the Soviet Spacecraft Luna 3 orbited the moon and sent pictures home that human beings were able to see the "far side" of the moon for the first time.

- A phenomenon called tidal locking is responsible for the consistent view.

- The Earth and its moon are in close proximity and thus exert significant gravitational forces on each other. These tidal forces slow the rotations of both bodies.

- They locked the moon's rotation in sync with its orbital period relatively soon after it formed – as a product of a collision between a Mars-sized object and the proto-Earth, 100 million years after the solar system coalesced.

Water on Moon's sunlit surface

- NASA's Stratospheric Observatory for Infrared Astronomy (SOFIA) has confirmed,for the first time, water on the sunlit surface of the Moon. This discovery indicates that water may be distributed across the lunar surface, and not limited to cold, shadowed places.

- SOFIA has detected water molecules (H_2O) in Clavius Crater, one of the largest craters visible from Earth, located in the Moon's southern hemisphere.

- SOFIA, which is a joint project of NASA and the German Aerospace Centre, is a 2.5m telescope, the world's largest flying observatory that is flown on a Boeing 747-SP aircraft, which flies at an altitude of about 45,000 feet.

- The telescope uses the Faint Object infraRed Camera for the SOFIA telescope (FORCAST), with the help of which it was able to pick up the specific wavelength of water molecules on the surface of the Moon.

- So far, previous observations have discovered some compounds of hydrogen on the Moon's surface, but those observations were unable to distinguish between water and hydroxyl.

- The quantity of water found is small. NASA says that the amount of water in the Sahara desert is 100 times more than what SOFIA has detected in the lunar soil.

- Researchers suspect that the water found in the crater could have possibly been delivered by tiny meteorite impacts or could have been formed by the interaction of energetic particles ejected from the Sun.

- When solar winds deliver hydrogen to the lunar surface, the hydrogen could have reacted with oxygen-bearing minerals in the soil to form hydroxyl.

- This hydroxyl then could be transformed into water.

Artemis program

- On 24 September 2020, NASA published the outline for its Artemis program, which plans to send the next man and first woman to the lunar surface by the year 2024. The last time NASA sent humans to the Moon was in 1972, during the Apollo lunar mission.

- With the Artemis program, NASA wishes to demonstrate new technologies, capabilities and business approaches that will ultimately be needed for the future exploration of Mars.

- The program is divided into three parts, the first called Artemis I is most likely to be launched next year and involves an uncrewed flight to test the SLS and Orion spacecraft. Artemis II will be the first crewed flight test and is targetted for 2023. Artemis III will land astronauts on the Moon's South Pole in 2024.

- In 2011, NASA began the ARTEMIS (Acceleration, Reconnection, Turbulence, and Electrodynamics of the Moon's Interaction with the Sun) mission using a pair of repurposed spacecraft, and in 2012, the Gravity Recovery and Interior Laboratory (GRAIL) spacecraft studied the Moon's gravity.

Artemis Accords

- Earlier this year in May 2020, the US Space agency NASA had announced a new set of principles which are specifically designed to safeguard the use of Outer Space — `Artemis Accords'. What is this Artemis Accord?
- Besides encouraging sustainable lunar resource extraction, it also seeks to ensure transparency and peace in outer space, and to facilitate international cooperation and to also "establish a common set of principles to govern the civil exploration and use of outer space."

Who owns the Moon?

- Nobody owns the Moon. Not the US, not India, or China, or any individual State. Additionally, the Moon is not owned 'collectively' by the various states and governments around the world.
- Humanity also doesn't own the Moon. It is not ours. However, we have all agreed that we have the right to go to the Moon, and use it, and live there, and use resources we find there. And we further agree that no State can annex or claim the Moon as their own.

What about India?

- Indian companies can also "mine" the Moon, but they should first create national legislation giving the details and particulars about how they will do it.

NASA's Gateway lunar orbiting outpost

- NASA recently finalised the contract for the initial crew module of the agency's Gateway lunar orbiting outpost. The contract, which is worth $187 million has been awarded to Orbital Science Corporation of Dulles, Virginia, which is a wholly- owned subsidiary of Northrop Grumman Space.
- Essentially, the Gateway is a small spaceship that will orbit the Moon, meant for astronaut missions to the Moon and later, for expeditions to Mars.
- It will act as a temporary office and living quarters for astronauts, distanced at about 250,000 miles from Earth.
- The spaceship will have living quarters, laboratories for science and research and docking ports for visiting spacecraft.

Global Rules related to Space:

- International treaties are governing the use of space that mandate that outer space and celestial bodies like the Moon, must only be exploited for peaceful purposes. Some relevant international treaties that address aspects of the outer space issue are:
- Outer Space Treaty, 1967: The Outer Space Treaty prohibits only weapons of mass destruction in outer space, not ordinary weapons.
- Limited Test Ban Treaty of 1963: It prohibits nuclear tests and any other nuclear explosions in the atmosphere or outer space
- Astronauts Rescue Agreement of 1968: It requires the safe return of astronauts and objects launched into space to their country of origin;
- Liability Convention of 1972: It establishes procedures for determining the liability of a state that damages or destroys space objects of another state;
- Registration Convention of 1976: It requires the registration of objects launched into space
- Moon Agreement of 1984: It took the first steps to establish a regime for exploiting the natural resources of space.

MARS MISSION

Phobos imaged by MOM

- Mars Colour Camera (MCC) onboard Mars Orbiter Mission has imaged Phobos, the closest and biggest moon of Mars, on 1st July 2020 when MOM was about 7200 km from Mars and at 4200 km from Phobos. Spatial resolution of the image is 210 m.
- Phobos is largely believed to be made up of carbonaceous chondrites. The violent phase that Phobos has encountered is seen in the large section gouged out from a past collision (Stickney crater) and bouncing ejecta.
- Stickney, the largest crater on Phobos could be seen along with the other craters (Shklovsky, Roche & Grildrig).

- The country had on 24 September 2014 successfully placed the Mars Orbiter Mission spacecraft in orbit around the red planet, in its very first attempt, thus breaking into an elite club.
- ISRO had launched the spacecraft on its nine-month- long odyssey on a homegrown PSLV rocket from Sriharikota in Andhra Pradesh on 5 November 2013.
- It had escaped the earth's gravitational field on 1 December 2013.
- The Mars Orbiter has five scientific instruments - Lyman Alpha Photometer (LAP), Methane Sensor for Mars (MSM), Mars Exospheric Neutral Composition Analyser (MENCA), Mars Colour Camera (MCC) and Thermal Infrared Imaging Spectrometer (TIS).
- Mars Orbiter Mission is India's first interplanetary mission to planet Mars with an orbiter craft designed to orbit Mars in an elliptical orbit.
- The mission also known as Mangalyaan was initially meant to last six months, but subsequently Isro had said it had enough fuel for it to last "many years."

Hope: atmospheric data

- On 19 July 2020, the UAE launched the Arab world's first mission (Amal (Hope)) to Mars.
- The launch of the spacecraft Amal (Hope) took place from the Tanegashima Space Center, Japan, aboard a Mitsubishi Heavy Industries' H-II A rocket. Hope was developed by UAE scientists in the US, and its launch is the 45th for H-II A.
- Carrying three instruments including a high-resolution camera and a spectrometer, the spacecraft is on an orbital mission to collect data on Martian climate dynamics and help scientists understand why Mars's atmosphere is decaying into space.
- Hope is the UAE's fourth space mission and first interplanetary one. The previous three were all Earth-observation satellites.
- Hope was reach Mars's orbit Mars in February 2021 and then start orbiting the planet. Its overall mission life is one Martian year.

Tianwen-1: Soil study

- China's first Mars probe (Tianwen-1 (formerly Huoxing 1)) launched on a Long March 5 Y-4 boosters from Xichang, China on 23 July 2021. Tianwen-1 ("Questions to Heaven")
- It consists of an orbiter, a lander and a rover and aims to study Martian topography and geology and determine the composition of the surface material, climate and environment.
- The orbiter reached the planet by early 2021 and use high-resolution cameras to search for a suitable landing site somewhere in the Utopia Planitia region.
- It weighs around 240 kg and will carry cameras, subsurface radar, a spectrometer, a magnetometer, and atmospheric sensors.
- Tianwen-1 is not China's first attempt to go to Mars. A previous mission with Russia in 2011 ended prematurely as the launch failed.

Perseverance: hunt or life

- NASA's rover Perseverance (launched on 30 July 2020) will look for signs of habitable conditions on Mars and microbial life in its ancient past.
- Over its mission duration of one Martian year (687 Earth days), it will collect
- Martian rock and sediment samples for analysis on Earth.
- The rover is equipped with specialised equipment to collect data, analyse weather conditions that can help plan for future human missions, and produce oxygen from the carbon-dioxide-rich atmosphere.
- Perseverance touch down on Mars on February 18, 2021. NASA's Curiosity rover has been exploring Mars since 2012. It remains active although its targeted mission life is over.

NASA's multiple generations of Mars rovers

- NASA's incredible journey of driving on Mars started about 24 years ago, in 1997: when the Mars Pathfinder Mission with the Sojourner rover egressed on the Martian soil.
- It was an unforgettable experience to be part of the Operations team for Mars Pathfinder: a mission put together on a very tight budget that many thought would fail.

- However, Mars Pathfinder would succeed and in the process would change the subsequent history of Mars Exploration.
- Thus, NASA would go on to send the twin rovers, Spirit and Opportunity, to Mars in 2003, followed by Curiosity in 2012, followed by Perseverance that is launched on 30 July 2020.

What is new with Perseverance?

- First, Perseverance will carry a unique instrument MOXIE or Mars Oxygen ISRU Experiment: which for the first time will manufacture molecular oxygen on Mars using carbon dioxide from the carbon-dioxide-rich atmosphere.
- There is the new push for ISRU at NASA: in NASA jargon, ISRU means In Situ Resource Utilization: or the use of local resources to meet human needs or requirements of the spacecraft.
- If oxygen can be successfully extracted on Mars in some significant scale, this can have two direct advantages: first, the oxygen can be used for human visitors to Mars, and second, the oxygen can be used to manufacture rocket fuel for the return journey.
- Second, Perseverance will carry Ingenuity, the first ever helicopter to fly on Mars. This is the first time NASA will fly a helicopter on another planet or satellite.
- Ingenuity is a technology demonstration: the challenge, of course, is to fly the helicopter in the thin atmosphere of Mars. Like a drone on Earth, a Mars helicopter can help in rover drive planning and in fetching samples from locations that the rover cannot safely drive to.
- If thiS technology demonstration is successful, we will see a greater role for such helicopters in future missions.
- Third, Perseverance is the planned first step to bring back rock samples from Mars for analysis in sophisticated laboratories on Earth: with the goal of looking for biosignatures: or signatures of present or past life.

Why all Mars Mission in the end of July

- The end of July 2020 offers a launch window during which Earth and Mars will be aligned at their closest points in two years, which means using less fuel to reach the planet.
- If a spacecraft is launched too early or too late, it will arrive in the planet's orbit when the planet is not there.

'Dust Devil' on Martian surface

- The NASA said its 'Curiosity rover' on 9 August 2020 captured the plumes of spinning columnar vortex of wind called "Dust Devils".
- It also apprised that it was 16 feet (5 metres) wide and 164 feet (50 meters) tall while it was almost one-third to half a mile away from the rover.
- Meanwhile, it attributed to the prevailing windy season in the region for such formations.

Exoplanets

Ariel Space Mission

- The European Space Agency (ESA) has formally adopted Ariel, the explorer that will study the nature, formation and evolution of exoplanets.
- As of now the existence of more than 4,000 exoplanets is considered confirmed, while there are thousands of other candidate exoplanets that need further observations to say for certain if they are exoplanets.
- Proxima Centauri b is the closest exoplanet to Earth and is four light-years away and inhabits the "habitable zone" of its star, which means that it could possibly have liquid water on its surface.

- Planets that lie outside of the Solar System and orbit around stars other than the Sun are called exoplanets or extrasolar planets.
- Exoplanets are not easy to detect since they are much less brighter than the stars they orbit and hence it is difficult to see them directly using telescopes.
- As per NASA, only a handful of exoplanets have been found using telescopes and the rest have been detected using indirect methods.

- One of these methods involves tracking the dimming of a star that happens when a planet passes in front of it. NASA's Kepler Space telescope uses this method to spot thousands of planets.
- Other methods to track exoplanets include gravitational lensing and the "wobbling method", which is based on the idea that an orbiting planet will cause its parent sta to orbit slightly off-centre.
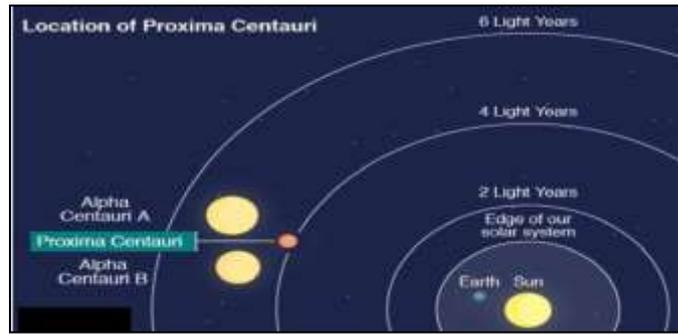
Why do scientists study exoplanets?

- The search for exoplanets is driven by the possibility that life may exist beyond Earth and even if there is no evidence for this, scientists believe that their hunt for an answer will reveal details about where humans came from and where we're headed.

What is the Ariel Space Mission?

- Ariel (Atmospheric Remote-sensing Infrared Exoplanet Large-survey), which scientists are planning to launch in 2029, will perform a large-scale survey of over a thousand exoplanets over a period of four years.

- These thousand exoplanets will range from gas giants to rocky planets, which will help them to compile a list of their compositions and properties thereby providing insights about how planetary systems form and evolve.
- Ariel is the first mission of its kind dedicated to measuring the chemical composition and thermal structures of hundreds of exoplanets.
- Further, Ariel will help to answer one of the key questions of ESA's Cosmic Vision Plan, which is, "What are the conditions for planet formation and the emergence oflife?"
- A large-scale survey that Ariel will perform is required to know more about exoplanets and exoplanetary systems.

TESS completes primary mission

- NASA's Transiting Exoplanet Survey Satellite (TESS), on July 4, 2020 finished its primary mission imaging about 75 percent of the starry sky as part of a two-year-long survey.
- In capturing this giant mosaic, TESS has found 66 new exoplanets, or worlds beyond our solar system, as well as nearly 2,100 candidates astronomers are working to confirm.
- TESS is producing a torrent of high-quality observations providing valuable data across a wide range of science topics.
- TESS will survey 200,000 of the brightest stars near the sun to search for transiting exoplanets. TESS launched on 18 April 2018, aboard a SpaceX Falcon 9 rocket.

TESS discovers three hot planets

- Using NASA's Transiting Exoplanet Survey Satellite (TESS), astronomers have discovered a young star called TOI 451 with three planets revolving around it.
- The recently discovered mini solar system is located in the Eridanus constellation,

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which is a part of the Pisces-Eridanus stream.
- The star of this system is 400 light-years away from us and is just 120 million years old, which makes it a lot younger when compared to our Sun.

FIRST POTENTIAL RADIO SIGNAL DETECTED

- An international team of scientists has collected the first possible radio signal from a planet beyond our solar system, emanating from an exoplanet system about 51 light-years away.
- Using the Low Frequency Array (LOFAR), a radio telescope in the Netherlands, the Researchers uncovered emission bursts from the Tau Bootes star-system hosting a so-called hot Jupiter, a gaseous giant planet that is very close to its own sun.
- The study found that only the Tau Bootes exoplanet system exhibited a significant radio signature, a unique potential window on the planet's magnetic field.
- The signal is from the Tau Bootes system, which contains a binary star system and an exoplanet.
- If confirmed through follow-up observations, the researchers said, this radio detection opens up a new window on exoplanets and provides a novel way to examine alien worlds that are tens of light-years away. Earth's magnetic field protects it from solar wind dangers, keeping the planet habitable.

'PI PLANET' DISCOVERED

- Scientists at the Massachusetts Institute of Technology (MIT), along with others, have discovered an earth-sized "Pi Planet" that revolves around its star every 3.14days.
- The orbit of the planet, which the scientists suspect is likely not hospitable as its tight orbit brings the planet close enough to its star to heat its probably terrestrial surface up to 450 Kelvins, or around 350 degrees Fahrenheit, is reminiscent of the universal mathematics constant.
- The researchers discovered signals of the planet in data taken in 2017 by the National Aeronautics and Space Administration (NASA) Kepler Space Telescope's K2 mission.
- The new planet is labeled K2-315b; it is the 315th planetary system discovered within K2 data.

What is a radio burst

- NASA has reported that on 28 April 2020, it observed a mix of X-ray and radio signals never observed before in the Milky Way. Significantly, the flare-up it observed included the first fast radio burst (FRB) seen within the galaxy.
- The first FRB was discovered in 2007, since when scientists have been working towards finding the source of their origin.
- Essentially, FRBs are bright bursts of radio waves (radio waves can be produced by astronomical objects with changing magnetic fields) whose durations lie in the millisecond-scale, because of which it is difficult to detect them and determine their position in the sky.
- The source of the FRB detected in April in the Milky Way is a very powerful magnetic neutron star, referred to as a magnetar, called SGR 1935+2154 or SGR 1935, which is located in the constellation Vulpecula and is estimated to be between 14,000-41,000 light-years away.

Earth to Voyager 2

- In the nearly 44 years since NASA launched Voyager 2, the spacecraft has gone beyond the frontiers of human exploration by visiting Uranus, Neptune and, eventually, interstellar space.
- In March, the agency was compelled to shut down its only means of reaching 12 billion miles across the heavens to this robotic trailblazer.
- On 19 February 2021, Earth's haunting silence will come to an end as NASA switches that communications channel back on, restoring humanity's ability to say hello to its distant explorer.
- Because of the direction in which it is flying out of the solar system, Voyager 2 can only receive commands from Earth via one antenna in the entire world.
- Both Voyager 1 and Voyager 2 hold the records for the farthest a spacecraft has ever

traveled and for the longest operating mission.

Asteroid

What is an asteroid?

- Asteroids are rocky objects that orbit the Sun, much smaller than planets. They are also called minor planets. According to NASA, there are 994,383 known asteroids, the remnants from the formation of the solar system over 4.6 billion years ago.

- Asteroids are divided into three classes. First, those found in the main asteroid belt between Mars and Jupiter, which is estimated to contain somewhere between 1.1-1.9 million asteroids.

- The second group is that of trojans which are asteroids that share an orbit with a larger planet. NASA reports the presence of Jupiter, Neptune and Mars trojans. In 2011, they reported an Earth trojan as well.

- The third classification is Near-Earth Asteroids (NEA), which have orbits that pass close by the Earth. Those that cross the Earth's orbit are called Earth-crossers. More than 10,000 such asteroids are known, out of which over 1,400 are classified as potentially hazardous asteroids (PHAs).

Why do scientists study asteroids?

- Scientists study asteroids to look for information about the formation and history of planets and the sun since asteroids were formed at the same time as other objects in the solar system.

- Another reason for tracking them is to look for asteroids that might be potentially hazardous.

- It is for these reasons that scientists are interested in gathering information about asteroids.

- For instance, scientists are interested in studying Bennu because it hasn't undergone drastic changes since its formation over billions of years ago and therefore it contains chemicals and rocks dating back to the birth of the solar system. It is also relatively close to the Earth.
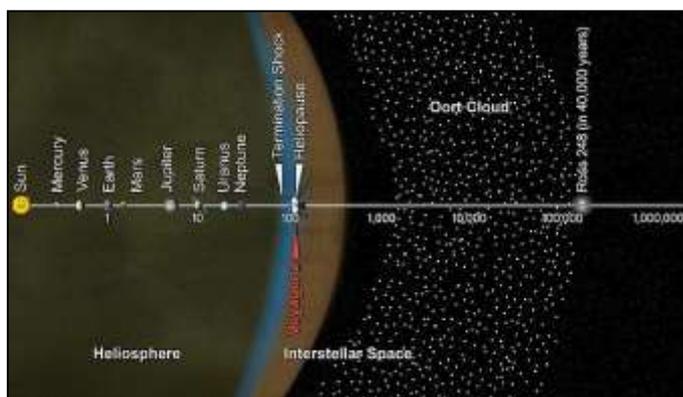
What is 2001 FO32?

- On 21 March 2021, the largest asteroid predicted to pass by Earth in 2021 will be at its closest.

- It won't come closer than 2 million km to Earth, but it will present a valuable scientific opportunity for astronomers who can get a good look at a rocky relic that formed at the dawn of our Solar System.

- It is called 2001 FO32. There is no threat of a collision with our planet now or for centuries to come.

- Scientists know its orbital path around the Sun very accurately, since it was discovered 20 years ago and has been tracked ever since.

- For comparison, when it is at its closest, the distance of 2 million km is equal to 5¼ times the distance from Earth to the Moon. During this approach, 2001 FO32 will pass by at about 124,000 kph – faster than the speed at which most asteroids encounter Earth. Still, that distance is close in astronomical terms, which is why 2001 FO32 has been designated a "potentially hazardous asteroid".

Asteroid Apophis

- The USA's NASA space agency has ruled out the possibility of the dreaded asteroid Apophis causing any damage to the Earth for the next 100 years.
- Named after the ancient Egyptian god of chaos and darkness, it was discovered in 2004, after which NASA had said that it was one of the asteroids that posed the greatest threat to Earth.
- Apophis measures 340 metres across– comparable to the size of the huge ship that has currently blocked the Suez Canal. (That ship, the Ever Given, is 400m in length, 200m width)
- Apophis was predicted to come threateningly close to us in the years 2029 and 2036, but NASA later ruled these events out. There were still fears about a possible collision in 2068, however.
- This year, the asteroid flew past Earth on 5 March 2021, coming within 17 million km of our planet. They also used the 100-metre Green Bank Telescope in West Virginia which showed imaging of Apophis.

NEOWISE to be visible in India

- Known as one of the brightest comets to pass near the Earth in over two decades, comet C/2020 F3 or NEOWISE will be visible in the northern hemisphere starting on 14 July 2020.
- The comet had been discovered by NASA's Near Earth Wide-field Infrared Survey Explorer (NEOWISE) earlier this year.
- Comet C/2020 F3 is expected to come closest to planet Earth on July 22 and July 23 and can be visible in the north-western sky.
- A comet is a cosmic snowball made up of frozen gases, rocks and some dust, which orbits around in an elliptical manner.
- When a comet reaches closer to the sun, its gases start to evaporate in a way that leaves a tail and a glowing head.
- Since they do not have their light on their own, they mostly reflect the sun's light. In a dark sky, these comets can be easily viewed.

What is 16 Psyche

- A recent study has found that asteroid 16 Psyche, which orbits between Mars and Jupiter, could be made entirely of metal and is worth an estimated $10,000 quadrillion — more than the entire economy of Earth.
- New images from NASA's Hubble Space Telescope offer a closer view of the mysterious asteroid 16 Psyche, whose surface may mostly comprise iron and nickel (several other rare materials like gold, platinum, cobalt, iridium and rhenium), similar to the Earth's core, according to the study published in The Planetary Science Journal on 2 November 2020.
- Metal asteroids are not commonly found in the solar system, and scientists believe that studying 16 Psyche may offer a rare glimpse of what the inside of a planet really looks like.
- The exact composition and origins of the asteroid will be uncovered in 2022, when NASA sends (SpaceX Falcon Heavy rocket from Cape Canaveral Air Force Station in Florida) an unmanned spacecraft to study it up close.

What is asteroid 16 Psyche?

- Located around 370 million kilometres away from Earth, asteroid 16 Psyche is one of the most massive objects in the asteroid belt in our solar system. The somewhat potato-shaped asteroid has a diameter of around 140 miles, according to NASA.
- It was first discovered on March 17, 1853, by the Italian astronomer Annibale de Gasparis and was named after the ancient Greek goddess of the soul, Psyche.

- Unlike most asteroids that are made up of rocks or ice, scientists believe that Psyche is a dense and largely metallic object thought to be the core of an earlier planet that failed in formation.

Hayabusa2 mission

- Six years after Japan's Hayabusa2 mission was launched, it returns back to Earth on 6 December 2020 carrying with it samples from the one-kilometre wide Ryugu asteroid that orbits the Sun.

- The mission is similar to NASA's OSIRIS-REX mission that brought back samples from asteroid Bennu late in October.

- As per NASA, the asteroid is thought to be made up mostly of nickel and iron. Asteroids like Ryugu are interesting for several reasons, perhaps foremost because they are near the Earth and might, one day in the far future, pose an impact threat.

- Hayabasu2's predecessor, the Hayabusa mission brought back samples from the asteroid Itokawa in 2010.

- Ryugu is also classified as a PHA and was discovered in 1999 and was given the name by the Minor Planet Center in 2015. It is 300 million kilometres from Earth and it took Hayabusa2 over 42 months to reach it.

NASA's OSIRIS-REx mission

- On 20 October 2020, NASA's OSIRIS-REx — Origins, Spectral Interpretation, Resource Identification, Security, Regolith Explorer — spacecraft briefly touched asteroid Bennu (located over 200 million miles away from Earth), from where it is meant to collect samples of dust and pebbles and deliver them back to Earth in 2023.

- The asteroid was named after an Egyptian deity by a nine-year-old boy from North Carolina in 2013 who won NASA's "Name that Asteroid" competition. The asteroid was discovered by a team from the NASA-funded Lincoln Near-Earth Asteroid Research team in 1999.

- On 20 October 2020, The spacecraft's robotic arm, also called the Touch-And-Go Sample Acquisition Mechanism or Tagsam, had made contact with the surface of the ancient Bennu asteroid. While mission planners expected the total time of contact to be less than 16 seconds.

- In 2016, NASA launched the OSIRIS-REx mission. It reached its target in 2018.

Geminids meteor shower unique

- The Geminids meteor shower, believed to be the strongest of the year, is active from December 4-December 20, with December 13 and 14 considered to be the best nights for viewing these meteor showers.

- Meteors are bits of rock and ice that are ejected from comets as they manoeuvre around their orbits around the sun.

- When a meteor reaches the Earth, it is called a meteorite and a series of meteorites, when encountered at once, is termed a meteor shower. According to NASA, over 30 meteor showers occur annually and are observable from the Earth.

- The Geminids meteor showers are unique because their origin does not lie in a comet, but what is believed to be an asteroid or an extinct comet. The Geminids emerge from 3200 Phaethon, which meteor scientists consider to be an asteroid.

- Discovered on October 11, 1983, the asteroid is over 5 km in diameter and was named after the Greek myth of Phaethon, the son of Sun god Helios.

Space Tourism

Virgin Galactic flying to space

- After a lifetime of yearning to fly in space, Virgin Galactic's Richard Branson was blast off aboard his own rocket ship 11 July 2021 in his boldest, grandest adventure yet. The test flight to the edge of space high above the southern desert of New Mexico. Branson, who heads the Virgin Group conglomerate that includes everything from entertainment to financial services to telecoms, founded Virgin Galactic in 2004.

- Maximum altitude is roughly 55 miles (70 kilometers), with three to four minutes of weightlessness provided.

- Sirisha Bandla who is part of six space travellers aboard 'VSS Unity' of Virgin Galactic become the second India-born woman to fly into space after Kalpana Chawla. Sirisha Bandla was born in Andhra Pradesh's Guntur district was brought up in Houston.
- Such a trip is called a "suborbital flight". Another high-profile suborbital trip is coming up on 20 July 2021, when Amazon's Jeff Bezos takes off on the Blue Origin spacecraft.

Shephard test successful

- Jeff Bezos' Blue Origin space company launched a New Shepard rocket for a seventh time from a remote corner of Texas on 13 October 2020, testing new lunar-landing technology for NASA that could help put astronauts back on the moon by 2024.
- In 2018, Blue Origin was one of the ten companies selected by NASA to conduct studies and advance technologies to collect, process and use space-based resources for missions to the Moon and Mars.
- New Shephard has been named after astronaut Alan Shephard, the first American to go to space, and offers flights to space over 100 km above the Earth and accommodation for payloads.
- The Federal Aviation Administration (FAA) said on 12 July 2021 it approved a Blue Origin license to carry humans on the New Shepard launch system into space.
- Jeff Bezos is set to fly to the edge of space on Blue Origin's maiden crewed voyage on 20 July 2021.

What is space tourism?

- Space tourism is a segment of space travel that seeks to give lay people the opportunity to go to space for recreational, leisure or business purposes. The idea is to make space more accessible to those individuals who are not astronauts and want to go to space for non-scientific purposes.
- A report published by the Congressional Research Service (CRS) notes that the concept of space tourism is "fairly new". The report mentions that in 1997, the private company Space Adventures was founded to offer "bookable space-related adventures".
- In fact, Space Adventures is the only private company to send paying customers to orbital space so far, the report says.
- In 2004, test pilot Mike Melville became the first private astronaut to fly beyond the Karman Line (recognised as the edge of space).
- In 2008, the billionaire video game developer, Richard Garriott became the sixth private citizen to fly to space. As per media reports, Garriott paid over $30 million to spend about 12 days at the ISS, which he traveled to aboard a Russian Soyuz spacecraft.
- Before Garriott, Space Adventures' customer Dennis Tito became the first space tourist in 2001.
- As of now, companies including Virgin Atlantic, SpaceX, XCOR Aerospace, Jeff Bezos's Blue Origi and Armadillo Aerospace are working on providing space tourism services to people.
- As of now, potential customers can pay a $1000 fully refundable registration fee to Virgin Galactic, after which they will be notified as and when tickets go on sale.

What's suborbital?

- When an object travels at a horizontal speed of about 28,000 km/hr or more, it goes into orbit once it is above the atmosphere. Satellites need to reach that threshold speed in order to do orbit Earth.
- Such a satellite would accelerate toward the Earth due to gravity. However, it moves fast enough that the Earth curves out from under it as fast as it falls, giving it a circular path.
- Any object travelling slower than 28,000 km/hr must eventually return to Earth.
- For an analogy, consider a cricket ball thrown into the air. Given that no human hand can give it a speed of 28,000 km/hr (about 8 m/sec), the ball will fly in an arc until its entire kinetic energy is swapped with potential energy.
- At that instant, it will lose its vertical motion momentarily, before returning to Earth under the influence of gravity.
- A suborbital flight is like this cricket ball, but travelling fast enough to reach the "edge of

Why Is Suborbital Important?

- Commercial Markets
  - Space tourism
  - Commercial imaging
  - Film & television
  - Fast package delivery
- Science
  - Microgravity research
  - Atmospheric research
- National Security
  - Surveillance
  - Verification of experimental systems (such as National Missile Defense)

space", and with enough horizontal velocity to go into orbit.

- If an object travels at 40,000 km/hr, it will achieve what is known as "escape velocity", and never return to Earth.
- With Branson and Bezos kicking off private space flight, several companies are looking for customers wanting to go on suborbital or even orbital journeys.

How does it work?

- The rocket system consists of two parts, the cabin or capsule and the rocket or the booster.
- The cabin can accommodate experiments from small Mini Payloads up to 100 kg.
- As per Blue Origin, the Mini Payloads provide easier space access to students, who are part of educational institutions that are developing their own space programs, "for less than the price of new football uniforms".
- Further, the cabin is designed for six people and sits atop a 60 feet tall rocket and separates from it before crossing the Karman line, after which both vehicles fall back to the Earth.
- All the six seats in the capsule are meant for passengers, each of whom get their own window seat. The capsule is fully autonomous and does not require a pilot.
- The system is a fully reusable, vertical takeoff and vertical landing space vehicle that accelerates for about 2.5 minutes before the engine cuts off.

What is Starship?

- SpaceX's Starship prototype exploded while attempting to land on 9 December 2020 after an otherwise successful test launch from the company's rocket facility in Boca Chica, Texas.
- Designed by SpaceX, Starship is a spacecraft and super-heavy booster rocket meant to act as a reusable transportation system for crew and cargo to the Earth's orbit, Moon and Mars.
- Starship as "the world's most powerful launch vehicle ability to carry over 100 metric tonnes to the Earth's orbit.

What is the idea behind developing this spacecraft?

- Starship has been under development since 2012 and is a part of Space X's central mission to make interplanetary travel accessible and affordable and to become the first private company to do so.
- Therefore, the company is working on building a fleet of reusable launch vehicles, capable of carrying humans to Mars and other destinations in the solar system.

SPACE INTERNET

OneWeb's satellites launched

- Following the successful launch of 36 satellites on 28 May 2021, OneWeb's Low Earth Orbit (LEO) constellation reached 218 in-orbit satellites. The company only has one

more launch to complete before it obtains the capacity to enable its 'Five to 50' service of offering internet connectivity to all regions north of 50 degrees latitude.

- The Five to 50 service is expected to be switched on by June 2021 with global services powered by 648 satellites available in 2022.
- OneWeb, a Low Earth Orbit (LEO) satellite communications operator, co-owned by Bharti Global and the UK government.
- These would form part of OneWeb's 648 LEO satellite fleet that will deliver high- speed, low-latency global connectivity.
- OneWeb is a global communications company that aims to deliver broadband satellite Internet around the world through its fleet of LEO satellites.

LEO technology

- LEO satellites have been orbiting the planet since the 1990s, providing companies and individuals with various communication services. LEO satellites are positioned around 500km-2000km from earth, compared to stationary orbit satellites which are approximately 36,000km away.
- Latency, or the time needed for data to be sent and received, is contingent on proximity. As LEO satellites orbit closer to the earth, they are able to provide stronger signals and faster speeds than traditional fixed-satellite systems.
- Additionally, because signals travel faster through space than through fibre-optic cables, they also have the potential to rival if not exceed existing ground-based networks.
- However, LEO satellites travel at a speed of 27,000 kph and complete a full circuit of the planet in 90-120 minutes.
- As a result, individual satellites can only make direct contact with a land transmitter for a short period of time thus requiring massive LEO satellite fleets and consequently, a significant capital investment.
- Due to these costs, of the three mediums of Internet – fibre, spectrum and satellite – the latter is the most expensive.

Competitors

- OneWeb's chief competitor is Starlink, a venture led by Elon Musk's SpaceX. Starlink currently has 1,385 satellites in orbit and has already started beta testing in North America and initiating pre-orders in countries like India.
- However, Starlink's satellites fly closer to the earth and therefore, the company requires a larger fleet to provide global connectivity than OneWeb.
- Amazon is a newcomer to the space, with its Project Kuiper initiative announced in 2019.
- While Amazon also has its own rocket production capability, its Blue Origin rocket is far less developed than SpaceX's Falcon 9.
- The Soyuz rockets used by OneWeb are perhaps at the biggest disadvantage with the technology being 50 years old and the costs of launch significantly higher.
- Other companies have also ventured into this market, including tech heavyweights Google and Facebook.
- The former launched its 'Loon' project in 2013, using high-altitude balloons to create an aerial wireless network. After testing the service in rural Kenya, Google's parent company, Alphabet, abandoned the project in 2021.
- Taking a different track, Facebook attempted to beam internet down to earth using drones. However, after two failed test flights, it also abandoned the project in 2018. It has since announced its intention to launch a new internet service using satellite technology.

Indian satellite internet market

- The acquisition of OneWeb by Bharati Limited could arguably give it a distinct advantage in India and parts of Africa, in which another Bharati company, Airtel, already has a significant presence.
- Currently, Starlink and OneWeb aim to launch in India by 2022, with Amazon's Project Kuiper also in talks to receive regulatory approval to operate in the country.
- Over 70% of rural Indians do not have access to the Internet, a problem that is

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particularly worrisome given the increasing need for digital integration in the fields of education and banking in light of the pandemic.

- However, while companies like OneWeb and Starlink have marketed themselves to rural Indian consumers, given their price points (and expected price points in the case of OneWeb,) it is unlikely that most rural Indians will be able to afford their services.

Starlink satellites

- Elon Musk's Starlink project to provide broadband from space received authorization on 27 April 2021 to place its satellites lower than previously proposed. The US Federal Communications Commission (FCC) said the move will "serve the public interest," and gave SpaceX a green light despite protest from competitors such as Amazon.
- In 2018, SpaceX received FCC approval to launch 4,425 broadband satellites at orbits of 1,110 km to 1,325 km.
- FCC order in 2019   to use a lower altitude for over 1,500 of those satellites. Today's FCC order granting SpaceX's additional license-change request lowers the altitude for 2,814 of the satellites, letting them orbit in the 540-570 km range.
- Today's FCC order will also let SpaceX use a lower elevation angle for antennas on user terminals and gateway Earth stations.
- SpaceX has deployed 362 Starlink satellites, including two prototypes, into 550-kilometer orbits. Its next 60 satellites launched aboard a Falcon 9 rocket 22 April 2021 from Cape Canaveral, Florida. SpaceX, on 26 May 2021, executed its second launch of Falcon 9 first stage booster with 60 Starlink satellites to orbit.

CREW MISSION

SpaceX-NASA Crew-1 mission

- As part of NASA's first commercial human spacecraft system in history, a crew of four astronauts is now en route to the International Space Station (ISS) on a 27-hour flight, onboard SpaceX's Crew Dragon spacecraft called Resilience.
- The mission was launched on 21 November 2020.
- Crew-1 is the first operational flight of the SpaceX Crew Dragon spacecraft on a Falcon 9 rocket to the ISS and is also the first of the three such flights scheduled over the course of 2020-21.
- It is the first of six crewed missions that NASA and SpaceX will operate as part of the Commercial Crew Program, whose objective is to make access to space easier in terms of its cost, so that cargo and crew can be easily transported to and from the ISS, enabling greater scientific research.
- Boeing and SpaceX were selected by NASA in September 2014 to develop transportation systems meant to transfer crew from the US to the ISS.
- While the Crew Dragon spacecraft is capable of staying in orbit for a period of 210 days, it will return in spring 2021, making it the longest human space mission launched from the US.
- At the ISS, the Crew-1 team will join members of Expedition 64 and conduct microgravity studies.
- Some of the research that the crew is carrying with themselves includes materials to investigate food physiology, which will study the effects of dietary improvements on immune function and the gut microbiome and how those improvements can help crews adapt to spaceflight.
- Another experiment aboard the Crew Dragon is a student-designed experiment titled, "Genes in Space-7" that aims to understand how spaceflight affects brain function.
- Other experiments include research that will enable scientists to understand the physical interactions on liquid, rocks and microorganisms, another experiment on the role of microgravity on human health and how microgravity affects heart tissue.
- NASA used to have a fleet of five spaceships under its Space Shuttle programme, that were used to make a total of 135 of journeys into space, and the International Space Station (ISS), in the 30 years between 1981 and 2011.

- Two of these were destroyed in accidents, the Challenger in 1986 and Columbia in 2003, each resulting in the death of seven astronauts.
- After the 2003 accident, in which India-born astronaut Kalpana Chawla was among those killed, the US government had decided to close the Space Shuttle programme.
- The three remaining spaceships, Discovery, Atlantis, and Endeavour, were formally retired in July 2011, even though they were fit for many more flights.

The significance of the Crew-2 mission

- Four astronauts were launched to the International Space Station (ISS) from Florida as part of collaboration between NASA and SpaceX under the Commercial Crew Program (23 April 2021). Now, Crew-2 astronauts will join the members of Expedition 65
- The mission is called Crew-2 and is the second crew rotation of the SpaceX Crew Dragon and the first with international partners.
- Out of the four astronauts, two are from NASA and two are from the Japan Aerospace Exploration Agency (JAXA) and the European Space Agency (ESA).
- The main objective of this program is to make access to space easier in terms of its cost, so that cargo and crew can be easily transported to and from the ISS, enabling greater scientific research.
- Some of the research that the crew carried with them included materials to investigate food physiology meant to study the effects of dietary improvements on immune function and the gut microbiome and how those improvements can help crews adapt to spaceflight.

Sentinel-6 satellite

- The Copernicus Sentinel-6 Michael Freilich satellite, designed to monitor oceans, was launched from the Vandenberg Air Force base in California aboard a SpaceX Falcon 9 rocket on 21 November 2020.
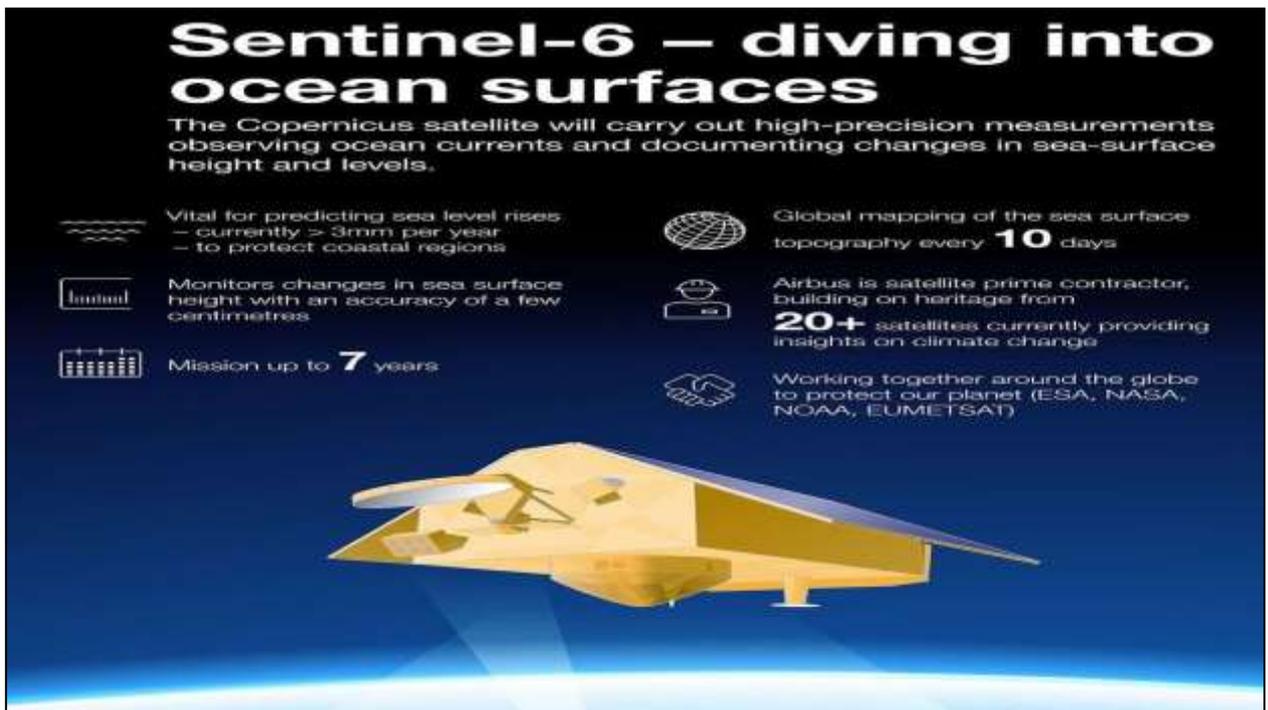
- This is a part of the next mission dedicated to measuring changes in the global sea level.
- Other satellites that have been launched since 1992 to track changes in the oceans on a global scale include the TOPEX/Poseidon, Jason-1 and OSTN/Jason-2, among others.
- The Sentinel-6 Michael Freilich satellite has been named after Dr. Michael Freilich, who was the Director of NASA's Earth Science Division from 2006-2019 and passed away in August this year.
- The mission, called the Jason Continuity of Service (Jason-CS) mission, is designed to measure the height of the ocean, which is a key component in understanding how the Earth's climate is changing.

- The spacecraft consists of two satellites, one of them launched on 21 November 2020, and the other, called Sentinel-6B, to be launched in 2025.
- It has been developed jointly by the European Space Agency (ESA), NASA, European Organisation for the Exploitation of Meteorological Satellites (Eumetsa), the USA's National Oceanic and Atmospheric Administration (NOAA) and the EU, with contributions from France's National Centre for Space Studies (CNES).
- Since 1992, high-precision satellite altimeters have helped scientists understand how the ocean stores and distributes heat, water and carbon in the climatesystem.

US spacecraft named after Kalpana Chawla

- An American commercial cargo spacecraft bound for the International Space Station has been named after fallen NASA astronaut Kalpana Chawla (S S Kalpana Chawla capsule), the first India-born woman to enter space, for her key contributions to human spaceflight.
- Northrop Grumman, an American global aerospace and defence technology company, announced that its next Cygnus capsule will be named the "S.S. Kalpana Chawla", in memory of the mission specialist who died with her six crewmates aboard the space shuttle Columbia in 2003.
- Chawla was selected in honour of her prominent place in history as the first woman of Indian descent to go to space.
- The S S Kalpana Chawla capsule is scheduled to launch on the NG-14 mission atop a Northrop Grumman Antares rocket from the Mid-Atlantic Regional Spaceport (MARS) at NASA's Wallops Flight Facility in Virginia on 29 September 2020.

SPACEX BREAKS INDIA SPACE RECORD

- SpaceX on 24 January 2021 night broke a world space record by launching 143 satellites in quick succession, beating India's record of deploying 104 satellites in February 2017.
- The launch vehicle for the SpaceX record-breaking flight was the Falcon 9 and the mission was designated as Transporter-1.
- The lift-off at Cape Canaveral in Florida, at one point, the rocket flew over India and its signal was picked up by Isro's Telemetry, Tracking and Command Network at Bengaluru.

SpaceX selected for SPHEREx mission

- NASA has selected tech billionaire Elon Musk's private aerospace company SpaceX to provide launch services for an astrophysics mission to survey the sky in the near-infrared light.
- The planned two-year mission is called SPHEREx, short for Spectro-Photometer for the History of the Universe, Epoch of Reionization, and Ices Explorer.
- The near-infrared light, which, though not visible to the human eye, serves as a powerful tool for answering cosmic questions involving the birth of the universe, and the subsequent development of galaxies.
- SPHEREx will also search for water and organic molecules -- essentials for life as we know it -- in regions where stars are born from gas and dust, known as stellar nurseries, as well as disks around stars where new planets could be forming.
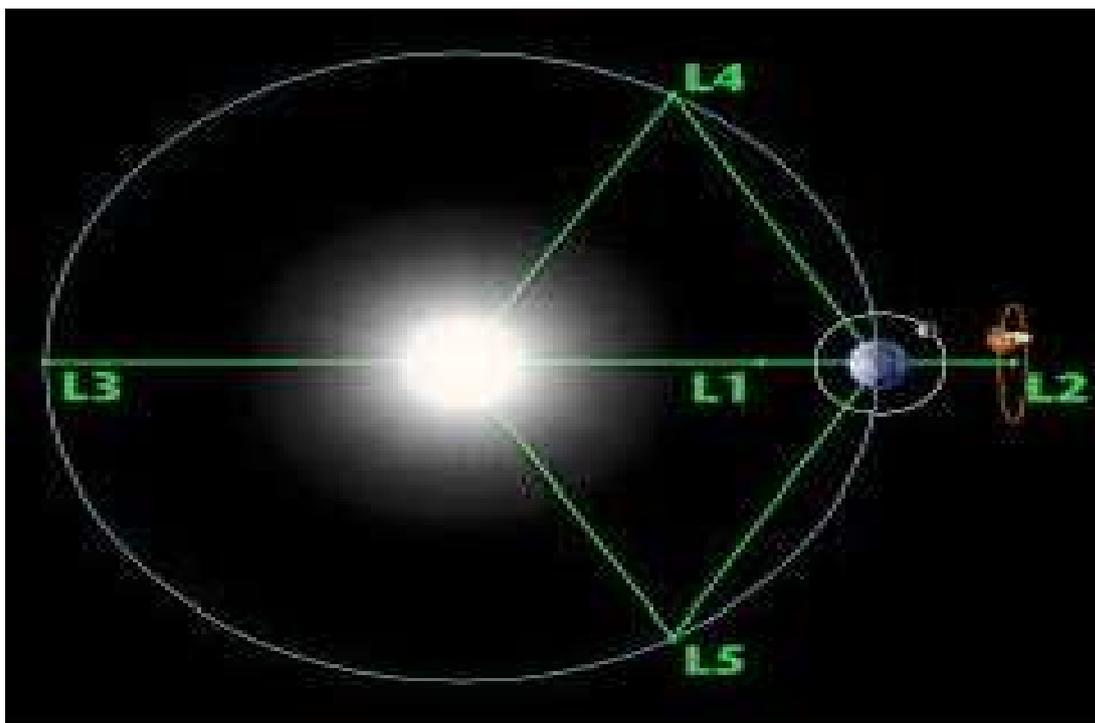
SUN

Aditya - L1 First Indian mission to study the Sun

- The Aditya-1 mission was conceived as a 400kg class satellite carrying one payload, the Visible Emission Line Coronagraph (VELC) and was planned to launch in a 800 km low earth orbit.
- A Satellite placed in the halo orbit around the Lagrangian point 1 (L1) of the Sun-Earth system has the major advantage of continuously viewing the Sun without any occultation/ eclipses.
- Therefore, the Aditya-1 mission has now been revised to "Aditya-L1 mission" and will be inserted in a halo orbit around the L1, which is 1.5 million km from the Earth.
- The satellite carries additional six payloads with enhanced science scope and objectives.

Algorithm for Aditya L1 developed

- A group of researchers, led by the Aryabhatta Research Institute of Observational Sciences (ARIES), has developed a novel algorithm to track the very fast accelerating Coronal Mass Ejections (CMEs) emerging from the interiors of the Sun.
- Due to limited technology — both in terms of satellite and ground-based observatories along with computational capabilities, acquiring observations of CMEs originating from within the Sun's interiors have been a hurdle for the scientific community.
- Space environment around Earth is governed by the Sun. Weather and climate on Earth are influenced by even a minor variation in this environment.
- CMEs, along with solar flares, solar energetic particles, high-speed solar winds, together pose serious threat to most of Earth's space-based services including Global Positioning System (GPS), radio and satellite-based telecommunication and can lead to power grid failure.
- This algorithm, named CME Identification in Inner Solar Corona (CIISCO), could even set a foundation in planning research of the lesser- known lower corona region of the Sun using Aditya L1, India's maiden mission to the Sun.
- This Indian Space Research Organisation (ISRO)-led mission is scheduled for a launch in 2022.

Telescope

What is Square Kilometre Array

- On 4 February 2021, the Square Kilometre Array Observatory (SKAO) Council held its maiden meeting and approved the establishment of the world's largest radio telescope.

- SKAO is a new intergovernmental organisation dedicated to radio astronomy and is headquartered in the UK. At the moment, organisations from ten countries are a part of the SKAO.
- These include Australia, Canada, China, India, Italy, New Zealand, South Africa, Sweden, the Netherlands and the UK.
- Unlike optical telescopes, radio telescopes can detect invisible gas and, therefore, they can reveal areas of space that may be obscured by cosmic dust.
- Significantly, since the first radio signals were detected by physicist Karl Jansky in the 1930s, astronomers have used radio telescopes to detect radio waves emitted by different objects in the universe and explore it.

So what is significant about the SKA telescope?

- The telescope, proposed to be the largest radio telescope in the world, will be located in Africa and Australia whose operation, maintenance and construction will be overseen by SKAO.
- The completion is expected to take nearly a decade at a cost of over £1.8 billion.

HST captures Einstein Ring

- The National Aeronautics and Space Administration (NASA) and European Space Agency (ESA) operated Hubble Space Telescope (HST) has captured the GAL-CLUS- 022058s in a stunning image. The narrow galaxy is curved around a spherical companion, depicting a highly rare phenomenon.
- The GAL-CLUS-022058s is located in Fornax or the Furnace's southern hemisphere constellation.
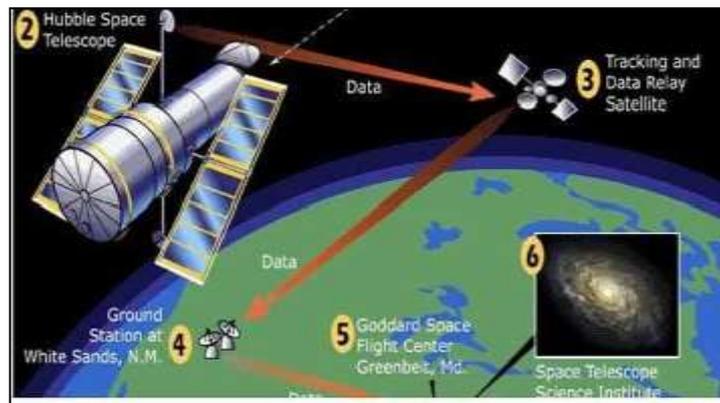
- The space agency has called this one of the most complete as well as the largest Einstein Ring that has ever been discovered by us in the vast universe.
- Astronomers who have been observing this particular Einstein Ring have started calling it the "Molten Ring", alluding to both its appearance as well as the host constellation.
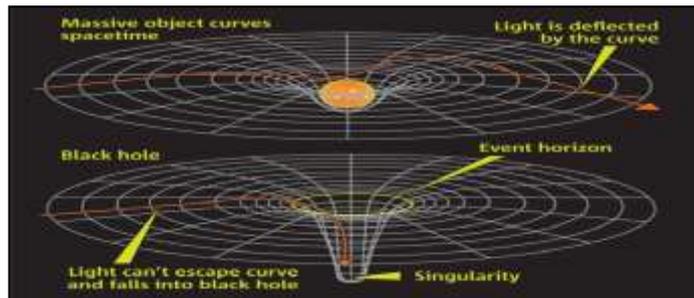
- The phenomenon was first theorised by great scientist Albert Einstein in his general theory of relativity.
- The object has an unusual shape due to the gravitational lensing, a process that causes light coming from a faraway place to bend due to an object's gravity between the source of the light and the observer.
- In this particular case, the agency said, the light was originating from the galaxy in the background and it was distorted and made into a curve due to the gravitational pull of the galaxy cluster in front of it.

Blackhole

- In Einstein's theory of relativity, Einstein postulated that space and time, together known as space time, were in fact warped by massive objects.
- The more massive the object, the larger the impact in has on space time. The curves created by objects form a sense of gravity and replace the gravitational force that classical physics preached.
- In contrast to a force pulling all objects with mass together, objects are instead caught

following the straight path in warped area, known as the geodetic effect, of a massive object.

- By bending space-time, massive objects can also "bend" electromagnetic waves that travel on these curved surfaces. By creating his theory of general relativity, Einstein set the stage for black holes to make a reemergence in the world of physics.
- While Einstein's general relativity allowed black holes to exist, Einstein was not responsible for the modern idea of black holes; Karl Schwarzschild was.

A missing supermassive black hole

- A black hole is a place in space where gravity pulls so much that even light can not get out. The gravity is so strong because matter has been squeezed into a tiny space. This can happen when a star is dying.
- A supermassive black hole, which is estimated to weigh up to 100 billion times the mass of the Sun, is seemingly missing, leaving astronomers perplexed.
- Scientists have been looking for the black hole using NASA's Chandra X- ray Observatory and Hubble Space Telescope, and have so far found no evidence that it is anywhere to be found.
- Not unexpectedly, many social media users have expressed confusion about the black hole's whereabouts, which is supposed to be at the centre of a far-off galaxy.

The 'missing' black hole

- The black hole is supposed to be located in Abell 2261, an enormous galaxy cluster that is about 2.7 billion light-years away from our planet.
- One light-year is the distance that a beam of light travels in one Earth year, which is 9 trillion km.
- On the scale of the Universe, astronomers measure the distance from stars and galaxies in the time it takes for light to reach us.
- So, when we look at a celestial object, we are looking at how it appeared that long ago in the past.
- At 2.7 billion light-years away, the Abell galaxy is at an overwhelmingly large distance away from us.

So, what could have happened?

- Every large galaxy in the universe has a supermassive black hole at its centre, whose mass is millions or billions of times that of the Sun, according to NASA.
- The black hole at the centre of our galaxy– the Milky Way– is called Sagittarius A*, and is 26,000 light-years away from Earth.

'Recoiling' black holes

- When two black holes merge, they release what are known as gravitational waves– invisible ripples travelling at the speed of light, which squeeze and stretch anything in their path.
- As per the theory of gravitational waves, during such a merger, when the amount of waves generated in one direction is stronger than another, the new big black hole can be sent away from the centre of the galaxy into the opposite direction. This is known as a "recoiling" black hole.
- Einstein predicted that something special happens when two bodies—such as planets or stars—orbit each other.
- He believed that this kind of movement could cause ripples in space. These ripples would spread out like the ripples in a pond when a stone is tossed in. Scientists call these ripples of space gravitational waves.
- Gravitational waves are invisible. However, they are incredibly fast. They travel at the speed of light (186,000 miles per second). Gravitational waves squeeze and stretch anything in their path as they pass by.

What causes gravitational waves?

The most powerful gravitational waves are created when objects move at very high speeds. Some examples of events that could cause a gravitational wave are:

1. when a star explodes asymmetrically (called a supernova)
2. when two big stars orbit each other

3. when two black holes orbit each other and merge

India's LIGO gravitational-wave observatory gets green light

- The observatory is scheduled for completion in 2024, will be built in the Hingoli District of Maharashtra state in western India.

- An Indian team of scientists has been collaborating formally on the Laser Interferometer Gravitational-Wave Observatory (LIGO) project with US scientists since 2016.

- In 2015, LIGO's US detectors made the first discovery of gravitational waves — energy produced and radiated by the collision of two black holes — thereby confirming Albert Einstein's prediction and launching a new way of studying the Universe.

- The Indian gravitational-wave detector would be only the sixth such observatory in the world and will be similar to the two US detectors in Hanford, Washington, and Livingston, Louisiana.

- India's Department of Atomic Energy and its Department of Science and Technology signed a memorandum of understanding with the US National Science Foundation for the LIGO project in March 2016.

- LISA Pathfinder is a necessary precursor mission for LISA, the joint ESA and NASA formation-flying mission (launch planned for 2034) of three spacecraft.

- eLISA was born out the original joint NASA/ESA LISA mission, after NASA pulled out of the project. On April 8, 2011, NASA announced that it would be unable to continue its LISA partnership with the European Space Agency due to funding limitations.

- eLISA will be the first observatory in space to explore the Gravitational Universe. It will gather revolutionary information about the dark universe.

- The eLISA Consortium is convinced that a spaceborne low-frequency gravitational wave observatory to be launched in 2034 is the ideal tool to make progress in our understanding of the Universe.

- In the aftermath, ESA started studying a variant of the original LISA concept, called eLISA in ESA's "Cosmic Vision Program 2015-2025".

LISA Pathfinder Mission

- LISA Pathfinder has been introduced to mitigate the risks of the LISA mission. The main goal of the LISA Pathfinder mission is to demonstrate the concept of the gravitational wave detection using a single spacecraft: it will put two test masses in a near-perfect gravitational free-fall and control and measure their motion with unprecedented accuracy.

- This is achieved through state-of-the-art technology comprising the inertial sensor system, the laser metrology system, the drag-free control system and an ultra-precise micro-propulsion system.

Evolved Laser Interferometer Space Antenna (eLISA)

- eLISA is a spectacular plan of setting into space three spacecraft, a mother and two daughter spacecraft, which will fly in a triangular formation, trailing the earth in its orbit around the sun at a distance of over 50 million km.

- Each arm of the imaginary triangle, from the mother to each daughter spacecraft, will measure about a million km.

- Inside these spacecraft will float "freely falling" test masses – cubes with sides measuring about 46 mm.

- Laser interferometers will accurately measure changes in the distance between these cubes. If they should be affected by a gravitational wave, the minute changes in this distance are measure by the interferometer.
- eLISA aims to measure gravitational waves in the frequency range from 0.1mHz to about 100 mHz. To do this, it is necessary for the interferometers to have an arm length of a million kilometres and that is impossible to achieve with an earth based setup.
- A neutron star is the collapsed core of a massive supergiant star, which had atotal mass of between 10 and 25 solar masses, possibly more if the star was especially metal-rich.

COAL

India proposes to adopt rolling coal auctions

- India proposes to adopt a 'rolling auction' mechanism for conducting coal auctions, under which a pool of coal blocks will always remain available for auctions, coal minister Pralhad Joshi said on 25 March 2021.
- With rolling auctions, we will upload a comprehensive list of mines along with key technical data and bidders can submit their preferences for the mines to be includedin the next tranche of auction. This would be a continuous process and would resultinexpediting the auction setup.
- It will also help bidders in planning better and would further enhance transparency in the system.
- Coal is the first mineral resource where rolling auction mechanism is being implemented.
- The country launched on 25 March 2021 second tranche of auction for commercial coal mining offering 67 mines for sale of coal.

19th Electric Power Survey

- Even as the country pushes for its expansion of the renewable energy projects, coal is set to remain as the predominant fuel in India's energy mix in foreseeable future.
- As per the 19th Electric Power Survey, out of the all India power generation installed capacity of 6, 19,066 MW by the end of 2026-27, coal based projects would have a high 40 per cent share at around 2,38,150 MW.

- As per the recent study carried by Central Electricity Authority on Optimal Generation Capacity mix for 2029-30, the likely All Indiainstalled capacity in 2029-30 is estimated to be 8,17,254 MW which includes 2,66,911 MW Coal, 25,080 MW Gas, 71,128 MW Hydro, 18,980MW Nuclear and 4,35,155 MW Renewable Energy Sources.
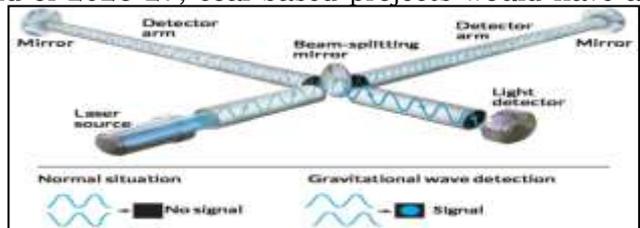
DEADLINE TO ADOPT NEW EMISSION NORMS

- India has pushed back deadlines for coal-fired power plants to adopt newemission norms by up to three years, and allowed utilities that miss thenew target to continue operating after paying a penalty, according to a government notice.

- India had initially set a 2017 deadline for thermal power plants to installFlue Gas Desulphurization (FGD) units that cut emissions of sculpturedioxides. But that was postponed to varying deadlines for different regions,ending in 2022.
- The new order dated 1 April 2021 from the environment ministry saysplants near populous regions and the capital New Delhi will have tocomply by 2022, while utilities in less polluting areas have up to 2025 tocomply or retire units.

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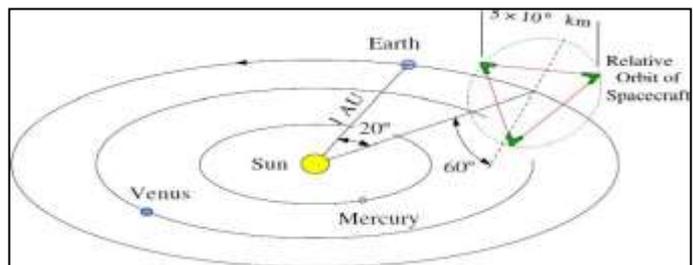
Flue Gas Desulphurisation (FGD)

- With the MoEFCC order (In December 2015), it has becomecompulsory to install Flue Gas Desulphurisation (FGD) system inthe existing and upcoming thermal power plants to curb Soxemissions.
- FGD is a system which reduces the Sox (NoX and PM) in flue gasthrough chemical treatment and
- Converting the captured SOx into a by-product such as Gypsum orCalciumSulphateorSulphuric Acid depending upon the type ofmechanism used.
- The deadline was extended to December 2022 by the SupremeCourt.

NATURAL GAS

Indian Gas Exchange (IGX)

- India's first gas exchange —the Indian Gas Exchange (IGX) — was launched on 15
- June 2020.
- The exchange is to facilitate the growth of the share of natural gas in India'senergy basket.
- The IGX is a digital trading platform that will allow buyers and sellers of naturalgas to trade both in the spot market and in the forward market for importednatural gas across three hubs —Dahej and Hazira in Gujarat, and Kakinada inAndhra Pradesh.
- Imported Liquified Natural Gas (LNG) will be regassifiedand sold to buyersthrough the exchange, removing the requirement for buyers and sellers to findeach other.
- The price of domestically produced natural gas is decided by the government. Itwillnot be sold on the gas exchange.
- The Indian Energy Exchange on 3 December 2020 said its arm, Indian GasExchange (IGX), has secured authorization from the Petroleum and Natural GasRegulatory Board (PNGRB) to operate as a Gas Exchange for the period of 25 years.
- With this development, IGX has become the first regulated gas exchange in thecountry. The IGX is incorporated as a wholly owned subsidiary of the IEX.
- India is eying to increase the share of gas in its overall energy mix from 6 per centto 15 per cent by 2030.
- INDIAN ENERGY EXCHANGE LIMITED (IEX) is the first and largest energyexchangein India providing a nationwide, automated trading platform for physicaldelivery of electricity, Renewable Energy Certificates and Energy SavingCertificates.
- IEX is approved and regulated by Central Electricity Regulatory Commission(CERC) and has been operating since 27 June 2008.

Kochi-Mangaluru Natural Gas Pipeline

- In 5 January 2021, Prime Minister dedicated to the nation the Kochi-Mangalurunatural gas pipeline (444 Km) of the Gail Authority of India Limited (GAIL).
- The key infrastructure project has come about after overcoming protests in Kerala,misconceptions about safety, and a long delay.
- The pipeline will deliver liquefied natural gas (LNG) sourced from a terminal inKochi built by Petronet LNG in 2013 at a cost of Rs 4,500. However, for want ofpipeline connectivity, it could not be utilised until now.
- The terminal's objective is to supply natural gas for domestic and industrial use inKerala and South India.
- It is South India's first LNG-receiving, regasification and re-loading terminal witha capacity of five million metric tonnes per annum.

Petronet LNG Ltd

- Petronet LNG Ltd is an Indian oil and gas company formed by the governmentof India (2 April 1998) to import liquefied natural gas (LNG) and set up LNGterminals in the country.
- It is a joint venture company promoted by the Gas Authority of IndiaLimited (GAIL), Oil and Natural Gas Corporation Limited (ONGC), Indian OilCorporation Limited

(IOC) and Bharat Petroleum Corporation Limited (BPCL).

- Petronet LNG Limited, one of the companies in the Indian energy sector, has set upthecountry's first LNG receiving and regasification terminal in Dahej, Gujarat,and another terminal in Kochi, Kerala.

Ramanathapuram–Thoothukudi Natural Gas Pipeline

- Prime Minister on 17 February 2021 dedicated the Ramanathapuram–Thoothukudinatural gas pipeline and Gasoline desulfurisationunitin Tamil Nadu.
- The project has been set up by Chennai Petroleum Corporation Ltd (CPCL), asubsidiary of Indian Oil Corporation.
- The Ramanathapuram-Thoothukudi section (143 km) of the Ennore-Thiruvallur-Bengaluru-Puducherry-Nagapattinam-Madurai-Tuticorin Natural Gas pipeline(ETBPNMTPL) has been laid at the cost of about Rs 700 crore.
- The pipeline will use the gas from ONGC fields and deliver indigenous natural gasas feedstock to Southern Petrochemical Industries Corp Ltd (SPIC) at Tuticorin andother industrial/commercial customers and CGD GAs.
- The Gasoline desulfurisation unit at CPCL, Manali, has been constructed at a cost ofabout Rs 500 crore, generating 18,000 man-days of employment.

KGD6 means for India

- Reliance Industries Ltd and BP (British Petroleum) have announced the start ofgas production from the R cluster, the deepest off-shore gas field in Asia.
- The field is the first of three deepwater gas projects in the KGD6 block jointlydeveloped by RIL and BP to come on stream.
- RIL has a participating interest of 66.7% in the KG-D6 block and BP has aparticipating interest of 33.3% in the block.
- The three projects are a key part of the plan to boost domestic production ofnatural gas to increase the share of natural gas in India's energy basket from 6.2%now to 15% by 2030.

MoU for using biodigester technology

- The Maharashtra Metro Rail Corporation Ltd (Maha-Metro) on 5 January 2021 signed an agreement with the Defence Research and Development Establishment (DRDE) of the DRDO for adopting the Biodigester Technology for treating human waste and recyclingwater consumed in Pune metro rail.
- It has been adopted by the Indian Railways leading to zero toilet discharge on tracks. A biodigester system utilizes organic waste, particularly animal and human excreta, to produce fertilizer and biogas.
- A biodigester consists of an airtight, high-density polyethylene container within which excreta diluted in water flow continuously and are fermented by microorganisms present in the waste.
- The fermentation process is anaerobic, i.e., it takes place without oxygen, and the bacteria responsible for decomposition are methanogenic(i.e., they produce methane, also known as biogas).
- The processed manure is an organic, pathogen-free fertilizer that is rich in nitrogen, phosphorus and potassium. The products are primarily for self-consumption on farms.

CRUDE OIL

What is net-zero?

- In its bid to reclaim the global climate leadership (22-23 April 2021), the US is widely expected to commit itself to a net-zero emission target for 2050 at the summit.
- Several other countries, including the UK and France, have already enacted laws promising to achieve a net-zero emission scenarios by the middle of the century. Even China has promised to go net-zero by 2060.
- India, the world's third biggest emitter of greenhouse gases, after the US and China, is the only major player holding out.
- Net-zero, which is also referred to as carbon-neutrality, does not mean that a country would bring down its emissions to zero.

- Rather, net-zero is a state in which a country's emissions are compensated by absorption andremoval of greenhouse gases from the atmosphere.
- Absorption of the emissions can be increased by creating more carbon sinks such as forests, while removal of gases from the atmosphere requires futuristic technologies such as carbon capture and storage.
- This way, it is even possible for a country to have negative emissions, if the absorption and removal exceed the actual emissions.
- A good example is Bhutan which is often described as carbon-negative because it absorbs more than it emits.
- It is being argued that global carbon neutrality by 2050 is the only way to achieve the Paris Agreement target of keeping the planet's temperaturefrom rising beyond 2°C compared to pre-industrial times.

India's objections

- India is the only one opposing this target because it is likely to be the most impacted by it.
- India's position is unique. Over the next two to three decades, India's emissions are likely to grow at the fastest pace in the world, as it presses for higher growth to pullhundreds of millions of people out of poverty.
- No amount of afforestation or reforestation would be able to compensate for the increased emissions. Most of the carbon removal technologies right now are eitherunreliable or very expensive.
- Several studies have shown that India is the only G-20 country whose climate actions are compliant to the Paris Agreement goal of keeping global temperaturesfrom rising beyond 2°C.
- At the same time, it has been saying that it does not rule out the possibility of achieving carbon-neutrality by 2050 or 2060. Just that, it does not want to make an international commitment so much in advance.

World's first 'carbon-neutral' oil

- Billionaire MukeshAmbani's Reliance Industries Ltd has sourced the world's first consignment of 'carbon-neutral oil' from the US as it looks to become a net zerocarboncompany by 2035.
- Reliance, which operates the world's largest single location oil refining complex at Jamnagar in Gujarat with capacity of 68.2 million tonnes a year, got 2 million barrels of consignment Permian basin, the US supplier said.
- Oxy Low Carbon Ventures (OLCV), a division of US oil Major Occidental, delivered carbon-neutral oil to Reliance.
- Oxy Low Carbon Ventures and Macquarie will offset carbon dioxide equivalent to that associated with the production, delivery and refining of the crude oil and the use of the resulting product through the retirement of carbon offset credits.
- This will make the oil 'carbon-neutral'.
- The Very Large Crude Carrier (VLCC) Sea Pearl containing the carbon-neutral oil unloaded the cargo at Jamnagar on 28 January 2021.
- This transaction is a first step in the creation of a new market for climate-differentiated crude oil.
- The offsets were sourced from a variety of projects verified under the Verra Verified Carbon Standard meeting eligibility criteria for the UN's International CivilAviation Organization's Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA).
- The first US-based international energy company to announce an ambition to achieve net-zero GHG emissions associated with the use of its products by 2050, has been using carbon-dioxide in its enhanced oil recovery operations in the Permian for over 40 years.

NUCLEAR ENERGY

The significance of Kakrapar-3

- The third unit of the Kakrapar Atomic Power Project (KAPP-3) in Gujarat achieved its

'first criticality' — a term that signifies the initiation of a controlled butsustained nuclear fission reaction.

- KAPP-3 is the country's first 700 MWe (megawatt electric) unit, and the biggest indigenously developed variant of the Pressurised Heavy Water Reactor (PHWR).
- The PHWRs, which use natural uranium as fuel and heavy water as moderator, are the mainstay of India's nuclear reactor fleet.
- Until now, the biggest reactor size of indigenous design was the 540 MWe PHWR, two of which have been deployed in Tarapur, Maharashtra.
- State-owned Nuclear Power Corporation of India Ltd (NPCIL) had awarded the reactor-building contract for both KAPP-3 and 4 to Larsen & Toubro at an original contract value of Rs 844 crore.

Evolution of India's PHWR technology

- PHWR technology started in India in the late 1960s with the construction of the first 220 MWe reactor, Rajasthan Atomic Power Station, RAPS-1 with a design similar to that of the Douglas Point reactor in Canada, under the joint Indo-Canadian nuclear co-operation.
- For the second unit (RAPS-2), import content was reduced considerably, and indigenisation was undertaken for major equipment. Following the withdrawal of Canadian support in 1974 after Pokhran-1

Artificial Sun

- China successfully powered up its "artificial sun" nuclear fusion reactor for the first time on 4 December 2020, marking a great advance in the country's nuclear power research capabilities.
- The HL-2M Tokamak reactor is China's largest and most advanced nuclear fusion experimental research device, and scientists hope that the device can potentiallyunlock a powerful clean energy source.
- It uses a powerful magnetic field to fuse hot plasma and can reach temperatures of over 150 million degrees Celsius -- approximately ten times hotter than the core of the sun.

KSTAR's 'artificial sun' breaks world record

- Reaching an ion temperature of over 100 million degrees Celsius for 20 seconds, South Korea's magnetic fusion device, the Korea Superconducting TokamakAdvanced Research (KSTAR) has set a new world record for fusion.
- The magnitude of the experiment can be understood from the fact that the Sun burns at 15 million degrees Celsius. By comparison, the KSTAR was able to achieve a temperature of over 6.6 times more than that of Sun's.
- The KSTAR has often been referred to as South Korea's "artificial sun".
- It achieved the same temperature in 2018 too, but only for one and a half seconds.
- In 2019, it reached that temperature for eight seconds.
- This is also a great achievement because no one has been able to sustain plasma nearly as hot as this for a long period of time. The feat was achieved on 24 November 2020.

SOLAR ENERGY

- India has moved up two positions to rank 74th on a global 'Energy Transition Index' with improvements on all key parametersofeconomic growth, energy security and environmental sustainability, the World Economic Forum (WEF) said in May 2020.
- Electricity dominates the public discourse on the energy economy. However, it accounts for only 18% of India's total energy demand. The rest 82% comprisesother energy sources such as coal, oil and gas, and biomass.

- Unfortunately, our energy sector is heavily import-dependent (85% for crude oil, 53% for gas and 24% for coal). The volatility in the prices of these fuels has a huge impact on the import bill, to the tune of $160 billion. These numbers will double over the next decade as demand grows.
- India will overtake the European Union as the world's third-largest energy consumer by 2030, according to the International Energy Agency (IEA).
- In its recent forecast, India will account for the biggest share of energy demand growth over the next two decades.

About the International Solar Alliance (ISA)

- It is an Indian initiative, which was launched jointly by Prime Minister of India Mr.NarendraModi and H.E. François Hollande, President of France on 30 November 2015 in Paris, France on the side-lines of the 21st Conference of Parties (CoP 21) to the United Nations Framework Convention on Climate Change.

- The ISA Assembly is the main decision-making body of the alliance and it decides on various administrative, financial and program-related issues.
- When the ISA Framework Agreement entered into force on 6 December 2017, ISA formally became a de-jure treaty based International IntergovernmentalOrganization, headquartered at Gurugram, India.
- All members of the United Nations can join the International Solar Alliance (ISA) under the recently amended ISA Framework Agreement.
- As on 30 July 2020, 87 Countries have signed the Framework Agreement of the ISA and of these 67 have deposited their instruments of ratification. It has set a target of 1TW of solar energy by 2030.
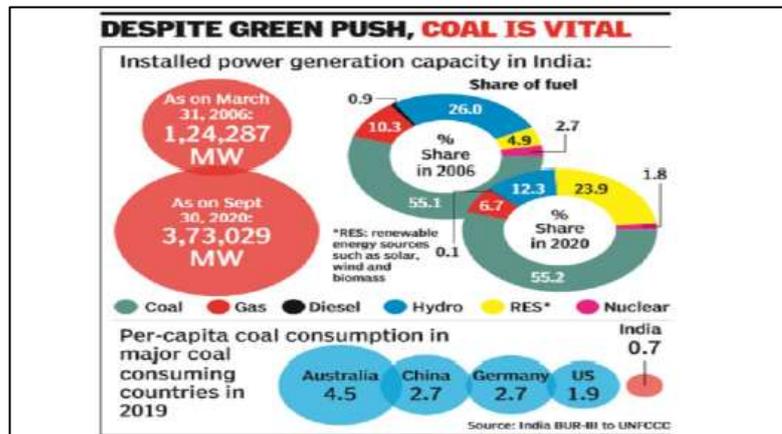
- AlsoISA is the first ever treaty based international governmentorganizationthat is headquartered in India. It is situated in Gurugram. Itwas till September 2020, that India had installed a solar capacity of 36 GW.India has 38 GW of installed wind energy.

First World Solar Technology Summit

- First World Solar Technology Summit (WSTS) was organized on 8thSeptember, 2020.
- The Federation of Indian Chambers of Commerce and Industry (FICCI), as the convenor of ISA Global Leadership Task Force on Innovation, worked with the International Solar Alliance (ISA) in organizing the summit.
- The conference saw ISA signing four agreements, signalling its intent to focus on key areas of the solar energy sector.

1. A partnership agreement between the Union Ministry of Renewable Energy, the World Bank and ISA on One World, One Sun, One Grid.

2. A partnership between the Global Green Growth Institute and ISA on the promotion of a million solar pumps.

3. A Memorandum of Understanding with the International Institute for Refrigeration, Paris and ISA.

4. Partnership agreements on the implementation of 47 projects between ISA and NTPC.

- ISA also launched its technology journal, Solar Compass 360.
- World Solar Bank - International Solar Alliance (ISA) aims to create a World Solar Bank with authorised capital of $15 billion to fund projects.
- India's installed solar power generation capacity stood at over 36 GW by September 2020 this year.

World Solar Bank

- The International Solar Alliance (ISA) would be launching the World Solar Bank at COP 26, United Nations Climate Change Conference to be held in Glasgow inNovember 2021.
- The world solar bank is a proposed financial agency that would pool resources from around the world and use them to finance the solar power projects in the member countries of ISA.
- The proposed capital size of the World Solar Bank is expected to be around 10 billion dollars.
- There is a clause that the host country of the bank would need to finance 30% of the proposed capital.

ISA Journal on Solar Energy

- ISA would also launch a journal on Solar Energy (I JOSE) that would help authors from across the globe to publish their articles on solar energy.
- The articles in this journal would be reviewed by global experts and will reach the member countries through ISA's vast network of NFPs (NationalFocal points) and STAR (Solar Technology and Application Resource centres) centres.
- Besides, there is need for huge funding for solar projects across the world for increasing share of renewable sources in the overall energy mix.

India in 'Ease of Doing Solar 2020'

- India is now one of the world's top markets for solar energy, a new report by the International Solar Alliance (ISA) said on 24 February 2021.
- The report, 'Ease of Doing Solar 2020', identified countries that were high solar energy performers in 2020.
- The report is a continuation of the pilot study conducted for four member countries in 2019 which has now been expanded to cover 80 countries with a refined evaluation framework.

- Using data across its 80 member countries, ISA reveals the world's easiest markets to execute and invest in solar projects.
- Owing to its strong potential, ambitious sustainability targets, high solar irradiation, and robust power infrastructure, India has emerged as a leading performer along with countries like Brazil, Saudi Arabia, and the United Arab Emirates.
- The report lists countries like Rwanda, Sri Lanka, Nigeria, Argentina, Egypt and 24 others as having moderately favourable conditions for solar investments.

- Countries such as Bangladesh, Ethiopia, Zimbabwe, Mozambique and several others have been listed as progressive states that are in initial stages ofdevelopment of a favourable ecosystem.
- The report highlights the best practices in policy and regulation amongst member countries.
- The report provides a snapshot of the progress made by the member countries by using an evaluation framework consisting seven key indicators - macro economy, policy enablers, technical feasibility, market maturity, infrastructure, financingecosystem, and energy imperatives.
- India has set an ambitious target of 450 GW of renewable energy by 2030 with175 GW deployment by 2022. This is the world's largest expansion policyaccording to the report.

PROJECT HIGHLIGHTS

Vital to India's ambitious plan of being a major solar power exporter

The 750 MW solar project in the 1590 hectare area in Madhya Pradesh's Rewa district is Asia's largest solar power project.

Project comprises three solar generating 250 MW of power each.

Project is aimed at reducing carbon emission equivalent to 15.7 lakh tonnes of CO2 annually. It is equivalent to planting 2.60 crore trees.

Customers outside the state to get 24% energy, while 76% go to discoms in MP.

Apparently, the first solar project in the country to break the "grid parity barrier."

After its foundation stone was laid on December 2017, the project was completed in two and half years.

The World Bank loan to the project has been given at cheaper rates under the Clean Technology Fund without state government guarantee.

The project has a purchase rate of ₹2.97 paise per unit, which is the lowest till date.

Its payment security mechanism for reducing risks to power developers is recommended as a model to other states by the Centre.

The solar park is developed by Rewa Ultra Mega Solar Limited (RUMSL).

Central financial assistance of ₹138 crore was provided to RUMSL for developing the solar park

Once the park was developed, Mahindra Renewables Private Limited, ACME Jaipur Solar Power Private Limited and Arinsun Clean Energy Private Limited were selected by RUMSL through reverse auction.

One of the major consumers of this project is the Delhi Metro Rail Corporation (DMRC)

Asia's largest solar project in MP

- The 750- megawatt Rewa solar Power Plant in Madhya Pradesh was dedicated to the nation by Prime Minister NarendraModi on 10 July 2020.
- The solar plant was set up by the Rewa Ultra Mega Solar Limited, a joint venture between Madhya Pradesh UrjaVikas Nigam Limited and the Centre's Solar EnergyCorporation of India (SECI).
- The plant consists of three solar power generating units that are located on a 500- hectare plot of land inside a 1,500-hectare solar park.
- Mahindra Renewables Pvt, Arinsun Clean Energy Pvt, and ACME Jaipur Solar Power Pvtare the three companies that bagged the mandate to build the three generating units.
- It is the first renewable energy project to supply institutional customers outside the state, including Delhi Metro, which will get 24 per cent of energy from the project.

Achiever	Countries with most favourable technical and commercial conditions for solar and perceived as most attractive for investments in solar.
Influencer	Countries with moderately favourable technical and commercial conditions for solar and perceived as moderately attractive for investments in solar.
Progressive	Countries which are at initial stages in development of a favourable ecosystem in terms of commercial feasibility and investments for solar.
Potential	Countries with untapped potential and at a nascent stage for development of favourable ecosystem.

Achiever			
Brazil	India	Saudi Arabia	United Arab Emirates

Influencer				
Algeria	Costa Rica	Jamaica	Peru	Seychelles
Argentina	Dominican Republic	Maldives	Rwanda	Sri Lanka
Bolivia	Egypt	Mali	Saint Kitts and Nevis	Tanzania

- The project was also included in the PM's "A Book of Innovation: New Beginnings".
- It is also the first project to get funding from The World Bank and Clean Technology Fund in India.

World's largest solar tree

- CSIR-CMERI has developed the World's Largest Solar Tree, which is installed at CSIR-CMERI Residential Colony, Durgapur.
- The installed capacity of the Solar Tree is above 11.5 kWp. It has the annual capacity to generate 12,000-14,000 units of Clean and Green Power.
- There are a total of 35 Solar PV Panels in each tree with a capacity of 330 wp each.

- CMERI (Central Mechanical Engineering Research Institute) is India's apex research and development institute for mechanical engineering. The institute is governed by the Council of Scientific and Industrial Research (CSIR).
- The Ministry of New and Renewable Energy (MNRE) launched the Pradhan MantriKisanUrjaSurakshaevemUtthanMahabhiyan (PM KUSUM) Scheme to supportthe installation of off-grid solar pumps in rural areas and to reduce the dependency on the grid.

India's sprawling renewable energy park

- On 15 December 2020, Prime Minister NarendraModi lay the foundation stone for the 30,000 MW project in Gujarat's Kutch district, billed as the largest of its kind in the world.
- The renewable energy park will have two zones: one, a 49,600-hectare hybrid park zone that will accommodate wind and solar power plants of 24,800 MW capacities;and two, an exclusive wind park zone spread over 23,000 hectares.
- The project will be located between Khavda village and Vighakot. The project site is about 25 km from Khavda, which is the last point that can be accessed by civiliansin the area.
- This site has been chosen because this is a complete wasteland and windmills put near the border also act as a boundary.
- For the hybrid park zone, land has been allotted to Adani Green Energy Ltd (19,000 ha), Sarjan Realities Ltd (Suzlon, 9,500 ha), NTPC Ltd (9,500 ha), Gujarat IndustriesPower Company Ltd (4,750 ha) and Gujarat State Electricity Corporation (6,650 ha).
- The entire 23,000 ha at the exclusive wind zone park has been allotted to Solar Energy Corporation of India (SECI) to set up wind projects under the competitivebidding route policy.
- PowerGrid Corporation of India will evacuate the power produced at this park.
- RENEWABLE ENERGY HAS A SHARE OF 39% IN THE TOTAL INSTALLED GENERATION CAPACITY IN THE COUNTRY i.e. 368.98 GW (Upto 29th February, 2020).
- India now at 5TH GLOBAL POSITION for overall installed renewable energy capacity.
- RENEWABLE ENERGY INSTALLED CAPACITY INCREASED 226% IN LAST 5 YEARS.

World's largest floating solar project

- The world's largest floating 600 MW solar energy project to be constructed at Omkareshwar dam on Narmada riverinKhandwa districtof Madhya Pradesh will begin power generation by year 2022-23.
- The International Finance Corporation, World Bank and Power Grid have granted in-principle consent for providing aid for the said project development.
- The primary feasibility study of the project has been completed in collaboration with the World Bank.
- The project is likely to begin power generation by year 2022-23.

Facebook signs first deal for renewable energy

- Facebook has signed a deal to buy renewable energy in India from a local firm'swind power project, the social media giant's first such deal in the South Asian nation, the companies said on 15 April 2021.
- The 32 megawatt wind power project, located in Karnataka, is part of a larger portfolio of wind and solar projects that Facebook and Mumbai-based CleanMaxare working together on for supplying renewable power into India's electrical grid, they said in a joint statement.
- CleanMaxwillown and operate the projects, while Facebook will buy the power off the grid using environmental attribute certificates, or carbon credits.
- Facebook typically doesn't own the power plants but instead signs "long-term" electricity purchasing agreements with the renewable power company.
- That enables the project to seek out the financing that it would need. India is Facebook's biggest market by users.

Artificial energy island project

- The Danish government on 4 February 2021 approved a plan to build an artificial island

in the North Sea as part of its effort to switch to green energy.

- The project is being called the largest construction project to be undertaken in Denmark's history with an estimated cost of DKK 210 billion.
- An energy island is based on a platform that serves as a hub for electricity generation from surrounding offshore wind farms.
- Denmark wants to become the first country in the world to begin working on such energy islands with a total capacity of about 5 GW offshore winds.
- The construction of both islands is expected to be complete by 2030.

HYDROGEN FUEL

Hydrogen fuel cell vehicles

- The Ministry of Road Transport and Highways has notified the Standards for Safety Evaluation of vehicles being propelled by Hydrogen Fuel cells through anamendment to Central Motor Vehicles Rules 1989 ...dated 23rd September, 2020.
- This would facilitate the promotion of hydrogen fuel cell-based vehicles in the country, which are energy-efficient and environmentally friendly.

Hydrogen Enriched CNG (HCNG)

HCNG is a mixture of compressed natural gas (CNG) and some percentage of Hydrogen for heat or energy generation. HCNG which may be used as a fuel of Internal Combustion Engine (ICE) is considered a cleaner source of fuel, more powerful and offers more mileage then even CNG.

Some advantages of HCNG:
- HCNG reduces emissions of CO up to 70%.
- Enables up to 5 % savings in fuel.
- Better performance due to higher Octane number.

In 2018, Delhi Government has tied up with Indian Oil Corporation Limited (IOCL) to study the technology and infrastructure needs to induct 50 HCNG buses on a trial basis. IOCL has plans to mix (18-20) % Hydrogen in these buses. Current cost of H2 is more than the cost of Natural Gas. So, HCNG's costly than CNG.

Reduce carbon emission but it has also led to increased NOx emissions.

Hydrogen is the most abundant element in the universe.

Hydrogen exists only combined with other elements

Hydrogen is being seen as a direct replacement of fossil fuels

- At the heart of the fuel cell electric vehicles (FCEV) is a device that uses a source of fuel, such as hydrogen, and an oxidant to create electricity by an electrochemical process.
- Put simply, the fuel cell combines hydrogen and oxygen to generate electric current, water being the only byproduct.
- While the fuel cells generate electricity through an electrochemical process, unlike a battery-electricity vehicle, it does not store energy and, instead, relies on a constant supply of fuel and oxygen — in the same way that an internal combustionengine relies on a constant supply of petrol or diesel, and oxygen.

Globally, EVs are bracketed under three broad categories

- BEVs have no internal combustion engine or fuel tank, and run on a fully electric drive train powered by rechargeable batteries.
- Conventional hybrid electric vehicles or HEVs combine a conventional internal combustion engine system with an electric propulsion system, resulting in a hybrid vehicle drive train that substantially reduces fuel use. The onboard battery in aconventional hybrid is charged when the IC engine is powering the drive train.
- Plug-in hybrid vehicles or PHEVs too have a hybrid drive train that uses both an internal combustion engine and electric power for motive power, backed byrechargeable batteries that can be plugged into a power source.
- FCEVs are widely considered to be the next frontier in EV technology.
- Since they are powered entirely by electricity, FCEVs are considered EVs — but unlike BEVs, their range and refuelling processes are comparable to conventional cars andtrucks.
- In India, so far, the definition of EV only covers BEVs; the government

TYPES OF EVs

HYDROGEN-POWERED VEHICLES SCORE OVER TRADITIONAL ELECTRIC VEHICLES (EVs):

HEVs (HYBRID ELECTRIC VEHICLES): High fuel economy (less fuel use than petrol cars), low tailpipe emission

BEVs (BATTERY-POWERED ELECTRIC VEHICLES): Fully electric, rechargeable batteries, no petrol

PHEVs (PLUG-IN HYBRID VEHICLES): Batteries + petrol

FCEVs (FUEL-CELL ELECTRIC VEHICLES): Hydrogen + oxygen (fully electric, but refuel, not recharge like BEVs)

has lowered taxes to 12%.

- At 43%, hybrid electric vehicles and hydrogen FCEVs attract the same tax as IC vehicles.
- The Ministry of Science and Technology has supported two networked centres on hydrogen storage led by IIT Bombay and Nonferrous Materials Technology Development Centre, Hyderabad.
- These involve 10 institutions, including IITs, and IISc, Bangalore.

India's first hydrogen fuel cell electric hybrid car

- India's first Hydrogen Fuel Cell (HFC) electric hybrid car successfully completed its maiden test run in Pune in October 2020.
- This indigenously developed technology was a collaborative effort between scientists from two Council of Scientific and Industrial Research (CSIR) labs – National Chemical Laboratory (NCL), Pune and Central Electro ChemicalResearch Institute (CECRI), Karaikudialong with KPIT, Pune.
- In the HFC technology, hydrogen gas from the on-board gas cylinder interacts with the Membrane Electrode Assembly (MEA) from the anode side to produceprotons (positively charged particles) and electrons (negatively charged particles).
- The protons, after passing through the proton exchange membrane, interacts with oxygen from the local air available on the cathode side to produce water.
- The electrons flow through the outside circuit and produce electricity.

FAME India Scheme Phase II

- The government on 25 September 2020 said it has sanctioned 670 electric buses for Maharashtra, Goa, Gujarat and Chandigarh and 241 charging stations in MadhyaPradesh, Tamil Nadu, Kerala, Gujarat and Port Blair under Phase-II of the FAMEIndia Scheme.
- The Department of Heavy Industries under the Ministry of Heavy Industries andPublic Enterprises, is administering the Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles in India (FAME India) Scheme since April, 2015 (completed on 31st March, 2019) to promote adoption of electric and hybrid vehicles (xEVs) in India.
- At present, Phase-II of FAME India Scheme is being implemented for a period of 3 years with effect from April 1, 2019 with a total budgetary support of Rs 10,000 crore.
- The National Electric Mobility Mission Plan (NEMMP) 2020 is a National Mission document providing the vision and the roadmap for the faster adoption of electric vehicles and their manufacturing in the country.

Fame India Scheme has four focus Areas:

1. Technology development
2. Demand Creation
3. Pilot Projects
4. Charging Infrastructure

To encourage advanced technologies, the benefits of incentives will be extended to only those vehicles which are fitted with advanced batteries like a LithiumIon battery and other new technology batteries.

Agreement for centre of excellence on hydrogen

- Indian Oil has signed a preliminary agreement with Norway's Greenstatto set up a centre of excellence on hydrogen on 18 February 2021.
- The centre of excellence on hydrogen (CoE-H) will be a vehicle for promoting R&D projects in green and blue hydrogen between Norwegian and Indian R&D institutions/universities.
- The centre will facilitate transfer and sharing of technology, know-how and experience through the green hydrogen value chain and other relevant technologiesincludinghydrogen storage and fuel cells.

- The partnership between Indian Oil and Greenstatwill assist stakeholders in developing business models besides offering consultancies to industry, utilities and regulators on hydrogen storage, hydrogen production, refuelling stations, fuel cellsandcarbon capture technologies.

- The government plans to set up a national hydrogen mission, finance minister NirmalaSitharaman had said in her Budget speech.

- The colours denote the source or method used to produce hydrogen.

- 'Green' hydrogen is produced by electrolysing water using power from renewable energy sources such as wind or solar.

- 'Grey' hydrogen is obtained by separating some of the hydrogen molecules in natural gas.

- Hydrogen produced from coal or petcoke, the end product of refining, is known as 'brown' hydrogen.

- Hydrogen sourced from carbon capture and storage is known as 'blue' hydrogen.

- Hydrogen from biomass and plastics is known as 'white' hydrogen.
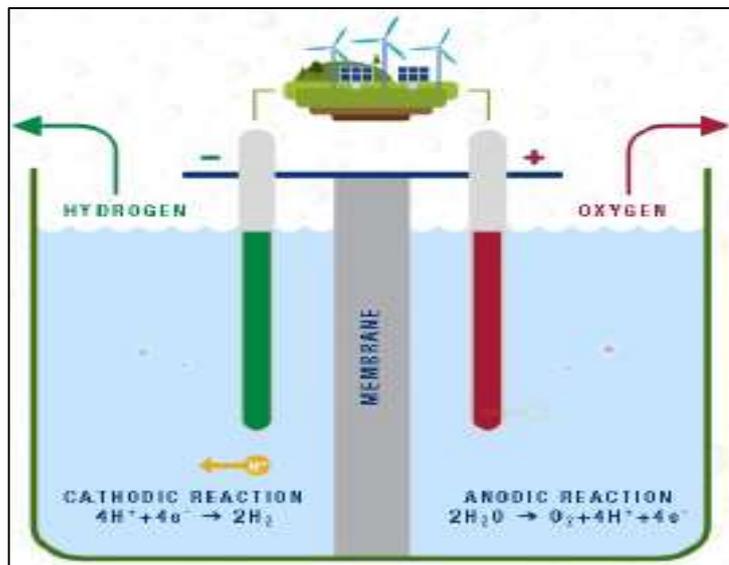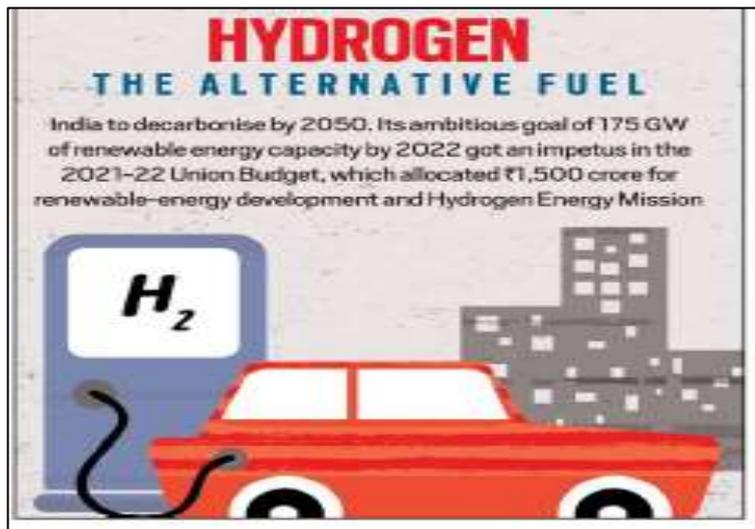
What is pink hydrogen?

Similar to green hydrogen, pink hydrogen is made via electrolysis, but using nuclear energy as its source of power.

What is yellow hydrogen?

Another type of hydrogen made by electrolysis is yellow, where electrolysis is achieved solely through solar power (unlikegreen which could use acombination of renewable energysources such as wind or solar).

National Hydrogen Mission

India's National Hydrogen Mission was announced by the Union Minister for Finance NirmalaSitharamanduring her budget speech on 1 February 2021.A comprehensive National HydrogenEnergy Mission was announced by the Prime Minister NarendraModi at the Third Re-inVest Conference inNovember 2020.It is now proposed to launch a Hydrogen Energy Mission in 2021-22for generating hydrogen from greenpower sources.

History of Hydrogen fuel

- In 1937, the German passenger airship LZ129 Hindenburg used hydrogen fuel tofly across the Atlantic, only to explode while docking at Naval Air StationLakehurst in New Jersey, killing 36 people.

WHY HYDROGEN?

- India's electricity is heavily coal-dependent. Hydrogen will replace fossil fuels, address pollution and oil-price rise

- It's the most abundant element in the universe, is lighter, energy dense, and

two-three times more efficient than burning petrol

- It will benefit transportation (contributes 1/3rd of India's greenhouse-gas emissions), iron and steel and chemicals sectors

- In the late 1960s, hydrogen fuel cells helped power NASA's Apollo missions to the moon.

- After the oil price shocks of the 1970s, the possibility of hydrogen replacing fossil fuels came to be considered seriously.

THE GOOD

- Near zero carbon footprint (electricity to extract hydrogen comes from fossil fuels)
- Provides range like a Tesla Model S, about 400 miles or 550 km per charge
- Stored in tanks (like CNG) and integrated into cars' bellies (unlike CNG)
- Lighter than heavy lithium-ion batteries. Better for long-haul trucks, commercial vehicles
- Refuels in 5 minutes

THE BAD

SCALE: Only 3 manufacturers — Honda, Toyota (Japan) and Hyundai (South Korea). Under 25,000 hydrogen FCEVs on road in 2020, compared to 8 million EVs

LACK OF INFRA: Less than 500 hydrogen stations globally

SAFETY: Explosion risk and highly combustible. Stored at very high (up to 700 bar) pressure, but tank is outside passenger bay

- Three carmakers — Japan's Honda and Toyota, and South Korea's Hyundai — have since moved decisively in the direction of commercialising the technology, albeit on a limited scale.

HYDRO ELECTRIC

SJVN gets 3 hydroelectric projects

- State-owned power producer SJVN Ltd has been awarded three hydroelectric power projects totaling 501 megawatts (MW) by the Himachal Pradesh government.
- The three projects are to be developed in the Chenab river basin in Himachal Pradesh.
- It   has
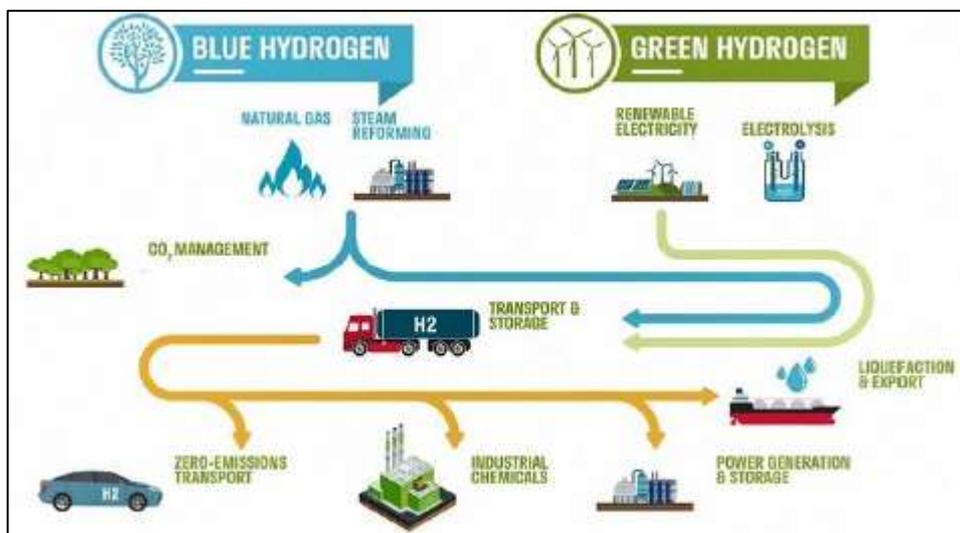
allocated 104 MW Tandi, 130 MW Rashiland267 MW SachKhas Hydro Electric Projects

on the Chenab Basin to SJVN.

- SatlujJalVidyut Nigam Limited (SJVN) is a Mini RatnaCPSE under administrative control of Ministry of Power, was incorporated on 24 May 1988 as a joint venture of the Government of India (GOI) and the Government of Himachal Pradesh (GOHP).
- SJVN Ltd is a hydroelectric power generation company.
- The company is the largest operational hydroelectric power generation facility in India based on installed capacity with an aggregate generation capacity of 1912 MW.

BIO

FUEL

4 National Policy on biofuels, 2018

Objective

To Expand the scope of Raw Material for Ethanol Production by the use of:

- Sugarcane Juice
- Sugar Containing Materials e.g. Sugar Beet, Sweet Sorghum
- Starch Containing Materials e.g. Corn, Cassava
- Damaged Food Grains e.g. wheat, broken rice, rotten Potatoes, unfit for human consumption

3 Generation of Bio Fuels
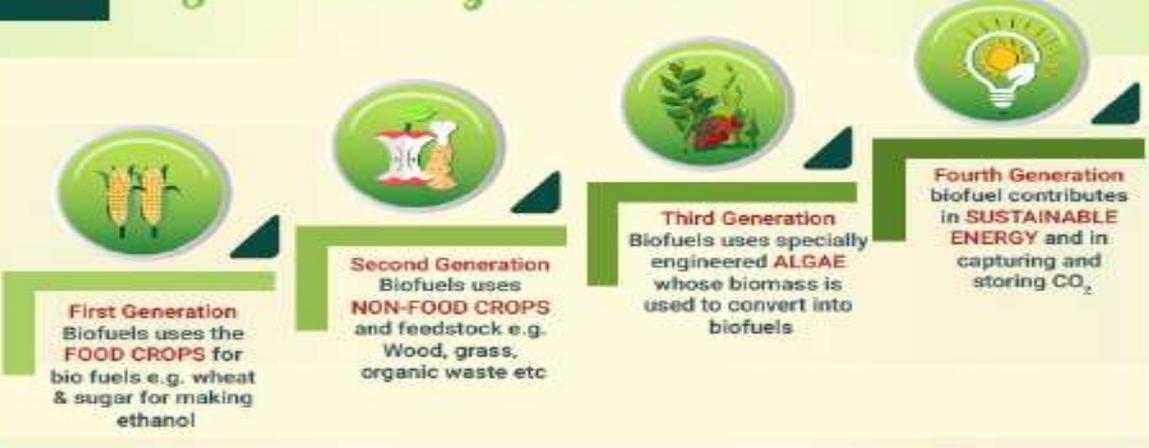
First Generation Biofuels uses the **FOOD CROPS** for bio fuels e.g. wheat & sugar for making ethanol

Second Generation Biofuels uses **NON-FOOD CROPS** and feedstock e.g. Wood, grass, organic waste etc

Third Generation Biofuels uses specially engineered **ALGAE** whose biomass is used to convert into biofuels

Fourth Generation biofuel contributes in **SUSTAINABLE ENERGY** and in capturing and storing CO_2

Salient Features

Categorizes biofuels to enable extension of appropriate financial and fiscal incentives under each category as

- Basic Bio-fuels - First Generation (1G) bio-ethanol and biodiesel
- Advanced Bio-fuels — Second Generation (2G) ethanol, Municipal Solid Waste (MSW) to drop-in fuels, Third Generation (3G) bio-fuels, Bio-CNG etc.

Allows use of surplus food grains for production of ethanol to blend with petrol and ensures appropriate price to farmers during surplus

Provides Thrust on Advanced Biofuels by Viability gap funding scheme for 2G ethanol Bio refineries of Rs.5000 crore in 6 years, additional tax incentives and higher purchase price as compared to 1G biofuels

Contributes to supply chain mechanisms for biodiesel production from non-edible oilseeds, used cooking oil, etc

Converges efforts of concerned Ministries/Departments with respect to bio-fuels

Biofuel From Algae
- Indian scientists have developed low-cost biodiesel from microalgae under the INSPIRE programmeof ministry of science and technology.
- The Innovation in Science Pursuit for Inspired Research (Inspire) is an innovative programmesponsored and managed by the ministry for attractingtalents to research and innovation.
- The technique to use microalgae is developed by a team of scientists. It is led by T Mathimanifrom the National Institute of Technology (NIT), Tiruchirappalli.
- Innovation of Science Pursuit for Inspire Research (INSPIRE) is one such innovative scheme proposed by the Department of Science & Technology for attraction of talent to science.
- Government of India approved this Scheme in November 2008
- INSPIRE Scheme has included three programs and five components.
- They are i) Scheme for Early Attraction of Talents for Science (SEATS), b) Scholarship for Higher Education (SHE) and c) Assured Opportunity for ResearchCareers (AORC).

Rocket to run on Biofuels
- On 31 January 2021, Stardust 1.0 was launched from Loring Commerce Centre in Maine, US, a former military base, becoming the first commercial space launchpowered by biofuel, which is non-toxic for the environment as opposed totraditionally used rocket fuels
- Stardust 1.0 is a launch vehicle suited for student and budget payloads.
- The rocket is 20 feet tall and has a mass of roughly 250 kg.
- The rocket can carry a maximum payload mass of 8 kg and during its first launch carried three payloads.
- The rocket is manufactured by bluShift, an aerospace company based in Maine that is developing rockets that are powered by bio-derived fuels.
- Stardust 1.0 is being developed by the company since 2014 when the company was founded by its CEO SaschaDeri.
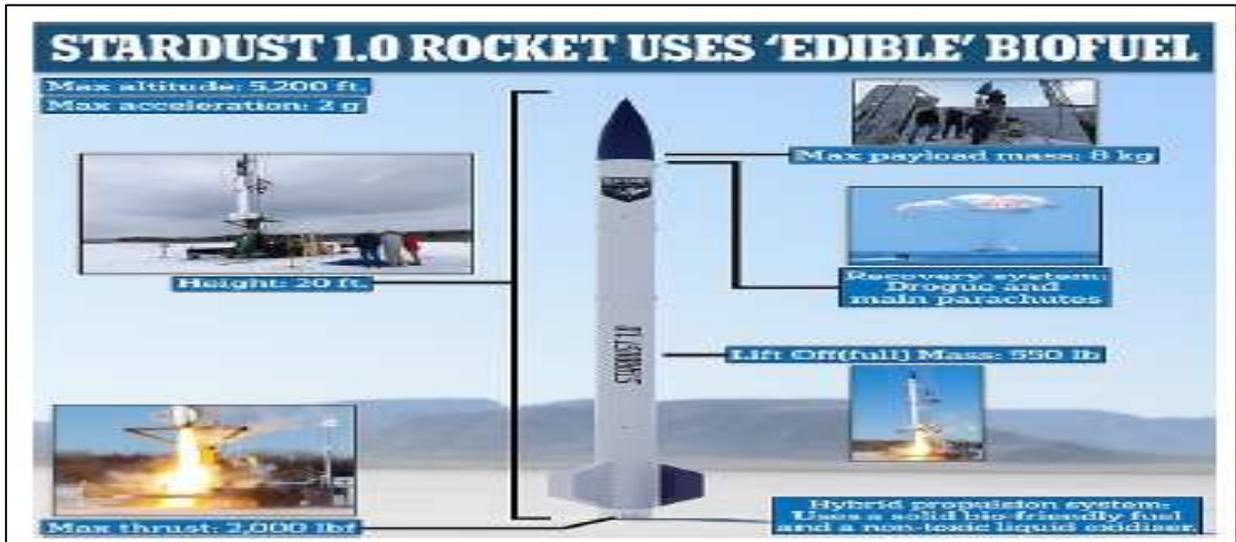
India notifies use of E20

- India 8 March 2021 notified the use of E20, a blend of 20 per cent ethanol and 80 per cent petrol, as fuel for compatible vehicles.
- The Ministry of Road Transport and Highways notified the use of E20 and issued mass emission standards for the same.
- The draft rules were put up for objections and comments in December. The final notification was issued after considering the comments and suggestions, said the ministry.
- During studies, it has been observed that E20 decreases the Carbon Monoxide and Hydrocarbons emissions significantly, compared with normal gasoline in two-wheelersand four-wheelers, a ministry said.
- The compatibility of a vehicle with E20 will be defined by the manufacturer and will have to be displayed on the vehicle by putting a clearly visible sticker.

<center>**GEO THERMAL**</center>

India's first geothermal field project

- A historic tripartite agreement for establishing India's first-ever geothermal field development project in Lehhas been signed, with Ladakh Lieutenant Governor RK Mathurterming it a step towards achieving the goal of carbon-neutral Ladakh.

- The pact was signed between Union Territory Administration Ladakh, LadakhAutonomous Hill Development Council (LAHDC)-LehandOil and Natural Gas Corporation (ONGC) Energy Centre on 6 February 2021.
- ONGC Energy Centre is the implementing agency for this pilot project.
- Geothermal energy's largest producer is the United States. It is also generated in more than 20 countries.
- The largest of geothermal development in the world in the Geysers north of SanFransisco in California.
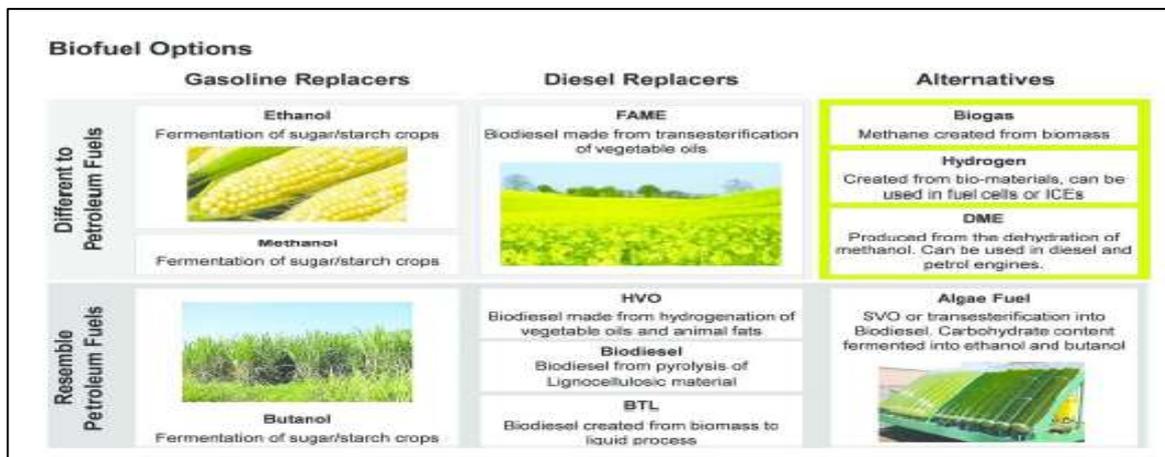
SECURITY

SRIJAN Portal
- ➢ SRIJAN is a "one stop shop" online portal that provides access to the vendors to take up items that can be taken up for indigenization.
- ➢ It will help industry partners to play active role in the goal of self-reliance in defence sector.
- ➢ On this portal, public entities/PSUs can display their items which they have been importing or are going to import which the Indian Industry can design, develop and manufacture as per their capability or through joint venture.

The Naga Peace Process
- ➢ The Nagas are not a single tribe, but an ethnic community that comprises several tribes who live in the state of Nagaland and its neighbourhood.
- ➢ Demand: A Greater Nagalim that would cover not only the state of Nagaland but parts of neighbouring states, and even of Myanmar.

Peace talks in recent years
- ➢ 1975: A peace accord was signed in Shillong in which the NNC leadership agreed to give up arms.
- ➢ 1997: NSCN (I-M) signed a ceasefire agreement. Key agreement was that there would be no counter-insurgency offensive against NSCN (I-M), who in turn would not attack Indian forces.
- ➢ 2015: The Centre signed a framework agreement with the NSCN(I-M). This set the stage for the ongoing peace talks.
- ➢ The government and the NSCN (I-M) have failed to agree on issues relating to a separate Naga flag and a constitution.

Naval Innovation and IndigenisationOrganisation (NIIO)
- ➢ The NIIO puts in place dedicated structures for the end users to interact with academia and industry.
- ➢ The objective is to foster innovation and indigenisation for self-reliance in defence in keeping with the vision of Atmanirbhar Bharat.
- ➢ The NIIO is a three-tiered organisation:
  1. Naval Technology Acceleration Council (N-TAC) will bring together the twin aspects of innovation and indigenisation and provide apex level directives.
  2. A working group under the N-TAC will implement the projects.
  3. A Technology Development Acceleration Cell (TDAC) has also been created for induction of emerging disruptive technology in an accelerated time frame.

Defence Production and Export Promotion Policy 2020
- ➢ India had been a major defence importer for many years.
- ➢ The policy has laid out following goals and objectives:
  a) To achieve a turnover of ₹1, 75,000cr (US$ 25Bn) including export of ₹35,000cr (US$ 5 Billion) by 2025.
  b) To develop a dynamic, robust and competitive defence industry to cater the needs of Armed forces with quality products.
  c) To reduce dependence on imports and take forward "Make in India" initiatives through domestic design and development.
  d) To promote export of defence products and become part of the global defence value chains.

India's Defence Sector
- ➢ With an annual defence budget of about $70 billion, India is behind only the US ($732 billion) and China ($261 billion) in terms of military expenditure around the globe.
- ➢ It is also the second-largest buyer of foreign weaponry after Saudi Arabia in the

world, accounting for 9.2% of the total global arms imports during 2015-2019.
➤ The estimated size of the existing Indian defence industry is around ₹80,000 crore, with the public sector's contribution being almost 80% of it.

Defence India Startup Challenge and iDEX

➤ Defence Minister has launched the Defence India Startup Challenge (DISC 4) during the iDEX event, featuring the initiatives aimed at expanding the horizons of Innovations for Defence Excellence (iDEX) ecosystem.
  o The iDEX initiative stands out as one of the most effective and well-executed defence Startup ecosystem created in our country and it would be a decisive step towards achieving self-reliance in the spirit of the AtmaNirbhar Bharat campaign in defense realm.
➤ iDEX4Fauji is a first of its kind initiative, launched to support innovations identified by members of the Indian Armed Forces and will bolster frugal innovation ideas from soldiers/ field formations.
➤ iDEX4Fauji would open this window and allow our Faujis to become part of the innovation process and get recognised and rewarded.
➤ The defence offset is an obligation by an international player to boost India's domestic defence industry if India is buying defence equipment from it.
  o An offset provision in a contract makes it obligatory on the supplier to either ―reverse purchase, execute export orders or invest in local industry or in research and development‖ in the buyer's domestic industry.

INS Viraat

➤ Viraat which was decommissioned from the Indian Navy after 30 years of glorious service, reached Alang for recycling.
➤ INS Viraat holds the world record as mentioned in the Guinness Book of records for being the longest serving warship of the world.
➤ Alang in Gujrat is one of the world's biggest ship recycling yards where around 30% of the global ships (250-280) are recycled annually.
➤ To create bigger markets for ships recycling industry, India has acceded to ‗Hong Kong International Convention for Safe and Environmentally Sound Recycling of Ships, and passed the "The Recycling of Ships Bill, 2019".

Hypersonic Technology Demonstrator Vehicle

➤ DRDO has successfully demonstrated the hypersonic air-breathing scramjet technology with the flight test of Hypersonic Technology Demonstration Vehicle (HSTDV).
➤ HSTDV is an unmanned scramjet demonstration aircraft for hypersonic speed flight, developed by India's DRDO. HSTDV is not a weapon itself but and is being developed as a carrier vehicle for hypersonic and long-range cruise missiles.
➤ The HSTDV cruise vehicle is mounted on a solid rocket motor, which takes it to a required altitude. Once it attains certain Mach numbers for speed, the cruise vehicle is ejected out of the launch vehicle. After that, the scramjet engine is ignited automatically.
➤ The only countries in the world which have hypersonic technology are the United States of America, Russia and China.
➤ In addition to war applications, India will also use HSTDV for multiple civilian applications including the launching of small satellites at low cost.

ABHYAS

➤ India successfully conducted the flight test of ABHYAS – High-speed Expendable Aerial Target (HEAT) – from a test range in Odisha.
➤ It has been designed and developed by the Aeronautical Development Establishment (ADE) of the DRDO.
➤ It has been designed and developed by the Aeronautical Development Establishment (ADE) of the DRDO.
➤ It is powered by a small gas turbine engine and has an Inertial Navigation System (INS) along with a Flight Control Computer (FCC) for guidance and control.

INS Kavaratti

- INS Kavaratti was formally inducted into the Indian Navy at the Naval Dockyard in Eastern Naval Command.
- INS Kavaratti is the last of the four indigenously built Anti-Submarine Warfare (ASW) stealth corvettes built under Project 28, Kamorta class, by Garden Reach Shipbuilders & Engineers (GRSE), Kolkata.
- The ship has up to 90% indigenous content and the use of carbon composites for the superstructure is a commendable feat achieved in Indian shipbuilding.
- The ship's advanced stealth features make her less susceptible to detection by the enemy.

Operation Meri Saheli

- Indian Railways has launched "Meri Saheli" initiative for focused action on security of women across all zones. The initiative was started as a pilot project in South Eastern Railway in September 2020.
- It is launched with an objective to provide safety and security to lady passengers travelling by trains for their entire journey from starting station to destination station.

Basic Exchange and Cooperation Agreement (BECA)

- India and U.S. have signed BECA, the last of four foundational agreements for strategic ties. BECA stands for Basic Exchange and Cooperation Agreement for Geo-Spatial Cooperation.
- The previous three agreements are:
  1. The General Security of Military Information Agreement (GSOMIA) signed in 2002.
  2. The Logistics Exchange Memorandum of Agreement (LEMOA) signed in 2016.
  3. The Communications Compatibility and Security Agreement (COMCASA) in 2018.
- It will help India get real-time access to American geospatial intelligence that will enhance the accuracy of automated systems and weapons like missiles and armed drones.
- Through the sharing of information on maps and satellite images, it will help India access topographical and aeronautical data, and advanced products that will aid in navigation and targeting.
- It will allow for expanded geospatial information sharing between the armed forces. It was not signed till now due to differences over the issue of reciprocity in the exchange of information.

ADMM-Plus

- The ADMM-Plus is a platform for ASEAN and its eight Dialogue Partners Australia, China, India, Japan, New Zealand, Republic of Korea, Russia and the United States (collectively referred to as the "Plus Countries"), to strengthen security and defense cooperation for peace, stability, and development in the region.
- The Inaugural ADMM-Plus was convened in Ha Noi, Viet Nam in October 2010.

BRICS Counter Terrorism Strategy

- For the first time, the bloc of five emerging economies have approved a counter-terrorism strategy aimed at strengthening linkages on combatting terrorism and sharing of timely information.
- BRICS is the group composed by the five major emerging countries - Brazil, Russia, India, China and South Africa -, which together represent about 42% of the population, 23% of GDP, 30% of the territory and 18% of the global trade.
- The acronym BRIC was coined by Goldman Sachs in 2001 to indicate the emerging powers that would be, alongside the United States, the five largest economies of the world in the 21st century.
- In 2006, BRIC countries started their dialogue, which since 2009 takes place at annual meetings of heads of state and government. In 2011, with South Africa joining the group, the BRICS reached its final composition, incorporating a country from the African continent.
- At the Fortaleza Summit (2014), in Brazil, important institutions were created: The

New Development Bank (NDB) and the Contingent Reserve Arrangement (CRA). The CRA is operational and is an important financial stability mechanism for countries affected by crises in their balance of payments.

➢ The BRICS countries have elaborated this Counter-Terrorism Strategy with the aim of strengthening the security of the BRICS countries.

➢ The objective of BRICS counter-terrorism cooperation is to complement and strengthen the existing bilateral and multilateral ties among the BRICS countries, and to make a meaningful contribution to the global efforts of preventing and combating the threat of terrorism.

Updated Crime Manual of CBI

➢ The Central Bureau of Investigation (CBI) has brought out a revised crime manual after 15 years by keeping sight of latest developments in law, investigation techniques and procedures.

➢ The agency had set up a task force under Additional Director Praveen Sinha to make necessary changes in the crime manual, a set of guidelines for the investigating officer to follow while probing a case, which was last revised in 2005.

➢ CBI's crime manual: It lays down the standard operating procedures for the agency to implement in matters pertaining to special investigations, economic offences and cyber-crimes. The crime manual dictates the working of the investigative agency and lays down procedures on how the agency is expected and supposed to act in its investigations.

➢ **Highlights**

o A separate chapter dedicated to investigations in foreign jurisdictions and coordinating and operating with Interpol. It also covers how to expedite issuance of Interpol notices against accused who have absconded from India and sought refuge abroad.

o Changes in the standard operating procedures: specially to probe digital crimes in the cyber world and those across national boundaries. so as to enhance speed and quality of investigation in consonance with global best practices.

o Considering the strides in the information-communication technology, the updated procedures in collection and analysis of digital evidence and for the handling of complex cybercrime cases have also been incorporated in the manual.

o Under the revised guideline, the Head of a Branch is required to complete the necessary process in six months and the Head of the Zone has to sum it up by nine months in usual cases.

➢ The new manual provides information about the laws, procedures and their interpretations in a format to assist the investigating officers in their day-to-day work.

➢ It has also discussed the team approach of investigation to be adopted in larger and complex cases.

AFSPA and Nagaland

➢ The Ministry of Home Affairs (MHA) has declared the entire State of Nagaland as a "disturbed area" for six more months, under the Armed Forces (Special Powers) Act (AFSPA).

o In simple terms, AFSPA gives armed forces the power to maintain public order in "disturbed areas".

➢ They have the authority to prohibit a gathering of five or more persons in an area, can use force or even open fire after giving due warning if they feel a person is in contravention of the law.

➢ The Armed Forces (Special Powers) Act (AFSPA) has been in force in the Northeast since 1958 and Nagaland had acquired statehood in 1963. Hence, Nagaland has been under the Armed Forces (Special Powers) Act for almost six decades.

➢ The draconian act has not been withdrawn despite a framework agreement being signed in 2015 between Naga insurgent group NSCN-IM general secretary ThuingalengMuivah and government interlocutor R.N. Ravi in the presence of central

government.

➢ A disturbed area is the one which is declared by notification under Section 3 of the AFSPA. It can be invoked in places where the use of armed forces in aid of civil power is necessary.
  o The Central Government, or the Governor of the State or administrator of the Union Territory can declare the whole or part of the State or Union Territory as a disturbed area. A suitable notification would have to be made in the Official Gazette.

➢ Presently, AFSPA, 1958, is operational in the entire States of Assam, Nagaland, Manipur (except Imphal Municipal area), three districts namely Tirap, Changlang and Longding of Arunachal Pradesh and the areas falling within the jurisdiction of the eight police stations in the districts of Arunachal Pradesh, bordering the State of Assam.

➢ The notification declaring Manipur and Assam as "Disturbed Areas' has been issued by the State governments. For Nagaland, the notification is issued by the MHA.

Hydrowarfare

➢ Recently, China announced that it is planning to build a major hydropower project as a part of its 14th Five-Year Plan (2021-25), on the YarlungZangbo River, in Mêdog County in Tibet.

➢ China in 2015 operationalised its first hydropower project at Zangmu in Tibet, while three other dams at Dagu, Jiexu and Jiacha are being developed, all on the upper and middle reaches of the river.
  o The "Great Bend" of the Brahmaputra and at the YarlungZangbo Grand Canyon in Medogcounty, where the river falls spectacularly over a 2,000 metre-drop and turns sharply to flow across the border into Arunachal Pradesh.

➢ There are two hydropower projects being built in Arunachal Pradesh on the tributaries of the Brahmaputra: the 600 MW Kameng project on the Bichom and Tenga Rivers and the 2,000 MW Subansiri Lower Hydroelectricity Project.

Biological Warfare

➢ These are microorganisms like virus, bacteria, fungi, or other toxins that are produced and released deliberately to cause disease and death in humans, animals or plants.

➢ It is a subset of a larger class of weapons referred to as weapons of mass destruction, which also includes chemical, nuclear and radiological weapons. The use of biological agents is a serious problem, and the risk of using these agents in a bioterrorist attack is increasing.

➢ The Biological Weapons Convention (BWC):It is the first multilateral disarmament treaty banning the development, production and stockpiling of an entire category of weapons of mass destruction entered into force in 1975.
  o The development, stockpiling, acquisition, retention, and production of:
  o Biological agents and toxins "of types and in quantities that have no justification for prophylactic, protective or other peaceful purposes;"
  o Weapons, equipment, and delivery vehicles "designed to use such agents or toxins for hostile purposes or in armed conflict."
  o The transfer of or assistance with acquiring the agents, toxins, weapons, equipment, and delivery vehicles described above.

➢ Biological warfare agents differ greatly in the type of organism or toxin used in a weapons system, lethality, length of incubation, infectiousness, stability, and ability to be treated with current vaccines and medicines. There are five different categories of biological agents that could be weaponized and used in warfare or terrorism. These include:
  o Bacteria—single-cell organisms that cause diseases such as anthrax, brucellosis, tularemia, and plague.
  o Rickettsiae—microorganisms that resemble bacteria but differ in that they are intracellular parasites that reproduce inside cells. Typhus and Q fever are examples of diseases caused by rickettsia organisms.

- o Viruses—intracellular parasites, about 1/100 the size of bacteria, that can be weaponized to cause diseases such as Venezuelan equine encephalitis.
- o Fungi—pathogens that can be weaponized for use against crops to cause such diseases as rice blast, cereal rust, wheat smut, and potato blight.
- o Toxins—poisons that can be weaponized after extraction from snakes, insects, spiders, marine organisms, plants, bacteria, fungi, and animals. An example of a toxin is ricin, which is derived from the seed of the castor bean.

Tour of Duty recruitment model

- ➢ Army's proposed 'Tour of Duty' recruitment model may be expanded to Navy and IAF too.
- ➢ ToD is expected to result in a significant reduction in the expenditure on pay and pensions and free up funds for the Army's modernization.
- ➢ The overall purpose of the ToD concept is 'internship/temporary experience'.
- ➢ This scheme is for those who did not want a full career in the Army but still wanted to put on the uniform.
- ➢ They would also have an edge after leaving the service and going to the corporate sector.
- ➢ In case of any unfortunate eventuality, all the benefits will get extended to the person or the next of kin as is due to a regular officer or jawan.
- ➢ This engagement based on the pattern adopted by the Israel Defence Forces (IDF), excluding the conscription clause, is considered to accrue benefits to Army as well as the individual.
- ➢ This proposal keeps the engagement as voluntary unlike Israel's practice of necessary three years of military service for every able-bodied person.
- ➢ Three-year volunteer scheme is being designed to attract more youth to Army, fill upofficers' vacancies, and reduce ballooning defence pensions.

SIPRI report on arms market

- ➢ Stockholm International Peace Research Institute (SIPRI) is an international institute based in Sweden, dedicated to research into conflict, armaments, arms control and disarmament.
- ➢ Established in 1966, SIPRI provides data, analysis and recommendations, based on open sources, to policymakers, researchers, media and the interested public.
- ➢ The U.S. arms industry accounted for 61% of sales by the world's "Top 25" manufacturers last year, ahead of China's 15.7%.
- ➢ China and the United States are the two biggest states in terms of global arms spending.
- ➢ Airbus and Thales have the strongest international presence — each is represented in 24 countries. European companies are more internationalised than others.
- ➢ For the first time, a company from West Asia made it into the "Top 25": EDGE, of the United Arab Emirates. EDGE is a good illustration of how the combination of high national demand for military products and services with a desire to become less dependent on foreign suppliers is driving the growth of arms companies in the Middle East.
- ➢ SIPRI also noted that French group Dassault had shot up from 38th to 17th place, boosted by exports of its Rafale fighter jets in 2019.
- ➢ India is the world's second largest arms importer.
- ➢ The largest percentage increase in annual arms sales—105 per cent—was reported by French producer Dassault Aviation Group, which was the supplier of Rafale to India.

Exercise Kavach

- ➢ The Indian Army has carried out a large-scale conjoint military training exercise named 'Kavach' in the Andaman Sea and Bay of Bengal.
- ➢ The drill was conducted under the Andaman and Nicobar Command (ANC), the only Joint Forces Command of the country, with the participation of the Eastern Naval

Command and Army Southern Command involving the Indian army, navy, air force as well as the coast guard.

➤ It formed a part of the AMPHEX-21 tri-service joint amphibious exercise in the Andaman and Nicobar group of islands.

Ease of Doing Business in Defence Manufacturing

➤ Recently, some measures have been taken up by Government to increase the ease of doing business in defence.

➤ The initial validity of industrial licenses under the I(D&R) Act, 1951 which was earlier 7 years, extendable up to 3 years for existing as well as future licenses, has been revised to 15 years, further extendable up to 18 years for existing as well as future licenses.

➤ Further, under Arms Act 1959/Arms Rules 2016, license granted shall be valid for the life time of the licensee company provided the licensee shall be required to setup facility and fulfill other conditions within a period of seven years from the date of grant of a license.

➤ The advanced version of National Industrial Classification (NIC-2008) has been adopted, which is a superior/sophisticated industrial classification.

➤ The 'Security Manual for Licensed Defence Industry' has been issued. With the issue of the Security Manual, the requirement of affidavit from the applicants has been done away with.

➤ Restriction of annual capacity in the Industrial Licence for Defence Sector has been removed under Industries (Development & Regulation) Act, 1951.

➤ Licensee has been allowed to sell the defence items to the government entities under the control of Ministry of Home Affairs (MHA), Public Sector Undertakings (PSUs), State Governments and other Defence Licensee companies without approval of Department of Defence Production.

➤ Licensee has been allowed to manufacture enhanced capacity up to fifteen percent of the existing capacity with prior intimation to the licensing authority under Arms Act, 1959.

➤ A new online portal has been developed for facilitating filing of online applications for Industrial Licence under Industries (Development & Regulation)-IDR Act, 1951/Arms Act, 1959.

➤ Defence products list requiring compulsory licence from DPIIT under Industries (Development & Regulation) Act, 1951 and Arms Act, 1959 has been pruned, the licensing in defence sector has been further liberalized.

➤ To facilitate further ease of doing business in Industrial Licensing, No Industrial Licence/Arms Licence is required for manufacture of any parts or accessories in Defence Sector, unless they are specifically listed in any of the Annexures of Press Note 1(2019 Series). This shall not apply to issue of Arms Licence for small arms by MHA.

➤ Pushing for self-reliance in the defence sector, the government had taken steps to move forward in the sector with "transparency, predictability and ease of doing business".

➤ The government was actively promoting not only domestic manufacturing but also an export-oriented defence industry.

TROPEX 21

➤ Recently, the exercise had commenced in January 2021 involving all three Commands of the Indian Navy, the Tri-Services Command at Port Blair, and elements of Indian Army, Indian Air Force and Coast Guard.

➤ The biennial 'Theatre Level Operational Readiness Exercise (TROPEX)' aims to validate the Navy's offensive as well as defence capabilities and safeguard national interests in the maritime domain besides promoting peace and stability in the Indian Ocean.

➤ The Biennial exercise is the largest exercise conducted by Indian Navy aimed to validate its concepts of war-fighting across the entire spectrum of warfare.

NAVDEX 21 and IDEX 21

Recently, Indian Naval Ship Pralaya reached at Abu Dhabi, UAE, 19 February 2021 to

participate in the NAVDEX 21 (Naval Defence Exhibition) and IDEX 21 (International Defence Exhibition), scheduled from 20 to 25 February 2021.

Malabar Naval Exercises

➢ MALABAR series of maritime exercises commenced in 1992 as a bilateral Indian Navy (IN) - United States Navy (USN) exercise. Japan Maritime Self Defence Force (JMSDF) joined MALABAR in 2015. The 2020 edition will now witness participation of the Royal Australian Navy (RAN) in this joint maritime exercise.

➢ It is primarily focusing on containing China's military expansionism in the Indo-Pacific region.

Anti-Tank Guided Missile Systems 'Helina' and 'Dhruvastra'

➢ Recently, Joint User Trials for Helina (Army Version) and Dhruvastra (Air Force Version) Missile Systems have been carried out from Advanced Light Helicopter (ALH) platform in desert ranges.

➢ The missile systems have been designed and developed indigenously by the Defence Research and Development Organisation (DRDO).

➢ While the Helina weapon systems has been developed for the Indian Army, its IAF variant Dhruvastra has also been developed by the DRDO and now both variants are ready for induction into services.

➢ The Helina and Dhruvastra are third generation, Lock on Before Launch (LOBL) fire and forget Anti-Tank Guided Missiles that can engage targets both in direct hit mode as well as top attack mode.

➢ The system has all-weather day and night capability and can defeat battle tanks with conventional armour as well as with explosive reactive armour.

➢ It is one of the most-advanced anti-tank weapons in the world.

Sandes App

➢ Recently, The National Informatics Centre has launched an instant messaging platform called Sandes on the lines of WhatsApp.

➢ The app was initially launched for Android users and then the service was extended to iOS users.

➢ The new NIC platform can be used for all kinds of communications by anyone with a mobile number or email id.

Exercise Desert FLAG VI

➢ For the first time ever, Indian Air Force is participating in Exercise Desert Flag-VI in the United Arab Emirates (UAE).

➢ Ex Desert Flag is an annual multi-national large force employment warfare exercise hosted by the United Arab Emirates Air Force.

➢ The Indian Air Force is participating for the first time in Exercise Desert Flag-VI along with air forces of United Arab Emirates, United States of America, France, Saudi Arabia, South Korea and Bahrain.

France's first military exercises in space: AsterX

➢ France has begun its first military exercises in space to test its ability to defend its satellites, in a sign of the growing competition between world powers in Earth's orbit.

➢ The exercise, codenamed "AsterX" in memory of the first French satellite Asterix from 1965.

➢ The exercises are part of France's strategy to become the world's third-largest space power, after the US and China.

➢ These space military exercises are the first for the French army and even a first in Europe.

➢ Along with France, the new US Space Force and German space agencies are taking part in the exercises.

INS Karanj

➢ INS Karanj is Indian Navy's third Scorpene-class conventional diesel electric submarine to be inducted into service.

➢ She is fitted with a permanent magnetic synchronous motor, making it one of the quietest submarines in the world.

➤ Karanj has been equipped with the best sensors in the world and is fitted with an integrated platform management system to provide centralised propulsion and machinery control. The powerful diesel engines can quickly charge batteries for a stealthy mission profile. Also, its modular construction enables upgradation to air independent propulsion in future.

➤ Six Scorpene Class submarines are being built in India by the Mazagon Dock Shipbuilders Limited (MDL) Mumbai, under collaboration with M/s Naval Group, France.

➤ The first submarine of the class, INS Kalvari, was commissioned in December 2017 and the second, INS Khanderi, in September 2019. A fourth submarine, Vela, was launched into the water in May 2019 and the fifth, Vagir, in November 2020, and both are undergoing sea trials.

  o The sixth is in an advanced stage of outfitting.

➤ The Scorpene Submarines are one of the most advanced conventional submarines in the world. These platforms are equipped with the latest technologies in the world. More deadly and stealthier than their predecessors, these submarines are equipped with potent weapons and sensors to neutralise any threat above or below the sea surface.

Military Farm Service

➤ Recently, Military farms have been closed after 132 years of glorious service to the Nation.

➤ The farms were set up with the sole requirement of supplying hygienic cow milk to troops in garrisons across British India. The first military farm was raised on February 1, 1889 at Allahabad.

➤ Military Farms are pioneers in introduction of Artificial Insemination (AI) in cattle in the early 20th century (1925).

➤ Aim: To ensure nutritious milk supply to the troops deployed in India.

➤ **Project Frieswal:** It is a collaborative project of national importance being undertaken by Military Farms with Indian Council of Agriculture Research (ICAR), Min of Agriculture. It is the world's biggest cross breeding programme that envisages to evolve a milch breed of cattle for tropical world.

  o Its aim was to produce and rear Holstein Friesian cross bread with Sahiwal breed for high milk productivity.

➤ Technical Activities under Frieswal Project: Semen freezing, planned breeding, progeny testing and gene mapping were some of the other areas in which the research for the project was undertaken.

The genesis of the decision to close military farms

➤ It was in June 2013 that the Quarter Master General's branch of the Army Headquarters, under which Military Farms fell, issued a direction that the farms will be closed in a phased manner.

➤ In June 2014, another order was issued by the Deputy Director-General Military Farms that the responsibility of supply of milk and milk products was being shifted from Military Farms to Army Service Corps (ASC).

➤ In 2016, Lt. Gen. DB Shekatkar (retd) committee which was appointed to recommend measures to enhance combat capability and rebalance defence expenditure of the armed forces.

  o In 2016, a committee under Lt Gen DB Shekatkar (retd) submitted a report on reorganisation of several branches of the Army in which it was recommended that the Military Farms be closed down.

Joint logistics facility

➤ The Chief of Defence Staff General Bipin Rawat has operationalised the third joint logistics node (JLN) in Mumbai.

  o The JLNs in Guwahati and Tri-Services, Andaman and Nicobar Command, Port Blair were operationalised on January 01, 2021.

➤ It is a very important first step in the direction of logistics integration of our three Services.

- It will provide integrated logistics cover to the armed forces for their small arms ammunition, rations, fuel, general stores, civil hired transport, aviation clothing, spares and also engineering support in an effort to synergise their operational efforts.
- An integrated theatre command envisages a unified command of the three Services, under a single commander, for geographical theatres that are of security concern.
- The integrated theatre commander will not be answerable to individual Services, and will be free to train, equip and exercise his command to make it a cohesive fighting force capable of achieving designated goals.
- The Shekatkar committee has recommended the creation of 3 integrated theatre commands — northern for the China border, western for the Pakistan border and southern for the maritime role.
- The Andaman and Nicobar Command (ANC) is the first and only tri-service theater command of the Indian Armed Forces, based at Port Blair in the Andaman and Nicobar Islands, a Union Territory of India.
  - It was formed in 2001, following the Group of Ministers' report on national security, after the Kargil War.
- The other tri-service command, the Strategic Forces Command (SFC), looks after the delivery and operational control of the country's nuclear assets.
  - It was created in 2003, but because it has no specific geographic responsibility and a designated role, it is not an integrated theatre command but an integrated functional command.

Exercise 'ShantirOgroshena'

- Exercise ShantirOgroshena, a 10 day long multinational military exercise, Concluded on 12 April 2021 at Bangabandhu Senanibas (BBS), Bangladesh.
- The Exercise was organized to commemorate the birth centenary of Bangladesh's 'Father of the Nation' Bangabandhu Sheikh Mujibur Rahman and mark 50 years of the country's liberation from Pakistan.
  - Multinational military exercise.

Exercise La Pérouse

- Recently, The Navy has deployed two ships and a P-8I long range maritime patrol aircraft for the France-led multi-lateral maritime exercise La Pérouse which began in the Eastern Indian Ocean.
- The first edition of the La Pérouse joint exercise, initiated by France in 2019, included ships from Australia, Japan and the USA.
- For the first time India will join its Quad partners — Australia, Japan, and the United States — in the France-led joint naval exercise, La Pérouse.

NanoSniffer: A Microsensor based Explosive Trace Detector

- The Union Minister has launched NanoSniffer, the world's first Microsensor-based Explosive Trace Detector (ETD).
- NanoSniffer can detect explosives in less than 10 seconds and it also identifies and categorizes explosives into different classes.
- It can accurately detect a wide range of military, commercial, and home-made explosives threats.
- NanoSniffer provides trace detection of the nano-gram quantity of explosives, and delivers results in seconds.
- It gives visible & audible alerts with a sunlight-readable color display.
- It is a 100 per cent Made in India product in terms of research, development & manufacturing. The core technology of NanoSniffer is protected by patents in the U.S. & Europe.

Advanced Chaff Technology

- The Defence Research and Development Organisation (DRDO) has developed an Advanced Chaff Technology to safeguard the naval ships against enemy missile attack.
- Chaff is an electronic countermeasure technology used by militaries worldwide to protect naval ships or other sensitive targets from radar and radio frequency (RF)

guiding mechanisms of the enemy missile.

➤ The chaff rockets deployed in the air reflect as multiple targets for the missile guidance systems and deflecting adversary missiles, thus protecting own assets.

➤ Defence Laboratory Jodhpur (DLJ), a DRDO laboratory, has indigenously developed three variants of this critical technology namely:

1. Short Range Chaff Rocket (SRCR),
2. Medium Range Chaff Rocket (MRCR) and
3. Long Range Chaff Rocket (LRCR)

Chaff v/s flares:

➤ Chaff — which comprises "millions of tiny aluminum or zinc-coated fibers" — is stored onboard an aircraft in tubes and ejected behind the plane to confuse radar-guided missiles.

➤ Meanwhile, flares distract heat-seeking, infrared-guided missiles "by ejecting magnesium pellets from tubes to ignite in the wake behind an aircraft.

Project DANTAK

➤ It was established on April 24, 1961 as a result of the visionary leadership of His Majesty the Third King and then Prime Minister Jawahar Lal Nehru.

➤ DANTAK was tasked to construct the pioneering motorable roads in the Kingdom.

➤ The notable projects executed by the project include the construction of Paro Airport, Yonphula Airfield, Thimphu – Trashigang Highway, Telecommunication & Hydro Power Infrastructure, Sherubtse College, Kanglung and India House Estate.

Chenab Arch Bridge

➤ Recently, Indian Railways completed the construction of the arch of Chenab Bridge in the union territory of Jammu and Kashmir.

➤ This is the highest Railway Bridge in the world being 359m above the river bed level.
   o It is a National project of India.

➤ Indian Railways is constructing the iconic Arch Bridge on River Chenab as a part of the Udhampur-Srinagar-Baramulla rail link (USBRL) project.

➤ The length of the Chenab bridge will be 1,315 metres with 17 spans, of which the span of the main arch across Chenab river will be 467m.

➤ Steel was specifically chosen for the construction of the bridge as it will make the project more economical.

➤ It can withstand earthquakes with a magnitude of up to eight and high-intensity blasts.
   o Bridge designed for blast load in consultation with DRDO for the first time in India.

Operation Samudra Setu II

➤ Indian Navy has launched Operation Samudra Setu II for shipment of liquid medical oxygen-filled cryogenic containers and associated medical equipment from various countries to India.

➤ It was launched along with 'Vande Bharat Mission'.
   o The Vande Bharat Mission started to evacuate Indians stranded abroad due to coronavirus-induced travel restrictions.
   o It was the world's largest expatriation exercise to bring back stranded Indians from foreign destinations.

Iron Dome Air Defence System: Israeli

➤ It is manufactured by Rafael Advanced Defence Systems Limited and has been in service with Israeli Air Force since 2011.The radar system was developed by Elta.

➤ Iron Dome is a multi-mission system capable of intercepting rockets, artillery, mortars and Precision Guided Munitions like very short range air defence (V-SHORAD) systems as well as aircraft, helicopters and Unmanned Aerial Vehicles (UAV) over short ranges of up to 70 km.

➤ It is an all-weather system and can engage multiple targets simultaneously and be deployed over land and sea.

➤ One of the system's important advantages is its ability to identify the anticipated point of

impact of the threatening rocket, to calculate whether it will fall in a built-up area or not, and to decide on this basis whether or not to engage it.

➢ The I-DOME is the mobile variant with all components on a single truck and C-DOME is the naval version for deployment on ships.

➢ The system's inability to cope with very short range threats as estimates put the Iron Dome's minimum interception range at 5-7 kilometres.

Offshore Patrol Vessel (OPV) 'Sajag'

➢ This is third of five OPVs indigenously designed and built by the Goa Shipyard Limited in line with Prime Minister Narendra Modi's 'Make in India' vision.

➢ It is fitted with advanced technology, navigation and communication equipment, sensors, and machinery.

➢ Sajag will strengthen its concurrent multiple operations' capability towards ensuring safe, secure and clean seas as also responding promptly to maritime emergencies in neighbourhood.

➢ The Indian Coast Guard was created through an Act of Parliament in 1978 and has today emerged as the fourth largest in the world, with almost 160 ships and 62 aircraft.
  o The concept of forming ICG came into being post 1971 war, when it was assessed that maritime borders are equally vital as land borders.
  o The blueprint for a multi-dimension Coast Guard was conceived by the visionary Rustamji Committee.

Research Design & Standards Organization

➢ Indian Railways' Research Design & Standards Organization (RDSO) has recently become the nation's first institution to be declared as Standard Developing Organization (SDO) under the mission called "One Nation One Standard" on Bureau of Indian Standards.

➢ The recognition is valid for 3 years and will require renewal after completion of the validity period.
  o Research Designs & Standards Organization (RDSO), Lucknow, which is the sole R&D Wing of Ministry of Railways, is one of India's leading Standard formulating Body undertaking standardization work for railway sector.

➢ The idea of One Nation One Standard Mission was first conceived in2019, it was envisioned on the line of one nation, one ration card scheme in order to ensure quality products in the country.

➢ **Benefits of this Recognition**
  o Larger participation of industry/vendors/technology developers/MSME's in Indian Railways supply chain
  o The competitiveness amongst the industry will increase
  o There will be a reduction in cost and quantum improvement in the quality of product and services
  o There will be smooth induction of latest evolving & emerging technologies on Indian Railways
  o Dependence on imports will reduce and "Make-in-India" will get a boost
  o Improved ease-of-doing-business
  o RDSO will be recognized on international standards-making bodies and there will be integration with global supply chain/global trade

Passage Exercise

➢ A passage exercise is normally undertaken whenever an opportunity arises, in contrast to pre-planned maritime drills.

➢ Over the last few months, the Indian Navy has conducted a number of Passage Exercises (PASSEX) with navies from Indonesia, Japan, Australia and the US.

➢ PASSEXs are conducted regularly by IN with units of friendly foreign navies, whilst visiting each other's ports or during a rendezvous at sea.

Nuclear Arsenal: SIPRI Report

➢ According to Swedish think tank Stockholm International Peace Research Institute

(SIPRI) Year Book 2021, the Number of nuclear warheads globally appears to be increasing.

➢ The nine nuclear armed states - the U.S., Russia, the U.K., France, China, India, Pakistan, Israel and North Korea - together possessed an estimated 13,080 nuclear weapons at the start of 2021.

   ➢ Russia and the U.S. together possessed over 90% of global nuclear weapons and have extensive and expensive modernisationprogrammes under way.

      o The U.S. and Russia have reduced their nuclear arsenals under the 2010 New Strategic Arms Reduction Treaty (New START) but it will lapse in February 2021.

      o Both the countries have approved the extension of New START for another five years.

   ➢ India possessed an estimated 156 nuclear warheads at the start of 2021 compared to 150 at the start of last year, while Pakistan had 165 warheads, up from 160 in 2020.

      o India and Pakistan are seeking new technologies and capabilities that dangerously undermine each other's defence under the nuclear threshold.

➢ India was the third largest military spender in the world in 2020, behind only the US and China.

➢ The five largest arms importers were Saudi Arabia, India, Egypt, Australia and China.

➢ The five largest arms exporters were the United States, Russia, France, Germany and China.

➢ **Region Wise:** Asia and Oceania were the largest importing regions for major arms, receiving 42% of global arms transfers in 2016–20.

      o India, Australia, China, South Korea and Pakistan were the biggest importers in the region.

Krivak class frigate

➢ The Krivak class stealth ships being built with technology transfer from Russia by Goa Shipyard Ltd. (GSL) under "Make in India".

   o The engines for the ships are supplied by ZoryaNashproekt of Ukraine.

➢ In October 2016, India and Russia signed an Inter-Governmental Agreement (IGA) for four Krivak or Talwar stealth frigates.

   o Two to be procured directly from Russia and two to be built by the GSL.

➢ These new Krivak III frigates will have the same engines and armament configuration as Yantar's last three frigates — INS Teg, Tarkash and Trikand. These include the vaunted BrahMos anti-ship and land attack missile.

➢ Due to the use of stealth technologies and a special hull design, the resulting frigate features reduced radar cross section (RCS) as well as electromagnetic, acoustic and infrared signatures.

➢ Project Seabird:The largest naval infrastructure project for India.

Exercises

S. No	Exercise name	Partner Nation	Remarks
1.	INDRA NAVY	Russia	Started in 2003, 11th edition took place in 2020 in the Bay of Bengal
2.	JIMEX	Japan	The 4th edition of India – Japan Maritime bilateral exercise was held in North Arabian Sea.
3.	SITMEX-20	Singapore and Thailand	A trilateral naval exercisetook place in the Andaman Sea.The 2020 edition of the exercise was hosted by RSN.
4.	Desert Knight-21	France	It is a bilateral Air exercise, DK-21 took place at Air Force Station Jodhpur.

| 5. | DUSTLIK II | Uzbekistan | A joint military exercise, was commences in Chaubatia, Ranikhet (Uttarakhand).The first edition of the exercise was held at Uzbekistan in Nov 2019. |
| 6. | Varuna | France | It started in 1983 between the navies of India and France, later named as varuna in 2001. VARUNA-2021' concluded in in the Arabian Sea. |

ART AND CULTURE

Mongolian Kanjur Manuscripts

➢ The Ministry of Culture has taken up the project of reprinting of 108 volumes of Mongolian Kanjur (Concise Orders) under the National Mission for Manuscripts (NMM).
  • The NMM was launched in February 2003 by the Government of India, under the Ministry of Tourism and Culture.
  • Objectives: To publish rare and unpublished manuscripts so that the knowledge enshrined in them is spread to researchers, scholars and general public at large.
➢ It is held in high esteem by the Mongolian Buddhists and they worship the Kanjur at temples and recite the lines of Kanjur in daily life as a sacred ritual.
➢ It is considered to be the most important religious text in Mongolia.
➢ Mongolian Kanjur has been translated from Tibetan.
➢ It is a source of providing a cultural identity to Mongolia.

Madhubani Paintings

➢ Madhubani painting, also referred to as Mithila Art (as it flourishes in the Mithila region of Bihar), is characterized by line drawings filled in by bright colours and contrasts or patterns.This style of painting has been traditionally done by the women of the region, though today men are also involved to meet the demand.
➢ Popular: Their tribal motifs and use of bright earthy colours. These paintings are done with mineral pigments prepared by the artists.
➢ The work is done on freshly plastered or a mud wall. For commercial purposes, the work is now being done on paper, cloth, canvas etc.
➢ Floral, animal and bird motifs, geometrical designs are used to fill up all the gaps.
➢ Themes: Hindu deities such as Krishna, Rama, Siva, Durga, Lakshmi, Saraswati, Sun and Moon, Tulasi plant, court scenes, wedding scenes, social happenings etc.

Chola Era: Rare Inscription

➢ A rare inscription dating back to the Renati Chola era has been unearthed in Kadapa district that has kindled interest among the fraternity of archaeology and history.
  o The Telugu Cholas of Renadu (also called as Renati Cholas) ruled over Renadu region, the present day Cuddapah district.
  o The Cholas are remembered as one of the longest rulingdynasties in the southern regions of India.
  o The early periods of the Chola rule saw the onset of the Sangam literature. Kantaman was one of the prominent rulers of this era.
  o Rajaraj Chola and Rajendra Chola further expanded the kingdom into the Tamil region.
➢ It has been found engraved on a dolomite slab and shale.
➢ The inscription was written in archaic Telugu.
➢ The inscription seems to throw light on the record of a gift of six Marttus (a measuring unit) of land gifted to a person Sidyamayu, one of the Brahmins serving the temple at Pidukula village.

Swami Sree Narayana Guru

➢ He was a social reformer. He transformed the social fabric of Kerala and changing the traditional beliefs of Keralites.
➢ He led reform movement in Kerala, revolted against caste system and worked on propagating new values of freedom in spirituality and social equality which transformed the Kerala society.
➢ He also lent his support to the Vaikkom Satyagraha which was aimed at temple entry in Travancore for the lower caste.
➢ Narayana Guru organized an All-Region Conference in 1923 at AlwayeAdvaita Ashram, which was reported to be first such event in India.

Indus Valley Civilization (Dairy Production)

➢ The year 2020 marks 100 years of discovery of Indus Valley Civilisation, and a new study has shown that dairy products were being produced by the Harappans as far back as 2500 BCE.

➢ The studies were carried out on 59 shards of pottery from KotadaBhadli, a smallarcheological site in present-day Indian state of Gujarat.

➢ The study used molecular analysis techniques to study the residues from ancient pottery.

➢ Through a process called stable isotope analysis, the researchers were also able to identify the type of ruminant used for dairy, and concluded that these were cattle, like cows and buffalo, rather than goats and sheep.

➢ The Harappans did not use dairy for their household. The large herd indicates that milk was produced in surplus so that it could be exchanged and there could have been some kind of trade between settlements. This could have given rise to an industrial level of dairy exploitation.

LachitBorphukan

➢ Originally named as Lachit Deca, LachitBorphukan, the fierce and indefatigable Ahom Commander, was born during the early 17th century at Betioni in the Golaghat district of modern Assam.

   o Lachit received military training from an early age and joined the Ahom King Jayadhvaj Singha (1648-1663) as a scarf-bearer. The post 'scarf-bearer' or 'SoladharaBarua' is considered as a part of the incumbent king's personal staff.

   o In the subsequent time, owing to his military training, Lachit was appointed as 'GhoraBarua' or 'Superintendent of Royal Horses'. Later he was promoted to the post of Commander of the Simulgarh Fort situated at the south bank of Brahmaputra.

   o When Chakradhwaj Singha became the king of Ahom dynasty during 1663 to 1669, he appointed Lachit as the Superintendent of the Royal Guards.

   o Finally, Lachit was appointed as 'Borphukan' by King Chakradhwaj Singha. Then onwards, Lachit Deka was known as LachitBorphukan.

➢ The position of Borphukan, which is one of the top five councillors in the Ahom kingdom, was instituted by King Prataap Singha (1603-1641). Borphukan is a position embedded with both executive and judicial powers with its headquarters at Kaliabor in Assam. Lachit shifted the headquarters to Itakhuli in Guwahati.

➢ The National Defence Academy (NDA), ever since 1999 has been conferring the best passing out cadet with the LachitBorphukan gold medal,' named after soldier LachitBorphukan.

➢ **Battle of Saraighat:** In August 1667, Chakradhvaj Singha appointed LachitBorphukan as the Commander-in-Chief of Ahom kingdom. Immediately, Lachit started operation against the invading Mughal army to reclaim Guwahati.

➢ By November 1667, Lachit, with his military prowess, evicted the last vestiges of Mughal presence from the frontier of Assam. Mughal Emperor Aurangzeb Alamgir was enraged after the humiliating defeat and in January 1668 sent a strong contingent of Mughal army under Raja Ram Singh Kachwaha of Amber to defeat LachitBorphukan and his army.

➢ The final battle of Saraighat started in 1671. On the day of Saraighat battle, Lachit was terribly unwell. However, despite being ill, he displayed tremendous valour, extraordinary bravery and exemplary leadership. Such an action by an ailing yet forceful Lachit motivated his troops. They fought the battle with fierce zeal and intense courage. The Mughal army suffered comprehensive defeat in the hands of Lachit's army.

➢ In April 1672, a year after the decisive battle of Saraighat, Lachit died at his Kaliabor headquarters.

➢ The battle of Saraighat, which was occurred in 1671, was the culmination of many small fights in between the two rival armies. The Mughal troops started fighting under Raja Ram Singh since February 1669

Kevadia Tourism Circuit

➢ Prime Minister inaugurated 17 tourism projects around the Statue of Unity (SoU), now

called the 'Kevadia Tourism Circuit', on his two-day visit to Gujarat, the first since the pandemic struck.

➢ Nestled between the Satpura and Vindhyachal mountain ranges in Kevadia of Narmada district, the 182-metre-high statue dedicated to Sardar Vallabhbhai Patel, built at a cost of Rs 3,000 crore, is said to be the tallest in the world.

➢ Kevadia, a village in the tribal Narmada district, is home to the Sardar Sarovar Dam reservoir on the Narmada river, and was a popular picnic spot even before the SoU came up.

➢ The circuit covers 35 tourist spots, out of which the Valley of Flowers, Vishwa Van, Jungle Safari, Cactus Garden, Butterfly Garden, Ekta Nursery, Tent City, Khalvani Eco-tourism, Zarwani Eco-tourism, NaukaVihar and River Rafting, located around the periphery of the statue and the Narmada Dam, are already open.

➢ Major Attractions in Kevadia:
  o Sardar Patel Zoological Park and Jungle Safari
  o Children's Nutrition Park
  o The Mirror Maze
  o Carnival look and Riverfront cycling tour

Miyas of Assam and their Char-Chapori culture

➢ The 'Miya' community comprises descendants of Muslim migrants from East Bengal (now Bangladesh) to Assam. They came to be referred to as 'Miyas', often in a derogatory manner.

➢ The community migrated in several waves — starting with the British annexation of Assam in 1826, and continuing into Partition and the 1971 Bangladesh Liberation War — and have resulted in changes in demographic composition of the region.

➢ A char is a floating island while chaporis are low-lying flood-prone riverbanks. They are used interchangeably or with a hyphen. They keep changing shapes — a char can become a chapori, or vice versa, depending on the push and pull of the Brahmaputra.

➢ The community's cultural motifs and heritage are related to agriculture and the river. The community has a variety of songs (bhatiali related to the river, magangeet or harvest songs, noikhelorgeet or boat songs etc), instruments and equipment to catch fish, as well as different kinds of boats.

➢ They have an ancient performative martial art called the Lathibari.

Khudiram Bose

➢ One of the youngest leaders of the Independence movement, Bengali revolutionary Khudiram Bose is highly regarded for his fearless spirit.

➢ Khudiram Bose had just crossed 18 years of age when he was sentenced to death for an attack to the British and was hung on 11th August 1908 at Muzaffarpur, Bihar.

➢ In 1905, when Bengal was partitioned, he actively participated in protests against the British.

➢ He was part of the Anushilan Samiti that was active in the first quarter of 20th century in Bengal advocating the revolutionary idea for freedom movement. The Samiti was led by nationalists like Rishi Aurobindo Ghosh, and his brother Sri Barindra Ghosh.

➢ On April 30, 1908, Bose threw a bomb on a carriage which he suspected was carrying Kingsford. But it turned out that it was carrying the wife and daughter of a barrister named Pringle Kennedy, who lost their lives, as Kingsford escaped.

➢ On May 21, 1908, the historic trial of Bose began presided by Judge Corndoff, Nathuni Prasad and Janak Prasad in the Jury. Bose's lawyer Narendra Kumar argued that he was too young to be able to make bombs. However, the judges had evidence of more revolutionary activities planned.

➢ On July 13, 1908, Bose was finally sentenced to death.

Hampi and its significance

➢ Hampi is the town of ruins of Vijayanagara Empire. It is one of the UNESCO recognized world heritage sites in India. The place is one of India's most known archaeological destinations.

➢ The heritage site is located near the River Tungabhadra. Hampi was known by various names at different points of time: Hosapattana (New City), Vijayanagara (City of Victory),

Vidyanagara (City of Learning) or Hampe, Pampa-kshetra and Pampa-pura—after the local goddess Pampa, who was worshipped even before the seventh century C.E.

  o Hampi was the capital of the mighty Vijaynagar Empire in the 14th century.

➢ The temples of Hampi, its monolithic sculptures and monuments, attract the traveler because of their excellent workmanship.

➢ Hampi remained in central importance in the medieval times as the second capital of the Vijayanagara Empire.

➢ Hampi is famous for Purandara Festival. This annual festival is held in January-February in the Vittal temple to celebrate the birth anniversary of the medieval poet-composer, Purandar.

➢ **Battle of Talikota (1565),** confrontation in the Deccan region of southern India between the forces of the Hindu raja of Vijayanagar and the allied Muslim sultans of Bijapur, Bidar, Ahmadnagar, and Golconda.

➢ The battle was fought on January 23, 1565, at a site southeast of Bijapur, in what is now northern Karnataka state.

➢ It also began a final Muslim penetration of southern India that lasted until the end of the 18th century.

Subhash Chandra Bose

➢ The Union Culture Ministry has announced that January 23, birth anniversary of Subhas Chandra Bose, would be celebrated as "Parakram Divas", day of courage, every year.

➢ He was born on 23 January, 1897, in Cuttack, Orissa Division, Bengal Province.

➢ Since his young days, he was highly influenced by Vivekananda's teachings and considered him as his spiritual Guru.

➢ Bose joined the Indian National Congress in 1921. He also started a newspaper called 'Swaraj'.

➢ In 1923, Bose was elected the President of the All India Youth Congress and also the Secretary of Bengal State Congress. He also served as the Chief Executive Officer of the Calcutta Municipal Corporation, with Das as mayor of Calcutta.

➢ Bose's ideologies were highly contradictory to that of Mahatma Gandhi, who was highly popular among masses. While Bose stood for self-governance, even if it meant the use of force against the British, Gandhi emphasized on non-violent means.

➢ Bose stood for and was elected the party's president in 1939 but was forced to resign due to differences with Gandhi's supporters.

➢ On June 22, 1939, Bose organized the All India Forward Bloc, a faction within the Indian National Congress, aiming at consolidating the political left, but was arrested again, and released following a seven-day hunger strike.

➢ He founded the Indian Legion out of about 4500 Indian soldiers who were in the British army and had been taken prisoners by the Germans from North Africa.

➢ Bose's arrival in Japan revived the Indian National Army (Azad Hind Fauj) which had been formed earlier with Japanese help.

  o The INA was first formed under Mohan Singh and Japanese Major Iwaichi Fujiwara, and comprised Indian prisoners of war of the British-Indian Army captured by Japan in the Malayan (present-day Malaysia) campaign and at Singapore.

➢ Azad Hind or the Provisional Government of Free India was established as a government-in-exile with Bose as the head. Its headquarters was in Singapore. The INA was its military.

➢ Bose is credited with the very famous slogan, "Give me blood, and I shall give you freedom!" as well as "Jai Hind. " He is also credited to be the first man to call Mahatma Gandhi "Father of the Nation", in his address from Singapore.

➢ The INA supported the Japanese army in its invasion of northeast India and also took control of the Andaman and Nicobar Islands. However, they were forced to retreat by the British forces following the Battles of Kohima and Imphal in 1944.

➢ Bose authored the book 'The Indian Struggle' which covers the Indian independence movement from 1920 to 1942.

➢ His death is one of the greatest mysteries in the history, Bose is said to have died from third-degree burns in a plane crashed in Taiwan on August 18, 1945.

Veer Savarkar

➢ Born on May 28, 1883, in a Marathi Brahmin family, Veer Savarkar is known for his vision of Hindu Rashtra (Hindu Nation) and Akhand Bharat (United India).

➢ He was inspired by leaders like Bal Gangadhar Tilak, Lala Lajpat Rai and Bipin Chandra Pal.

➢ The Savarkar brothers were active in the Mitra Mela, a secret society formed with the aim of liberating, through the use of armed force, India from British rule.

➢ He and his brother founded a secret society called Abhinav Bharat Society.

➢ When In 1906, Savarkar left for London to get credentialed in law, he involved himself with organizations such as India House and the Free India Society.

➢ In his book 'The History of the War of Indian Independence', he analysed the circumstances of 1857 uprising. It was Veer Savarkar who named the 1857 rebellion as the first war of independence, was banned by British authorities.

➢ In 1911, Savarkar was sentenced to 50 years in the cellular jail of Andamans, also known as Kala Pani for revolting against the Morley-Minto reforms (Indian Councils Act 1909).

➢ He served as president of the Hindu Mahasabha from 1937 to 1943.

➢ In 1964, he felt that his goal of independence India is achieved and he declared his wish to attain Samadhi. He started a hunger strike on February 1, 1966, and passed away on February 26, 1966.

➢ He worked on the abolishment of untouchability and caste-based discrimination in Ratnagiri.

Risa (Hand woven cloth in Tripura)

➢ The traditional Tripuri female attire comprises three parts — risa, rignai and rikutu.

➢ Risa is a handwoven cloth used as a female upper garment, and also as headgear, a stole, or a present to express respect.

➢ As an upper garment, it is wrapped around the torso twice.

➢ Rignai is primarily worn as the lower garment and literally translates into 'to wear'. It can be understood as an indigenous variety of the sari of mainland India.

➢ Rituku is mainly used as a wrap, or like a 'chunri' or a 'pallu' of the Indian saree. It is also used to cover the head of newly married Tripuri women

➢ These garments were traditionally handwoven. Handloom remains an integral part of the Tripuri household, even with the advent of powerloom-manufactured garments.

➢ Risa is common in almost all 19 indigenous tribal communities of Tripura.

Indian Telegraph Act 1885

➢ It governs the use of wired and wireless telegraphy, telephones, teletype, radio communications and digital data communications.

➢ At the time the Act was conceived, India was still under the rule of the British Raj.

➢ Telegraph was first installed in 1851 and a trans-India telegraph was completed three years later in 1854.

➢ It also authorizes government law enforcement agencies to monitor/intercept communications and tap phone lines under conditions defined within the Indian Constitution.

➢ Section 5(2) of the act allows central and state governments to prevent the transmission of messaging during a "public emergency or in the interest of public safety", or "in the interests of the sovereignty and integrity of India, the security of the state".

➢ The Rules framed in 2017, issued under the Indian Telegraph Act, 1885, stipulate that only the Home Secretary of the Union or a state can pass an order to suspend the telecom services, including the Internet, "due to public emergency or in the interest of public safety", and that the order must include the reasons for the decision.

Buddhist Monastery found by Archaeological Survey of India (ASI)

➢ Recently, ancient Buddhist monastery found in a hilly area of Hazaribagh district of Jharkhand.

- A branch of ASI has excavated 10 stone statues of deity Tara and the Buddha in Burhani village near JuljulPahar of Sitagarhi Hills.
- four statues of deity Tara in Varad Mudra [gesture of hand showing dispensing of boons].
  - Nagri script on a Tara statue:Nagri is a previous version of Devnagri script and the words indicate Buddhist religious affiliation.
- Six statues of the Buddha in Bhumisparsa Mudra [gesture of hand showing five fingers of right hand towards the earth symbolising the Buddha's enlightenment].
- A sculpture which appears to be that of Shaivite deity Maheswari – with a coiled crown and chakra – indicating cultural assimilation in the area.
- The presence of statues of deity Tara shows possible proliferation of Vajrayana form of Buddhism in this region.
  - Vajrayana (The Vehicle of the Thunderbolt) is a form of Tantric Buddhism, which flourished in India from 6th to 11th century.

Monpa Handmade Paper of Tawang

- Monpa Handmade paper is made by the Monpa tribe from the bark of tree Shugu Sheng grown locally in Tawang and is identified by its distinctive translucent fibrous texture.
- The bark from the shrub has to be extricated, dried, boiled with a solution of ash, made into pulp and then cut into sheets of paper.
- The handmade paper sheet measuring 24 inch in length and 16 inch in width.
- Khadi and Village Industries Commission, has made Monpa Handmade paper available online through its e-portal www.khadiindia.gov.in.
- The paper is weightless but its natural fibers add great tensile strength to this paper making it apt for various art works.
  - The paper serves as a good material for religious scriptures.

Pandit Bhimsen Joshi Jayanti

- Born on February 4, 1922 at Gadag in Dharwad district of Karnataka.
- He received the Bharat Ratna in 2008.
- A brilliant exponent in the field of Hindustani classical music, Pandit Bhimsen Joshi was also known for his presentation of patriotic and a devotional singer.
  - Bhimsen's Hindustani classical music had a unique style as it was influenced by a number of greats including Begum Akhtar, Smt. KesarbaiKerkar and Ustad Amir Khan.
- Though he mainly stuck onto Kirana gharana for most part of his career, he also incorporated various styles and gharanas from each of his inspirations.
  - Kirana Gharana, which got its name from a small town called Kerana inUttar Pradesh and founded by Ustad Abdul Karim Khan. Famous artistes such as Abdul Wahid Khan, Suresh Babu Mane, Hira Bai Badodekar, Roshanara Begum belong to this gharana.
- On January 24, 2011, he breathed his last.

Kerala's famous temple art Tholpavakkoothu

- Recently, a shadow leather puppet in Kerala's famous temple art Tholpavakkoothu has been animated by a robot.
- Tholpavakkoothu or shadow puppetry is a temple art form which is prevalent in the Bhagavathy temples (mother Goddess) in Palakkad district and nearby regions in Kerala.
  - This art is confined largely to Pulavar families from Shoranur region of Palakkad district.
- Tholppava (Thol means leather, Pava means puppet) are moved with the help of strings, and their shadows are depicted on a screen with the help of a row of oil lamps in the background.
- The story of Tholppavakkoothu performance is from the Indian epic, Ramayana.
- The narrative used for the performance is a mixture of prose and poetry called Adalpattu.
- It is also known as Nizhalkkoothu and Olakkoothu.
- The chief puppeteer is known as 'Pulavan'.

➢ Accompanying instruments include Ezhupara, Chenda and Maddalam. The puppetry is staged on a special structure in temple premises called Koothumadam.

Anangpal II

➢ Anangpal II, popularly known as AnangpalTomar, belonged to the Tomar dynasty that ruled parts of present-day Delhi and Haryana between the 8th and 12th centuries.

➢ The capital of Tomars was Dhillikapuri (Delhi) during the reign of Anangpal II.
  o Initially at Anangpur (near Faridabad) during the reign of Anangpal I (who founded the Tomar dynasty in the 8th century).

➢ AnangpalTomar II was succeeded by his grandson Prithviraj Chauhan.

➢ The Delhi Sultanate was established in 1192 after Prithviraj Chauhan's defeat in the Battle of Tarain (present-day Haryana) by the Ghurid forces.

➢ Anangpal II is credited to have established and populated Delhi during his reign in the 11th century.

➢ The region was in ruins when he ascended the throne in the 11th century; it was he who built Lal Kot fort (Qila Rai Pithora) and Anang Tal Baoli (in South Delhi).

➢ The Tomar rule over the region (present-day Delhi and Haryana) is attested by multiple inscriptions and coins.
  o The most reliable evidence about the early history of Delhi is inscribed on the iron pillar of Masjid Quwaatul Islam, adjacent to the Qutab Minar.
  o According to this inscription, Anangpal of the TomarRajputs founded Delhi between 1053 and 1109 AD.

➢ According to KA Nizami's Urdu book, Ehd-e-Wusta ki Dilli, translated in English as Delhi in Historical Perspectives, looks at Delhi across six centuries (from 1300 to 1800). Tracing the antecedents of Delhi, Nizami refers to Persian annals that describe it as "Inderpat".

➢ According to KA Nizami's Urdu book, Delhi formally emerged as a city only in the 11th century when TomarRajputs took over the mountainous Aravalli region.

Kathakali maestro ChemancheriKunhiraman Nair

➢ Recently, Veteran Kathakali exponent Guru ChemancheriKunhiraman Nair died at the age of 105 in Koyilandy, Kerala.

➢ Guru ChemancheriKunhiraman Nair was Born on June 16, 1916.

➢ ChemancheriKunhiraman Nair's tryst with Kathakali, the ancient dance drama of Kerala, began at the age of 14, when he left his home to join a kathakali troupe run by Guru Karunakaran Menon.

➢ After years of practice and hard work, he founded BharatiyaNatyakalalayam in 1945, which was the first school of dance in north Kerala and later went on to establish several other dance schools, including the Cheliya Kathakali Vidyalayam(1983) in his native village.

➢ His portrayal of Lord Krishna and Kuchela on stage always left the audience spellbound and his last notable public performance was at the age of 100.

➢ He had been honoured with the Padma Shree in 2017 in recognition of his glorious contribution to the art form.

➢ Several awards and recognitions came his way over the years including that of the Kerala Sangeeta NatakaAkademi and Kerala Kalamandalam.

Shigmo Festival/ Shigmotsav

➢ The Shigmo festival, also known as Shigmotsav, is one of the most popular spring festivals that take place in Goa every year. It is a vibrant celebration full of colour, song and dance rooted in Goan culture and traditions.

➢ Shigmo is the celebration of a 'rich, golden harvest of paddy' by the tribal communities of Goa.

➢ Agricultural communities including the Kunbis, Gawdas and Velips celebrate the festival that also marks the onset of spring.

➢ Shigmo celebrations last over a fortnight in the months of Phalgun-Chaitra months of the Hindu calendar that correspond with March-April every year.

➢ Folk dances like Ghodemodini (a dance of equestrian warriors), Gopha and Phugadi are

among the many dances performed by the participating communities.

Lingaraj Temple

- ➢ Lingaraj Temple, built in 11th century, is dedicated to Lord Shiva and is considered as the largest temple of the city Bhubaneswar, Odisha.
- ➢ Built by king JajatiKeshari of Soma Vansh, the main tower of this temple measures 180-feet in height.
- ➢ It is built in red stone and is a classic example of Kalinga style of architecture.
- ➢ The sprawling temple complex has one hundred and fifty subsidiary shrines.
- ➢ In the sanctum sanctorum, the linga of Lord Shiva is regarded as 'Swayambhu' (self-originated) and worshipped as both Lord Shiva and Lord Vishnu.
- ➢ The presiding deity here is known as Hari-Hara; Hari denotes Lord Vishnu and Hara meaning Lord Shiva.
- ➢ The other attraction of the temple is the Bindusagar Lake, located in the north side of the temple.The pond has religious relationship with the main temple

Gurudev Rabindranath Tagore Jayanti

- ➢ Rabindranath Tagore was born on May 7, 1861 in the Jorasanko mansion in Calcutta to Debendranath Tagore and Sarada Devi.
- ➢ He was a Bengali poet, Brahmo Samaj philosopher, visual artist, playwright, novelist, painter and a composer.
- ➢ It was 'Gurudev' who gave the title of 'Mahatma' to the 'Father of the Nation'.
- ➢ The literary icon Rabindranath Tagore's compositions were chosen by two nations as their national anthems: India's 'Jana Gana Mana' and Bangladesh's 'Amar Sonar Bangla'. Even Sri Lanka's national anthem is based on Tagore's poem. The Bangla poem was first translated in Sinhalese and then adopted as National Anthem in 1951.
- ➢ Tagore wrote eight novels and four novellas – Chaturanga, ShesherKobita, Char Odhay and Noukadubi. He began his career in short stories at the age of 16 in 1877 with 'Bhikharini' (the beggar woman).
- ➢ Between 1893 and 1900 Tagore wrote seven volumes of poetry, which included Sonar Tari (The Golden Boat) and Khanika. Some of his best works include 'Balaka', 'Purobi', 'Sonar Tori' and 'Gitanjali'.
- ➢ In 1921 Tagore founded the Vishwa Bharati university at Shantiniketan that was a break away from the regular rote-learning mode of education to a kind that connected the students to humanities studies world over.
- ➢ Tagore, who began painting much later in his life when he was into his 60s, had made more than 3,000 paintings and drawings in the last 17 years of his life.
- ➢ Rabindranath Tagore became the first Asian to became Nobel laureate when he won Nobel Prize for his collection of poems, Gitanjali, in 1913.
- ➢ In 1915, he received knighthood from the British Crown, which he later renounced citing the massacre held at Jallianwala Bagh.

Maharana Pratap Jayanti

- ➢ Maharana Pratap was born on May 9, 1540, in Kumbhalgarh Fort to Jaiwanta Bai and Udai Singh II. His father, Udai Singh II, was the king of Mewar and his capital was Chittor.
- ➢ Maharana Pratap hailed from the Sisodiya clan of Rajputs.
- ➢ He was titled as "Mewari Rana" and was notable for his military resistance against the expansionism of the Mughal Empire and was known for his participation in the Battle of Haldighati and Battle of Dewair.
- ➢ The Battle of Haldighati was fought on 18 June 1576 between Pratap Singh and Akbar's forces led by Man Singh I of Amer. The site of the battle was a narrow mountain pass at Haldighati near Gogunda, modern day Rajsamand in Rajasthan.

Basava Jayanthi

- ➢ He was a 12th century philosopher, social reformer and preacher whose teachings are cherished not only by Karnataka but the whole country.
- ➢ He is also known as Bhaktibhandari (literally, the treasurer of devotion), Basavanna (elder brother Basava) or Basaveswara (Lord Basava).
- ➢ The twelfth century witnessed the emergence of a new movement in Karnataka, led by a

Brahmana named Basavanna who was initially a Jaina and a minister in the court of a Chalukya king.

- o His followers were known as Virashaivas (heroes of Shiva) or Lingayats (wearers of the linga).
- o They worship Shiva in his manifestation as a linga, and men usually wear a small linga in a silver case on a loop strung over the left shoulder.
- ➢ Basavanna spread social awareness through his poetry, popularly known as Vachanaas.
- ➢ Several important lingayat works are credited to Basavanna, including Vachana such as the Shat-sthala-vachana, Kala-jnana-vachana, Mantra-gopya, Ghatachakra-vachana and Raja-yoga-vachana.
- ➢ The Sharana movement he presided over attracted people from all castes, and like most strands of the Bhakti movement, produced a corpus of literature, the vachanas, that unveiled the spiritual universe of the Veerashaiva saints.
- ➢ He set up the Anubhava Mandapa, where the Sharanas, drawn from different castes and communities, gathered and engaged in learning and discussions.
  - o Recently, Karnataka Chief Minister laid the foundation stone for the 'New AnubhavaMantapa' in Basavakalyan, the place where 12th century poet-philosopher Basaveshwara lived for most of his life.

World's oldest cave art

- ➢ Recently, Researchers have reported that Pleistocene-era rock paintings dating back to 45,000-20,000 years ago in cave sites in southern Sulawesi, on the Indonesian island of Sulawesi, are weathering at an alarming rate.
  - o Sulawesi is the largest island in Wallacea, a biogeographically distinct zone of oceanic islands situated between continental Asia and Australia.
- ➢ Archaeologists have discovered the world's oldest known cave art which is a life-sized picture of a wild pig that was painted at least 45,500 years ago in Indonesia.
- ➢ The Sulawesi warty pig painting we found in the limestone cave of LeangTedongnge is now the earliest known representational work of art in the world, as far as we are aware.
- ➢ The previously oldest dated rock art 'scene' at least 43,900 years old, was a depiction of hybrid human-animal beings hunting Sulawesi warty pigs and dwarf bovids.
  - o It was discovered by the same research team at a nearby limestone cave site.
- ➢ The cave art of Sulawesi is much older than the prehistoric cave art of Europe.
- ➢ The painting was made using red ochre pigment and depicts a pig with a short crest of upright hairs and a pair of horn-like facial warts in front of the eyes.
- ➢ They used a calcium carbonate deposit, also referred to as a "cave popcorn", that had formed on the rear foot of one of the pig figures.

UNESCO heritage sites added in India

- ➢ The six sites are namely Satpura Tiger Reserve, Iconic riverfront of the historic city of Varanasi, Megalithic site of Hire Benkal, Maratha Military Architecture in Maharashtra, Bhedaghat-Lametaghat in Narmada Valley- Jabalpur, and temples of Kanchipuram.
- ➢ As per Operational Guidelines, 2019, it is mandatory to put any monument/site on the Tentative List (TL) before it is considered for the final nomination dossier.
  - a. India has 48 sites in the TL as of now.

Buddha Purnima

- ➢ Buddha Purnima is an auspicious day that marks the birth anniversary of Gautam Buddha, the founder of Buddhism. Buddha Purnima falls on a full moon night, usually between April and May.
  - o Also known as Vesak or Buddha Day and Buddha Jayanti, is the most important festival for the followers of Buddhism across the world. This year Buddha Purnima was observed on May 26.
- ➢ It was also on the Day of Vesak that the Buddha attained enlightenment, and it was on the Day of Vesak that the Buddha in his eightieth year passed away.
- ➢ Lord Buddha was born as Prince Siddhartha Gautama on the Purnima Tithi (full moon day) in 563 BC in Lumbini (modern day Nepal). In Hinduism, Buddha is considered as the ninth avatar of Lord Vishnu.

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o The Buddha belonged to a small gana known as the Sakya gana, and was a kshatriya.
o He attained enlightenment under a peepal tree at Bodh Gaya, Bihar.

➢ Gautama Buddha preached Dharma (duty), non violence, harmony and kindness. He left his worldly possessions and princedom at the age of 30 to lead a life searching for the truth, seeking penance in the hopes of liberating himself from suffering (duhkha).

PandavLeni Complex

➢ The Archaeological Survey of India (ASI) has found three more caves in the Trirashmi Buddhist cave complex, also known as Pandav Leni, near Nashik, Maharashtra.
   o The newly found caves are believed to be older than the Trirashmi caves.
   ➢ The Trirashmi or Pandav Leni caves are a group of 25 caves that were carved out of Trirashmi Hill between the 2nd century BC and 6th century AD.
   ➢ The Trirashmi Buddhist caves complex was first documented in 1823 by Captain James Delamaine and is now an ASI- protected site.
   ➢ The Buddhist sculptures and caves in Nashik are a significant early example of Indian rock-cut architecture representing the Hinayana tradition of Buddhism.
   ➢ The caves have images of the Buddha and Bodhisattvas, and sculptures with designs of Indo-Greek architecture.
   ➢ The caves are on a vertical face of the hill.
   ➢ The sculptures carved in cave premises showcase the impact of Buddhism and Jainism whichprovide information that Pandavleni caves served both the religion during an ancient period.
      o The cave has idols of Buddha, Jain TeerthankaraVrishabhdeo, and the icons of Bodhisatva, Veer Manibhadraji and Ambikadevi.
   ➢ These caves are popular meeting places for the disciples as well.
   ➢ There are also attractive water tanks that are very skillfully chiseled into the rock.
   ➢ It is believed to be as old as the Karla Cave near Lonavala.

National Maritime Heritage Complex

➢ A National Maritime Heritage Complex (NMHC) will be developed in Lothal region of Gujarat.
➢ NMHC would be developed as an international tourist destination, where the maritime heritage of India from ancient to modern times would be showcased.
➢ It would be developed in an area of about 400 acres with various unique structures such as National Maritime Heritage Museum, Light House Museum, Heritage Theme Park, Museum Themed Hotels & Maritime themed eco-resorts, Maritime Institute etc.
➢ The unique feature of NMHC is the recreation of ancient Lothal city, which is one of the prominent cities of the ancient Indus valley civilization dating to 2400 BC.
➢ Lothal was one of the southernmost cities, and the only port town, in the Indus Valley civilisation, located in Gujarāt.
   o Construction of the city began around 2400 BCE.
   o Artefacts suggest that trade may have been conducted with Mesopotamia, Egypt and Persia.
➢ Other features include the acropolis, the lower town, the bead factory, the warehouses, and the drainage system.
➢ It has been nominated as a UNESCO World Heritage Site by the Indian government, its application is pending on the United Nation's tentative list.

MISCELLANEOUS

Dare to Dream 2.0

➢ DRDO has launched its innovation contest "Dare to Dream 2.0" on the 5th death anniversary of former President.
  ➢ It is a scheme to promote the Indian innovators and startups for innovations in defence and aerospace technologies.
  ➢ Award money, up to Rs. 10 lakh for startup and Rs. 5 lakh to individual category, will be given to the winners.

Globbaandersonii

➢ The plant is commonly known as 'dancing ladies' or 'swan flowers' are characterised by white flowers, non-appendaged anthers (the part of a stamen that contains the pollen) and a — "yellowish lip".
➢ It is classified as — "critically endangered" (IUCN Red List of Threatened Species) and — "narrowly endemic", the species is restricted mainly to Teesta River Valley region which includes the Sikkim Himalays and Darjeeling hill ranges.

Karan-4

➢ Co 0238 (Karan 4) is a high yielding and high sugar content variety of Sugarcane, derived from the cross Co LK 8102 x Co 775. This variety was evolved at the Sugarcane Breeding Institute, Regional Centre, Karnal.
➢ The jiggery of Co 0238 is of A1 quality with light yellow colour. This variety is moderately resistant to the prevalent races of red rot pathogen.

DehingPatkai Wildlife Sanctuary

➢ The Assam government decided to upgrade DehingPatkai Wildlife Sanctuary also known as the Jeypore Rainforest located in Dibrugarh and Tinsukia districts of Assam into a national park.It will be the sixth national park of Assam after Kaziranga, Nameri, Manas, Dibru-Saikhowa and Rajiv Gandhi Orang National Park.
  ➢ It is located within the larger DehingPatkai Elephant Reserve.
  ➢ Sanctuary lies at the foot hill of Patkai hill.
  ➢ River Dehing passes through this wild life sanctuary.
  ➢ It forms the largest stretch of lowland rainforest in the country.
  ➢ It has the highest concentration of the rare endangered White Winged Wood Duck.

BalaramYojana

The Odisha government has propelled BalaramYojana to give rural credit of Rs 1,040 crore to provide employment opportunitiesto those farmers who are currently unemployed at the timeof infection of corona virus.

NekarSammanYojana

Karnataka Chief Minister has launched NekarSammanYojane for handloom weavers in July 2020. Under the scheme, the state government is transferring Rs 2000 of financial support to all weavers in the state registered with the SevaSindhu portal.

Kakrapar Atomic Power Plant achieved criticality

➢ Almost 25 years after the last unit was commissioned at Kakrapar Atomic Power Plant, the Nuclear Power Corporation of India Limited (NPCIL) has achieved criticality of a third unit of 700 MWe at the plant in Tapi district which is fully based on indigenous technology.The first two units at Kakrapar of 220 MWe (Megawatt electric) each were based on Canadian technology. The third unit is fully indigenous.
➢ A reactor is said to be critical when the nuclear fuel inside a reactor sustains a fission chain reaction, where each fission event releases a sufficient number of neutrons to sustain a series of reactions. Criticality is first step towards power production.

Sarabhai Crater

The terrain mapping camera on board Chandrayaan-2"s orbiter has captured the image of Sarabhai crater, named after ‗Vikram Sarabhai" the father of the Indian space programme,

on the moon.

Bonda Tribe

➢ Census 2011 says there are just 12,000 Bondas left and they are one of the 13 Particularly Vulnerable Tribal Groups (PVTGs) found in Odisha.

   o They were the first forest settlers in India.

➢ The Bondas continue to speak in their language, Remo, which comes under the Austroasiatic language belonging to the Mundari group.

➢ A matriarchal society, the women prefer to marry men who are younger by at least 5-10years, so that the men can earn for them when they grow old.

➢ The tribe is divided into three groups:

   1. The Upper Bondas or Bara-Jangar group, who live on the slopes at over 900 meters above sea level;
   2. The Lower Bondas, who live at the foothills,
   3. The Gadaba-Bondas, who live at the same altitude as the Upper Bondas.

ThumbiMahotsavam

➢ Kerala will host the 3rd edition of annual Dragonfly Festival 'ThumbiMahotsavam 2020'.

➢ The official mascot of this festival is 'Pantalu', which is the genus of dragonfly in the family Libellulidae commonly known as rain pool gliders.

➢ It is organised in association with the National Biodiversity Board, UNEP, UNDP and IUCN – Centre for Environment Conservation.

➢ Dragonflies act as important bio-indicators of the ecological health of an area as they feed on mosquitoes and other insects that are vectors to life-threatening diseases like Malaria and Dengue.

Warli Painting

➢ Warli painting is a style of tribal art mostly created by the tribal people. Maharashtra is known for its Warli folk paintings.

➢ Warli is the vivid expression of daily and social events of the Warli tribe, used by them to embellish the walls of village houses.

➢ Women are mainly engaged in the creation of these paintings. These paintings do not depict mythological characters or images of deities, but depict social life.

➢ Images of human beings and animals, along with scenes from daily life are created in a loose rhythmic pattern.

➢ Painted white on mud walls, they are pretty close to pre-historic cave paintings in execution and usually depict scenes of human figures engaged in activities like hunting, dancing, sowing and harvesting.

➢ The painting is sacred and without it, the marriage cannot take place. These paintings also serve social and religious aspirations of the local people. It is believed that these paintings invoke powers of the Gods.

MahatamaAyankali

➢ He was born on 28 August 1863 in Perumkattuvila, Thiruvananthapuram and died on 18 June 1941, leaving behind a better and more inclusive world for Keralite lower castes.

➢ He was a social reformer, who worked for the advancement of deprived untouchable people in the princely state of Travancore, British India.

➢ He faught against caste discrimination and was a leader of an anti-caste movement and who later fought for basic rights including access to public spaces and entry to schools.

➢ Voicing out sentiments of the downtrodden, the man soon began to be known as Urpillai and Moothapullai.

➢ He was instated as a member of the Assembly of Travancore, known as the SreeMoolam Popular Assembly (SMPA) or Praja Sabha.

➢ He establishes the Sadhu Jana ParipalanaSangham (Association for the Protection of the Poor), which aimed at uniting members from suppressed communities and campaigned for access to schools along with raising funds to set up Pulayar-operated schools.

Ambedkar Social Innovation &Incubation Mission (ASIIM)

➢ Union Minister for Social Justice and Empowerment recently launched the mission

under Venture Capital Fund for SCswith a view to promoting innovation and enterprise among SC students studying in higher educational institutions.

➢ Objectives:
  o To promote entrepreneurship among the SC Youth with special preference to Divyangs.
  o To incentivise students with innovative mind-set to take to entrepreneurship with confidence.
  o To support (1,000) innovative ideas till 2024 through a synergetic work with the Technology Business Incubators (TBIs) set up by Department of Science and Technology
  o To support, promote, hand-hold the start-up ideas till they reach commercial stage by providing liberal equity support

KisanSuryoday Yojana (GUJARAT)

➢ It aims to provide 16 hours of power supply to farmers in the state every day. Under this scheme, farmers will be able to avail power supply from 5 AM to 9 PM
➢ After the Sujalam-Suflam and Sauni scheme, Gujarat through the KisanSuryoday Yojana has set a milestone in meeting the needs of the Gujarat Farmers.

Skal International Asia Area

➢ UT of Jammu and Kashmir has won the bid to host the 50th annual Skal International Asia Area (SIAA) Congress in 2021.
➢ Skal is a professional organisation of tourism leaders around the world, promoting global tourism and friendship.
➢ It is the only international group uniting all branches of the travel and tourism industry.
➢ Skal International is an UNWTO Affiliate Member since 1984. The World Tourism Organization (UNWTO) is the United Nations agency responsible for the promotion of responsible, sustainable and universally accessible tourism.

New Shepherd Rocket System

➢ A rocket system, called New Shephard, meant to take tourists to space successfully completed its seventh test launch.
➢ New Shephard has been named after astronaut Alan Shephard, the first American to go to space.
➢ The rocket system is built by Amazon founder Jeff Bezos's space company called Blue Origin.
➢ It will eventually allow space tourists to experience microgravity by taking them over 100 km above the Earth.
➢ It has been designed to take astronauts and research payloads past the Karman line – the internationally recognised boundary of space.

Star Campaigner

➢ A star campaigner is a leader who seeks vote for his party during the election. He or she can be a politician or even a film star. There is no strict law governing who can or cannot be made a star campaigner. It depends on the party whom to choose as the star campaigner for the election.
➢ As per the guidelines of the EC, a 'recognised' party can nominate a maximum of 40 star campaigners for a particular election. An unrecognised political party can nominate a maximum of 20 star campaigners.
➢ The list of star campaigners has to be communicated to the Chief Electoral Officer and Election Commission within a week from the date of notification of an election.
➢ The expenditure incurred on campaigning by such notified star campaigners is exempt from being added to the election expenditure of a candidate. However, this only applies when a star campaigner limits herself to a general campaign for the political party she represents.
➢ If a candidate or her election agent shares the stage with a star campaigner at a rally, then the entire expenditure on that rally other than the travel expenses of the star campaigner is added to the candidate's expenses.

Nandankanan Zoological Park (NZP)

➢ NZP in Bhubaneswar, which suffered a huge loss following its closure due to the COVID-

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19 pandemic, has revived its innovative "Adopt-An-Animal"programme to mobilise resources for animals.
   o When one adopts an animal or a bird, the contribution goes to its care, feeding, enclosure enrichment and renovation.
   o Individuals and organisations are now allowed to adopt inmates even for a period of one month.
   o Elephant at Rs 2.5 lakh is the costliest species for adoption for a year
➢ It is one of the leading zoos in the country in terms of its fauna population and species diversity.

Gupkar Declaration
➢ Seven mainstream political parties of Jammu and Kashmir gave a formal shape to their cobbled alliance - People's Alliance for Gupkar Declaration (PAGD)- for the restoration of Article 370.
➢ The motive behind the alliance is to work towards restoring the special status of J&K after it was revoked in 2019.

10 Hafte-10 Baje-10 Minute
➢ Delhi Government appealed to Delhi residents to give 10 minutes every Sunday — from September 1 till November 15 — to ensure there's no stagnant water in their houses or surroundings to prevent the breeding of dengue-carrier mosquitoes.
➢ Stagnant water is suitable for breeding of Aedis, the mosquito breed also responsible for the spread of chikunguya.

Chapter Proceedings
➢ Mumbai police began ―chapter proceedings‖ against Republic Editor-in-Chief.
➢ Chapter proceedings are preventive actions taken by the police if they fear that a particular person is likely to create trouble and disrupt the peace in society.
➢ These proceedings are unlike punitive action taken in case of an FIR with an intention to punish.
➢ Here, the police can issue notices under sections of the Code of Criminal Procedure to ensure that the person is aware that creating nuisance could result in action against him, which includes paying a fine, in the absence of which, he could be put behind bars.
➢ A notice is issued to a person under section 111 of the Cr. P. C. The section states that any person who disseminates information that could lead to ill will among communities and castes should be served this notice. However, this is used in the rarest of the circumstances
➢ On receiving the notice under section 111, a person can appeal the notice before the court
➢ There is no need for even an FIR against a person for issuing a notice under section 107 of the Cr.P.C. (security of keeping peace in other cases).
➢ In this case the bond is signed for one year. Under section 110, a notice is served to a habitual offender who has a record of FIRs registered against him. In his case, he is asked to sign a bond for three years.

Mount Girnar
➢ India's biggest and one of the largest passenger ropeway projects in Asia has been constructed on Mount Girnar, the tallest mountain of the Gujarat.
➢ Mount Girnar is a major pilgrim site because of the presence of the Amba temple, the Dattatreya shrine, and many other Hindu temples as well as several Jain temples.
➢ Mount Girnar is a cluster of hills and peaks in Jungadh district. Its summit. at 1118m , is the highest in Gujrat.
➢ The 2,320-metre-long project is also the world's longest temple ropeway in the world and India's biggest passenger ropeway project.

Oaxaca Khadi
➢ In Mann kiBaat, Prime Minister asked people to go vocal for local while shopping during the festival season, and particularly extolled the virtues of khadi. Prime Minister made a reference to the region of Oaxaca in Mexico.
➢ Khadi Oaxaca is a farm-to-garment collective which comprises around 400 families, which live and work on traditional farms and homesteads in the Oaxaca region of

southern Mexico.

➢ The project uses cotton produced and cultivated on the Oaxaca coast, and produces chemical-free clothing, relying on locally harvested plant-based dyes.

Asafoetida (Heeng)

➢ Scientists at CSIR-Institute of Himalayan Bioresource, Palampur (IHBT), are on a mission to grow heeng in the Indian Himalayas.The first sapling has been planted in Himachal Pradesh's Kwaring village in Lahaul valley.

➢ Asafoetida is a herbaceous plant of the umbelliferae family. It is a perennial plant whose oleo gum resin is extracted from its thick roots and rhizome. The plant stores most of its nutrients inside its deep fleshy roots.

➢ Asafoetida is endemic to Iran and Afghanistan, the main global suppliers. It thrives in dry and cold desert conditions. While it is very popular in India, some European countries too use it for its medicinal properties.

➢ Heeng is not cultivated in India. India imports about 1,200 tonnes of raw heeng worth Rs 600 crore from Iran, Afghanistan and Uzbekistan.

First Har Ghar Jal State

➢ Goa has become the first state in the country to provide 100% piped tap water connections to rural households.

➢ In accordance with the central government's Jal Jeevan Mission, the project aims to supply piped water in all rural households by 2024. Under the scheme, Goa has successfully covered 2.30 lakh rural households.

  o Jal Jeevan Mission, a central government initiative under the Ministry of Jal Shakti, aims to ensure access of piped water for every household in India.

  o The mission's goal is to provide to all households in rural India safe and adequate water through individual household tap connections by 2024.

  o The Har GharNal Se Jal programme was announced by Finance Minister Nirmala Sitharaman in her Budget 2019-20 speech. This programme forms a crucial part of the Jal Jeevan Mission.

Mount Ili

Mount Ili Lewotolok situated in Lembata island in eastern Indonesia erupted recently.Mount Ili Lewotolok has been erupting on and off since October 2017. There are more than 120 active volcanoes in Indonesia prone to seismic upheaval due to its location on the Pacific "Ring of Fire," an arc of volcanoes and fault lines around the Pacific Ocean.

India Mobile Congress (IMC)

India Mobile Congress is the largest digital technology forum in South Asia. Organised by the Department of Telecommunications (DoT) and Cellular Operator Association of India (COAI), India Mobile Congress 2020 is scheduled for 8 December through 10 December 2020 & will be held virtually.IMC has established itself as a leading platform for bringing together the industry, Government, academia, and other ecosystem players, to discuss and display the latest in the technology world. Not only is India Mobile Congress the biggest technology event in South Asia, it is also the biggest networking event in India in the digital technology space. This year IMC's theme is going to be - "Inclusive Innovation - Smart I Secure I Sustainable".

Statue of Peace- Rajasthan

➢ Indian Prime Minister recently unveiled the 'Statue of Peace' in Rajasthan's Pali to mark the 151st Jayanti celebrations of Jainacharya Shree Vijay Vallabh Surishwer Ji Maharaj.

➢ The 151-inch tall statue has been made from Ashtadhatu- 8 metals, with Copper being the major constituent. The saint, Shree Vijay Vallabh Surishwer Ji Maharaj, lived during 1870-1954, and worked selflessly to spread the message of Lord Mahavira.being the major constituent. The saint, Shree Vijay Vallabh Surishwer Ji Maharaj, lived during 1870-1954, and worked selflessly to spread the message of Lord Mahavira.

Global Innovation and Technology Alliance

➢ Global Innovation & Technology Alliance (GITA) is a "not–for–profit" Section-8 Public Private Partnership (PPP) company promoted jointly by the Technology Development Board (TDB), Department of Science & Technology (DST), Government of India and the

Confederation of Indian Industry (CII).

➢ The Prime Minister's Council on Trade & Industry had, in 2010, recommended incorporation of a Government's arm's length entity under PPP mode to professionally manage the Government's funds for providing flexibility to industry for undertaking R&D along with global partners.

➢ The GITA platform encourages industrial investments in innovative technology solutions by
  o Mapping technology gaps,
  o Undertaking expert evaluation of technologies available across the globe,
  o Facilitating techno–strategic collaborative partnerships appropriate for Indian economy
  o Connecting industrial and institutional partners for synergistic matchmaking and
  o Providing soft funding for technology development / acquisition / deployment.

DibruSaikhowa National Park

➢ Dibru-Saikhowa National Park is designated as a biosphere reserve situated in the south bank of the river Brahmaputra in the extreme east of Assam state in India.

➢ Created to help conserve the habitat of the rare white-winged wood duck, the park is home to the water buffalo, black-breasted parrot bill, tiger and capped langur.

➢ The forest type of Dibru-Saikhowa comprises of semi-evergreen forests, deciduous forests, littoral and swamp forests and patches of wet evergreen forests.

➢ The Park is renowned for natural regeneration of Salix trees.

Kilauea Volcano

➢ The Kilauea volcano in Hawaii's Big Island erupted on December 20 which was followed by an earthquake. Kilauea is one of the most active volcanoes on earth.

➢ On Hawaii's Big Island, Kilauea volcano erupted for the first time in more than two years. The crater named Halemaumau illuminated by the hot lava as plumes of hot gas and steam burst out of the crater. The crater is located within Hawaii's Volcanoes National Park.

Sinai Peninsula

➢ It is a triangular peninsula linking Africa with Asia and occupying an area of 23,500 square miles (61,000 square km).

➢ The Sinai Peninsula lies between the Gulf of Suez and the Suez Canal on the west and the Gulf of Aqaba and the Negev on the east, and it is bounded by the Mediterranean Sea on the north and the Red Sea to the south.

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Nuclear Magnetic Resonance Technology

➢ Recently several new players have entered into the growing domestic honey market after pandemic as people are now focusing on wellness products post-pandemic.

➢ Environment watchdog CSE had issued a study report claiming leading honey makers' products were adulterated with sugar syrup.

➢ Most of the brands passed muster but when subjected to one test, called Nuclear Magnetic Resonance (NMR), that can ascertain the composition of a product at the molecular level, that was done at a lab in Germany, only three brands passed.

➢ An NMR instrument allows the molecular structure of a material to be analyzed by observing and measuring the interaction of nuclear spins when placed in a powerful magnetic field.

➢ NMR has become an indispensable analysis tool in cutting-edge science and technology fields.

➢ Among the tests employed as per Indian regulations is one to check whether the honey is adulterated with C4 sugar (cane sugar) or C3 sugar (rice sugar). Most samples cleared these tests but failed another test called the Trace Marker for Rice test, to test for rice syrup adulteration.

Partners in Population and Development (PPD)

➤ It is an intergovernmental initiative created specifically for the purpose of expanding and improving South-to-South collaboration in the fields of reproductive health, population, and development. Represented by 27 developing countries including India.

➤ Secretariat: Dhaka, Bangladesh

➤ PPD was launched at the 1994 International Conference on Population and Development (ICPD), when ten developing countries from Asia, Africa and Latin America formed an intergovernmental alliance to help implement the Cairo Program of Action (POA).

ParaySamadhan

➤ West Bengal government launched "ParayParaySamadhan [Resolving problems in neighbourhoods]" to address small grievances at the community level and to address small infrastructural gaps.

➤ This will be a supplementary initiative of 'Duare Sarkar'. While 'Duare Sarkar' is individual-oriented, neighbourhood problems will be addressed by this scheme.Like the "Duare Sarkar" scheme, "ParayParaySamadhan" would also operate in a real-time mode and people would be able to track their applications.

Mini Kaziranga

➤ Assam's Pobitora Wildlife Sanctuary, has the highest concentration of one-horned rhinos in the world and is often called 'Mini Kaziranga' due to similar landscape and vegetation.

➤ Pobitora Wildlife Sanctuary is one of the major living areas of the fresh water Dolphins or South Asian River Dolphins, which are primarily found in the rivers of Ganga and Brahmaputra in India. It is often called as 'Susu' or 'Hihu' in the local dialect and is recognized by the Government of India as the National Aquatic Animal

➤ Assam is the most species-rich State in India in terms of turtle diversity. It is home to 20 species of freshwater turtles and tortoises out of 29 species found in India. But, 80% of these species are threatened with extinction.

Dak Pay

➤ The Department of Posts and the India Post Payments Bank (IPPB) unveiled a new digital payment application "DakPay" as part of its ongoing efforts to provide digital financial inclusion at the last mile across the country.

➤ DakPay is a suite of digital financial and assisted banking services provided through the postal network to cater to the financial needs of various sections of society, particularly those living in rural areas.

➤ The services include free-of-cost money receipts and transfers at doorsteps, and scanned QR codes, to make payments for a range of utility and banking services.

➤ Postmen and women, and Gramin Dak Sevaks, have been equipped with smartphones and biometric devices to provide doorstep banking services.

➤ Under the DakPay umbrella brand, India Post aims to provide facilities such as
  o checking bank balances;
  o transactions through multiple bank accounts;
  o the payment facility through the IPPB mobile banking application for postal products' making payments using DakPay virtual debit card; and cash withdrawal and deposit using the Aadhaar-enabled payment system.
  o The government is also contemplating a provision for credit facilities.

Tharu Tribe

➤ The Tharu community belongs to the Terai lowlands, amid the Shivaliks or lower Himalayas. The word tharu is believed to be derived from sthavir, meaning followers of Theravada Buddhism. Most of them are forest dwellers, and some practice agriculture.

➤ They speak various dialects of Tharu, a language of the Indo-Aryan subgroup, and variants of Hindi, Urdu, and Awadhi.

➤ Tharu women have stronger property rights than is allowed to women in mainstream North Indian Hindu custom.

Cryogenic Technology

➤ Cryogenic technology involves the use of rocket propellants at extremely low temperatures. The combination of liquid oxygen and liquid hydrogen offers the highest energy efficiency for rocket engines that need to produce large amounts of thrust.

- But oxygen remains a liquid only at temperatures below minus 183 0 Celsius and hydrogen at below minus 253 0Celsius.
➤ A cryogenic engine provides more force with each kilogram of cryogenic propellant it uses compared to other propellants, such as solid and liquid propellant rocket engines and is more efficient.

Makaravilakku Festival

➤ It is an annual festival held on Makara Sankranti in Kerala, India at the shrine of Sabarimala. The festival includes the Thiruvabharanam (sacred ornaments of Lord Ayyappan) procession and a congregation at the hill shrine of Sabarimala.
➤ The erstwhile royal family of Pandalam is the custodian of the ornaments.

Pangolin

➤ Pangolins, also known as scaly anteaters, are the only known mammals with large keratin scales covering their skin.They are also toothless and nocturnal
➤ The Indian Pangolin is found throughout the country south of the Himalayas, excluding the north-eastern region while the Chinese Pangolin ranges through Assam and the eastern Himalayas.
➤ Both these species are Listed in Schedule I of Wildlife (Protection) Act, 1972
➤ **Protection Status:**
  - Indian Pangolin: Endangered,
  - Chinese Pangolin: Critically Endangered

Four indigenous games- in the Khelo India Youth Games 2021

1. Kalaripayattu of Kerala:

➤ Kalaripayattu is an Indian martial art and fighting style that originated in modern-day Kerala.
➤ Stages of the art form: While the first stage consists of body conditioning exercises such as sequences, workouts and kicks to develop the pace of the body, the second stage is all about fighting techniques with wooden weapons such as sticks. The third stage involves the use of metal weapons and the fourth and final stage includes bare hand fighting techniques, massage treatments etc.
➤ Another focus of Kalaripayattu is specialisation in indigenous medicinal practices. Three forms of massage are prevalent in the Kalarichikitsa system – ennathechupidipikkal or oil massage, kai uzhichil or massage using hands, and chavittiuzhichil or massage using feet.

2. Mallakhamb of Central India

➤ It was originated in Maharashtra around 200 years ago. Guru BalambhattdadaDeodhar is known as founder of Mallakhamb.
➤ From 1961 to 1976 Gymnastics Federation of India conducted the National Mallakhamb Championships along with Gymnastics.
➤ There are 3 types of Mallakhamb which are played on competitive level:
  I. Fixed mallakhamb
  II. Hanging mallakhamb
  III. Rope mallakhamb

3. Gatka of Punjab

➤ Gatka originates in the state of Punjab and this traditional fighting style of the Nihang Sikh warriors is used both as self-defense as well as a sport.
➤ It is believed to have originated when sixth Sikh guru Hargobind adopted 'Kirpan' for self defense during Mughal era and tenth Guru Gobind Singh made it compulsory for everyone to use the weapons for self defense. Guru Gobind Singh Ji is known as the greatest Gatka warrior of all times.
➤ It has been divided into the traditional (Rasmi) and sports (Khel) style.
➤ Punjab government has now officially recognised Gatka as a sport in its policy, and the players enjoy the 3% quota during admissions, as do the players of other sports.

4. Thang-ta of Manipur

➤ Thang Ta--"The Art of the Sword and Spear"-- is the traditional martial art of Manipur in Northeast India.

- It integrates various external weapons - the sword, spear, dagger, etc. - with the internal practice of physical control through soft movements coordinated with the rhythms of breathing. It is part of the great heroic tradition of Manipur.
- The proper name for Thang-Ta is HUYEN LALLONG ("method of safe-guarding").
- It is an elaborate system of physical culture that involves breathing methods, meditations, and rituals.
- Three warriors -PaonaNaol Singh, NingthoukhongjaPoila, Loukrakpam Sana Mityeng each founded a distinct style within the art of THANG-TA.

Sangay volcano erupts

- Recently, Ecuador's Sangay volcano erupted, spewing clouds of ash as high as 8,500 meters (about 28, 890 feet) into the sky. The ash spurted from the volcano has damaged crops and cattle in several areas.
- Sangay has had frequent eruptions in historic times, mostly of strombolian type.
- Ecuador, part of the Pacific Rim's "Ring of Fire" region, has eight volcanoes in its territory.
- Due to its remoteness, Sangay hosts a significant biological community. Since 1983, its ecological community has been protected as part of the Sangay National Park. The park has been listed as a UNESCO World Heritage Site since 1983.

Sinabung volcano unleashes new burst

- Recently, Indonesia's Mount Sinabung, on the island of Sumatra was shooting smoke and ash as high as 1,000 meters (3,280 feet) into the air and hot ash clouds traveled up to 3 kilometers (1.8 miles) southeast.
- Sinabung is among more than 120 active volcanoes in Indonesia, which is prone to seismic upheaval due to its location on the Pacific Ring of Fire, an arc of volcanoes and fault lines encircling the Pacific Basin.
- Sinabung had been inactive for centuries before it erupted again in 2010.

India's first bat with sticky disks

- The bat species Eudiscopusdenticulus, aptly called disk-footed bat, is very distinctive in appearance with prominent disk-like pads in the thumb and bright orange colouration.
    - The newly-recorded bat was presumed to be a bamboo-dwelling species.
- The disk-footed bat was also found to be genetically very different from all other known bats bearing disk-like pads.
- Meghalaya has yielded India's first bamboo-dwelling bat with sticky disks, taking the species count of the flying mammal in the country to 130.
- The disk-footed bat has raised Meghalaya's bat count to 66, the most for any State in India.

Madhu Kranti Portal & Honey Corners

- Recently, the Union Minister for 'Agriculture and Farmers' has launched Madhukranti portal and Honey Corner.
- It is an initiative of National Bee Board (NBB), Ministry of Agriculture and Farmers Welfare under National Beekeeping & Honey Mission (NBHM).
- This portal is being developed for online registration to achieve a traceability source of Honey and other beehive products on a digital platform.
- This will also help in checking the quality and source of adulteration of honey.
- Honey Corners are specially designed space in NAFED's stores dedicated to sale of honey.
- It is operated by National Agricultural Cooperative Marketing Federation (NAFED).

Sunderlal Bahuguna

- Sunderlal Bahuguna, the Gandhian who was the driving force behind the legendary Chipko movement against deforestation that marked a key milestone in Indian environmentalism, died with Covid-19 aged 94.
- Born on January 9, 1927 in Maroda village in Tehri — now a district in Uttarakhand — Bahuguna's life was dedicated to social causes, activism, and writing.
- He participated in the Independence movement and was subsequently a part of Vinoba Bhave's Sarvodaya movement.

- He was one of the main leaders of the Chipko movement in northern India in the 1970s.
- Two years later, he marched 4,000km (2,500 miles) in the Himalayas to draw attention to environmental degradation.
- He led the charge against the construction of big dams in the Himalayas in the 1980s. He was fervently opposed to the construction of the Tehri dam.
- Bahuguna himself was awarded the Padma Vibhushan in 2009. In 1981, he had refused to accept the Padma Shri over the government's refusal to cancel the Tehri dam project despite his protests.
- Sunderlal Bahuguna will be remembered as a man of the earth, who strove all his life to save it.

BioHub facility

- The World Health Organization (WHO) and Switzerland have launched a BioHub facility that will allow rapid sharing of pathogens between laboratories and partners to facilitate a better analysis and preparedness against them.
- The facility will help in safe reception, sequencing, storage and preparation of biological materials for distribution to other laboratories, so as to facilitate global preparedness against these pathogens.
- It will enable member states to share biological materials with and via the BioHub under pre-agreed conditions, including biosafety, biosecurity, and other applicable regulations.

Eruption of mount nyiragongo

- The volcano eruption caused about 5,000 people to flee a neighbourhood of Goma, a city of about two million people, across the nearby border into Rwanda.
- Nyiragongo is one of the world's most beautiful and active volcanoes, is a large stratovolcano near Lake Kivu at the eastern border of DR Congo with Rwanda in the Virunga National Park.
- It has a 1.2 km diameter summit caldera containing the world's most active and largest lava lake.
- The last time Nyiragongo erupted was January 17, 2002, killing more than a hundred people and covering almost all of the eastern part of Goma with lava, including half of the airport's landing strip.
- India is one of the largest troop contributing nations to MONUSCO, which is headquartered in the Eastern town of Goma and bordering Rwanda.

Incredible India Tourist Facilitator Certification (IITFC)

- Incredible India Tourist Facilitator (IITF) Certification Programme is a digital initiative of Ministry of Tourism (MoT), Govt. of India for the citizens of India to become a part of the booming Tourism Industry.
- It is an online programme where one can learn about tourism at their own time, space, path and pace.
- The successful completion of this programme would enable the learner to become a Certified Tourist Facilitator of Ministry of Tourism, Govt. of India.

Operation Pangea XIV

- Recently, the Interpol through its Operation Pangea XIV targeted the sale of fake and illicit medicines and medical products.
- More than 1.10 lakh web links, including websites and online marketplaces, have been taken down in an operation.
    - The first "Operation Pangea" conducted in 2008.
- The operation coordinated by INTERPOL involved police, customs and health regulatory authorities from 92 countries. Indian agencies also participated in the operation.
    - The Central Bureau of Investigation that is the nodal body for the Interpol in the country.

Heritage trees

- The Maharashtra Cabinet passed an action plan to protect and preserve trees older than 50 years in urban areas by terming them heritage trees.
    - The most common method of determining the age of the tree is Dendrochronology – or tree-ring dating also called growth rings.

- ➢ The plan includes the concept of heritage tree and plan of action for conservation; method to define age of the tree; compensatory plantation; rules to be followed before hacking trees, etc.
- ➢ Compensatory plantation will include planting the number of trees equivalent to the age of trees to be cut.
  - o The saplings need to be six to eight feet in height while planting and they will undergo geo-tagging with seven years of caring period.
  - o The option of monetary compensation has also been given, instead of compensatory plantation.
- ➢ A State-level Tree Authority will be formed to protect and preserve heritage trees.
  - o The State authority will issue directions for the use of tree cess.
- ➢ The local tree authorities will come under this body.
  - o Tree experts will be part of the local tree authorities.
  - o These bodies will ensure that the tree census is conducted after every five years.

They will also be in charge of counting heritage trees, ensuring their preservation, keeping tabs on tree plantation, pruning and caring of trees, and ensuring that 33% of government land is used for tree plantation.

OUR TOPPERS