

**Quick Revision  
for CSE**



# **LANDMARK** Updates in **GENERAL STUDIES**

for UPSC & State PSC Civil Services Prelim & Main Exams



**Covers all updates on**  
Economy, Polity with Supreme Court  
Judgement, Environment & Science &  
Technology

  
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# ***LANDMARK***

Updates in

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# **GENERAL STUDIES**

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for UPSC & State PSC Civil Services  
Prelim & Main Exams

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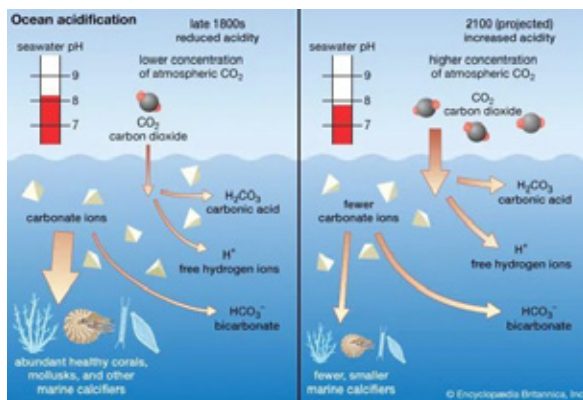




# Unit I

# Environment and Ecology

## 1. Ocean Acidification and Arctic Ice



- Define as decrease in the pH value of the ocean over a long period of time.
- **Primary Reason:** Uptake of CO<sub>2</sub> from the atmosphere.
- **Effects:** Harmful to life forms relying on carbonate-based shells and skeleton altered marine food chains.

### Arctic Region

- A geographic area spreading around the North Pole (about 66.5° north of the Equator).



### Significance of Arctic Region:

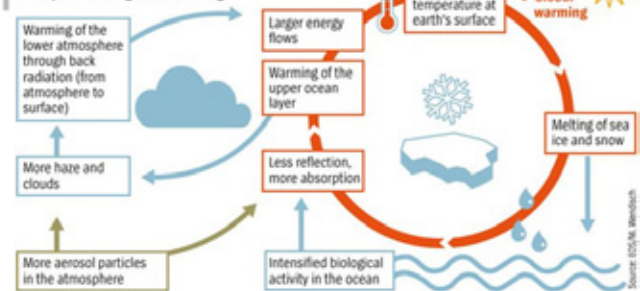
- Melting of ice due to Climate change making region more accessible for economic exploitation for oil & gas reserves, metals and minerals, etc.
- Possibilities to open Northern Sea Route as a new trade route.
- It aid to circulate ocean currents of the world.
- It articulated as barometer of world's climate change.

### India in Arctic Region:

- Arctic research programme since 2007 with several expeditions undertaken till date.
- Unveiled its first Arctic policy.
- One of the Observers in the Arctic Council.

### Arctic Amplification

The dynamics of global warming



- Indian Arctic station 'Himadri' is located at Norway and serves as a hub of Indian scientific investigations since 2008.

### Arctic Amplification

- An enhancement of near-surface air temperature change over Arctic relative to lower latitudes.
- Arctic is heating up 4 times as fast as rest of world due to Arctic amplification (AA).
- **Causes of AA:** Global warming, Icealbedo feedback, lapse rate feedback, water vapour feedback and ocean heat transport.
- **Impact:** Affects fauna of the region especially, Polar Bears, whales and seals; would open up new sea-trade routes; would facilitate further extraction of natural resources.



## 2. India's Long-Term Low Emission Development Strategy (LT-LEDS)

- Recently, India submitted its Long-Term Low Emission Development Strategy (LTLEDS) to the United Nations Framework Convention on Climate Change (UNFCCC).
- Under Article 4.19 of the Paris Agreement, parties to the UNFCCC agreed to formulate and communicate LT-LEDS.
- During COP 26 at Glasgow, Parties that have not yet done so had been urged to communicate their LT-LEDS by COP 27.
- It considers common but differentiated responsibilities and respective capabilities, in the light of different national circumstances.
- It is not obligatory unlike NDCs.
- It is broader in scope than NDCs and incorporate developmental goals and also required investment and government expenditure.

## 3. Montreal Protocol, 1987

- Protocol of Vienna Convention, 1985** : Protection of the Ozone Layer.
- Governments, scientists and industry work together to cut out 99% of all ozone-depleting substances (ODS).
- Membership** : Ratified by all 198 UN Member States (including India).
- Kigali Agreement**:
  - ✓ Adopted in 2016 and **entered into force in 2019**.
  - ✓ Provided a path to achieve an **80% reduction in HFCs consumption by 2047**.
  - ✓ Adopted because **Montreal Protocol** led to **replacement of chlorofluorocarbons (CFCs) with Hydrofluorocarbons (HFCs)** which do **not destroy the Ozone layer but are extremely potent in causing global warming**.

### India and Montreal Protocol

- In 1992, India became a Party to Montreal Protocol
- India has successfully met phase out targets of all ODS as per Montreal Protocol Schedule.
- India ratify the Kigali Amendment to Montreal Protocol in 2021.
- India has to start phase down by 2028 and cut HFC emission by 15% of 2024-26 levels by the year 2047.

### Ozone (O<sub>3</sub>) and Ozone-depleting substance (ODS)

- Ozone layer**: Concentrated in **Stratosphere**, absorbs **UV rays**.
- Thinning of the ozone layer**: 1985, ozone hole over the Antarctic.
- ODS**: Man-made chemicals having high Ozone depleting potential (ODP).
- Example**: Chlorofluorocarbons (CFCs), Halons, Methyl Bromide (CH<sub>3</sub>Br), Bromochloromethane (CH<sub>2</sub>BrCl).
- Uses of ODS**: Refrigerators, air conditioners, fire extinguishers, foams etc.
- Impact of ozone layer depletion**: Increases risk of skin cancer and cataracts, weakens human immune systems, decreases agricultural productivity, affects terrestrial and aquatic biogeochemical cycles etc.



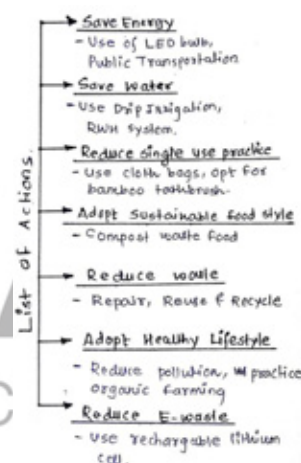
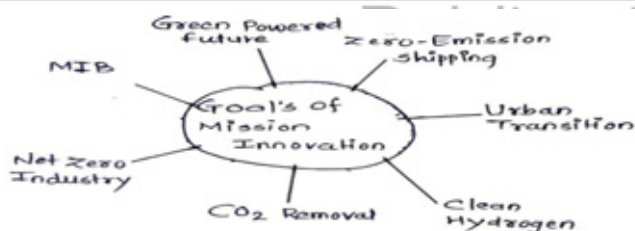
## 4. Innovation Roadmap of the Mission Integrated Bio-refineries (IRMIB)

- At Global Clean Energy Action Forum, India declares to launch of IRMIB.
- IRMIB is Developed by:** Co-leads of Mission Integrated Bio-refineries (MIB) with active inputs from Brazil, Canada, EC and the UK.
- Aims to fill the void by:**
  - ✓ It identifying gaps and challenges in current bio-refining value chains,
  - ✓ It prioritising Eight key actions to support the Mission,
  - ✓ It guides the Mission's overall path in achieving its goal.
- It is one of the mission under Mission Innovation (MI).
- Aim:** Greater international collaboration and financing for Energy RD&D during the next five years.
- Members:**
  - ✓ **Co-lead:** India and Netherlands
  - ✓ **Core mission members:** Brazil and Canada
  - ✓ **Mission support group:** European Commission and UK
- Goal:** To develop and demonstrate innovative solutions to accelerate the commercialization of integrated bio-refineries.
- Target:** To replace 10% of fossil-based fuels, chemicals and materials with bio alternatives by 2030.
- Prioritizes eight collaborative actions organized around 3

### Mission Innovation (MI)

- Global initiative to catalyze action and investment in research, development and demonstration to make clean energy affordable, attractive and accessible to all this decade.
- It consists of 22 countries and EU.
- India is a founding member.
- First phase of the mission launched alongside the Paris Agreement in 2015.
- Mission Innovation 2.0, second phase of MI, was launched in 2021.

### Mission Integrated Bio-refineries (MIB)



- ✓ Supporting Research, Development and Demonstration (RD&D).
- ✓ Accelerating Pilots and Demonstrations.
- ✓ Improving Policy and Market Conditions.

## 5. Mission Life (Lifestyle for Environment)

- Concept introduced by the Indian PM at the UNFCCC COP-26 in Glasgow.
- With in India, at least 80% of all villages and urban local bodies aimed to become environment-friendly by 2028.
- Aim:** To nudge individual and collective action to protect and preserve the environment.
- Targets:** Mobilise at least 1 billion Indians and other global citizens to take individual and collective action for protecting and preserving the environment in the period 2022 to 2027.
- Mission Duration:** 5-year programme, visualizing three core shifts in our collective approach towards sustainability.
- Implementation:**
  - NITI Aayog to curate and incubate in the first year.
  - Subsequently implementation by the MoEFCC in a non-linear and non-sequential manner.
- Vision:**
  - To live a lifestyle that is in tune with our planet and does not harm it.
  - People living such a lifestyle are called Pro-Planet People (P3).

## 6. Carbon Border Adjustment Mechanism (CBAM)

- From 2026, it will tax carbon-intensive products, like iron and steel, cement, fertilizer, aluminium, electricity, and hydrogen.
- It aims to eliminate the variation in carbon price paid by firm subjected to Emissions Trading System (ETS) of the EU.
- Part of the “Fit for 55 in 2030 package: EU’s plan to reduce GHG emissions by at least 55% by 2030 compared to 1990 levels, in line with the European Climate Law.
- Deductions can be claimed from their CBAM liability if Non-EU producer has already paid for the emission in the country of production.
- Also referred as a carbon border tax or a carbon leakage instrument.

### Significance of CBAM

- It address carbon leakage issues
- It encourage the more rapid application and utilization of renewable technologies
- It uphold the polluter pay principles
- It incentivizes non-EU countries to increase their climate ambitions.
- It ensure global climate not undermining due to carbon leakage

### Functions of CBAM:

- Importers of EU purchase carbon certificates related to the carbon price on the lines of EU’s carbon pricing rules.

## 7. Nationally Determined Contributions (NDCs)

- Post-2020 climate actions requested by the Paris Agreement from each Party.
- ‘**Glasgow Climate Pact**’, signed by the countries during the COP26 of UNFCCC had requested Parties to revisit and strengthen the 2030 targets in their NDCs by the end of 2022.
- In their NDCs, countries communicate:
  - ✓ Actions they will take to **reduce their GHG emissions** in order to reach the goals of the Paris Agreement
  - ✓ Actions they will take to **build resilience to adapt** to the impacts of rising temperatures.
- Submitted every 5 years to the UNFCCC secretariat.
- A manifestation of the Paris Agreement’s ‘ratcheting mechanism’— wherein countries must revise their pledges to be more ambitious every five years.
- ✓ Represents the framework for India’s transition to cleaner energy for the period 2021- 2030.
- ✓ Updates two of the three quantitative targets of 2015 NDCs related to emissions intensity and share of non-fossil fuels in installed electricity capacity.
- ✓ Two panchamrita commitments (promises made during COP26 in Glasgow) not converted into official targets i.e. of 500 GW non fossil fuel energy & emissions of at least one billion tonnes of carbon dioxide by 2030.

### NDCs of India

- India’s first NDC submitted to UNFCCC in 2015.
- **India’s updated NDCs:**
  - ✓ Prepared after carefully considering India’s national circumstances and the principle of common but differentiated responsibilities and respective capabilities (CBDR-RC).

### Climatic commitment of India at COP26, Glasgow

- Achieve the target of Net Zero by the year 2070
- Increase non-fossil fuel energy capacity to 500 GW by 2030
- Meet 50% of its energy requirements from renewable energy by 2030
- Reduce the total projection carbon emission by one billion tonnes from now till 2030
- Reduce the carbon intensity of economy by less than 45% by 2030.

## 8. Carbon Capture Utilisation and Storage (CCUS)

- It encompasses technologies to capture CO<sub>2</sub> from the atmosphere and flue gas, then recycling the CO<sub>2</sub> for utilization and finding safe and permanent storage options.
- Due to combustion of coal, oil, natural gas, wood or any other fuel, in an industrial furnace, a power plant's steam-generating boiler, or other large combustion device, result into production of flue gases.
- Captured CO<sub>2</sub> are converted into fuel (methane and methanol), refrigerants, building materials by using CCU technologies.
- This captured gas is used directly in fire extinguishers, pharma, food and beverage industries and agricultural sector too.
- The CCUS policy framework and its deployment mechanism in India is launched by NITI Aayog.
- The established of two National Centres of Excellence in CCUS at IIT Bombay and JNCASR, Bangalore.
- These centres will facilitate capturing & mapping of current R&D and innovation activities in the domain and also develop networks of researchers, industries and stakeholders.
- To enable near-zero CO<sub>2</sub> emissions from power plants and carbon-intensive industries, Mission Innovation challenge on CCUS.
- Accelerating CCS Technologies (ACT) to facilitate R&D and innovation that can lead to development of safe and cost-effective CCUS technologies.

### Policy framework

- It aims to develop and implement a practicable framework to accelerate research and development on CCUS in India.
- It explores the importance of the technology as an emission reduction strategy to achieve deep decarbonisation from the hard-to-abate sectors like steel, cement etc.

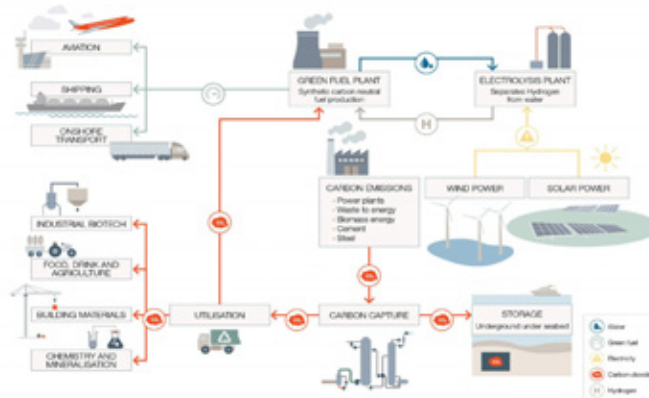


Fig: Carbon Capture Utilisation and Storage

### Different Carbon Capture technologies

Technologies	Remarks
Chemical solvent	It preferred when dealing with gas streams that are lean in CO <sub>2</sub> . It has relatively lower pressures such as flue gas streams from power plants etc.
Physical solvent	This work well on gas streams with relatively higher CO <sub>2</sub> concentration and pressure such as pre-combustion capture in case of gasification projects.
Adsorption	Suitable for gas streams with moderate to high pressure and moderate CO <sub>2</sub> Concentration such as steam methane reforming (SMR) flue gas.
Cryogenic separation	It prefer in cases where cost of power is low.

## 9. Uniform Carbon Trading Market

Government of India is planning **implementation of a carbon trading scheme** which can subsume all carbon trading mechanisms in India. The government proposes to initiates by **voluntary carbon market and gradually shift to 'cap and trade'**.

### Carbon Trading or Carbon Emission Trading

- A market-based system of selling and buying and permits and credits for carbon emission.
- It mostly uses model- cap and trade.
- The idea of cap-and-trade originated with the Kyoto Protocol.
- Kyoto Protocol created 3 market mechanisms:
  - ✓ Emissions Trading,
  - ✓ Clean Development Mechanism,
  - ✓ Joint implementation.



- Paris Agreement under Article 6, created a new market mechanism and a framework for nonmarket approaches mechanism.
- It can exist at international, national, state or local level.
- **Example:** China launched the world's largest market for carbon emissions trading, in 2021.

## 10. Norms for Thermal Power Plants (TPPS)

- Coal TPP contributes over half SO<sub>2</sub> concentration, 30% of oxides of nitrogen and 20% PM in ambient atmosphere.
- MoEFCC notified environmental norms in 2015, for particulate matter (PM), sulphur dioxides (SO<sub>2</sub>), nitrogen oxides and mercury and water use for coal based TPPs.
- Compliance with norms requires retrofitting existing TPPs with auxiliaries to control emissions such as Flue Gas Desulphurisation (FGD), Selective Catalytic Reduction etc.
- **FGD:**
  - ✓ A set of technologies **used to remove SO<sub>2</sub> from sources of emissions.**
  - ✓ **Example: Exhaust flue gases** of fossil-fuel power plants.

SO <sub>2</sub> norms for TPPs			
Categories	Criteria	Deadline for parameter other than SO <sub>2</sub> emission	Deadline of SO <sub>2</sub> emission
A	Within 10 km radius of National Capital Regions (NCR) or Cities having millions plus population	End of 2022	End of 2024
B	Within 10 km radius of critically populate areas or non-attainment cities (not meeting National Ambient Air Quality Standards)	End of 2023	End of 2025
C	Remaining plants	End of 2024	End of 2026

### Heavy Metal Contamination

These are the Naturally occurring elements.

- They have **High atomic weight and density at least 5 times greater than that of water.**

**Example:** lead, iron, nickel, cadmium, arsenic, chromium and copper.

### Effects of heavy metals exposure

- **Health:** Slowly progressing physical, muscular, and neurological degenerative processes that mimic Alzheimer's, Parkinson's disease etc.
- **Environment:** Affect biodegradability of organic pollutants, making them less degradable
- **Plants:** Influences soil fertility disturbs photosynthesis etc.
- Heavy metals can be separate out from water samples by using fibrous membrane filter made up of biopolymer-based material.

## 11. Per and Polyfluoroalkyl Substances (PFAS)

- PFAS is chemicals with partially or completely fluorinated carbon chains of varied lengths.
- It referred as "forever chemicals" as do not degrade easily in the environment due to strong carbon-fluorine bonds.
- Substance like perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) listed under Stockholm Convention on Persistent Organic Pollutants (their production and use are restricted or eliminated in the Parties.)
- Health risks like decreased fertility, developmental effects in children, interference with body hormones, increased cholesterol levels, liver damage, kidney and testicular cancer.
- It is difficult to capture and destroy.

### Applications

### Concerns associated with use of PFAS:

- It is found in the blood of people and animals.

- Use in non-stick cook and bake ware
- Use in water and oil proof apparel
- Utilise in Biocide, cleaning agents, and impregnation spray
- Useful in food packaging
- Use in stain resistance upholstery carpet
- Applicable in fire fighting foam.

## Major Water Pollutant in news

<b>Nanoplastics</b>	Researchers have developed a <b>new, metallic fingerprint-based method to detect and measure amount of nanoplastics</b> in organisms. Researchers <b>exposed lettuce plants to nanoplastics</b> from commonly found plastic waste in environment — <b>polystyrene (PS) and polyvinyl chloride (PVC) nanoplastics</b> . It is <b>smaller than 1,000 nanometre</b> (1 nm is equal to one billionth of a metre). It can <b>lead to cell damage and inflammation</b> in humans; <b>growth impairments, larval deformities and other toxic effects</b> in marine organisms.
<b>Microplastic</b>	It is less than 5mm in size. It include microfibers (most abundant), fragments, pellets, flakes, sheets or foams. It enter water bodies through <b>atmospheric deposition, run-off from contaminated land or through municipal wastewater</b> . By using <b>Raman spectroscopy, micro plastics and toxic chemicals containing the cyclohexyl functional group</b> were detected which were found responsible for the ailments in the fish. Chemicals containing the <b>cyclohexyl group are commonly used in agriculture and the pharmaceutical industry</b> .
<b>Endosulfan</b>	Supreme Court (SC) directed <b>Kerala to pay ₹5 lakh compensation</b> each victim of toxic Endosulfan Pesticide. It is an <b>organochlorine biocide used for controlling pests</b> and mites by generating Neurotoxic effects. It can <b>spray on cotton, cashew, fruits, tea, paddy, and tobacco</b> etc. It was <b>banned by SC in 2011</b> . It is kept under Stockholm Convention on Persistent Organic Pollutants. Alachlor, Dichlovos, Trichlorfon, Phosphamidon, methyl parathion, phorate and triazophos was completely banned.
<b>Nonylphenol (NP)</b>	A study <b>revealed the presence of high levels of toxic chemical NP in drinking water</b> across India. It is <b>commonly used in the production of Nonylphenol Ethoxylates (NPEs)</b> . It <b>used as surfactants</b> and in day-to-day <b>consumer products</b> such as detergents, wetting agents and dispersants. <b>Endocrine disruptor</b> associated with adverse effects like <b>birth defects, skin and eye irritation</b> etc. <b>United Nations Environment Programme (UNEP)</b> has <b>designated NP as a chemical of global concern</b> . <b>No standards exclusively for NP in drinking and surface waters in India</b> .
<b>Chlorpyrifos, fipronil, atrazine and paraquat</b>	According to a report by the Pesticide Action Network (PAN) a non-profit body, <b>chlorpyrifos, fipronil, atrazine and paraquat are being used in excess</b> in various states than what has been recommended by the <b>Central Insecticides Board and Registration Committee</b> , India's pesticides regulator. <ol style="list-style-type: none"> <li>1. <b>Chlorpyrifos</b> is used to control <b>foliage and soil-borne insect pests</b>.</li> <li>2. <b>Fipronil</b> used to control ants, beetles, cockroaches, fleas, etc.</li> <li>3. <b>Atrazine</b> used to <b>selectively control annual grasses and broadleaf weeds before they emerge</b>.</li> <li>4. <b>Paraquat</b> is a <b>herbicide</b> used primarily to control weed and grass control.</li> </ol>

## 12. Light Pollution or Photo Pollution

The presence of **excessive, misdirected, or obtrusive artificial (usually outdoor) light** is known as **light pollution**.

### Key components of light pollution

- ✓ **Glare:** The excessive brightness that causes visual discomfort.
- ✓ **Sky glow:** The brightening of the night sky over inhabited areas.
- ✓ **Light trespass:** The light falling where it is not intended or needed.
- ✓ **Clutter:** The bright, confusing and excessive groupings of light sources.

### Effect of Light pollution on Human and Birds

#### 1. Harm human health:

- ✓ It impact circadian rhythms and production of melatonin which are regulated by light and dark.
- ✓ It can contribute to sleep disorder, diabetes etc.

#### 2. Disruption of ecosystem: It impact birds, animals and plants.

#### 3. Disorientation during flight: It attract and disorient bird flying at night causing them to circle illuminated areas, depleting their energy reserve and putting them at risk of exhaustion, predation and lethal collision.

4. **Light induce collision:** It contribute to millions of birds from collision with building and other infrastructure.
5. It interfering with astronomical research and reduce energy consumptions.

#### Measures to mitigate light pollution

- ✓ **Promoting the use of LED technology and green energy** for displays and illuminations.
- ✓ **Avoid illuminated advertisements** that obscure or diminish the effectiveness of traffic signals.

## 13. E-Waste (Management) Rules 2022

1. **Definition:** Electrical and electronic equipment, whole or in part discarded as waste, and rejects from manufacturing, refurbishment and repair processes.
2. **Coverage:** Every manufacturer, producer, refurbisher, dismantler, and recycler involved processing of e-waste with **certain exceptions**.

Entity not covered in E-Waste (Management) Rules 2022	
Entity	Covered in
Waste batteries	Battery waste management rule 2022
Packaging plastics	Plastics waste management rule 2016
Micro-enterprise	MSME Development Act, 2006
Radioactive waste	Atomic Energy Act, 1962

**Registration:** Compulsory registration of manufacturer, producer, refurbisher, or recycler of the eproducts **with Central Pollution Control Board (CPCB)**.

#### Introduction of Extended Producer Responsibility (EPR)

- It certificates to incentivize registered electronic waste recyclers by introducing.
- The CPCB to conduct random sampling of electrical and electronic equipment placed on the market to monitor and verify the compliance of reduction of hazardous substances provisions.
- Imposition and collection of environmental compensation on the producer in case of nonfulfilment of obligations as per CPCB guidelines.

#### Responsibility:

<b>Manufacturers</b>	<ul style="list-style-type: none"> <li>o Make the <b>end product recyclable</b>.</li> <li>o <b>Component</b> made by different manufacturers should be <b>compatible with each other</b>.</li> </ul>
<b>Producers</b>	<ul style="list-style-type: none"> <li>o Obtaining and implementing extended producer responsibility targets may be made stable for 2 years and starting from <b>60% for the year 2023-2024 and 2024-25; 70% for the year 2025-26 and 2026-27 and 80% for the year 2027-28 and 2028-29 onwards</b>.</li> <li>o These rules will be applicable from 1st April, 2023.</li> <li>o <b>Creating awareness</b>.</li> </ul>
<b>Recycler</b>	<ul style="list-style-type: none"> <li>o Ensuring that the recycling <b>processes and facilities are in accordance with the regulatory standards</b>.</li> <li>o <b>Maintain a record</b> of e-waste collected.</li> </ul>
<b>State government</b>	<ul style="list-style-type: none"> <li>o <b>Earmark space for e-waste dismantling and recycling</b> in the existing and upcoming industrial parks, estates, and industrial clusters.</li> <li>o <b>Undertaking industrial skill development</b> and establishing measures for protecting the health and safety of workers engaged in the dismantling and recycling facilities for e-waste.</li> </ul>



## 14. The Wild Life (Protection) Amendment Act, 2022

This act seeks to protect and conserve wildlife by better management of protected areas and implement the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Key Amendments	
<b>New Chapter VB for implementation of CITES</b>	<ul style="list-style-type: none"> <li>• <b>Designation of authorities by the Central government</b> <ul style="list-style-type: none"> <li>✓ <b>Management Authority (MA):</b> it responsible for issuance of permits and certificates for trade of scheduled specimens in accordance with the Convention.</li> <li>✓ <b>Scientific Authority-</b> To advice MA on aspects related to impact on the survival of the specimens being traded.</li> </ul> </li> <li>• <b>Identification mark</b> to be used by the MA for a specimen, as per CITES. The modification or removal of the identification mark prohibited.</li> <li>• <b>The registration certificate to be obtained by person possessing live specimens</b> of scheduled animals from the MA.</li> <li>• <b>The breeders of species in Appendix I of Schedule IV required making an application for licence</b> to the Chief Wild Life Warden within 90 days of the commencement of the amendment.</li> <li>• <b>The conditions for export, import, re-export and introduction from sea</b> of scheduled specimens have been specified.</li> </ul>
<b>Rationalisation of schedules</b>	<p><b>Reduce the number of schedules from 6 to 4 by:</b></p> <ul style="list-style-type: none"> <li>✓ By reducing the number of schedules for specially protected animals from 4 to 2.</li> <li>✓ <b>Inserting a new schedule for specimens listed in the Appendices under CITES</b> (scheduled specimens).</li> <li>✓ <b>Removing the schedule for vermin species.</b></li> <li>✓ <b>The wild animals will be declared as Vermin by Central Government</b> by the way of notification for any area and for a specified period</li> </ul>
<b>Control of sanctuaries</b>	<ul style="list-style-type: none"> <li>• <b>The Chief Wildlife Warden will manage and protect sanctuaries in accordance with the management plans</b> prepared as per guidelines of the central government.</li> <li>• <b>In case of sanctuaries falling under Scheduled Areas or areas where Forest Rights Act 2006 is applicable,</b> the management plan for such sanctuary prepared after due consultation with the <b>Gram Sabha</b> concerned.</li> </ul>
<b>Increase in Penalties</b>	<ul style="list-style-type: none"> <li>• For <b>General violation</b> increases to 1 lakh from Rs25,000.</li> <li>• For <b>specially protected animals</b> increases to 25,000 from Rs10,000.</li> </ul>
<b>Exemptions for 'live elephant' (section 43)</b>	<ul style="list-style-type: none"> <li>• <b>Transfer or transport of live elephants allowed for a religious or any other purpose</b> by person having ownership certificates in accordance with conditions prescribed by the Central Government.</li> </ul>
<b>New section 42A for Surrender of captive animals</b>	<ul style="list-style-type: none"> <li>• <b>Any person having a certificate of ownership for captive animals or animal products, can voluntarily surrender</b> them to the Chief Wild Life Warden.</li> <li>• <b>No compensation to be paid to the person for surrendering</b> such items and the items will become the property of the State Government.</li> </ul>
<b>Relaxation of certain restrictions</b>	<ul style="list-style-type: none"> <li>• <b>Permits may be granted for Film-making</b> (without causing any adverse impact to the habitat or wildlife) to enter or reside in a sanctuary.</li> <li>• <b>Certain activities</b> such as, grazing or movement of livestock, bona fide use of drinking and household water <b>by local communities etc. allowed without a permit</b> in a sanctuary.</li> </ul>
<b>Other Provisions</b>	<ul style="list-style-type: none"> <li>• <b>Central government empowered to regulate or prohibit the import, trade, possession or proliferation of invasive alien species.</b></li> <li>• <b>No renewal of any arms licences to be granted to any person residing within 10 kilometres</b> of a sanctuary except under the intimation to the Chief Wild Life Warden or the authorised officer.</li> <li>• <b>State Board for Wild Life permitted to constitute a Standing Committee.</b></li> </ul>

## 15. Cheetah Reintroduction Plan

- It was launched at the 19th meeting of the National Tiger Conservation Authority (NTCA).
- Aims to establish viable cheetah met population in India that allows the cheetah to perform its functional role as a top predator.
- It provides space for the expansion of the cheetah within its historical range thereby contributing to its global conservation efforts.
- Kuno also offers the prospect of housing four big cats of India - tiger, lion, leopard and cheetah – and allowing them to coexist as in the past.

### Other sites:

- Nauradehi Wildlife Sanctuary Madhya Pradesh.
- Gandhi Sagar Wildlife Sanctuary - Bhainsrorgarh Wildlife Sanctuary complex, Madhya Pradesh
- Shahgarh bulge in Jaisalmer, Rajasthan
- Mukundara Tiger Reserve as fenced enclosure Rajasthan.

### Reintroducing African Cheetah in India

- The locally extinct cheetah-subspecies of India is found in Iran and is categorized as critically endangered.
- Since it is not possible to source the critically endangered Asiatic cheetah from Iran without affecting this sub-species.
- India will source cheetahs from Southern Africa, which can provide India with substantial numbers of suitable cheetah for several years.

### Sites for reintroduction of cheetah



- Kuno National Park (NP) in Madhya Pradesh will get 13 cheetahs next year, who can co-exist with leopards.
- The move is being described as the world's largest intercontinental animal translocation.
- KNP is devoid of human settlements, forms part of Sheopur-Shivpuri deciduous open forest landscape.
- It is estimated to have a capacity to sustain 21 cheetahs.
- It has a suitable habitat and adequate prey base.

### Importance of relocation:

- Cheetah's conservation, being **flagship species**, will **revive grasslands and its biomes and habitat**.
- Grasslands are a hugely neglected habitat in country** despite largest number of Schedule I protected animals under Wildlife Protection Act residing in these grasslands.

### About Cheetah

- They are the fastest mammal on land.
- Cheetahs don't need much water and can survive in dry forests, grasslands, open plains and desert regions.
- Cheetah is the only large carnivore that got completely wiped out from India in 1952, mainly due to over-hunting and habitat loss.

Basis	African cheetah	Asiatic cheetah
IUCN status	Vulnerable	Critical Endanger (Extinct in India)
CITES status	Appendix I	Appendix I
Distribution	Africa	Only few left in Iran
Physical characteristic	Bigger in size, sturdy legs and neck	Smaller in size and Legs are slender
Food intake	Diverse diet due to bigger habitat	Medium size prey like chinkara, gazelle.
Appearance		

## 16. Project Tiger

- A Centrally Sponsored Scheme of the MoEFCC launched in 1973.
- It was initially launched in 9 Tiger reserves (TRs) in different states of India.
- It provides central assistance to tiger range States for in-situ conservation of tigers in designated tiger reserves.
- The National Tiger Conservation Authority (NTCA) a statutory body is the Implementing Agency established through Wild Life (Protection) Amendment Act, 2006.
- Its functions include, overarching supervisory/coordination role and approves the Tiger Conservation Plan prepared by the State Governments.
- The centre provides financial assistance to states of 60% and 50% for expenditure on all non-recurring items and expenditure on recurring items respectively.

## Landmark Updates of General Studies Subject

- The North-eastern and Himalayan States are provided 90% central assistance in both cases.

### Activities undertaken under project Tiger

- Establishment and development of new Tiger Reserves: 52 tiger reserves covering over 75,000 sq. km.
- Recently declared TRs:** Ranipur TR (53rd TR) and Ramgarh Vishdhari TR (52nd TR).
- Other Protected areas accorded approval for declaration as TR: Sunabeda Wildlife Sanctuary (Odisha), Male Mahadeshwara Hills Wildlife Sanctuary (Karnataka), and Guru Ghasidas National Park & Tamor Pingla Wildlife Sanctuary Tiger Reserve (Chhattisgarh).
- Core buffer strategy for TRs:** Core areas are kept free of all human activities, a co-existence agenda adopted in buffer and fringe areas with landscape approach.

- NTCA recently banned new construction in tiger reserves' core areas.
- NTCA conducting 5th cycle of assessment using application M-STrIPES (Monitoring System for Tigers Intensive-Protection & Ecological Status): Uses GPS to geotag photo-evidence.
- Independent monitoring and the evaluation of tiger reserve by developing Management
- Effectiveness Evaluation (MEE) Framework
- Special Tiger Protection Force (STPF) deployed in several TRs for focused anti-poaching operations.
- Technological advancements: E-Bird project uses Unmanned Aerial Vehicles (UAV) for Surveillance and Monitoring.

Recently declared Tiger reserves	
Tiger reserve	Details
<b>Ramgarh Vishdhari Tiger Reserve</b>	Rajasthan Government has <b>notified the Ramgarh Vishdhari Wildlife Sanctuary as a tiger reserve.</b> It is the <b>4th Tiger Reserve</b> of Rajasthan after <b>Ranthambore, Sariska and Mukundra</b> . It located in Bundi district and in part in Bhilwara and Kota districts. It serves as a tiger corridor between <b>Ranthambore Tiger Reserve</b> and <b>Mukundra Hills Tiger Reserve</b> . The topography varies from gentle slopes to steep rocky cliffs from flat-of hills of <b>Vindhya</b> to the conical hillocks and sharp ridges of the <b>Aravallis</b> . The river Mez, a tributary of Chambal river is flowing through this habitat. It has Dry Deciduous Forest types vegetation. Famous for Golden jackal, Indian wolf, leopard, striped hyena, chinkara, antelope, Chital, Sambar, Nilgai etc.
<b>Ranipur Tiger Reserve (RTR)</b>	Uttar Pradesh cabinet approved the notification of <b>state's 4th</b> (Dudhwa, Pilibhit and Amangarh are remaining 3) <b>and India's 53rd tiger reserve</b> in <b>Ranipur Wildlife Sanctuary</b> in Chitrakoot district. It is located in the Chitrakoot district of Uttar Pradesh. The reserve <b>have</b> Tropical dry deciduous forests vegetation. It is famous for Tiger, leopard, bear, spotted deer, sambhar, chinkara, reptiles, etc.

## 17. Eco-Sensitive Zones (ESZ)

### Recent Judgement

- The Supreme Court has directed that every protected forest, national park and wildlife sanctuary in the country should mandatorily have a minimum 1 km ESZ, from their demarcated boundaries.
- The directions were passed in reference to applications filed under the TN Godavarman Thirumalpad versus Union of India case.
- It applicable to all such states and Union Territories where the minimum ESZ is not prescribed.
- A extended boundary shall prevail if the existing ESZ goes beyond 1 km buffer zone or if any statutory instrument prescribes a higher limit.
- No new permanent structure will be allowed within the ESZ.
- Mining within national wildlife sanctuary or national park is not permitted.

- Activity already being undertaken, within the 1km or extended ESZ, but lying outside the ambit of prohibited activities may continue with permission.
- The Principal Chief Conservator of Forests of each State/UT directed to make a list of subsisting structures at the ESZs and submit a report to the court within 3 months.
- The Requirements could be diluted if there is "overwhelming public interest".
- In respect of PAs for which the proposal of a State/UT has not been given, the 10 kilometres buffer zone as ESZ shall be implemented, according to MoEFCC guidelines, till a final decision is arrived.

### About ESZ

- To be protected from industrial pollution and unregulated development, under the Environment Protection Act (EPA), 1986, the ecologically important and fragile areas around protected areas designate.

## Landmark Updates of General Studies Subject

- The Central Government in exercise of the powers conferred by section 3 of the EPA, 1986 can notify ESZ.

### Aim of ESZs

- To create some kind of “Shock Absorber” for the Protected Areas (PAs).
- To act as a transition zone from areas requiring higher protection to those requiring lesser protection.
- To regulate human activities, rather than prohibit, around PAs.
- As per 2011 guidelines, the extensions of ESZs up to 10 kms around a PA.
- It also includes Sensitive corridors, connectivity and ecologically important patches, crucial for landscape linkages, even beyond 10 kms width.

- The distribution of an area of ESZ and the extent of regulation may not be in uniform all around and are kept PA specific.

### Activities involves in the ESZ

- The commercial mining, setting of saw mills, polluting industries, and major HEP are prohibited under ESZ.
- Activities like felling of trees, regulating hotels and resorts, drastic change in agricultural practices, widening of roads, and introduction of exotic species are regulated in ESZ.
- Rainwater harvesting, organic farming, ongoing agricultural and horticultural practices and adoption of green technologies can be allowed in the ESZ.

## 18. Biodiversity Heritage Sites (BHSS)

- State of Tamil Nadu issued a notification to declare Arittapatti and Meenakshipuram villages in Madurai district the first biodiversity heritage site in State.
- BHSS Well defined areas that are unique, ecologically fragile ecosystems, spread over terrestrial, coastal and inland and marine waters having rich biodiversity.
- The State Governments, in consultation with local bodies can Notified BHS.
- It can be identified and notified as per the provisions of the Section 37 of the Biological Diversity Act 2002.
- State Government in consultation with Central Government may frame rules for the management and conservation of BHS.
- The creation of BHSs may not put any restriction on prevailing practices and usages of local communities, other than those voluntarily decided by them.
- State Governments are also empowered to frame schemes for compensating or rehabilitating any person or section of people economically affected by such notification.
- State Biodiversity Boards (SBB) may invite suggestion for declaration of BHSs through relevant community

institutions (Gram sabhas, panchayats, urban wards, forest protection committees, tribal councils).

- Presently 35 BHS are in India including Majuli, Unakoti, Silachari Caves, and Amarkantak etc.
- First Biodiversity Heritage Site of India-Nallur Tamarind Grove in Bengaluru, Karnataka (2007).

### Criteria for BHS

- Richness of wild and domestic species or intra-specific categories.
- High endemism and presence of rare, threaten and keystone species.
- Species with evolutionary significance and wild ancestors of domestic and cultivated species
- Past pre-eminence of biological component represented by fossil beds and having significant aesthetic, ethical and cultural values.
- Importance of maintenance of cultural diversity with or without a long history of human association with them.

## 19. Forest (Conservation) Rules, 2022

These rules are notified under the **Forest (Conservation) Act, 1980** and will **replace the Forest (Conservation) Rules, 2003**.

### Committees and their functions:

Committees	Features
<b>Regional Empowered Committee</b>	<ul style="list-style-type: none"> <li>It is setup by Central govt in each of the regional offices.</li> <li>It meet at least twice every month to examine every referred project for approval or rejection</li> </ul>



## Landmark Updates of General Studies Subject

<b>Advisory Committee</b>	<ul style="list-style-type: none"> <li>To be setup by the Central govt consisting 6 members to meet every month.</li> <li>To advise with regards to grant of approval under various sections of rules.</li> </ul>
<b>Project screening committee</b>	<ul style="list-style-type: none"> <li>To be constituted by State or UT.</li> <li>To meet at least twice every month to recommend projects to State/UTs administration.</li> <li>To examine the proposal received from the State Government or Union territory Administration, except proposals involving forest land of five hectares or less.</li> </ul>

### Proposals for Prior Approval of the Central Government

- In- Principle' approval after considering the recommendation of the Advisory Committee.
- The Nodal Officer may, after receipt of the 'In-Principle' approval from the Central Government.

### Compensatory Afforestation

A Land for compensatory afforestation shall be provided which is neither notified as forest under the Indian Forest Act, 1927 or any other law nor managed as forest by the Forest Department.

### Compensatory Afforestation Fund Act, 2016

- The Compensatory Afforestation (CA) refers to afforestation and regeneration activities carried out as a way of compensating for forest land diverted to non-forest purposes.
- The act establishes **National and State Funds for the same purpose.**
- About 90% of the all money collected for compensatory afforestation by a State/UT shall be **transferred to the State Fund** and the **balance 10% to the National Fund.**
- The money received in the National and State fund shall be an **interest bearing and non-lapsable under public account.**
- The function of National and State Authority is to manage and utilise the respective funds for the purposes this Act of **this Act** such as conservation and development of forest and wildlife.

## 20. Great Barrier Reef (GBR)



- This method will help in building reefs threatened by climate change. Mesh technology will help to store coral larvae at  $-1960^{\circ}\text{C}$  ( $-320.8^{\circ}\text{F}$ ).
- The GBR is a largest barrier reef of the world, located at north eastern coast of Australia in Coral Sea.
- In 1981, it was declared a World Heritage Area because of its outstanding universal value.

### About Coral Reef

- The corals are the invertebrate animals belonging to a large group of colourful animals called Cnidaria.
- Each of these coral called as a polyp.
- They contain microscopic algae called zooxanthellae which have symbiotic relationship with animals.
- The coral polyps (animals) provide algae (plants) a home, and in exchange the algae provide polyps with food they generate through the process of photosynthesis.
- It share less than 1% of the earth's surface but provide a home to nearly 25% of marine life.
- They act as barriers to protect shoreline from waves and storms.
- Events like Ocean acidification, unsustainable fishing (Blast fishing), nutrients run-offs, coral harvesting etc put stress of corals.

- Scientists have successfully developed a new method known as Cryomesh to freeze and store coral larvae.

**Distribution of coral reefs in India**

- It found in Gulf of Mannar, Palk-bay, Gulf of Kutch, Andaman & Nicobar Islands, Lakshadweep islands and Malvan (Maharashtra).
- About 570 species of hard corals found in India and almost 90% of them are found in waters surrounding A&N Islands.
- They are protected under Schedule I of Wildlife Protection Act (WPA), 1972.

## 21. First Sovereign Green Bonds (SGB) Framework for India

- A green bond is a fixed-income instrument designed to support specific climate-related or environmental projects.
- The SGBs are issued by the Government.
- The issuances of SGBs are announced earlier in Union Budget 2022-23.
- To encourage energy efficiency, reduces carbon & GHG emissions form the basis for classification of the Green project.
- The renewable energy, clean transportation, water and waste management, green buildings are the eligible project which is including in framework.
- It excludes, nuclear power generation, landfill projects, directs waste incineration, and hydropower plants larger than 25 MW etc.
- To validate key decisions on issuance of SGB, the Green Finance Working Committee constituted.
- The proceeds will be deposited with Consolidated Fund of India.

**1. Green Bonds in India**

- The SEBI had brought **disclosure norms for green bonds** in 2017, whereby issuer will have to **make disclosure** about **environmental objectives** of issue of such securities.
- India's **First Green Bond** was issued by Yes Bank Ltd in 2015.

**2. Municipal Green Bonds**

- The SEBI has announced that issuers of municipal debt securities can issue green bonds in compliance with guidelines for issuance and listing non-convertible debentures.
- The **eligible projects** include renewable energy, clean transportation, water and waste management, green building etc.

**3. Blue Bonds**

- The SEBI has proposed the concept of blue bonds as a mode of sustainable finance. A blue bond is a relatively new form of debt instrument that is issued to support investments in healthy oceans and blue economies.
- The Blue Economy is sustainable use of ocean resources for economic growth, improved livelihoods, and jobs.
- The Blue bonds offer an opportunity for mobilising private sector capital to be mobilized to support the blue economy.
- India can deploy blue bonds in various aspects of blue economy like oceanic resource mining, sustainable fishing, national offshore wind energy policy etc.

## 22. Cloud Forest Assests

The **Earth Security**, a global nature-based asset management advisory firm, recently released a new report “**Cloud Forest Assets Financing a Valuable Nature-Based Solution**”. As per report the suggested **Cloud forest bonds** are a part of ‘**Nature Based Solutions (NBS)**’ and their financing to protect these Cloud forests.

**Cloud forest**

- It is the area with the forest cover greater than 10% and fog present greater than 70% of the time.
- It found mostly between 1500 to 3000 m above sea level.
- The shorter trees covered in mosses and fern
- It is also cooler and wetter than other forest.

- It is blanket in dense grounds level clouds.
- These are mountain tropical forests generally found at the river headstreams and mostly covered with clouds.
- These forests serve as the storage of clean water for communities, industries and hydropower plants.
- Majority of Cloud Forest i.e., 90% are found in 25 developing countries in tropical regions which bears the disproportionate impact of climate change.

**Benefits of Cloud Forest Assests**

1. It helps in resource monetization
2. It prospecting the true potential of ecosystem services

## Landmark Updates of General Studies Subject

- It is stepping toward the green economy
- It helps in combating climate change
- It can alternate the climate financing mechanism for low income countries
- It helps in participation and community capacity buildings.

### Nature Based Solutions (NBS)



- It is the actions that protect, sustainably manage or restore ecosystem.
- It can address the societal challenge such as climate change, human health, food and water securities, and disaster risk reduction effectively and adaptively.
- It simultaneously provide human well being and biodiversity benefits.
- It leverage nature and the power of healthy ecosystem to protect people, optimized infrastructure and safeguard the stable biodiverse future.

### Benefits of nature based solutions

- Adaption:** Climate sensitive agriculture by cultivating drought resistance crops like millets can help in saving ground water and achieve food security.
- Mitigation:** The NBS like afforestation can help to provide 37% mitigation needed by 2030 to achieve Paris climate target.
- Resilience:** The recent initiative **MISHTI (Mangrove Initiative for Shoreline Habitat and Tangible Income)** helps to build resilience against cyclone and tsunamis using mangrove along with providing income opportunity for coastal communities.

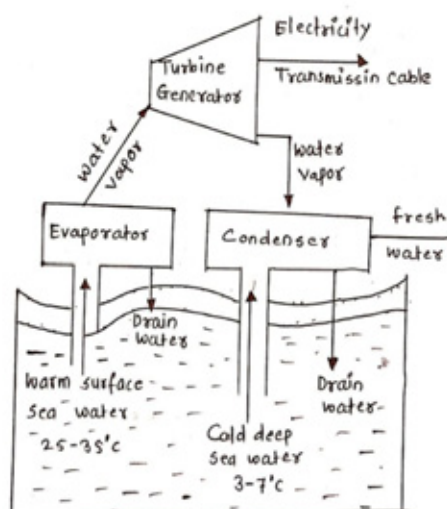
### Mitigation of Climate Change through NBSs

Supporting actions	Ecosystem	Ecosystem services	Outcomes
Mains functionality is to avoid degradation, protect restore and manage ecosystem in a climate change context.	Forests	Carbon storage in vegetation	Tonnes of CO <sub>2</sub> reduce avoided and sequestered
	Grasslands	Carbon storage in soils	
	Mangroves	Storm surge attenuation	Number of people with reduce the vulnerability to climate change
	Wetlands	Flood water retention	

## 23. Ocean Thermal Energy

- The National Institute of Ocean Technology (NIOT), under Ministry of Earth Sciences (MoES) is establishing India's first Ocean Thermal Energy Conversion (OTEC) plant.
- The OTEC plant will have a capacity of 65kW in Kavaratti, Lakshadweep with indigenous technology.
- It will power the Low Temperature Thermal Desalination (LTTD) based desalination plant for conversion of Sea water into Potable water.
- Earlier in 1980, India had planned to set up an OTEC plant, off the Tamil Nadu coast, but it was abandoned.

### Ocean Thermal Energy Conversion (OTEC)





- It is a process for producing energy by harnessing the temperature differences (thermal gradients) between ocean surface waters and deep ocean waters.
- In tropical regions, surface water, heated by Sun's energy, can be much warmer than deep water.
- This temperature difference can be used to produce electricity and to desalinate ocean water.
- The OTEC systems use a temperature difference of at least 20° Celsius to power a turbine to produce electricity.

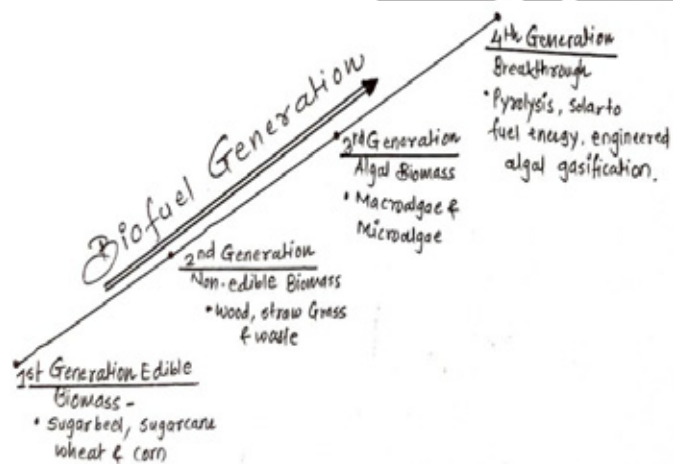
**India's potential:**

- The OTEC has a theoretical potential of 180,000 MW in India subject to suitable technological evolution.
- India is geographically well placed
- Generates a constant, clean source of electricity unlike intermittent electricity from renewable resources like wind and solar
- The potential to generate potable water, hydrogen, and ammonia; Cold and nutrient rich water from the
- The OTEC process can benefit commercial products such as air conditioning, aquaculture, etc.

Other forms of ocean based energy	
<b>Wave energy</b>	It can be generated by using divide either floating the ocean surface or moored in ocean floor by force generated by the ocean wave.
<b>Current energy</b>	This can be capture as kinetic energy from the ocean current by submerge turbine.
<b>Tidal energy</b>	This can be harnessed potential energy from difference in water level from low tide and high tide.

## 24. National Policy on Biofuels-2018

Recently, amendments to the national policy on Biofuels, 2018 get approved by the cabinet to advance the target of 20% ethanol blending in petrol to ethanol supply year (ESY) 2025-26 from earlier 2030.

**Biofuels**

- It refers to liquid transportation fuels, such as ethanol and biodiesel, derived from agricultural produce, forests or any other organic material (feedstock).
- It is based on the feedstock used to produce Biofuels and they are classified into four generations.

- Currently, 1st generation Biofuels are the main source of Biofuels globally despite 140 billion tonnes of agro-waste or biomass generated from agriculture every year.
- It also covered Bio-ethanol, Biodiesel and Bio-CNG.

**Aim of NBP**

- To increase usage of Biofuels in the energy and transportation sectors of the country in the coming decade
- To utilize, develop and promote domestic feedstock and its utilization for production of Biofuels.
- The National Bio-fuel Coordination Committee (NBCC) is the implementation agency set up in 2020, chaired by Minister Petroleum and Natural Gas.
- It has representatives from 14 other ministries and departments too
- It take decisions for effective implementation and monitoring of Biofuels program in the country
- It provides overall coordination among FCI and oil marketing companies.

**Recent Amendments:**

- Use of more feedstock for production of Biofuels.
- Production of Biofuels under the 'Make in India' programme in Special Economic Zones and Export Oriented Units.
- To grant permission for export of Biofuels in specific cases.
- Addition of new members to the NBCC and it has the permission to change the policy.

## 25. National Bio-energy Programme (NBP)

- The Ministry of New and Renewable Energy (MNRE) recently notified that NBP will continue from FY 2021-22 to 2025-26 with a budget outlay of ₹858 crore for the first phase.
- The NBP will consist of the three sub-schemes i.e., Waste to Energy Programme, Biomass Programme, and Biogas Programme.

Sub-scheme	Objective	Advantages	Scope
<b>Biomass Programme</b> (Scheme to Support Manufacturing of Briquettes & Pellets and Promotion of Biomass based cogeneration in Industries)	To support setting up of <b>Biomass Briquette/Pellet Manufacturing plants</b> and to support Biomass based <b>cogeneration projects</b> in Industries. <b>IREDA is the Implementing agency.</b>	Provides <b>CFA to project developers and service charges to implementing agency and inspection agencies</b> in respect of setting up of Briquette / Pellet manufacturing plants and Biomass cogeneration projects in industries.	It reduces <b>stubble burning</b> . It provide additional source of income to farmers and <b>Better environmental practices and reduced pollution.</b>
<b>Biogas Programme</b>	Setting up of biogas plants for small power needs of users. It is implemented by designated Programme Implementing Agency (PIA) of State or Union Territory or Biogas Development and Training Centres (BDTC). IREDA, NABARD/ RBI approved Financial Institutions may also implement it in consultation with PIAs.	Covers setting up of <b>small and medium biogas plants ranging from 1M3 (cubic meter) to 2500 M3</b> biogas generation per day for individual user, farmers, poultry etc.	<b>GHG reduction, improved Sanitation, Employment Creation, and digested slurry</b> from biogas plants can supplement / reduce use of chemical fertilizers.
<b>Waste to Energy Programme</b> (On Energy from Urban, Industrial and Agricultural Wastes or Residues)	To support the setting up of Waste to Energy projects for generation of <b>Biogas/ Bio-CNG or Power plants</b> (excluding municipal solid waste to power project)/ <b>producer or syngas</b> from urban, industrial and agricultural wastes/residues. <b>IREDA is the implementation agency.</b>	It provides <b>Central Financial Assistance (CFA) to project developers and service charges to implementing/ inspection agencies</b> in respect of successful commissioning of waste to energy plants.	<b>Safe, technologically advanced means of waste disposal</b> that reduces greenhouse gases generates clean energy and recycles metal.

## 26. Electricity (Promoting Renewable Energy through Green Energy Open Access) Rules, 2022

Recently, Power ministry has notified Electricity (Promoting Renewable Energy through Green Energy Open Access) Rules, 2022.

### Key Highlights of rule

- The consumers are entitled to demand supply of Green Power from Discoms.
- The commercial and Industrial consumers are allowed to purchase green power on voluntarily basis.
- Green Open Access is allowed to any consumer and reduction in the limit of Open Access Transaction from 1 MW to 100 KW for green energy.
- This aims to enable small consumers also to purchase renewable power through open access (OA).
- It increase transparency in approval process of OA
- The OA approvals will be granted in 15 days or else it will be deemed to have been approved subject to fulfilment of technical requirements. It will be through national portal.
- The uniform renewable purchase obligation on all obligated entities in the area of a distribution licensees.
- The green certificates for consumers if they consume green power.
- Te cross subsidy surcharge and additional surcharge shall not be applicable if green energy is utilized for production of green hydrogen and green ammonia.

## 27. Energy Conservation (Amendment) Act, 2022

It amends **Energy Conservation Act, 2001** which provides a framework for regulating **energy consumption and promoting energy efficiency and energy conservation**. These amendment deals with **saving the environment and tackling climate change**, while 2001 act deals with **saving energy**, thus broadening **scope and objective** of principal Act.

### Key Features of Amendment

- Act empowers central government to specify a carbon credit trading scheme.
- The carbon credit implies a tradable permit to produce a specified amount of CO<sub>2</sub> or other GHGs.
- The central government or any authorized agency may issue carbon credit certificates to entities registered and compliant with scheme.
- The government empowered to set requirements for designated consumers to meet a minimum share of energy consumption from non-fossil sources like green hydrogen, green ammonia, etc.
- The failure to meet obligation will be punishable with a penalty of up to Rs 10 lakh.
- The energy Conservation and Sustainable Building Code to replace Energy Conservation Code for buildings.
- This new code will provide norms for energy efficiency and conservation, use of renewable energy, and other requirements for green buildings.
- It also applicable to the office and residential buildings meeting above criteria.
- It also empowers state governments to lower the load thresholds.
- It expands the scope of energy consumption standards to include vehicles (as defined under the Motor Vehicles Act, 1988), and vessels (includes ships and boats), in addition to equipment and appliances.
- The state Electricity Regulatory Commissions (SERCs) empowered to make regulations for discharging their functions.
- The state Governments required to constitute energy conservation funds for promotion of energy efficiency and conservation measures.
- It will receive contribution by both Union and State govt.
- It increases and diversifies number of members and secretaries in governing council of BEE.

## 28. Deep Sea Mining

- Involves extracting ores rich in cobalt, manganese, zinc and other rare metals from the sea floor of the deep ocean.
- India has a Deep-Sea mission for mining Central Indian Ocean Basin, access for which was granted by ISA.
- About 54% of the world's ocean seafloor is beyond national jurisdiction and their mineral resources are designated as the common heritage of all mankind.
- The deep-sea contains a number of critical minerals needed for batteries, smart phones, laptops renewable energy capacity; found in three main resource types:
- The Polymetallic Nodules (precipitated iron oxy-hydroxides) and manganese oxides on abyssal plain sediments at about 3,500–6,000 m water depths.
- Seafloor Massive Sulphides or Polymetallic Sulphides formed along tectonic plate boundaries and volcanic provinces in water depths from <500 to 5000m.
- The cobalt-rich Ferromanganese Crusts on rock outcrops on seamounts and ridges at water depths of 400–7,000 m.

### Exploration for minerals in the Area



## 29. Biodiversity

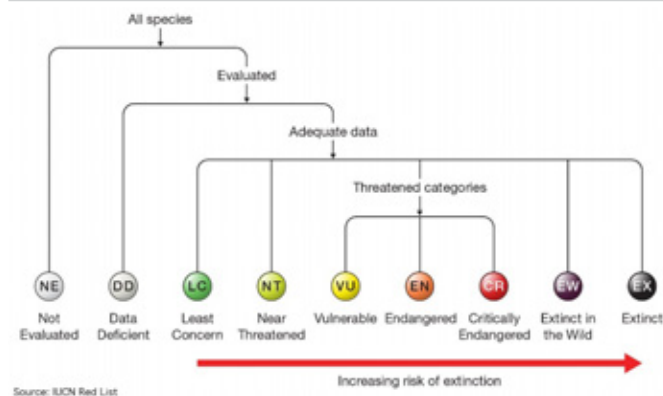


The **variability among the living organism from all sources**, including terrestrial, marine and other aquatic ecosystems and the ecological complex of which they are part, **including diversity within species, between species and of ecosystems** (UN Earth Summit).

### Mega Diverse Countries

- World's Top Biodiversity rich countries
- Identified by **Conservation International, 1988**
- Total of **17 countries** were identified which are mostly located in Tropical and sub-tropical regions. (Australia, Brazil, China, Colombia, Ecuador, United States, Philippines, India, Indonesia, Madagascar, Malaysia, Mexico, Papua New Guinea, Peru, Democratic Republic of Congo, South Africa and Venezuela)
- Criteria (Endemism)**
  - At least **5000** of the world's plants as endemics
  - Marine ecosystem** within its border

### IUCN Classification: Red Data Book Updates



### Conservation Priority

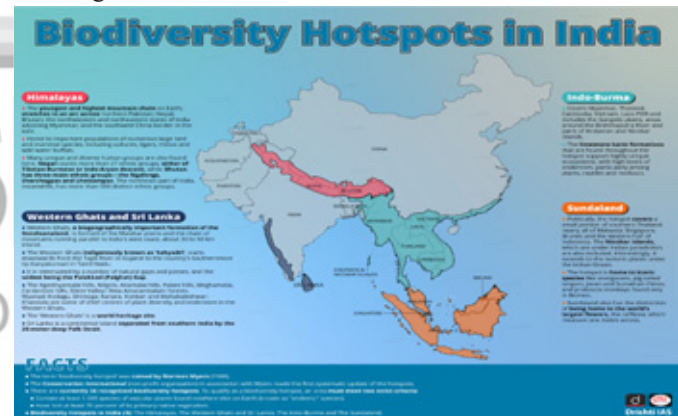
**Extinct (EX):** A species in which the **last individual** has died or where systematic and time-appropriate surveys have been unable to log even a single individual

### Biodiversity Hotspots

- Regions containing **exceptional concentrations of plant endemism** and **experiencing high rates of habitat loss**
- Out of 35/36 globally identified biodiversity hotspots, India has 4 –
  - Eastern Himalayas** - Nepal, India
  - Indo – Burma** - India and Myanmar
  - Western Ghats and Sri Lanka**
  - Sundaland** – Nicobar group of islands, Indonesia, Malaysia, Singapore, Brunei & Philippines

### Criteria

- Plant Endemism:** At least **0.5 %** of the world's total or 1500 species of vascular plants as endemism
- Serious habitat loss:** lost at least **70 %** of its primary vegetation



**Extinct in the Wild (EW):** A species whose **members survive only in captivity** or as **artificially supported populations** far outside their historical geographic range

**Critically Endangered (CR):** A species that possess an **extremely high risk of extinction** as a result of rapid population declines of 80 to more than 90 percent over the previous 10 years (or three generations), a current population size of fewer than 50 individuals, or other factors

**Endangered (EN):** A species that possess a **very high risk of extinction** as a result of rapid population declines of 50 to more than 70 per cent over the previous 10 years (or three generations), a current population size of fewer than 250 individuals, or other factors

**Vulnerable (VU):** A species that possess a very high risk of extinction as a result of rapid population declines of 30 to more than 50 per cent over the previous 10 years (or three generations), a current population size of fewer than 1,000 individuals, or other factors.




**Near Threatened (NT):** A species that are close to becoming threatened or may meet the criteria for threatened status in the near future

**Least Concern (LC):** A species that are pervasive and abundant after careful assessment

**Data Deficient (DD):** A species in which the amount of available data related to its risk of extinction is lacking in

some way. Consequently, a complete assessment cannot be performed. Thus, unlike the other categories in this list, this category does not describe the conservation status of a species

**Not Evaluated (NE):** a category used to include any of the nearly 1.9 million species described by science but not assessed by the IUCN

Critically Endangered (CR) Mammals					
Species	Features	Distribution	Threats	Protections	
				WPA	CITES
 <p><b>Andaman White Toothed Shrew, Jenkins, Nicobar white-tailed</b></p>	<ul style="list-style-type: none"> <li>Mouse-like mammals usually active by twilight or at night</li> <li>Endemic to India</li> </ul>	South Andaman Island	Habitat loss is due to selective logging, natural disasters - tsunamis, and drastic weather changes.	Schedule I.	Appendix I
 <p><b>Chinese Pangolin</b></p>	Nocturnal ant-eating animal	Southern Nepal, North-East India, Bhutan, Bangladesh, Myanmar, northern Indochina, and southern China	Poaching for itsmeat, and traditional medicines.	Schedule I.	Appendix I
 <p><b>Kashmir stag/hangul</b></p>	State animal of Jammu and Kashmir	Mountains of the Kashmir Valley and northern Chamba in Himachal Pradesh. ( <b>Dachigam National Park</b> ).	Habitat destruction, over-grazing by domestic livestock, and poaching.	Schedule I.	Appendix I
 <p><b>Large Rock Rat or Elvira Rat</b></p>	Nocturnal, and burrowing rodent's endemic to India.	Known only from the Eastern Ghats of Tamil Nadu.	Habitat loss, conversion of forests, and fuelwood collection.	Schedule V	
 <p><b>Malabar Civet</b></p>	Endemic to India and was first reported in Travancore, Kerala	Exclusively in Western Ghats (Kerala)	Deforestation & commercial plantations	Schedule I.	Appendix III.

## Landmark Updates of General Studies Subject

 <p><b>Namdapha Flying Squirrel</b></p>	<p>Arboreal &amp; Nocturnal endemic to India. <b>Habitat:</b> Tropical forest</p>	<p>Found only in the Namdapha Tiger Reserve in Arunachal Pradesh.</p>	<p>Hunted for food, Skin &amp; Fur</p>	<p>Schedule II.</p>	<p>Appendix I.</p>
<b>Mammals: Endangered (EN)</b>					
 <p><b>Asiatic Lion</b></p>	<p>Found only in India. Lions population in Gujarat is steadily increasing</p>	<ul style="list-style-type: none"> <li>• <b>Gir protected areas</b> – Gir NP, Gir Sanctuary, Pania Sanctuary, Mitiyala Sanctuary &amp; Adjoining forest reserve.</li> <li>• <b>Six New sites Identified</b> <ul style="list-style-type: none"> <li>✓ <b>MP:</b> Madhav NP, Gandhi Sagar NP.</li> <li>✓ <b>RJ:</b> Sitamata WLS, Mukundra Hills, Kumbhalgarh WLS</li> <li>✓ <b>Jessore-Belaram Ambaji WLS</b></li> </ul> </li> </ul>	<p>Poaching, habitat Fragmentation</p>	<p>Schedule I.</p>	<p>Appendix I</p>
 <p><b>Himalayan Brown/Red Bear</b></p>	<p>It exhibits <b>Sexual dimorphism</b></p>	<p>Nepal, Tibet, north India, and north Pakistan.</p>	<p>Loss of habitat, persecution by humans, and poaching of their fur and claws for ornamental purposes and medicinal use.</p>	<p>Schedule I.</p>	<p>Appendix I</p>
 <p><b>Pygmy hog</b></p>	<p>Indicator species. Reflects health of grasslands of region. Known only from India World's smallest wild pig</p>	<p><b>Habitat:</b> Tall and wet Tarai grassland. Found in Manas WLS</p>	<p>Loss of habitat due to human settlements, agricultural encroachment, dry-season burning, livestock grazing, commercial forestry, &amp; flood control schemes.</p>	<p>Schedule I.</p>	<p>Appendix I</p>

 <p><b>Bengal Tiger</b></p>	<p>National animal of India Keystone species. Umbrella species for conservation purposes.</p>	<ul style="list-style-type: none"> <li>• Endemic to Shivalik–Gangetic floodplain landscape,</li> <li>• Central Indian highlands, Eastern and Western Ghats, Sundarbans National park</li> </ul>	<p>Poaching, Depletion of prey, habitat loss, Inbreeding, and Human-Animal conflict.</p>	<p>Schedule I.</p>	<p>Appendix I.</p>
 <p><b>Capped Langur</b></p>	<p>An arboreal species</p>	<p>Bangladesh, Bhutan, India, and Myanmar</p>	<p>Habitat Loss, and Fragmentation</p>	<p>Schedule I</p>	<p>Appendix III</p>
 <p><b>Asiatic Elephant</b></p>	<p>Largest terrestrial mammal in India India Declare- National Heritage mammal</p>	<p>Karnataka&gt;Assam&gt;Kerala East central &amp; Northern regions of India</p>	<p>Poaching for the illegal ivory trade habitat loss and human-elephant conflict.</p>	<p>Appendix I</p>	<p>Schedule I</p>
 <p><b>Asiatic Wild Dog/ Dhole/</b></p>	<p>Plays an important role as an apex predator in forest ecosystems Native to Central and South East Asia</p>	<p>Arunachal Pradesh, Assam, Meghalaya, West Bengal, Karnataka, Maharashtra, &amp; Kerala</p>	<p>Habitat loss, Loss of prey, competition from other predators, persecution, and possibly diseases from domestic and feral dogs</p>	<p>Schedule II</p>	<p>Appendix II</p>
 <p><b>Golden langur</b></p>	<p>An old-world monkey One of the most endangered primate species in India</p>	<p>Manas National Park, western Assam, Neighbouring foothills of the Black Mountains of Bhutan</p>	<p>Deforestation, human encroachments</p>	<p>Schedule I</p>	<p>Appendix I</p>
 <p><b>Hispid hare / Assam rabbit</b></p>	<p>Native to South Asia Also called Assam Rabbits</p>	<p>Southern foothills of the central Himalayas</p>	<p>Fragmented habitat due to increasing agriculture, flood control, and human development.</p>	<p>Schedule I</p>	<p>Appendix I</p>









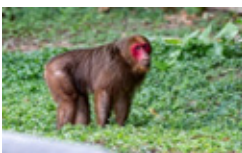
## Landmark Updates of General Studies Subject

 <p><b>Hog deer</b></p>	Peculiar habit of running like a hog with its head down without the traditional leaps of a deer.	Indo-Gangetic Plain in Pakistan, northern India, Nepal, Bangladesh Rare species of Hog Deer found in Keibul Lamjao NP, Manipur	Hunting, habitat loss, fragmentation, & human encroachments	Schedule III.	Appendix I
 <p><b>Kondana Rat</b> (<i>Millardia kondana</i>)</p>	Only found in India.	Sinhagarh Plateau, near Pune (Maharashtra)	Habitat loss, overgrazing of vegetation, and disturbance from tourism and recreational activities	Schedule III.	
 <p><b>Lion-tailed macaque/ Wanderoo</b></p>	Endemic to the Western Ghats	Evergreen forests of Western Ghats mountain the Shola forest of Karnataka, Kerala and TN	Habitat fragmentation is due to the spread of agriculture, tea, coffee, teak, and cinchona, the construction of water reservoirs, and human settlements to support such activities.	Schedule III	Appendix I
 <p><b>Nilgiri Tahar</b></p>	The state animal of <b>Tamil Nadu</b> . Shola forests are typically avoided by this species	Endemic to the Nilgiri Hills & Western and Eastern Ghats in Tamil Nadu & Kerala,	Habitat loss, overgrazing, and illegal hunting.	Schedule I	Appendix I
 <p><b>Red Panda</b></p>	State animal of <b>Sikkim</b> . Small arboreal animals native to the eastern Himalayas and South Eastern China Omnivorous (Mainly on Bamboo)	Arunachal Pradesh, Assam Meghalaya, Sikkim, and Darjeeling, West Bengal.	Habitat loss, fragmentation, poaching, inbreeding depression.	Schedule I	Appendix I.



 <p><b>Sangai/EDLS Deer/ Thamin / Brown Antlered</b></p>	State animal of <b>Manipur</b> . <b>Found only in Manipur</b> <b>Also Known as Dancing Deer.</b>	Marshy grasslands (Phumdis) of <b>Keibul Lamjao National Park, Loktak Lake, Manipur.</b>	Overgrazing, loss of grassland habitat & Hunting for Bow-shape antlers.	Schedule I.	Appendix I.
 <p><b>Western Hoolock Gibbon</b></p>		East of the Dibang river and south of the Brahmaputra and North Bank regions.	Habitat destruction and fragmentation	Schedule I	Appendix I.
 <p><b>White-bellied Musk Deer</b></p>	Only <b>males</b> produce the musk State animal of Uttarakhand	Kashmir, Kumaon, Sikkim, Nepal, China	Poaching & illegal trade for its musk.	Schedule I.	Appendix I.
 <p><b>Wild Water Buffalo/ Wild Asian Buffalo</b></p>	Large bovine native to the Indian subcontinent and southeast Asia >90% population found in Assam	Kaziranga, Manas & Dibru- Saikhowa NP, Laokhowa Wildlife Sanctuary & Bura Chapori Wildlife Sanctuary & around D'Ering Memorial Wildlife Sanctuary in Arunachal Pradesh.	Habitat loss, fragmentation, & poaching.		Appendix I.
<b>Vulnerable Mammals (VU)</b>					
 <p><b>Barasingha or swamp deer</b></p>	State animal of <b>Madhya Pradesh</b>	Northern and Central India, Southwestern Nepal. Kanha Tiger Reserve, MP.	Hunting for horns, loss of habitat & fragmentation	Schedule I	Appendix I.







## Landmark Updates of General Studies Subject

 <p><b>Greater One-Horned Rhino</b></p>	Assam has rhinos in four protected areas, i.e., Pabitora Wildlife Reserve, Rajiv Gandhi Orang National Park, Kaziranga National Park, and Manas National Park.	Small habitats in Indo-Nepal terai and northern West Bengal and Assam	Poaching for the horns Habitat loss, population density Decreasing genetic diversity	Schedule I	Appendix I.
 <p><b>Indian Sloth Bear</b></p>		Found in areas with forest cover, low hills bordering the outer range of the Himalayas from Punjab to Arunachal Pradesh	Habitat loss, the killing of nuisance bears, and poaching	Schedule I	Appendix I.
 <p><b>Bonnet macaque</b></p>		Endemic to Southern India.	Loss, fragmentation, and poaching of habitat.	Schedule II.	Appendix II.
 <p><b>Dugong (Sea Cow)</b></p>	Included in Convention on Migratory Species (CMS) list.	Gulf of Mannar, Andaman and Nicobar Islands & Gulf of Kutch.	Loss of seagrass beds due to ocean floor trawling, pollution, unsustainable hunting, or poaching.	Schedule I.	Appendix I.
 <p><b>Gaur/Indian Bison</b></p>	Trishna Wildlife Sanctuary in Tripura is the country's only natural breeding centre for bison.	Nagarhole, Bandipur, Masinagudi National Parks.	Poaching for trade to supply international markets & commercial trade in meat and trophies	Schedule I.	Appendix I.
 <p><b>Asian Black Bear or Moon Bear or White chested Bear</b></p>		Himalayan forests, North East India, South East Asia, South-East China.	Forest degradation, bamboo plantations, poaching	Schedule II.	Appendix I.
 <p><b>Leopard</b></p>	MP has the highest population of both Tiger & Leopard followed by Karnataka and Maharastra	Found in All forested habitats in India except in arid deserts & above timberline in the Himalayas.	Hunting, poaching, habitat loss, depletion of natural prey, and human conflict.	Schedule I.	Appendix I.






 <p><b>Asian smooth Otter</b></p>	Generally, described as a fish specialist	Restricted to the Himalayas, to the north of the Ganges and to southern India.	poaching, loss, and destruction of wetlands	Schedule I.	Appendix II
 <p><b>Nilgiri Langur/ Nilgiri Leaf Monkey</b></p>		Hilly areas of Western Ghats in Karnataka. Tamil Nadu & Kerala.	Habitat degradation, development activities, Introduction of exotic tree species.	Schedule I.	Appendix II.
 <p><b>Snow Leopard</b></p>	Keystone & Indicator Species	A large part of the western Himalayas, including the states of Jammu & Kashmir, Himachal Pradesh, Uttarakhand & Sikkim & Arunachal Pradesh in the eastern Himalayas.	Human interference, competition with livestock, poaching, climate change, unregulated tourism, illegal trade, and infrastructure development in the mountains	Schedule I.	Appendix I.
 <p><b>Himalayan Serow</b></p>	Cross between goat, donkey, cow, & pig.	Eastern, central, and western Himalayas but not in the Trans Himalayan region.	habitat loss and <b>intensive human impact.</b>	Schedule I.	Appendix I
 <p><b>Fishing Cats</b></p>	Nocturnal (active at night)	Sundarbans in West Bengal and Bangladesh, fishing cats inhabit the Chilika lagoon and surrounding wetlands in Odisha, Coringa, and Krishna mangroves in Andhra Pradesh.	Destruction of wetlands	Schedule I.	Appendix II
 <p><b>Clouded leopard</b></p>	State animal of Meghalaya	Nepal, Bangladesh, and Assam (eastern India) through Indochina to Sumatra and Borneo, and north-eastward to southern China	Habitat destruction and illegal poaching	Schedule I.	Appendix I
 <p><b>Stump Tailed Macaque</b></p>	Native to the North-East part of India & South East Asia.	Assam and Meghalaya to eastern Arunachal Pradesh, Nagaland, Manipur, Mizoram, and Tripura	Habitat loss and fragmentation & poaching.	Schedule II	Appendix II.



Near Threatened Mammals (NT)					
 <p><b>Chiru/ Tibetan Antelope</b></p>	Native to the Tibetan plateau.	Karakoram Wildlife Sanctuary & Changthang Cold Desert Wildlife Sanctuary (Ladakh).	Hunting for its fine wool is used to make the shahtoosh scarves, meat, and magnificent horns.	Schedule I.	Appendix I.
 <p><b>Asiatic Golden Cat</b></p>		Eastern Nepal through northeastern India to Indonesia.	Deforestation, declining prey base, and hunting for the illegal wildlife trade.	Schedule I.	Appendix I.
 <p><b>Indian Wild Ass/ Khur</b></p>	Native to Southern Asia	Rann of the Kutch region. The last refuge lies in the Indian Wild Ass Sanctuary, Little Rann of Kutch.	Diseases, habitat degradation due to salt activities, Invasive species Prosopis juliflora shrub, and encroachment and grazing by the Maldharis.	Schedule I.	Appendix I.
 <p><b>Malayan Giant Squirrel</b></p>	One of the world's largest squirrel species.	North-Eastern States and South-East Asia.	Deforestation, Fragmentation of forests, Crop cultivation, and Overharvesting of food.	Schedule I.	Appendix II.
 <p><b>Rusty-Spotted Cat</b></p>	The smallest member of the Cat's family	Eastern Gujarat Gir National Park in Maharashtra Tadoba-Andhari Tiger Reserve and along India's Eastern Ghats.	Habitat loss and fragmentation & poaching.	Schedule I.	Appendix I.
Least Concern (LC) Mammals					
 <p><b>Caracal</b></p>		Rajasthan, Gujarat, and Madhya Pradesh and are located in Kutch, the Malwa Plateau, and the Aravalli hill range.	Large-scale hunting, illegal trading and <b>loss of natural habitats</b>	Schedule I	Appendix I

 <p><b>Black Buck</b></p>	State Animal of Punjab, Haryana, and Andhra Pradesh	Rajasthan, Gujarat, Madhya Pradesh, Tamil Nadu, Odisha, and other areas throughout peninsular India.	Habitat degradation, illegal poaching, road accidents, cattle overgrazing, and wildlife crime	Schedule I	Appendix III
 <p><b>Himalayan Ibex</b></p>		Mainly in the trans-Himalayan ranges of the Union Territories of Ladakh and Jammu and Kashmir and Himachal Pradesh up to the river Sutlej	Illegal hunting, human disturbance, habitat loss and competition for forage with domestic livestock.	Schedule III	
 <p><b>Pashmina Goat</b></p>		The mountainous, cold arid region of Lahaul-Spiti and Kinnaur in Himachal Pradesh and high-altitude areas of Uttarkashi, Chamoli, and Pithoragarh districts of Uttarakhand bordering Tibet	Climate change and global warming		
<b>Critically Endangered (CR) Birds</b>					
 <p><b>Bengal Florican</b></p>	Known for its mating dance.	Native to only 3 countries in the world: Cambodia, India, and Nepal. In India, it occurs in 3 states, namely Uttar Pradesh, Assam, and Arunachal Pradesh.	Ongoing conversions of the bird's grassland habitats for various purposes, including agriculture	Schedule I.	Appendix I.
 <p><b>Great Indian Bustard</b></p>	State bird of <b>Rajasthan</b> .	Confined mostly to Rajasthan & Gujarat. A small population also occurs in Maharashtra, Karnataka & Andhra Pradesh.	Habitat loss, hunting, and mortality due to collision with power lines (they have poor frontal vision)	Schedule I	Appendix I
 <p><b>Himalayan Quail</b></p>	A bird belonging to the pheasant family	Western Himalayas.	Indiscriminate hunting during the colonial period along with habitat modification.	Schedule I.	Appendix I


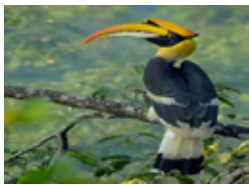

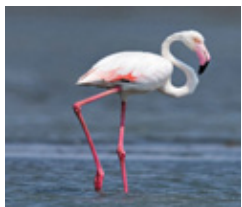


## Landmark Updates of General Studies Subject




 <p><b>Pink-headed Duck</b></p>	A nocturnal bird	Endemic to Andhra Pradesh.	Clearing of scrub jungles, creation of new pastures, growing of dryland crops, Illegal trapping of birds, plantations of exotic trees, quarrying, and the construction of river canals.	Schedule I	Appendix I & Appendix II
 <p><b>Siberian Crane</b></p>	Protected under Convention on Migratory Species.	Keoladeo National Park in Rajasthan.	Pesticide pollution, wetland drainage, development of prime habitat into agricultural fields, and to some extent, hunting.	Schedule I	Appendix I
 <p><b>Spoon Billed Sandpiper</b></p>		Coastlines of West Bengal, Orissa, Kerala, and Tamil Nadu.	Habitat degradation and land reclamation. Human disturbance also leads to a high incidence of nest desertion.	Schedule IV	Appendix I
 <p><b>White-bellied Heron</b></p>		Found at one or two sites in Bhutan, five or six sites in Assam and Arunachal Pradesh, and a few sites in Myanmar.	Loss and degradation of lowland forests and wetlands through direct exploitation and disturbance by humans.	Schedule I	
 <p><b>Jordon's Courser</b></p>	Nocturnal bird	State of Andhra Pradesh	Clearing of scrub jungle, creation of new pastures, growing of dry land crops, Illegal trapping of birds, plantations of exotic trees, quarrying, and the construction of the River Canals.	Schedule I	Appendix I



	Winter migrant to India.	In India, the habitat is restricted to the north and northwest of the country.	Conversion of habitat to arable land, illegal hunting, and proximity to human settlements.	Schedule I	Appendix I
	It is named in honour of the efforts of the <b>Bugun community</b> of Singchung village in West Kameng district in conserving the wildlife and forest of the area.	A temperate forest within the traditional lands of Singchung village in Arunachal Pradesh. It is mostly seen in select pockets of Eaglenest Wildlife Sanctuary and Singchung Bugun Village Community Reserve (SBVCR).	Building a highway	Schedule I	Appendix I
		Northeastern India	Habitat loss Unsustainable harvesting, Trapping & Poisoning of birds, Collection of eggs, Low water levels, complete drying up of water bodies	Schedule I	Appendix I
<b>Endangered (EN) Birds</b>					
	State bird of Assam	Extensively found in Assam and Arunachal Pradesh while also being sighted in Meghalaya, Manipur and Nagaland	Encroachment, deforestation and anthropogenic pressure	Schedule I	Appendix I.
	Endemic to the forests of central India	South Madhya Pradesh, in north-west Maharashtra and north-central Maharashtra	Logging operations, burning and cutting of trees encroachment for cultivation, grazing (reduce habitat suitability) and settlements	Schedule I	Appendix I.

## Landmark Updates of General Studies Subject

	Migratory raptor	Andhra Pradesh	Habitat loss, electrocution on/ collision with energy infrastructure, poisoning through herbicides/ pesticides/ veterinary drugs in food sources, etc.	Schedule I	
<b>Vulnerable (VU) Birds</b>					
	State bird of Kerala & Arunachal Pradesh	Rainforest regions of India (Western Ghats and Northeastern region of India), Southeast Asia	Habitat loss and hunting.	Schedule I	Appendix I.
<b>Near Threatened (VU) Birds</b>					
	State bird of the Union Territory of Ladakh	Breeds on the Tibetan plateau and migrates to Tawang for the winter.	Damage to the eggs and chicks, caused by feral dogs & Habitat loss	Schedule I	Appendix I.
<b>Least Concerned (LC) Birds</b>					
	The annual Flamingo Festival is to be held in January at Pulicat lake	Nal Sarovar Bird Sanctuary, Khijadiya Bird Sanctuary, Flamingo City, and the Thol Bird Sanctuary.	Habitat loss due to human activity and expansion.	Schedule IV	Appendix II
		South of the Sahara in Africa and <b>south of the Himalayas</b> in India. Also found in Sri Lanka and parts of Myanmar	<b>Not globally threatened</b> and currently, the populations are stable.	Schedule IV	
	It is known for the extreme altitudes it reaches when migrating across the Himalayas.	Migrates over the Himalayas to spend the winter in parts of South Asia (from Assam to as far south as Tamil Nadu.	Habitat loss, overhunting, egg collection, and persecution from farmers	Schedule IV	

Critically Endangered (CR) Fishes					
 <b>Hump Mahseer</b>	Also known as the Tiger of the Water.	found only in the Cauvery River basin.	Construction of dams, destructive fishing methods, reduced water flow rates, water & pollution, etc.	Schedule I	
 <b>Ganges Shark</b>		Ganga River (Padma River), Brahmaputra River, and Bay of Bengal.	Overfishing, pollution, increasing river use, and construction of dams and barrages.	Schedule I.	Appendix II
 <b>Knife-tooth Sawfish</b>		Western and eastern Indian Ocean, western Pacific Ocean	Habitat loss, water quality, and overutilization	Schedule I	Appendix I

## Practice Questions

### 1. Consider the following Environmental conventions:

1. Basel Convention: Prior Informed Consent Procedure for certain hazardous Chemicals and Pesticides
2. Rotterdam Convention: Control of Transboundary Movements of Hazardous Wastes and their Disposal

Which of the above pairs is/are correctly matched?

- (a) 1 only                                      (b) 2 only  
(c) Both 1 and 2                              (d) Neither 1 nor 2

**Ans: (d)**

#### Basel Convention:

- The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal was created to protect people and the environment from the negative effects of the inappropriate management of hazardous wastes worldwide.

#### Rotterdam Convention:

- The Rotterdam Convention on the Prior Informed Consent Procedure for certain hazardous Chemicals and Pesticides in international trade provide Parties with a first line of defence against hazardous chemicals.

### 2. Which of the following are parts of UNESCO's World Network of Biosphere Reserves:

1. Nokrek Biosphere Reserve
2. Great Nicobar Biosphere Reserve

Select the correct code:

- (a) 1 only                                      (b) 2 only  
(c) Both 1 and 2                              (d) Neither 1 nor 2

**Ans: (c)**

Eighteen biosphere reserves are a part of the World Network of Biosphere Reserves, based on the UNESCO Man and the Biosphere (MAB) Programme list.

- Nilgiri Biosphere Reserve Tamil Nadu, Kerala, Karnataka 2000
- Gulf of Mannar Biosphere Reserve Tamil Nadu 2001
- Sundarbans Biosphere Reserve West Bengal 2001
- Nanda Devi Biosphere Reserve Uttarakhand 2004
- Nokrek Biosphere Reserve Meghalaya 2009
- Pachmarhi Biosphere Reserve Madhya Pradesh 2009
- Simlipal Biosphere Reserve Odisha 2009
- Great Nicobar Biosphere Reserve Great Nicobar 2013
- Achanakmar-Amarkantak Biosphere Reserve Chhattisgarh, Madhya Pradesh 2012
- Agasthyamalai Biosphere Reserve Kerala and Tamil Nadu 2016
- Khangchendzonga National Park Sikkim 2018

### 3. Which of the following National Parks is unique in being a swamp with floating vegetation that supports a rich biodiversity?

- (a) Bhitarkanika National Park  
(b) Keoladeo Ghana National park  
(c) Keibul Lamjao National Park  
(d) Sultanpur National park

**Ans: (c)**

- It is the only floating park in the world, located in Manipur, North East India, and an integral part of Loktak Lake.
- The national park is characterized by many floating decomposed plant materials locally called phumdis.
- The park is a swamp established by Mann Sharma with floating mass of vegetation (created by accrual of organic garbage and biomass with soil particles that has been thickened into a solid form called phumdis, at the south-eastern side of the Loktak Lake, which has been declared a Ramsar site.

### 4. In which of the following states, Silent Valley National Park is situated?

- (a) Tamil Nadu                                      (b) Andhra Pradesh  
(c) Karnataka                                      (d) Kerala

**Ans: (d)**

- *Silent Valley National Park* in Kerala is confined by the Mannarkkad Plains to the South and the Nigiri Plateau to the North.

### 5. Which of the following statements are correct?

1. Green hydrogen is produced using renewable energy.
2. Grey hydrogen is produced using fossil fuels.
3. Black hydrogen is produced using coal.

Choose the correct answer using the options given below.

- (a) 1 and 2                                      (b) 1 and 3  
(c) 2 and 3                                      (d) 1, 2 and 3

**Ans: (a)**

- Green hydrogen : It is produced through electrolysis using renewable energy (solar, wind or hydel)
- Grey Hydrogen: It is produced using fossil fuels such as gas or coal.
- Brown Hydrogen: It is produced using coal and emissions are released in the air.
- Pink/Red hydrogen: it is produced through electrolysis using nuclear energy.

### 6. International Climate Club' has been launched by which institution?

- (a) G-7    (b) World Bank  
(c) G-20    (d) SAARC

**Ans: (a)**

The Group of Seven economies has established an open, worldwide climate club to encourage countries to work together to combat global warming. The decision was made by German Chancellor Olaf Scholz, who now holds the G-7 leadership until the end of the year. Japan will take up the Presidency from Germany. The club will aim to speed the industrial transition to greener types of energy and to create more emission-reduction strategies.

### 7. Consider the following pairs:

- | Species        | IUCN status           |
|----------------|-----------------------|
| 1. Black Rhino | Critically Endangered |
| 2. White Rhino | Endangered            |

Which of the pairs given above is/are correctly matched?

- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2

**Ans: (a)**

- Black Rhino: Critically Endangered
- Javan Rhino: Critically endangered
- White Rhino : Near Threatened

**8. Carbon Capture Utilization Storage (CCUS) is the process of:**

- (a) Generating carbon certificates from carbon-intensive activities and issuing them based on the carbon footprint associated with each such activity  
(b) Redistributing captured carbon from storage in the atmosphere to mitigate de-calcification in marine sources  
(c) Capturing waste carbon dioxide from large point sources and reusing it  
(d) Destroying atmospheric CO<sub>2</sub> by way of electrostatic precipitators and storing the residue in specialized storages

**Ans: (c)**

- Carbon capture utilization storage is the process of capturing waste carbon dioxide (CO<sub>2</sub>) from large point sources, such as fossil fuel power plants, and either transporting it to a storage site where it will not enter the atmosphere, normally an underground geological formation, or reusing it.
- In Carbon Capture and Storage (CCS), emissions are forced into underground rocks at great cost and no economic benefit while CCUS aims at using CO<sub>2</sub> emissions by exploiting the resource itself and creating new markets around it.

**9. Which of the following statements about Western Disturbances is/are correct?**

1. They originate near Caspian Sea.  
2. They are also called extra-tropical storms.  
3. They are detrimental for Rabi crops.

Choose the correct answer from the options given below.

- (a) 1 and 2 (b) 1 and 3  
(c) 2 and 3 (d) 1, 2 and 3

**Ans: (a)**

**Western Disturbances (WD)**

- Western disturbances are storms originating in the Caspian or Mediterranean Sea. These storms bring non-monsoonal rainfall to northwest India.
- They are labelled as an extra-tropical storm originating in the area of low pressure. Also, they are originates outside the tropics, thus referred as extra tropical.
- The disturbance travels from the “western” to the eastern direction. These travel eastwards on high-altitude westerly jet streams.
- WD brings winter and pre-monsoon rain. This rain (and fog) is important for the growth of the Rabi crop in the Northern India.

**10. Which of the following countries is not situated along Gulf of Thailand?**

- (a) Thailand (b) Cambodia  
(c) Vietnam (d) Laos

**Ans: (d)**

- The basin countries of Gulf of Thailand are Cambodia, Thailand, Malaysia and Vietnam.

**11. The Farakka Barrage is built across which river:**

- (a) Brahmaputra (b) Teesta  
(c) Ganga (d) Feni

**Ans: (c)**

- Ganga Water Treaty 1996: It is an agreement to share surface waters at the Farakka Barrage (on the river Ganga) near the mutual border between India and Bangladesh.

**12. Consider the following pairs:**

GI tags	State
1. Kandangi Saree	Bihar
2. Idu Mishmi Textiles	Uttar Pradesh

Which of the pairs is/are correctly matched?

- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2

**Ans: (d)**

- Kandangi Saree: Tamil Nadu
- Idu Mishmi Textiles: Arunachal Pradesh

**13. Consider the following countries:**

1. Israel 2. Brazil 3. Libya

Which of the above have borders with Egypt?

- (a) 1 only (b) 1 and 2  
(c) 1 and 3 (d) 2 and 3

**Ans: (c)**

- Countries with international borders to Egypt are the occupied Palestinian territory of the Gaza Strip, Israel, Libya, and Sudan.
- Egypt shares maritime borders with Cyprus, Greece, Jordan, Saudi Arabia, and Turk.

**14. Katkari Tribes are largely found in:**

- (a) Odisha (b) Tamil Nadu  
(c) Maharashtra (d) Andhra Pradesh

**Ans: (c)**

- Katkari is one of the 75 Particularly Vulnerable Tribal Groups (PVTGs).
- Katkaris are located primarily in Raigad and in parts of Palghar, Ratnagiri and Thane districts of Maharashtra as well as in some places of Gujarat.

**15. Which of the following countries with borders touching the Persian Gulf:**

1. Iran 2. Qatar

Select the correct answer using the code below:

- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2

**Ans: (c)**

Persian Gulf: The lands around the Persian Gulf are shared by eight countries namely, Bahrain, Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates.

With reference to Coal production in India, consider the following statements:

1. India has the largest coal reserves in the world.  
2. India is the fifth largest coal importer in the world.



## Landmark Updates of General Studies Subject

### 16. Which of the statements given above is/are correct?

- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2

**Ans: (d)**

- The total coal production in the country stands at 448 million tonnes (MT) as of October, 2022 which is 18 % higher than the production of the corresponding period of last year.
- Coal in India was first mined in 1774 by East India Company in Raniganj Coalfield along the Western bank of Damodar River.
- Today, India has the fifth largest coal reserves in the world.
- India is the second largest producer of coal in the world, after China.
- However, India is the second largest coal importer in the world and it imports mainly from Indonesia, Australia, South Africa and the United States. India lacks coking coal.

### 17. Consider the following statements regarding the effects of inflation:

- Generally, in case of inflation, the currency of the economy appreciates.
- Inflation redistributes wealth from creditors to debtors.

Which of the above statements is/are correct?

- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2

**Ans: (b)**

- There are multi-dimensional effects of inflation on an economy both at the micro and macro levels.
- Inflation redistributes wealth from creditors to debtors i.e. lenders suffer and borrowers benefit out of inflation.
- With every inflation the currency of the economy depreciates (loses its exchange value in front of a foreign currency) provided it follows the flexible currency regime rate is compared.

### 18. Brazil shares its border with which of the following countries?

- Argentina
- Chile
- Peru
- Venezuela.

Choose the correct answer from the options given below.

- (a) 1 and 2 (b) 2 and 3  
(c) 1, 2, 3 (d) 1, 3, 4

**Ans: (d)**

- Brazil does not share its border with Chile.
- Brazil shares border with every South American country except Ecuador and Chile.

### 19. Which of the following are the left bank tributaries of Ganga river?

- Gomti
- Ghagra
- Kosi
- Son

Choose the correct answer from the options given below.

- (a) 1 and 2 (b) 2 and 3  
(c) 1, 2, 3 (d) 1, 3, 4

**Ans: (c)**

- Gomti, Ghagra, Kosi, Gandak are the right bank tributaries of Ganga.
- Yamuna, Son, Punpun and Damodar are the left bank tributaries of the river Ganga.

### 20. Which of the following statements are correct?

- British type of climate has rainfall throughout the year.
- Westerlies winds affect this type of climate.

Choose the correct answer from the options given below.

- (a) 1 only (b) 2 only  
(c) Both (d) None

**Ans: (c)**

- Cool temperate Western Margin or British type of climate is predominantly found in Britain.
- Westerlies influence the climate all round the year.
- Frost can occur during winters.

### 21. Which of the following statements about Palk strait are correct?

- Palk bay is a shallow water body.
- Palk bay is separated from Gulf of Mannar by the Adams Bridge.
- Sethusamundaram canal project is a canal project to connect gulf of Mannar to Laccadive Sea.

Choose the correct answer from the options given below.

- (a) 1 and 2 (b) 2 and 3  
(c) 1 and 3 (d) 1, 2 and 3

**Ans: (a)**

- Palk bay is a shallow water body situated between India and Srilanka.
- It is connected to the Bay of Bengal. Adams Bridge separates Gulf of Mannar and Palk Bay.
- Gulf of Mannar is a shallow bay and it is a part of Laccadive Sea (Indian Ocean).
- Sethusamundaram canal project (2007) is an ambitious project connecting gulf of Mannar with Palk bay and develop it as a shipping route. Currently, it is on hold due to protests.

### 22. Afghanistan does not share its border with which of the following countries?

- (a) Iran (b) Turkmenistan  
(c) Uzbekistan (d) Kyrgyzstan

**Ans: (d)**

### 23. Which of the following statements is/are correct regarding 'Andaman and Nicobar' Islands?

- They are formed due to collision of Indian Plate and Burma Plate.
- They are extension of Arakan Yoma mountain range.
- Ten degree channel separates little Andaman from South Andaman.

Choose the correct answer from the option given below.

- (a) 1 and 2 (b) 1 and 3  
(c) 2 and 3 (d) 1, 2 and 3

**Ans: (a)**

- Andaman and Nicobar Islands were formed due to collision between Indian Plate and Burma Minor Plate part of Eurasian Plate.
- Andaman and Nicobar Islands are southward extension of Arakan Yoma range [Myanmar].
- The Great Andaman group of islands in the north is separated by the Ten Degree Channel from the Nicobar group in the south.
- 'Duncan passage' separates little Andaman from South Andaman

**24. Which among the following countries does not border the Black Sea?**

- |             |              |
|-------------|--------------|
| (a) Italy   | (b) Bulgaria |
| (c) Georgia | (d) Turkey   |

**Ans (a)**

The Black Sea is a marginal Mediterranean sea lying between Europe and Asia. It lies to the east of the Balkans in Southeast Europe and drains into the Mediterranean Sea. The countries bordering the Black Sea include Ukraine, Russia, Bulgaria, Georgia, Turkey and Romania.

**25. Which of the following is/are tributary/tributaries of Brahmaputra?**

- |           |          |
|-----------|----------|
| 1. Kameng | 2. Lohit |
|-----------|----------|

Select the correct answer using the code given below.

- |                  |                     |
|------------------|---------------------|
| (a) 1 only       | (b) 2 only          |
| (c) Both 1 and 2 | (d) Neither 1 nor 2 |

**Ans: (c)**

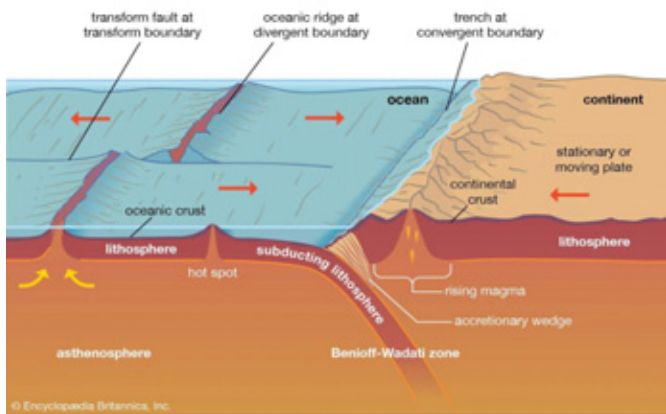
The principal tributaries of the river joining from right are the Lohit, the Dibang, the Subansiri, the Jiabharali, the Dhansiri, the Manas, the Torsa, the Sankosh and the Teesta whereas the Burhidihing, the Desang, the Dikhow, the Dhansiri and the Kopili joins it from left.



## Unit II

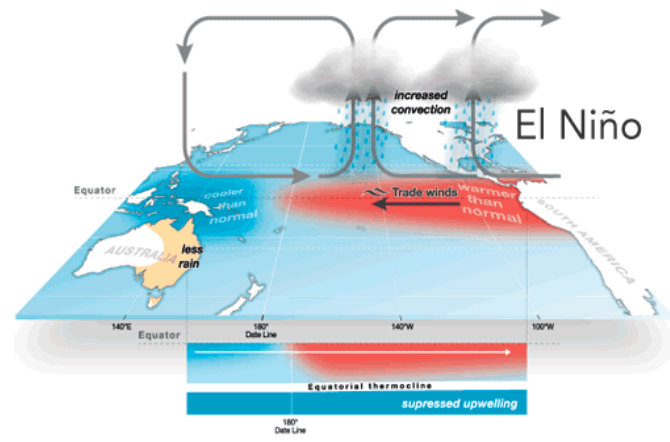
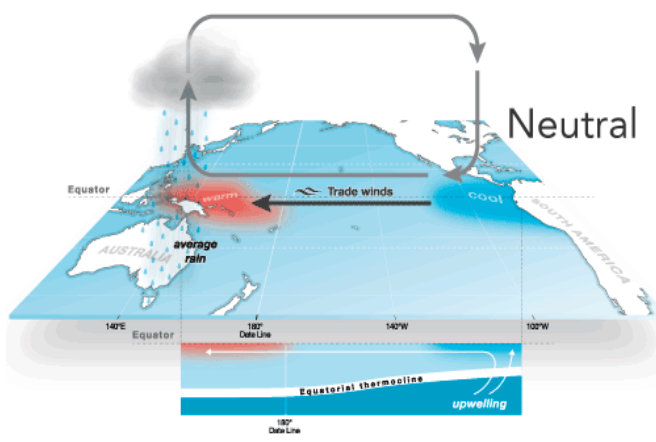
# Geography

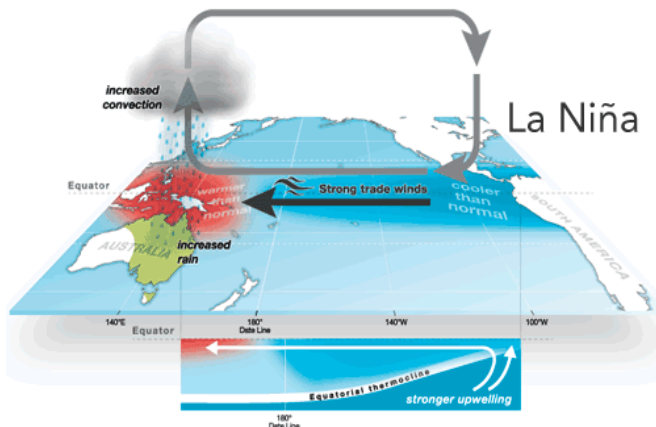
### 1. Sea Floor Spreading



- According to a research, the worldwide rate of sea floor expansion has decreased by 35%.
- Some ridges moved quickly, while others migrated slowly.
- The ridges in the eastern Pacific moved 100 millimetres less slowly than the global average each year.
- The report cites changing mantle convection, which carries heat from the interior of the planet to the surface, and increasing mountains as contributing factors.
- The formation of crusts, the Earth's outermost layer, through a geological process.
- This process occurs when tectonic plates divide, enabling magma from the earth's core to fill the void.
- A fresh oceanic crust is created as the lava cools.
- These events take place along massive mountain ranges that rise from the ocean floor known as mid-ocean ridges.

### 2. La Nina Conditions Enter 3rd Year, 6th Time Since 1950





The La Niña conditions that have been present across the Equatorial Pacific Ocean since September 2020 have reached their third year, according to data from the India Meteorological Department (IMD). It has been referred to as a “triple dip” La Niña since it began in September 2020, has persisted for the past 24 months, and appears likely to continue for another six months.

#### About La Niña

- The Pacific Ocean experiences the La Niña, sometimes referred to as “little girl,” as a weather trend.

- It is seen when the Eastern Equatorial Pacific’s (EEP) sea surface temperatures (SSTs) drop considerably below average.
- This causes a powerful high pressure system to form over EEP (the tropical west coast of South America).
- A counterpart of El Nino (also known as Little Boy or Christ Child), which is marked by extremely warm SSTs in EEP and generates a suppressed Monsoon.
- Together, La Niña and El Nino are the “cold” and “warm” phases of the El Nino-Southern Oscillation (ENSO), which affects the temperature of the waters of the Eastern and Central Pacific Ocean.
- El Niño and La Niña occur every 4 to 5 years on average.
- El Niño occurs more frequently than La Niña.

#### Effects of La Niña

- India is experiencing better monsoon rainfall. The hurricanes and cyclones in the Atlantic Ocean and Bay of Bengal that is frequent and strong.
- Drought in Peru and Ecuador, significant flooding in Australia, and high temperatures in the Western Pacific, Indian Ocean, and off the coast of Somalia.
- The La-Niña was responsible for the recent increase in heat wave incidents in India.
- This temperature difference was minimal due to a weak La Niña, which also caused the western disturbances that came to India to be feeble with little rain, forcing hot Westerly winds into India.

## 3. Karakoram Anomaly

- It refers to the stability or abnormal growth of glaciers in the central Karakoram, in contrast to the retreat of glaciers in nearby mountainous ranges of the Himalayas and other mountainous ranges of the world.
- A recent study conducted by researchers has postulated new theory to explain the reasons of glaciers in Karakoram Range are resisting glacial melt due to global warming.
- While previous studies highlighted role of temperature in establishing and sustaining anomaly, it is for the first-time highlighted impact of precipitation in feeding the anomaly.
- Revival of western disturbances (WDs) has been instrumental in triggering and sustaining KA.
- Contribution of WDs in terms of snowfall volume over core glacier regions of Karakoram have increased by about 27% in recent decades, while precipitation received from non-WD sources have significantly decreased by around 17%.
- Winter precipitation associated with WDs over Karakoram–Himalayas as one of key drivers behind its emergence.
- Hindu Kush Himalayan (HKH) region is a critically important natural global asset that extent up to 3500 km over 8 countries i.e., Afghanistan in the west to Myanmar in the east and crossing Pakistan, India, China, Nepal, Bhutan, and Bangladesh.

#### Reasons of KA



## 4. Subsidence of Josh math Land

### Significance

1. **Gateways to famous pilgrimage:** the sites like Badrinath, Hemkund sahib and international skiing destination.
2. **Cardinal math:** It is one of the cardinal math established by Adi Shankaracharya. Other three being, Dwarka, Puri and Sringri
3. **Strategically Importance:** It is one of the army's important cantonments areas.

### About Land subsidence

- Gradual settling or sudden sinking of Earth's surface due to removal or displacement of subsurface earth materials.
- Land subsidence vs. Landslides: Land subsidence refers to the gradual sinking of the ground surface while Landslides are sudden and rapid movements of soil and rock downhill.
- It can cause by resource extraction, infrastructure loads, tectonic movement and melting in ice sheet.

### Factors that make Joshimath highly vulnerable to sinking

- It is situated in middle slopes of a hill.
- The area around town covered with thick layer of overburden material.
- The perennial streams- Karmanasa and Dhaknala streams on west and east and Dhauliganga and Alaknanda rivers on south and north.
- The snow in upper reaches, and highly weathered rocks with low cohesive characteristics.
- Tectonic activity due to location on a fault line (Vaikrita Thrust) and near Main Central Thrust and Pandukeshwar Thrust.
- The city built on an ancient landslide material i.e. rests on a deposit of sand and stone, not rock, which doesn't have high load-bearing capacity.
- Unplanned construction and improper water drainage without due regard to bearing capacity.





# Economy

## 1. Poverty Estimation

**International Monetary Fund (IMF)** and **World Bank (WB)** published **two different** estimates of Poverty and inequality in India. **Economic Advisory Council to Prime Minister (EAC-PM)** also released the **State of Inequality in India** report.

### Different Poverty Measures

Poverty is usually measured as either absolute or relative poverty, based on a poverty threshold or poverty line, with people falling under this threshold line being considered poor.

- 1. Absolute poverty or extreme poverty:** It represents the lack of sufficient resources to secure basic life necessities, such as safe drinking water, food, or sanitation.
  - Example:** People earning less than \$1.9 on purchasing power parity (PPP) basis a day are considered extremely poor by the World Bank.
- 2. Relative Poverty:** It represents the worse income and resource status of a person or a household than what is thought to be adequate or socially acceptable in the society in which they live.

Poverty Estimation Approach		
Approach	Given by	Dimension or Indicators
Well-being approach	Erik Allard	Having materials Loving- Social Being spiritual- emotional
Capabilities approach	Amartya Sen	Economic capabilities Human capabilities Political capabilities Socio-cultural capabilities Security capabilities
Multi-dimensional poverty Index	UNDP, OPHI	<b>Education:</b> Years of schooling and school attendance <b>Health:</b> Child mortality and nutrition <b>Standard of living:</b> Electricity Drinking water Sanitation Flooring Cooking fuel and Assets

Poverty Estimation in India	
Tendulkar Committee, 2009	<ul style="list-style-type: none"><li><b>Methodology:</b> Based on Monthly Per Capita Consumption Expenditure (MPCE) computed on the basis of data from the National Sample Survey Organisation (NSSO).</li><li><b>Findings:</b> 21.9% of total population was below poverty line in 2011-12.</li></ul>

## Landmark Updates of General Studies Subject

<b>Rangarajan Committee, 2014</b>	<ul style="list-style-type: none"> <li>• <b>Methodology:</b> Based on an independent large survey of households by Centre for Monitoring Indian Economy (CMIE).</li> <li>• <b>Findings:</b> 29.5% of total population was below poverty line in 2011-12.</li> </ul>
<b>NITI Aayog's National MPI: Baseline Report</b>	<ul style="list-style-type: none"> <li>• It is developed by NITI Aayog in collaboration with <b>UNDP and Oxford Poverty and Human Development Initiative (OPHI)</b>.</li> <li>• It is based on 12 parameters (10 indicators of MPI and two new indicators antenatal care and bank account under Health and Standard of Living).</li> <li>• <b>Findings:</b> 25.01% of India's population as multidimensional poor.</li> </ul>
<b>Other committees</b>	<ul style="list-style-type: none"> <li>• Alagh Committee (1979), Lakdawala Committee (1993)</li> </ul>

## 2. Digital Tax

### About Digital Tax

The G24 group opposed to the plan to make sovereign promises not to collect any future digital services taxes, thereby delaying implementation of the global tax agreement. The Digital Services Tax is part of the OECD's two-pillar proposal for 2021, which has been agreed upon by 138 nations (as of 16 December 2022), including India, to reform global taxation standards and deal with the tax issues brought on by the digitization of the economy.

### Digital Tax in India

- It is a tax imposed on digital products, services, and business ventures.
- It is a type of direct taxation. India enacted an equalization levy of 6%.
- It was only applicable to internet advertising services.
- As part of the Finance Act 2020, the Indian Income-tax Act enlarged the scope of the Equalization Levy.
- It aimed at ensuring that non-resident, digital service providers pay their fair share of tax on revenues generated in the Indian digital market.

## 3. Amendment to Nidhi Rules, 2014

- The Central Government revised the Nidhi Regulations, 2014 in response to the fast increase in the number of 'Nidhi' Companies.
- Aims to improve governance and protect the public interest.
- In order to be recognised by the Union government as a Nidhi, a public firm must first have a share capital of 10 lakh rupees.
- Promoters and Directors of the firm must satisfy the requirements outlined in the rules.

### Nidhi Company

- It functions similarly to an NBFC, borrowing and lending money to its members.
- It promotes saving behaviours among its members and operates under the principle of mutual benefit.
- They do not require an RBI licence but must get clearance under the Companies Act.
- The RBI has the authority to give instructions for its deposit-taking activities, while the Ministry of Corporate Affairs oversees its operational issues.
- They cannot engage with the securities, insurance, hire-purchase, or leasing finance industries.
- It is completely prohibited to take deposits from or lend money to anybody outside members.
- In Nidhi corporations, only individual members are permitted.

## 4. Financial Services Institution Bureau (FSIB)

The Cabinet Appointments Committee (ACC) has approved a government decision to replace the Bank Board Bureau ((BBB) with the Financial Services Institutions Bureau (FSIB). It is set up under the Department of Financial Services (DFS), Ministry of Finance.

### Aims

1. Recommend persons for appointment as whole-time directors and non-executive chairpersons on the Boards of financial services institutions (including public sector banks (PSBs), public sector insurers (PSIs) and financial institutions (FIs).
2. Advise on certain other matters relating to personnel management in these institutions.
3. Promote excellence in Corporate Governance in Public Sector Financial Institutions.

### Major Function FSIB

1. Advise the Government on matters relating to appointments, transfer or extension of term of office and termination of services of the said directors.
2. Advise the Government on the desired management structure at the Board level for PSBs, FIs and PSIs.
3. Build a databank containing data related to the performance of PSBs, FIs and PSIs.
4. Advise the Government on formulation and enforcement of a code of conduct and ethics for whole-time directors in PSBs, FIs and PSIs.
5. Help PSBs, FIs and PSIs in terms of developing business strategies and capital rising plan etc.

### Composition of FSIB

- a. **Chairperson:** Nominated by Central Government who shall be:

- A retired official from the banking sector or a regulatory institution,
- A businessperson of repute with sufficient knowledge of the financial sector,
- A person with at least 25 years of experience in public administration with experience in banking and the financial sector.

### b. Ex officio members:

- Secretary in charge of DFS, Department of Public Enterprises, Chairperson of the Insurance Regulatory and Development Authority of India (IRDAI), Deputy Governor of RBI.
- 3 persons with subject matter knowledge relating to PSBs and FIs and 3 persons with subject matter knowledge relating to PSIs (to be nominated by the Central Government) as part time members.

### Bank Board Bureau (BBB)

- a. **Formation:** In 2016 as an autonomous recommendatory body to the **nationalized banks (management and miscellaneous Provision) schemes, 1980**, that provide legal framework for the composition and function of BBB. It was **Recommended By P.J.Nayak Committee** Set Up To Prescribe Ways To Resolve Issues Plaguing Indias PSBs.
- b. **Purpose:** To improve governance of PSBs by recommending for selection of heads of PSBs and Help the bank in developing strategies and capital rising plans.
- c. **Connection with PSBs:** It was a part of 7-point strategy of Indra Dhanush Mission aimed at revamping PSBs.

## 5. Standing Deposit Facility (SDF)

The Monetary Policy Committee (MPC) implemented the Standing Deposit Facility (SDF) as the floor in the Liquidity Adjustment Facility (LAF) corridor in its first bi-monthly policy review (FY23).

- A liquidity management instrument that absorbs liquidity (deposits) from Scheduled Commercial Banks (SCBs) in exchange for no collateral or government securities.
- It was initially advised as a method to control liquidity by the Urjit Patel Committee in 2014.

- In order to provide the RBI more flexibility in absorbing liquidity without the need for collateral, Section 17 of the RBI Act of 1934 was changed in 2018.
- It will take the position of the Fixed Rate Reverse Repo (FRRR) as the LAF corridor's level.
- Deposits under the SDF will not be eligible for the Statutory Liquidity Ratio (SLR) maintenance under Section 24 of the Banking Regulation Act of 1949, but they will be an eligible asset for the maintenance of the Cash Reserve Ratio (CRR) under Section 42 of the RBI Act of 1934.

## Landmark Updates of General Studies Subject

- **Need for SDF:** To manage surplus liquidity due to Covid-19.
- **Other Liquidity Management Instruments:** Targeted Long-Term Repo Operations (TLTROs), Open Market Operations (OMOs) etc.

Terms related to liquidity management			
Rates	Meaning	Collaterals	Functions
<b>Reverse Repo Rate</b>	Rate which RBI pays to SCBs to park their excess funds with RBIs	Yes (From RBI to Banks)	Tools to control inflation by absorbing liquidity
<b>Standing Deposit Facility</b>	Newly Introduce facility for SCBs to park their excess funds with RBI	No	Tools for liquidity management and financial stability
<b>Repo Rate</b>	Rate at which RBI lent money to SCBs	Yes (From Banks to RBI)	Tools to regulated liquidity in economy
<b>Marginal Standing Facility (MSF)</b>	A short term borrowing window for SCBs to get overnight funds from RBI in case of serious cash shortage or asset liability mismatch. Its maximum limit is 2% of Banks Net Demand and Time Liabilities (NDTL).	Yes (From Banks to RBI)	Short term loan from RBI to help SCBs

## 6. Indian Payment System

- The RBI has released **Payments Vision 2025**, which outlines the thinking process for the period December 2025.
  - According to the **Payment and Settlement Systems Act of 2007**, the **RBI controls and monitors** the payment system.
  - It is essential for financial inclusion, financial stability, and economic growth.
  - The Indian payment system is quickly going digital, with **UPI, IMPS, and Prepaid Payment Instruments (PPI)** transactions showing a CAGR of 104%, 39%, and 13% between 2019 and 2021, respectively.
  - The proportion of paper instruments in all retail payments decreased at the same period, falling from 3.83% to 0.88% in terms of volume.
- Payments Vision 2025**
- **Pillars of the Payments Vision 2021:** Competition, Cost, Convenience, and Confidence.
  - **Goals (Base on above Pillars):**
    - ✓ Integrity, Inclusion, Innovation, Institutionalization, and Internationalization in order to increase outreach, focus on the needs of the consumer, maintain cyber security, and deepen digital engagement.
    - ✓ E-payments for everyone, wherever, and whenever is the main theme (4Es).
- Vision:** Provide safe, secure, quick, convenient, affordable, and accessible e-payment choices to every user.

## 7. Central Bank Digital Currency (CBDC)

Its goal is to raise awareness about CBDCs and the intended characteristics of the digital Rupee. It demands the **amendment of the RBI Act of 1934**, so that the definition of **bank note** would cover the **Digital Rupee**. CBDC is defined by the RBI as **digital legal tender issued by a central bank**. The RBI is granted exclusive authority to print currency in India by the **RBI Act 1934**. According to the **Coinage Act of 2011**, only coins and one-dollar bills are issued by the federal government. It cannot be compared to **private cryptocurrencies**.



CBDC vs Mobile Money	
CBDC	Mobile Money
It is new payment instrument	It is only a type of payment transaction
It is direct liability of bank as it is the primary issuer of currency	It is liability of commercial bank and other authorized financial institutions
These are to be created to universally accessible nationally	Mobile wallet is subjected to KYC age limitation, where same age group are restricted from creating wallet.
It is peer to peer mechanism between sender and receiver and eliminated the need for inter bank settlement	It requires presence of intermediary issuing and acquiring banks, financial institution or payment service provider to authorise and validate the payment.

## 8. Social Stock Exchange (SSE)

- Securities and Exchange Board of India (SEBI) has introduced a framework for SSEs.
- It enables investors to **purchase shares in social enterprises** that have been examined by a reputable exchange.
- SEBI has approved **BSE** and **NSE** for SSE.
- Examples:** UK's Social Stock Exchange, Canada's Social Venture Connexion, and Singapore's Impact Investment Exchange.
- There are 16 broad activities permitted, including **reducing hunger, poverty, malnutrition**, and **LGBTQIA+** issues.
- NPOs must be recognised as charitable organisations, and the registration must be valid for the next 12 months.
- The NPO should be at least three years old.
- SEs that raises funds through SSE must publish their Annual Impact Report within 90 days of the end of their fiscal year.
- NPOs that are raising money by issuing **Zero Coupons Zero Principal Instruments** are required to make their vision, target market, and other information public.

### Framework of SSE

- Social Enterprises (SEs) **eligible** to participate in the SSE will be **non-profit organisations (NPOs)** and **for-profit social enterprises** with a primary purpose of social intent and impact.

## 9. Sovereign Green Bonds (SGRB)

- Financial instruments with a fixed rate of return called **Green Bonds** are used to finance initiatives that enhance the environment or the climate.
- The money earned by green bonds is only put towards environmental activities, such renewable energy and green building.
- When the sovereign or government guarantees the repayment of principal and payment of interest these bond referred to as SGrB.
- Promoting climate resilience or adaptation.
- Values and improves natural ecosystems and biodiversity in accordance with SDG principles.

### Framework of SGRB

- Classification of green projects base on:**
  - Encouraging energy efficiency.
  - Reducing carbon and greenhouse gases emissions.
- Green Finance Working Committee (GFWC):** It will support Ministry of Finance with selection and evaluation of projects etc.
- The proceeds of SGrB will be deposited to Consolidated Fund of India (CFI)** and then funds from the CFI will be made available for eligible green projects. **Public Debt Management Cell** will keep a track of proceeds.
- Eligible projects:** It will use the raised proceeds from sovereign green bonds for capitalisation or re-capitalization.



## 10. New Insurance Rules

1. A Corporate Agent can work with 9 insurers, while Insurance Marketing Companies can work with 6 insurers.
2. Extends the Regulatory Sandbox (RS) trial period from 6 to 36 months.
3. When rising “Others form of Capital,” there is no longer a necessity for prior IRDAI approval. It consists of preferred shares or subordinated debt.
4. Flexibility has been added to the appointed actuary’s experience (AA) and certification criteria.
5. From 180 to 365 days are now counted for determining the solvency situation when considering State/Central Government premium obligations.
6. The process of establishing an insurance company has been made simpler for convenience of doing business.

### Note:

1. **Insurance Penetration:** Ratio of total insurance premium to Gross Domestic Product in a year.
2. **Insurance Density:** Ratio of total insurance premium to Population.
3. **Regulatory sandbox:** Live testing of new or services in controlled or test regulatory environment.

## 11. Pension System in India

- The Indian Pension System is highly complex and fragmented with a wide variety of options.
- Public Pensions such as **Old Pension Scheme (NPS)** for civil servants and **New Pension Scheme (NPS)** for new entrants.
- Armed forces personnel are an exception to New Pension Scheme and are still covered by Old Pension Scheme.
- **Employee Pension Scheme (EPS)** for employees in the organized sector by **Employees’ Provident Fund Organisation (EPFO)**.
- Government Pension Schemes such as **Pradhan Mantri Vaya Vandana Yojana (PMVVY)**, **Atal Pension Yojana**, **Indira Gandhi National Old Age Pension Scheme (IGNOAPS)** etc.
- Pension Plans from Organizations such as LIC’s Saral Pension etc.

### Reasons for Introduction of New Pension Scheme

- It was introduced in **2004** based on the report of **Old Age Social and Income Security Project** due to:
  - ✓ **Increasing pension liability** of the government with **no specific growing corpus** for payments.
  - ✓ **Unsustainable nature of OPS** as pension liabilities kept climbing with increasing life expectancy due to better health facilities.

### Comparison between NPS and OPS

Basis	NPS	OPS
<b>Nature</b>	A define contributions pension where employee contribute toward NPS during their years of employments.	A define benefits pension of government employee on the basis of their last drawn salary.
<b>Eligibility</b>	All India citizens between 18-65 years.	Only government employee
<b>Risk</b>	Risky as insurance amount is invested in market – linked securities.	No risk involve
<b>Tax benefits</b>	Tax deductible annual investment of up to 1,50,000 under section 80CCD (1B) of Income Tax Act, 1961	No tax benefits are applicable to employees
<b>Pension amount on retirement</b>	About 60% of pension funds is tax-free when redeemed, while the remainder is taxable and remains invested in annuities.	It provide fixed monthly pension of 50% of the last drawn salary.

## 12. Internationalization of Rupee

- The union government change the **Foreign Trade Policy (FTP)** to allow for **settlement of rupee** for **international trade** for **export promotion schemes**.
- Tarapore Committee on Fuller Capital Account Convertibility (CFAC)** defined **international currency** as 'a currency that is widely used for international transactions'.
- Internationalization of a rupee is a process to **increase rupee acceptance (credibility)** across the world.
- It also referred to **adopting full capital account convertibility**.
- India allows partial Capital Account Convertibility and full current account convertibility**.
- Current Account Convertibility** is ability to **convert domestic currency into any foreign currency** and vice-versa.
- Framework for cross-border transactions in India is governed by the **Foreign Exchange Management Act (FEMA), 1999**.

Functions of International of currency		
Functions	Government	Private sectors
Store of value	International reserve	Currency substitutions
Unit of account	Anchor for pegging local currency	Denominating trade and financial transactions.
Medium of exchange	Vehicle currency for foreign exchange intervention invoice trade and financial transactions.	Innovative trade and financial transactions.



### Advantage of Internationalization of Rupee

- It reduced Foreign Exchange Reserves requirement for Balance of Payment.
- It reduces the imposed cost of forex on the economy by Interest Rate Differential (IRD).
- IRD is the change in interest rates between the currencies of two countries.
- It reduced vulnerability to External Shocks because of reduced dependence on foreign currency.
- It mitigates currency risks for Indian Enterprises by eliminating foreign exchange fluctuation, reducing the cost of doing business and support global growth of Indian businesses.
- It enhances India's global stature and respect, helping Indian Businesses through increased bargaining power.

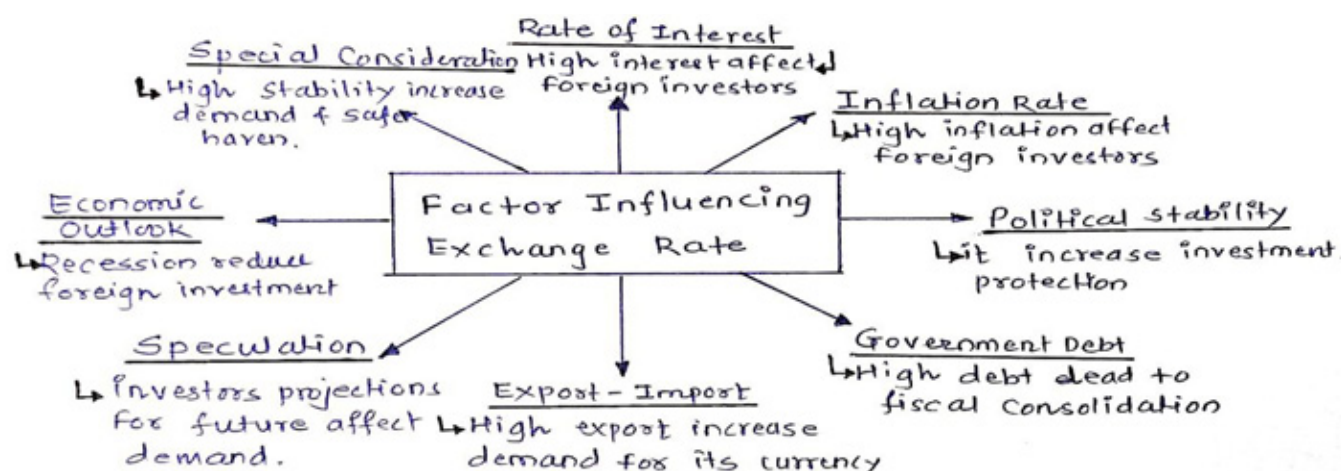
## 13. Depreciation of Indian Rupee (INR)

RBI has **reduced** the requirements for **non-resident Indian (NRI) deposits, external commercial borrowing (ECB), and foreign debt investments** in order to stop the Indian rupee's (INR) decline and increase foreign exchange inflows.

### Factors Influencing Exchange Rate

- The **price of one currency in terms of another currency** is called as exchange rate.

- It can be **fixed** (decided by central banks) exchange rate or **floating** (decided by demand and supply) exchange rate.
- Floating (flexible) exchange rate**: it is determined by the **foreign exchange market or forex** based on various factors.



- In India, the exchange rate management has evolved from the **fixed exchange rate regime** to **market-determined exchange rate** since March 1993.
- The role of **RBI and central government** is limited and just **interventions necessary to ensure orderly conditions in the forex ecosystem**.

Reasons and Impacts of Rupee Depreciation	
Reasons	Impacts
1. <b>Rising price of crude oil</b> and other commodities such as Edible oil.	1. <b>Widening of CAD</b> and <b>Balance of Payment</b> as India is a net importer
2. <b>Tightening global monetary policy</b> especially from USA to tame inflation.	2. <b>Increase import bill</b> of raw materials, equipment etc
3. <b>Sustain capital outflow</b> from FPIs	3. <b>Higher inflation</b> due to supply shock in key import commodities
4. Domestic problems like <b>inflation</b> and <b>widening current account deficit</b> etc.	4. <b>Decline in import cover</b> and lower <b>foreign investment</b> etc.

## 14. India's Intellectual Property Rights (IPR) Regime

- IPR are the exclusive rights given to persons over the use of his or her IP for a certain period of time.
- Theses protection is provided in the form of **Copyright, Geographical Indications (GI), Patents, Registered designs Trademarks** etc.
- **Trade-Related Aspects of Intellectual Property Rights (TRIPS)** is the most comprehensive multilateral agreement on IPR.
- It is in **synchronisation** with:
  1. Paris Convention for the Protection of Industrial Property (patents, industrial designs, etc.)
  2. Berne Convention for the Protection of Literary and Artistic Works (copyright).

### Framework for Governance IPR regime in India

Based on its framework for IPR regime control, India is ranked 43rd out of 55 nations in the International IP Index 2022 (by the US Chambers of Commerce).

Framework for Governance IPR regime in India		
Types of IPR	Legislative Framework	Administration Structure
Patent	Indian Patent Act, 1970 (amendment in 2005)	Controller General of Patent, Design and Trade Mark (CGPDTM)
Design	The Design Act 2002	
Trade Mark	The Trade Mark Act, 1999	
Copyrights	The Copyright Act, 1957	Registrar of Copyrights
Biodiversity	The Biological Diversity Act, 2002	National Biodiversity Authority
Geographical Indication	The GI of Goods (Registration and Protection) Act, 1999	Geographical Indication Registry
Transistors and electric circuit boards	The Semiconductor Integrated Circuit Layout Design Act, 2000	Semiconductor Integrated Circuits Layout Design Registry (SICLGR)
Plant varieties and formers	Protection of Plant Variety and Farmers rights Act, 2001	Department of Agriculture

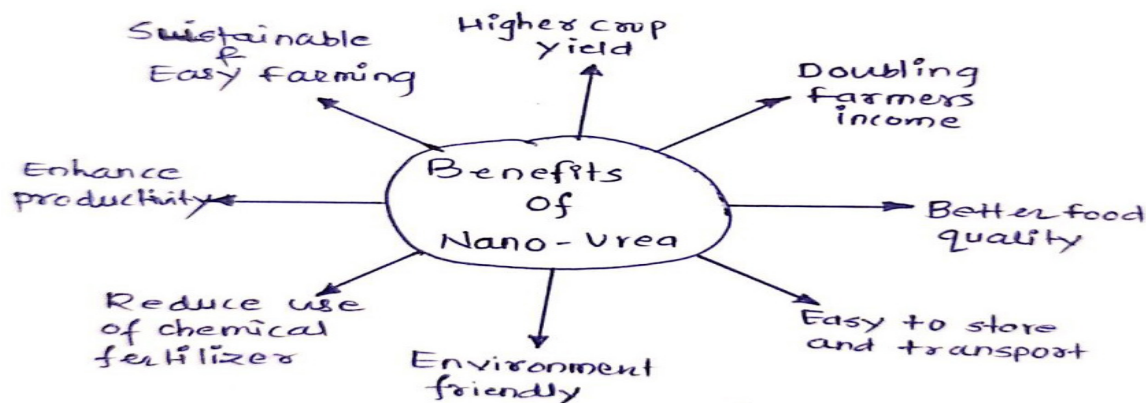
## 15. Minimum Support Price (MSP)

- The **MSP** for **six Rabi crops** for 2023–2024 has been increased with the approval of the **Cabinet Committee on Economic Affairs (CCEA)**.
- MSP** is a **price support mechanism** which acts as a **safety net for farmers** by guaranteed prices and assured markets for their products.
- It was **started in 1966-67** for **wheat** and **further expanded to other essential food crops**, which was then sold to the poor under subsidised rates under **Public Distribution System (PDS)**.
- MSP safeguard the crops** from **price fluctuations** caused by **unwarranted factors** such as monsoon, information asymmetry etc.
- On the advice of the **Commission for Agricultural Costs and Prices (CACP, a statutory body)**, it is set twice a year and then **approved** by the **Cabinet Committee of Economic Affairs (CCEA)**.
- The MSP is calculated by CACP using the farmer's expenses.
- The **final MSP** is calculated based on **incurred expenses (A2)** and the **imputed value of family labour (FL)**.
- There have been requests to consider a **new price method (C2)**.
- The **National Commission on Farmers (Swaminathan Committee)** also proposed that MSP be **at least 50% more than the weighted average cost of production**.

Crops covered under MSP			
Cereals (7)	Pulses (5)	Oilseeds (7)	Commercial (4)
1. Paddy	1. Chana	1. Rapeseeds-mustard	1. Cotton
2. Wheat	2. Arhar/ Tur	2. Groundnuts	2. Sugarcane
3. Maize	3. Urad	3. Soya been	3. Copra
4. Bajra	4. Moong	4. Sunflower	4. Raw jute
5. Jowar	5. Masur	5. sesamum	
6. Ragi		6. Safflower	
7. Barely		7. Niger seeds	

## 16. Nano-Urea

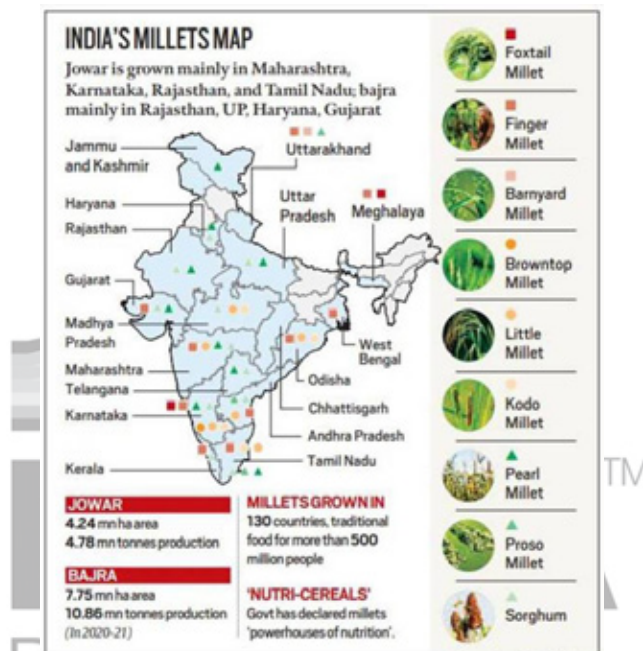
A **patented chemical nitrogen fertiliser** with Nano-nitrogen particles. **Nutrient Use Efficiency** (proportion of nutrient used by plants) of **Nano-urea is over 80%**. The reasons being Nano-urea has **higher surface-mass ratios** that help in releasing nutrients to plants in a controlled manner. Nitrogen from **conventional urea** goes waste due to **leaching** and **volatilization** (emissions of nitrous oxide in the atmosphere leading to air pollution and global warming). Nano-Urea, along with increased production of traditional urea, **can help India to eliminate urea import by 2025**.





## 17. International Year of Millets (IYM) 2023

The **UN General Assembly** has designated **2023 as IYM** in an effort to raise awareness of the health advantages of millets. Millets, often known as **Nutri-cereals** or **super foods** since they include nutrients such as **protein, Vitamin-A, Iron and Iodine, antioxidants**, and so on, are a wide family of short grained Cereals (Poaceae family). **India declared 2018** to be the **National Year of Millets** and asked the UN to designate 2023 as the International Year of Millets. They are produced on marginal land in **temperate, subtropical, and tropical countries as cereal crops/grains and fodder**.



- **Major Millets in India:** Pearl Millet (Bajra) (highest share), **Jowar** (Sorghum), and **Finger Millet** (Mandua/Ragi).
- **Major producers:** Rajasthan, Andhra Pradesh, Telangana, Karnataka, Tamil Nadu, Maharashtra, Gujarat, and Haryana.
- **Production in India:** Overall, India accounts for **80% of Asia's production** and **20% of global production**.
- **India Position:** India ranks **fifth in global millet trade**, but it is **less than 1% of domestic production**.

### Benefits of millets

- **Beneficial in alleviating malnutrition** and micronutrient deficiency.
- **Drought resistant crop:** Short growing period; Ability to **sequester carbon** and **assist in climate adaptation**; and Traditional association with **cultivation practice of tribal**.
- **Example:** Karnataka Ragi Habba (Festival).

### India's Initiatives for Millets

- The **'Mapping and Sharing of Good Practices'** programme for mainstreaming millets in Asia and Africa has been launched by **NITI Aayog** and the **World Food Programme (WFP)**, India.
- The **POSHAN Mission Abhiyan** includes millets as one of the notified nutri-cereals.
- By exporting value-added and processed organic millet goods to at least 100 nations, the **Agricultural and Processed Food Products Export Development Authority (APEDA)** hopes to export 2,000 crore worth of millet by FY26.



## 18. Sugarcane Production in India

India is world's largest sugar producer for year 2021-22 followed by Brazil. India also the world's 2nd largest exporter of sugar.

### Climatic conditions for Sugarcane

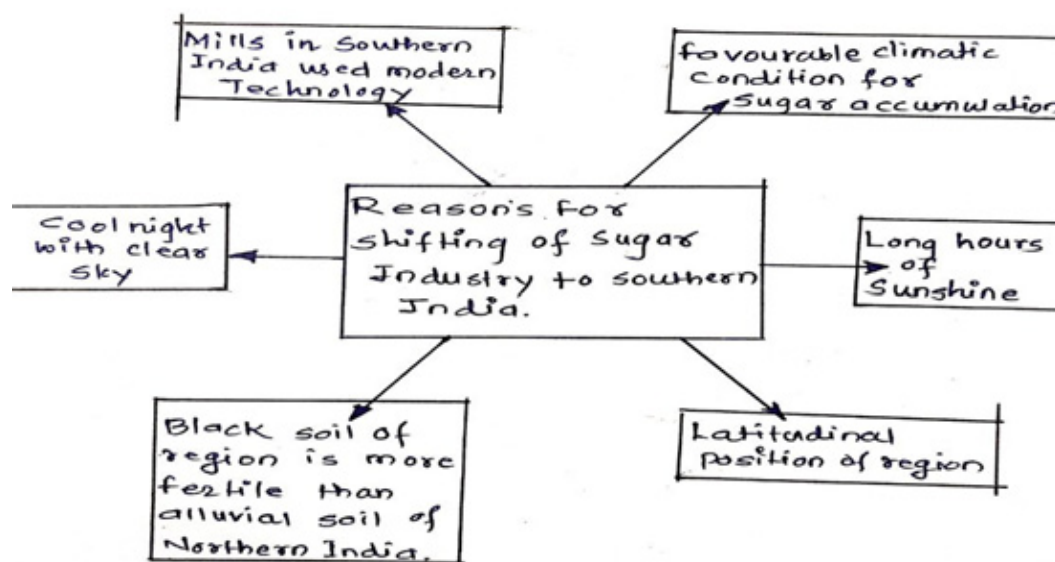
1. **Temperature:** It needs **hot and humid climate** with an average temperature of **21°C to 27°C**.
2. **Rainfall:** 75-150 cm
3. **Soil types:** Requires **moisture retentive soil** and deep **rich loamy soil** is ideal for its growth.

### Change in Production of Sugarcane at the State Level (2011- 2020)

- Northern sugarcane-producing states increased their output value by 42% whereas southern states decreased by 32.4%.
- Andhra Pradesh, Karnataka, Telangana, Tamil Nadu, and Maharashtra are the five Southern states whose sugarcane production decreased within the same time period.
- After a gap of five years, Maharashtra has surpassed Uttar Pradesh to reclaim the top spot in sugar production in India.

### Why is Uttar Pradesh declining in sugarcane production?

- Sugar cane is heavily diverted for ethanol production.
- Agricultural losses in low-lying parts of eastern Uttar Pradesh due to excessive rains and water logging.
- The majority of the cane region is using only one variety, Co-0238, making it vulnerable to the red rot fungus disease.



## 19. Asian Palm Oil Alliance (APOA)

- The Asian Palm Oil Alliance (APOA) is formed by **apex edible oil industry associations of five major palm oil importing countries**, including- **India, Pakistan, Sri Lanka, Bangladesh, and Nepal**.
- **Solvent Extractors' Association (SEA)** of India will manage its **secretariat**.
- It is based on idea to **gain collective bargaining power** and **make imports sustainable**.
- **Objectives:**
  1. **Change negative image** of palm oil and ensure that it is recognised as a **high-quality, economical, and healthy vegetable oil**.
  2. **Safeguard economic and business interests** of palm oil **consuming countries** and **increase its consumption** in member countries.
- **Indonesia** is world's largest producer and exporter of palm oil.
- **India** is world's biggest vegetable oils importer.

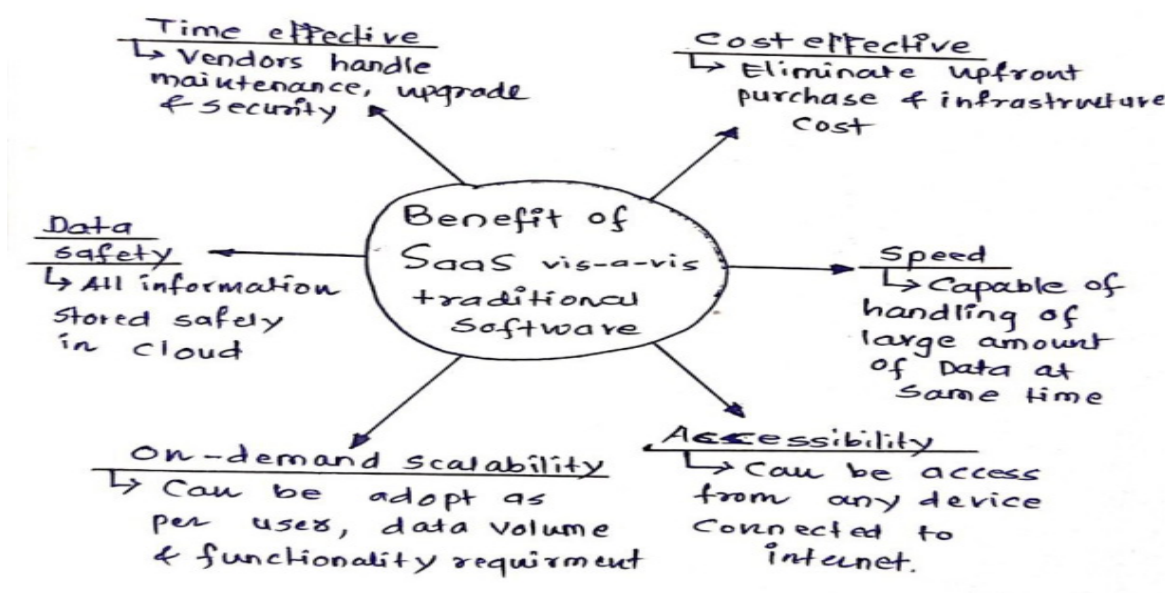
## 20. Primary Agricultural Credit Societies (PACS)

- PACS, **registered as cooperative societies**, provide the following facilities to their members:
  - Input facilities in form of cash** or kind component
  - Agriculture implements** on hiring basis.
  - Storage facility.**
- They constitute the **lowest tier of three-tier Short-term cooperative credit** in the country comprising of **around 13 Cr. farmers** as its members.
- Other two tiers are **State Cooperative Banks** at state level and **District Central Cooperative Banks** at district level.
- PACS are **outside the purview of Banking Regulation Act, 1949** and hence not regulated by RBI.
- Earlier, Cabinet Committee had approved **Computerization** of PACS with the objective of **increasing efficiency** of PACS, **bringing transparency and accountability** in their operations.

## 21. Software as a Service (SAAS)

SaaS is a **software distribution model** in which a **cloud provider** hosts **applications** and makes them available to end users over the internet. It includes services provided by **Google Workspace, Adobe Creative Cloud, and Github** etc.

**Key features of SaaS**



- It is **rented from a software vendor** who also provides technical support.
- It is provided on a **subscription basis** and the software can be **accessed on multiple devices**.
- It is one of three main categories of cloud computing, alongside:
  - Infrastructure as a Service (IaaS):** Where company leases a whole digital infrastructure (servers, network resources, etc.) for organizing business activities, creating applications, data storing, etc.
  - Platform as a Service (PaaS):** Where cloud environment (hardware, software, development tools and infrastructure) is provided for creating apps and their further support.

### SaaS sector in India

- India is the 3rd largest SaaS ecosystem globally**, after the USA and China.
- India is on the path to **surpass China to become the 2nd largest SaaS nation in the world by 2026**.
- India presently has **18 SaaS unicorns** as compared to one in 2018.

## 22. National Logistics Policy (NLP)

- The management of resources' acquisition, storage, and transportation to a final destination, or logistics, has grown to be a significant component of the economy.
- According to estimates, the Indian logistics market will be worth more than \$250 billion in 2021 and \$380 billion by 2025.
- Logistics Performance Score in the World Bank's 2018 Global Logistics Performance Index (44th).

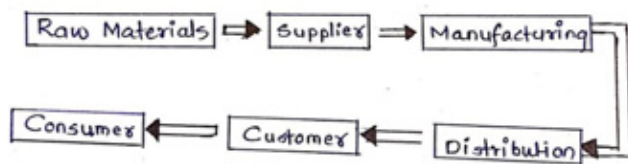


Fig: Logistic process

**Vision of NLP:** To develop a technologically enabled, integrated, cost-efficient, resilient, sustainable, and trusted logistics ecosystem in the country for accelerated and inclusive growth.

**Pillars of NLP:**

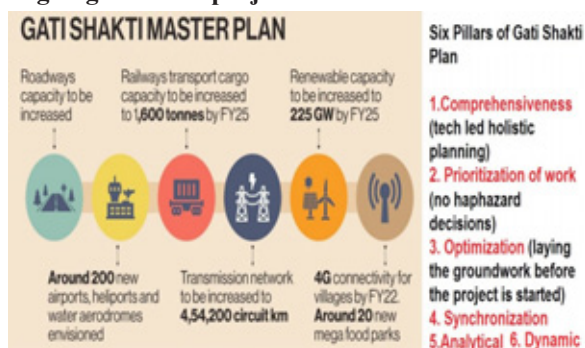


### Comprehensive Logistics Action Plan (CLAP)

- Integrated Digital Logistics System to develop a system of unified logistics interface.
- Standardization of physical assets and benchmarking service quality standards.
- Logistics Human Resources Development and Capacity Building to develop an overarching logistics human resource strategy.
- State engagement by supporting development of state/city level logistics plans, set up institutional framework at city/state level, measure and monitor action by states.
- EXIM (Export-import) Logistics to address infrastructure and procedural gaps in connectivity and create efficient and reliable logistics network.
- Service Improvement Framework for improving regulatory interface to enable seamlessness between sectors.
- Sectoral Plan for Efficient Logistics to be developed for each sector.
- Facilitation of Development of Logistics Parks.

## 23. PM Gati Shakti

National Master Plan (NMP) for **Multi-modal Connectivity**, is a **digital platform** for **comprehensive database** of the **ongoing & future projects** of 16 Ministries.



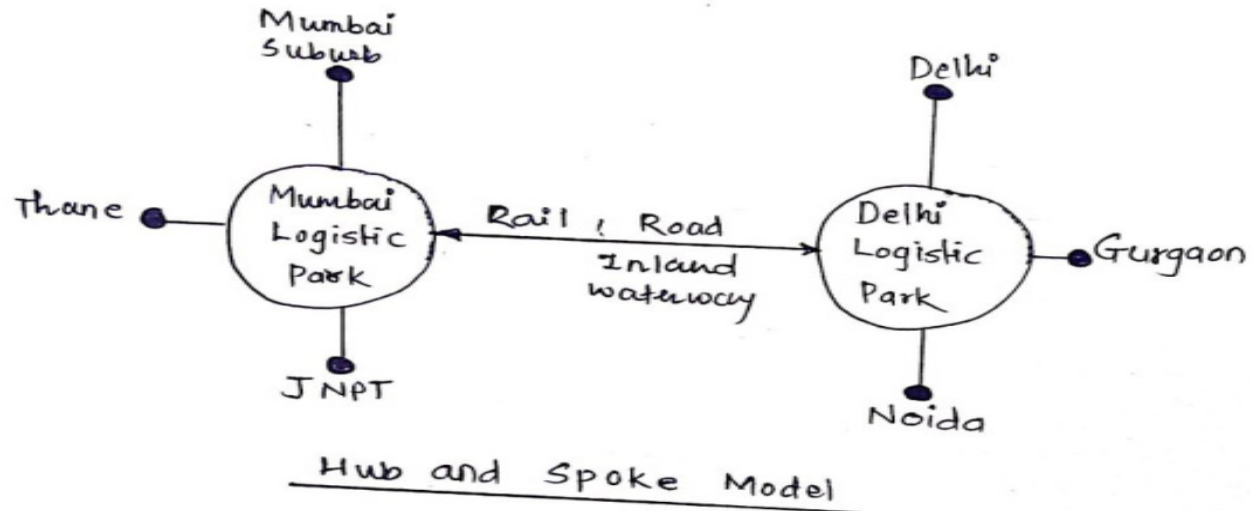
**Aim:** Create **Next Generation Infrastructure** by learning from the past and **achieving enhanced efficiency** through **6 pillars**:

- It is integrated with **200+ layers of geospatial data** on **existing infrastructure, forests, rivers and district boundaries**.
- It has been developed by the **BISAG-N**.
- Dynamic mapping of all infrastructure projects with realtime updation** by way of a map developed by BISAG-N.
- The map will be built on open-source technologies and **hosted securely on Meghrajai.e.GoI cloud**.

**Note: Bhaskaracharya National Institute for Space Applications and Geo-informatics (BISAG-N).**

- BISAG-N is an **Autonomous Scientific Society** registered under the Societies Registration Act, 1860 under the **MeitY**.
- **Its three main domain areas-** Satellite communication; Geoinformatics; and Geo-spatial technology

#### 24. Multi Modal Logistics Park



- Recently, Government awarded the contract of setting up **India's first multi-modal logistics park (MMLP)** near **Chennai** to **Reliance Industries (RIL)**.
- **The MMLP as an inter-modal freight-handling establishment** comprising warehouses, dedicated cold chain facilities, freight or container terminals and bulk cargo terminals.
- Its objective is to **centralize freight consolidation and reduce logistics cost** from 14% to less than 10% of GDP at par with International Standards.
- Under the '**PM Gati Shakti National Master Plan**', the Government of India has announced that **contracts will be awarded through PPP model for implementation of MMLPs**.
- **National Highways Logistics Management Limited (NHLML)**, **Inland Waterways Authority of India (IWAI)** and **Rail Vikas Nigam Limited (RVNL)** has signed a tripartite MoU for swift development of MMLP under Bharatmala Pariyojana
- **Bharatmala Pariyojana**, launched under **Ministry of Road Transport & Highways** in 2017, is an **umbrella program for highways sector** with focus on optimizing the efficiency of freight and passenger movement across the country.



## Practice Questions

### 1. Which of the following statements is/are correct about GST (Goods and Services Tax)?

- (1) GST is a destination based tax.
- (2) Article 279A defines the powers and composition of GST Council.

Choose the correct answer from the options given below.

- (a) 1 only
- (b) 2 only
- (c) Both
- (d) None

**Ans (c)**

#### Features of GST

- Destination based tax
- Applicable on the supply of the goods
- Rate slab are multiple according to the commodities covered and these tax slabs (rates) are decided mutually by the GST council (i.e., centre and states).

#### GST Council

- Article 279A - GST Council to be formed by the President to administer & govern GST.
- Union Finance Minister of India is the Chairman of GST council, and the ministers nominated by the state governments are the members.
- The centre will have 1/3<sup>rd</sup> voting power and the states have 2/3<sup>rd</sup> of the voting power.
- The decisions of the GST council are taken by 3/4<sup>th</sup> majority.

### 2. Which of the following statements is/are correct?

- (1) WPI is published by the Office of Economic Advisor.
- (2) CPI for Industrial Workers is published by NSO (National Statistical Office).

Choose the correct answer from the options given below.

- (a) 1 only
- (b) 2 only
- (c) Both
- (d) None

**Ans (c)**

#### Wholesale Price Index (WPI)

- WPI measures the changes in the prices of goods sold and traded in bulk by wholesale businesses to other businesses.
- WPI is published by the Office of Economic Adviser, Ministry of Commerce and Industry.
- WPI is the most often used inflation indicator in India.

#### Consumer Price Index (CPI)

- CPI measures price changes from the perspective of a retail buyer. It is released by the National Statistical Office (NSO).
- The CPI has several sub-groups including food and beverages, fuel and light, housing and clothing, bedding and footwear.
- Four types of CPI are as follows:
  - ♦ CPI for Industrial Workers (IW).
  - ♦ CPI for Agricultural Labourer (AL).
  - ♦ CPI for Rural Labourer (RL).
  - ♦ CPI (Rural/Urban/Combined).
- Of these, the first three are compiled by the Labour Bureau in the Ministry of Labour and Employment. CPI (Rural/

Urban/Combined) is compiled by the NSO in the Ministry of Statistics and Programme Implementation.

### 3. MCA21 is an e-Governance initiative of:

- (a) Niti Aayog
- (b) RBI
- (c) Ministry of Corporate Affairs
- (d) SEBI

**Ans (c)**

MCA21 is an e-Governance initiative of Ministry of Corporate Affairs (MCA) that enables an easy and secure access of the MCA services to the corporate entities, professionals and citizens of India. This will help the business community to meet their statutory obligations.

### 4. The phrase “quiet quitting” refers to:

- (a) Employees doing the bare minimum expected at work
- (b) Employers terminating their employees
- (c) Employees doing maximum work at office
- (d) Employees quitting their job without notice

**Ans (a)**

- The phrase doesn't refer to employees actually leaving their jobs, but instead, doing the bare minimum required of them.
- This could entail leaving work exactly at the end of one's shift, demanding additional pay for extra work, not signing up for ambitious projects, separating one's identity from their jobs, and/or setting clear work-life boundaries.

### 5. Which of the following can lead to Demand-Pull Inflation?

1. Deficit financing by the government
2. Depreciation of rupee

Select the correct answer code:

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

**Ans (c)**

This type of inflation is caused due to an increase in aggregate demand in the economy.

#### Causes of Demand-Pull Inflation:

- A growing economy or increase in the supply of money – When consumers feel confident, they spend more and take on more debt. This leads to a steady increase in demand, which means higher prices.
- Asset inflation or Increase in Forex reserves.
- Government spending or Deficit financing by the government – When the government spends more freely, prices go up.
- Due to fiscal stimulus.
- Increased borrowing.
- Depreciation of rupee.
- Low unemployment rate.
- Effects of Demand-Pull Inflation:
  - Shortage in supply
  - Increase in the prices of the goods (inflation).
  - The overall increase in the cost of living.

### 6. Consider the following statements regarding the effects of inflation:

1. Generally, in case of inflation, the currency of the economy appreciates.
2. Inflation redistributes wealth from creditors to debtors.



## Landmark Updates of General Studies Subject

Which of the above statements is/are correct?

- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2

**Ans (b)**

- There are multi-dimensional effects of inflation on an economy both at the micro and macro levels.
- Inflation redistributes wealth from creditors to debtors i.e. lenders suffer and borrowers benefit out of inflation.
- With every inflation the currency of the economy depreciates (loses its exchange value in front of a foreign currency) provided it follows the flexible currency regime rate is compared.

**7. Which of the following is not a direct tax?**

- (a) Income tax (b) Personal Property tax  
(c) Real Property tax (d) Entertainment tax

**Ans (d)**

- A direct tax is a tax paid directly by a person or organization to the entity imposing it.
- An individual taxpayer pays direct taxes to the government for various purposes, including income tax, real property tax, personal property tax, or taxes on assets.

**8. Which of the following statements is/are correct about UPI (Unified Payment Interface)?**

1. It was developed by National Payments Corporation of India (NPCI) and controlled by RBI (Reserve Bank of India) and IBA (Indian Bank Association).
2. UPI has a 3 factor authentication for security

Choose the correct answer from the options given below.

- (a) 1 only (b) 2 only  
(c) Both (d) None

**Ans (a)**

- UPI means Unified Payment Interface. It is a real-time payment system which helps in quick transfer of funds between two bank accounts.
- The funds are transferred through a single mobile application.
- UPI was developed by National Payments Corporation of India (NPCI) and controlled by RBI (Reserve Bank of India) and IBA (Indian Bank Association).
- UPI has a 2 factor authentication for security purposes.

**9. Which country has become the newest member of the BRICS New Development Bank?**

- (a) Egypt (b) Sri Lanka  
(c) Nigeria (d) Tanzania

**Ans (a)** India welcomed Egypt as the new member of the BRICS New Development Bank.

**10. What is National Monetization Pipeline?**

- (a) It's a new pipeline to transport petroleum.  
(b) A new demonetization scheme.  
(c) A govt. policy to utilize its idle lying assets  
(d) A govt. policy of nationalization of all pipelines.

**Ans (c)** A plan announced by Union Finance Minister whereby the government is going to utilize underutilized assets to raise estimated aggregate monetization potential of Rs 6 lakh crore through core assets of the Central Govt. over a 4-year period, from FY 2022 to FY 2025.

**11. "Daksha" Portal is an initiative of**

- (a) Ministry of Finance (b) Ministry of Agriculture  
(c) Reserve Bank of India (d) Ministry of Railways

**Ans (c)**

RBI launched advanced supervisory monitoring system named DAKSH.

The Reserve Bank of India (RBI) Governor Shaktikanta Das has launched a new 'SupTech' initiative called DAKSH. This application will be the bank's advanced supervisory monitoring system, which is expected to make the supervisory processes more robust.

**12. Consider the following statements about Central Bank Digital Currency (CBDC):**

1. Central Bank Digital Currency is the legal tender issued by a central bank in digital form.
2. It is not exchangeable with the fiat currency.

Which of the statements given above is/are correct?

- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2

**Ans (a)**

- Central Bank Digital Currency is the legal tender issued by a central bank in digital form.
- This means, it is the same as a fiat currency and is exchangeable one-to-one with the fiat currency, but different in its form.
- The RBI has often expressed worries about private cryptocurrencies (Bitcoin, Ether) being used for money laundering, terror financing, and tax evasion.
- The introduction of its own CBDC has been viewed as a means of bridging the benefits and risks of digital currency.

**13. 'Poison Pill', which was seen in the news, is associated with which field?**

- (a) Food Safety  
(b) Virology  
(c) Acquisition of Company  
(d) Pharmaceutical Industry

**Ans (c)** In the field of finance related to mergers and acquisitions, a limited-duration shareholder rights plan is also known as a "Poison pill".

**14. Consider the following statements:**

1. "Operation Flood" (OF) that started in the 1950s transformed Dairy sector.
2. The cooperative model, steered by Verghese Kurien, is associated with the Indian Dairy sector.

Which of the above statements is/are correct?

- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2

**Ans (b)**

- The overall growth in the dairy sector for the last 20 years has been between 4-5 per cent per annum, and lately, it has accelerated to even 6 per cent.
- In comparison, cereals have been growing at about 1.6 per cent per annum over the same period.
- It is well known that "Operation Flood" (OF) that started in the 1970s transformed this sector.
- The institutional innovation of a cooperative model, steered by Verghese Kurien, changed the structure of this sector.

## Unit IV

# Polity

### IMPORTANT SUPREME COURT JUDGEMENTS

#### 1. Supreme Court's decision on ECI appointments

**Central Idea:** Supreme Court has asked the central government to constitute a **permanent selection committee** comprised of the **Prime Minister**, the **opposition leader**, and the **Chief Justice of India** or his nominee to propose the **appointment of Election Commissioners**.

**Reasons:**

- Increase **transparency** and **accountability** in the Chief Election Commission appointment process.
- **Prevent** the ruling government from **exerting excessive influence on the appointment** of the CEC.
- Highlights the value of an **impartial Election Commission** in maintaining the **integrity of India's democratic process**.

**Analysis of Article 324(2):**

- It states that the **President appoints the Chief Election Commissioner** and other Election Commissioners, **subject to any law made by Parliament**.
- **Absence of law:** There is no law made by Parliament on this issue.
- **Urge for judicial intervention:** Court must step in to fill the constitutional vacuum, urges the PIL.
- **Question of executive non-interference:** This leads to question of **separation of powers** and if the judiciary is overstepping its role in filling this gap in the law.

#### 2. Euthanasia Mercy Killing - Living Will

- **Central idea:** A five-judge Bench of the Supreme Court agreed to significantly ease the procedure for **passive euthanasia** in the country by altering the existing guidelines for **living wills**.
- **Euthanasia:**
- It refers to the practice of an **individual deliberately ending their life**, oftentimes **to get relief** from an **incurable condition**, or **intolerable pain and suffering**. It can be administered **only by a physician can be either 'active' or 'passive'**.
  - ✓ **Active euthanasia:** It involves an active intervention to end a person's life **with substances** or **external force**, such as administering a **lethal injection**.
  - ✓ **Passive euthanasia:** Refers to **withdrawing life support or treatment** that is essential to keep a terminally ill person alive.

**Living Will:**

- A legal document detailing the type and level of medical care one wants to receive if they are unable to make decisions or communicate their wishes when care is needed.
- It addresses many **life-threatening treatments** and procedures, such as **resuscitation, ventilation, and dialysis**.
- A person can appoint a healthcare proxy to make decisions regarding care when they are unable to do so.
- It addresses how the assets of the incapacitated person should be managed.
- People can enlist the services of an estate planner or an attorney to help draft or review a living will.

## Landmark Updates of General Studies Subject

### Living Will in India

- First laid down in 2018 judgment in **Common Cause vs. Union of India**, which **allowed passive euthanasia**.
- It was in response to the **Aruna Shanbaug Case** where protagonists were arguing in favour of mercy killing to Aruna.
- The guidelines pertained to questions such as who would execute the living will, and the process by which approval could be granted by the medical board.
- It declared that an **adult human** being having **mental capacity** to take an informed decision has right to refuse medical treatment including **withdrawal from life-saving devices**.

### Recent changes

- **Medical board:** Instead of the hospital and Collector forming the two medical boards, both boards will now be formed by the hospital.
- **5 year experienced doctor:** The requirement of 20 years of experience for the doctors has been relaxed to five years.
- **Magistrate approval not required:** The requirement for the Magistrate's approval has been replaced by intimation to the Magistrate.
- **No witness required:** The 2018 guidelines required two witnesses and a signature by the Magistrate; now a notary

or gazetted officer can sign the living will in the presence of two witnesses instead of the Magistrate's countersign.

- **HC for appeal:** In case the medical boards set up by the hospital refuses permission, it will now be open to the kin to approach the High Court which will form a fresh medical team.

### Case Studies

<b>Netherlands, Luxembourg, Belgium</b>	Allow both euthanasia and assisted suicide for anyone who faces <b>unbearable suffering</b> that has no chance of improvement.
<b>Switzerland</b>	Banned euthanasia but allows assisted dying in the presence of a doctor or physician.
<b>Canada</b>	Euthanasia and assisted dying would be allowed for mentally ill patients by March 2023.
<b>United States</b>	Euthanasia is allowed in some states like Washington, Oregon, and Montana.
<b>United Kingdom</b>	Considers it illegal and equivalent to manslaughter.

## 3. Judicial Appointments Conundrum Post-NJAC Verdict

### Central idea:

- The vice president's criticism of the **National Judicial Appointing Commission (NJAC)** decision may be seen as a **high constitutional authority's** views **against national law** (Art. 141).
- The **court must follow the ruling** as long as the NJAC verdict is in place, which supports the **collegiums system** of appointing judges.
- The Parliament is free to propose new judicial appointment legislation, **possibly by a constitutional amendment**, but such laws would also **be reviewed by the courts**.

**Article 141:** The Supreme Court's decision will be enforceable by every court in India. The Supreme Court's decision, or its interpretation of the law or judgement, upon which the dispute is decided, must be taken into account when interpreting the declared law as a legal notion. Theory of Precedent in India is based on this.

### Case: State of Madras versus V.G. Row (1952)

- **Actual nature of Judicial Review:**
  - ✓ Judicial review was undertaken by the courts "not out of any desire to tilt at legislative authority in a crusader's spirit, but in discharge of a duty plainly laid down upon them by the Constitution".

- ✓ The Kesavananda Bharati verdict (1973) had made it clear that judicial review is not a means to usurp parliamentary sovereignty.

- ✓ It is a "system of checks and balances" to ensure constitutional functionaries do not exceed their limits.

### Limitations to Article 368

- ✓ It postulates only a 'procedure' for amendment of the Constitution.
- ✓ The same could not be treated as a 'power' vested in the Parliament to amend the Constitution so as to alter the 'core' of the Constitution.

### Doctrine of Precedent

- Any judicial system's structure places a high priority on the notion of precedent.
- It suggests that a judgement made by a court at the top of the judicial food chain binds courts below it.
- According to Article 141 of the Indian Constitution, all lower courts must abide by the Supreme Court's interpretation of the law.
- **State's High Court's decision is binding on all Lower Courts** within that state
- Division bench of a State High Courts' ruling is binding on the Justices sitting singly in that High court.

## 4. Ministers' Right to Free Speech and Issues

**Central idea:** Supreme Court held that there is no reason to impose **additional restrictions** on the **right to free speech of Ministers** and the government is not vicariously liable for disparaging remarks made by them, even if the comments are traceable to state affairs or meant to protect the government.

### Scope of freedom of speech

- **Article 19(1) (a):** it guarantees the freedom of speech and expression to all citizens. It is the first condition of liberty and plays an important role in forming public opinion. Ministers and lawmakers enjoy the freedom of speech and expression under **Article 19(1) of the Constitution as other citizens and additional restrictions cannot be imposed** to curb their right to free speech.
- **Article 19(2):** To curbs on free speech cannot extend beyond what is prescribed under Article 19(2) of the **Constitution imposes reasonable restrictions** and applies equally on all citizens.

### Restrictions can be imposed in the interests of:

- ✓ Sovereignty and integrity of India,
- ✓ Security of the state,
- ✓ Friendly relations with foreign states,
- ✓ Public order, decency or morality,
- ✓ In relation to contempt of court,
- ✓ Defamation,
- ✓ Incitement to an offense

### Issues examine:

- **Free speech and sensitive issues:** Examine whether ministers, public functionaries and lawmakers can claim freedom of speech while expressing views on sensitive matters.
- **Free speech and state matters:** Whether a statement by a minister in relation to any affairs of the State or for the protection of government can be attributed vicariously to the government itself.

## 5. All women have Right to Legal and Safe Abortion

**Central Idea:** The Supreme Court has held that **all women**, irrespective of their **marital status**, are entitled to safe and legal **abortion till 24 weeks of pregnancy** under the **Medical Termination of Pregnancy (MTP) Act**. The lower court had taken an **unduly restrictive view** that her plea for a safe abortion was not covered under the Medical Termination of Pregnancy Act. This was since the pregnancy arose from a consensual relationship outside wedlock.

### Amendments

- It substituted the term '**husband**' with '**partner**', a clear signal that the law covered **unmarried women** within its ambit.
- **Live-in relationships** had been recognised.
- There were a significant number of people in social mainstream who see no wrong in engaging in pre-marital sex.
- The law could not be used to quench **notions of social morality** and unduly interfere in their personal autonomy and bodily integrity.

### Medical Termination of Pregnancy (MTP) Act

- Abortion in India has been a **legal right** under various circumstances for the last 50 years since the introduction of the MTP Act in 1971.

- The Act was amended in 2003 to **enable women's access to safe and legal abortion services**.

- Abortion is covered 100% by the government's public national health insurance funds, Ayushman Bharat and Employees' State Insurance with the package rate for surgical abortion.

### Situation for legal abortion

1. If continuation of the pregnancy poses **any risks to the life** of the mother or mental health.
2. If the **foetus** has any **severe abnormalities**.
3. If pregnancy occurred as a result of **failure of contraception** (but this is **only applicable to married women**).
4. If pregnancy is a result of **sexual assault or rape**.

### Conditions for medical practitioners:

1. If the woman is either a survivor of sexual assault or rape or incest.
2. If she is a minor.
3. If her marital status has changed during the ongoing pregnancy (either widowhood or divorce).
4. If she has major physical disabilities or is mentally ill.



## Landmark Updates of General Studies Subject

5. On the grounds of foetal malformation incompatible with life or if the child is born, it would be seriously handicapped.
  6. If the woman is in humanitarian settings or disaster, or emergency situations as declared by the government.
  2. All pregnancies up to 20 weeks require one doctor's approval.
  3. Women can now terminate **unwanted pregnancies caused by contraceptive failure**, regardless of their marital status.
  4. There is also no upper gestation limit for abortion in case of foetal disability if so decided by a medical board of specialist doctors, which state governments and union territories' administrations would set up.
- Key changes made by the Medical Termination of Pregnancy (Amendment) Act, 2021**
1. The gestation limit rose from 20 weeks to 24 weeks, but only for **special categories of pregnant women** such as **rape or incest survivors**. But need the approval of two registered doctors.

## 6. Live streaming of Supreme Court proceedings

- In **Swapnil Tripathi**' judgment, 2018, the SC had cleared the deck for live streaming of cases of national and constitutional importance.
- To hear a public interest litigation seeking live streaming of judicial proceedings **on matters of constitutional and national importance**.
- **Reasons:**
  1. De-congestion of courts
  2. Improving physical access to courts for litigants who have to otherwise travel long distances
  3. Matters of National security,
  4. To ensure that victims, witnesses or defendants can depose truthfully and without any fear.
  5. To protect confidential information, including all matters relating to sexual assault and rape,
  6. Matters where publicity would be antithetical to the administration of justice, and
  7. Cases which may provoke sentiments and arouse passion and provoke enmity among communities.

### Recommendation of Attorney General

- **Approving allocation of transcripts and archiving the proceedings.**
- **Court must retain the power to withhold broadcasting, and to also NOT permit it in cases involving:**
  1. Matrimonial matters,
  2. Matters involving interests of juveniles or the protection of the private life of the young offenders,

### Case studies

1. **United States of America:** US Supreme Court has rejected pleas for broadcast of its proceedings, it has since 1955 allowed audio recording and transcripts of oral arguments.
2. **United Kingdom:** In 2005, the law was amended to remove contempt of court charges for recording proceedings of the Supreme Court.

## 7. Challenging the Special Marriage Act, 1954

**Central Idea:** The Supreme Court has **dismissed** a writ petition challenging the Constitutional validity of certain provisions of the Special Marriage Act, 1954 under which **couples seek refuge for inter-faith and inter-caste marriages**. The petition has called these provisions **violative of Article 21**, which guarantees the **right to privacy**. Under this couples require to give a notice of **30 days** before the date of marriage inviting objections from the public. The provisions contravene **Article 14** on prohibition of discrimination on grounds of religion, race, caste and sex as well as **Article 15** on right to equality as these requirements are absent in personal laws.

### Special Marriage Act, 1954

- It was enacted to facilitate the marriage of couples professing different faiths, and preferring a civil wedding.
- The law's features on prior public notice being given and objections for the safety and privacy of those intending to marry across religions.
- To overcome this, many settle for marriage under the personal law of one of them, with the other opting for religious conversion.



## 8. Three-judge bench to review SC Verdict on Poll Promises

**Central idea:** The Supreme Court has decided to **reconsider a 2013 judgment on Poll Promises**, which held that promises in the election manifesto do not constitute a **corrupt practice** under the law.

### Reasons for reconsideration of decision

1. **Rationale of the freebie:** The Chief Justice of India has now urged the three-judge bench to examine the possibility of passing an enforceable order to prevent ruling political parties from making and dispersing “irrational freebie” promises.
2. **Freebie vs. Welfare schemes:** Such freebies are completely divorced from actual welfare programmes and are just given out to **capture vote banks**, using public funds.
3. **Prevent bankruptcy:** Freebies might lead to a situation where the state government is unable to offer a fundamental amenity owing to a lack of funding, pushing the state closer to bankruptcy.

4. **Expert review:** Also consider forming an expert committee to analyse and provides suggestions against the distribution of wealth at the expense of national economy and public welfare.

### Examples of freebies

1. Promise of Rs 15 lakh in our bank accounts
2. Free TV, Laptops
3. Free electricity
4. Loan waivers
5. Offering free public transport ride to all women in Delhi

### What cannot be attributed to a freebie?

1. MGNREGA scheme (rural employment guarantee scheme)
2. Right to Education (RTE)
3. Food Security through fair price shops (under National Food Security Act)
4. Prime Minister Kisan Samman Yojana (PM-KISAN)

## 9. Supreme Court upholds powers of arrest, raids, seizure under PMLA

**Central Idea:** The Supreme Court upheld the core amendments made to the **Prevention of Money Laundering Act (PMLA)**, which gives **the government and the Enforcement Directorate (ED)** virtually unbridled powers of summons, arrest, and raids, and makes bail nearly impossible while shifting the burden of proof of innocence on to the accused rather than the prosecution.

### Petitions

- Petitions were filed against the amendments, which the challengers claimed would **violate personal liberty, procedures of law** and the constitutional mandate.
- The petitioners included many veteran politicians who all claimed that the **process itself was the punishment**.
- There were submissions that the **accused's right against self-incrimination suffered** when the ED summoned them and made them sign statements on threats of arrest.
- But the court said these statements were recorded as part of an **inquiry** into the proceeds of crime.
- A person cannot claim **right against self-incrimination** at a summons stage.

### Enforcement Directorate (ED)

- In 1956, ‘Enforcement Unit’ was formed in the Department of Economic Affairs.
- Aimed for handling Exchange Control Laws violations under the Foreign Exchange Regulation Act (FERA).
- Today ED investigating economic offences under the PMLA, Fugitive Economic Offenders Act, Foreign Exchange Management Act and FERA.
- Whenever any offence is registered by a local police station, which has generated proceeds of crime over and above ₹1 crore, the investigating police officer forwards the details to the ED.
- If the offence comes under the knowledge of the Central agency, they can then call for the First Information Report (FIR) or the charge sheet if it has been filed directly by police officials.

## 10. SC's 'Kihoto Hollohan' Judgment

**Central Idea:** A constitutional challenge to the **Tenth Schedule** was mounted, which was settled by the apex court in 'Kihoto Hollohan'. The case was whether the powerful role given to the Speaker violated the doctrine of basic structure. Supreme Court upheld the **sweeping discretion** available to the **Speaker** in deciding cases of **disqualification of MLAs**. The Supreme Court laid down the doctrine of basic principle in its landmark judgment in 'Kesavananda Bharati vs. State Of Kerala' (1973).

### 10th Schedule of the Constitution

- It was added by the Constitution (Fifty-Second Amendment) Act of 1985.
- It enables the disqualification of MLAs and MPs.
- It explains the Speaker's broad discretionary powers to decide in cases of defection.

### Ruling of SC

- The petitioners in 'Kihoto Hollohan' argued whether it was fair that the Speaker should have such broad powers, given that there is always a **reasonable likelihood of bias**.
- Speakers or Chairmen are **guardians of the rights and privileges** of the House.

- They are expected to and do take far reaching decisions in the Parliamentary democracy.
- Power to adjudicate questions under the Tenth Schedule in them should not be considered exceptionable.
- The provisions were "salutory and intended to strengthen the fabric of Indian Parliamentary democracy by curbing unprincipled and unethical political defections."

### Role of Deputy Speaker

- The roles of Speaker and Deputy Speaker of the House of the People (Lok Sabha) are mentioned in Article 93 of the Constitution, while the Speaker and Deputy Speaker of the Legislative Assembly of a state are described in Article 178.
- According to Article 95(1), the Deputy Speaker will carry out the Speaker's responsibilities when the position is open.
- Whenever the House is in session, the Deputy Speaker generally has the same authority as the Speaker.
- While the Deputy Speaker presides, any references in the Rules to the Speaker are interpreted to mean the Deputy Speaker.

## 11. Supreme Court recognizes Sex Work as a 'Profession'

**Central Idea:** Supreme Court has directed that police should neither interfere nor take criminal action against adult and consenting sex workers. Sex Work is a profession whose practitioners are entitled to dignity and **equal protection under law**. Criminal law must apply equally in all cases, on the basis of 'age' and 'consent'. The order was passed after invoking special powers under Article 142 of Constitution.

### Guidelines for Police

1. The Court ruled that sex workers should not be "arrested, penalised, harassed, or victimised" if a brothel is raided.
2. As only operating a brothel is against the law, volunteer sex employment is not prohibited.
3. The court stated that sex workers and their children are entitled to basic protection of human decency and dignity.
4. The court decided that a kid of a sex worker should not be taken away from the mother just because she works in the sex trade.

5. Also, it should not be assumed that if a kid is discovered living in a brothel or with sex workers, the child was trafficked.

### According to Article 23 of the Indian Constitution

1. Prohibition of human trafficking and forced labour.
2. Traffic in human beings and bears and other similar forms of forced labour are prohibited and any contravention of this provision shall be an offence punishable in accordance with the law.
3. Nothing in this article precludes the State from imposing compulsory service for public purposes, and the State shall not discriminate solely on the basis of religion, race, caste, or class, or any combination thereof, in imposing such service.

**Case studies across the world where prostitution is legal**

Countries	Status of prostitution
New Zealand	<ul style="list-style-type: none"> <li>Prostitution has been legal since 2003.</li> <li>There are even licenced brothels operating under public health and employment laws, and they get all the social benefits.</li> </ul>
France	<ul style="list-style-type: none"> <li>Prostitution is legal in France, though soliciting in public is still not allowed.</li> </ul>
Germany	<ul style="list-style-type: none"> <li>Prostitution is legalised and there are proper state-run brothels.</li> <li>The workers are provided with health insurance, have to pay taxes, and they even receive social benefits like pensions.</li> </ul>
Greece	<ul style="list-style-type: none"> <li>The sex workers get equal rights and have to go for health checkups as well.</li> </ul>
Canada	<ul style="list-style-type: none"> <li>Prostitution in Canada is legal with strict regulations.</li> </ul>

## 12. States have equal powers to make GST-related Laws

**Central idea:** The Supreme Court has held that Union and State legislatures have equal, simultaneous and unique powers to make laws on Goods and Services Tax (GST) and the recommendations of the GST Council are not binding on them.

**Key takeaways of the Judgment**

- The recommendations of the GST Council are the product of a collaborative dialogue involving the Union and the States.
- They are recommendatory in nature.
- They only have a persuasive value.
- To regard them as binding would disrupt fiscal federalism when both the Union and the States are conferred equal power to legislate on GST.

**Basis of the Judgment**

- The court emphasised that **Article 246A** of the Constitution gives the States power to make laws with respect to GST.
- It treats the Union and the States as “**equal units**”.
- It confers a simultaneous power (on Union and States) for enacting laws on GST.
- Article 279A**, in constituting the GST Council, envisions that neither the Centre nor the States are actually dependent on the other.

**The GST Council**

- A federal body aimed at bringing states and the Centre together on a single platform for nationwide implementation of indirect tax reform.
- It is an apex member committee responsible for modifying, reconciling, or procuring any legislation or rule pertaining to the context of goods and services tax in India.
- It specifies the tax rate, the tax exemption, the form submission deadline, the tax laws, and the tax deadlines, while taking into account the particular rates and requirements for various states.
- The main duty is to make sure that all goods and services are taxed at the same uniform rate across the country.

**Structure of GST Council**

- As per Article 279(1) the President must appoint the GST Council within 60 days after the commencement of Article 279A, of the modified Indian Constitution.
- It will be a combined forum for the States and the Centre.

**It consists of:**

- Chairperson: Union Finance Minister
- Charge of Revenue of Finance: Union Minister of State
- Members: Minister in charge of finance or taxation or any other Minister nominated by each State government

## 13. Death Penalty Abolition Debate

**Central idea:** The Supreme Court has invoked its **extraordinary powers to do complete justice** under **Article 142** of the Constitution and ordered the release of A.G. Perarivalan in former PM assassination case.

**Article 161:** Governor of a State shall have **the power to grant pardons, reprieves, respites or remissions of punishment or to suspend, remit or commute the sentence** of any person convicted of any offence against any law relating to **a matter** to which the **executive power of the State extends**.

**Why was this case for Governor?**

- Perarivalan was not a death sentenced convict.
- Earlier, the apex court had commuted his death penalty to life sentence for murder in 2014.
- The Governor had no business forwarding the pardon plea to the President after sitting on it for years together.
- Had this been a death penalty, the case would have been different.

**Why did the Supreme Court intervene?**

- Governor's **delay** to decide Perarivalan pardon for **more than two years** has compelled the apex court to employ its constitutional powers under Article 142 to do justice to Perarivalan.
- Governor's non-exercise of power under Article 161 of the Constitution was **not immune from judicial review**.

## 14. Nature as a living entity

**Central Idea:** The Madras HC observed that **Mother Nature** was accorded the rights akin to fundamental rights, legal rights, constitutional rights for its survival, safety, sustenance and resurgence in order to maintain its status and also to promote its health and well-being.

**Ecological Jurisprudence**

- A philosophy that **sees nature not as a set of objects to be exploited but as a community of subjects (humans and non-humans) who are connected through interdependent, reciprocal relationships**.
- The onset of **climate change** and the potential **mass extinction** of species is accompanied by the gradual closing window of opportunity to take meaningful action.
- Activists around the world are calling for **anthropocentric legal and governance systems** to be replaced with **eco-centric ones**.

**A case study**

1. The Ganga, the Yamuna, their tributaries, and the glaciers and catchments that feed these rivers in Uttarakhand were declared to have rights as a juristic or legal person or living entity by the Uttarakhand High Court in 2017.
2. The court in Narayan Dutt Bhatt v. Union of India, 2018, further stated that every member of the animal world has rights comparable to those of a live person.
3. The Punjab and Haryana High Court issued a decision in March 2020 proclaiming the Sukhna Lake in Chandigarh to be a living entity with rights equal to those of a person.

## 15. Freedom of Speech – Defamation, Sedition, Etc.

**Central idea: What is Sedition?**

Section 124A: An offence committed when any person by words, either spoken or written, or by signs, or by visible representation, or otherwise, brings or attempts to bring into hatred or contempt, or excites or attempts to excite disaffection towards the government established by law in India.

- Disaffection includes disloyalty and all feelings of enmity.
- However, comments without exciting or attempting to excite hatred, contempt or disaffection, will not constitute an offence.

- Sedition is a non-bailable offence.
- Punishment under Section 124A ranges from imprisonment up to three years to a life term with or without a fine.

**Sedition as a cognizable offence**

- For the first time in history in India during the tenure of Prime Minister Indira Gandhi in 1973, that is, arrest without a warrant was now permissible.
- In 1962 the Supreme Court interpreted the section to apply only if there is **incitement to violence** or **overthrowing a democratically elected government through violent means**.



## 16. No Fundamental or Absolute Right to receive Foreign Donations

**Central idea:** The Supreme Court upheld amendments introducing **restrictions in the Foreign Contribution Regulation Act (FCRA)** while holding that no one has a fundamental or absolute right to receive foreign contributions.

### Foreign Contribution Regulation Act (FCRA)

- It regulates foreign donations and ensures that such contributions do not adversely affect internal security.
- First enacted in 1976, it was amended in 2010 when a slew of new measures were adopted to regulate foreign donations.
- Applicable to all associations, groups and NGOs which intend to receive foreign donations.
- It is mandatory for all such NGOs to register themselves under the FCRA.
- The registration is initially valid for five years and it can be renewed subsequently if they comply with all norms.

## 17. Wearing hijab is not essential part of religion

**Central idea:** The HC held that **wearing hijab is not an essential religious practice in Islam**. Hence, not protected by the right to **freedom of religion guaranteed by Article 25 of the Constitution**. It was a **reasonable restriction** that was constitutionally permissible. The legality of the order prescribing guidelines for uniforms in schools and pre-university colleges under the provisions of the **Karnataka Education Act, 1983**.

## 18. States must decide on SC/ST quota in promotions

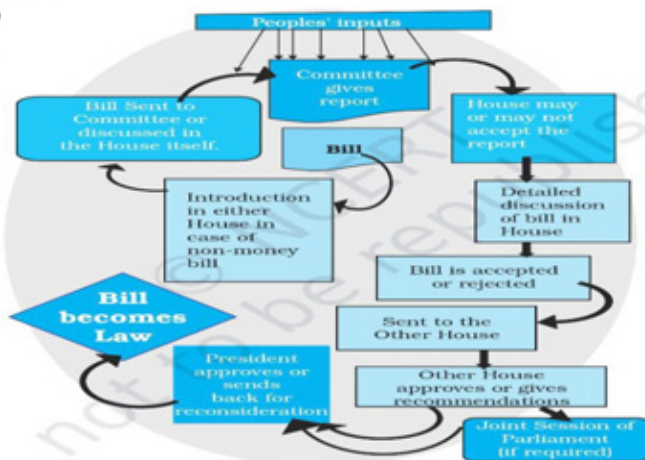
**Central idea:** The Supreme Court has refused to lay down the criteria for determining the inadequacy of representation for granting reservation in promotions for Scheduled Caste and Scheduled Tribe candidates in government jobs. It held 'cadre', and not class or group or the entire service '**cadre**', **not class or group or the entire service**, as the unit for the purpose of collection of quantifiable data for giving promotion quotas.

### LANDMARK CONSTITUTIONAL AMENDMENTS

The constitution amendment is the process of making changes to the nation's fundamental law or supreme law. Its procedure is laid down in **Part XX (Article 368) of the Constitution of India**. This ensures the sanctity of the Constitution of India and keeps a check on arbitrary power of the Parliament of India.

The amendment procedure borrowed from the **Constitution of South Africa**. The Article-368 in Part XX of the constitution, thus Parliament has Powers to amend the constitution. In the famous **Kesavananda Bharati** judgment, 1973 SC held that the **Parliament cannot amend** those parts which are **part of the Basic Structure** of the constitution.

### Procedure for amendment of constitution



- The amendment of Constitution can be initiated only by the introduction of a bill in either house of the Parliament
- The bill can be introduced either by a minister or by a private member and does not require the permission of the President
- The bill must be passed in each house by a special majority, that is, a majority of the total membership of the house and a majority of 2/3rd members of the house present and



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voting.

- Each house must pass the bill separately. If there is any disagreement, there is no provision for joint-sitting of the houses.
- If the bill seeks to amend the federal provisions of the constitution, it must be ratified by the legislatures of half of the states by a simple majority.
- The bill becomes an act after it receives President's assent.
- After passage of the bill by both the houses, it is presented to the President for his assent.
- The president must give his assent to the bill. He can neither withhold his assent to the bill nor return the bill for reconsideration of the Parliament.

Major amendments	Landmark changes
First Amendment Act, 1951	<ul style="list-style-type: none"> <li>Empowered the state to make special provisions for the advancement of socially and economically backward classes.</li> <li>Provided for the saving of laws providing for acquisition of estates, etc.</li> <li>Added Ninth Schedule to protect the land reform and other laws included in it from the judicial review.</li> <li>Added three more grounds of restrictions on freedom of speech and expression, viz., public order, friendly relations with foreign states and incitement to an offence. Also, made the restrictions 'reasonable' and thus, justiciable in nature.</li> <li>Provided that state trading and nationalisation of any trade or business by the state is not to be invalid on the ground of violation of the right to trade or business.</li> </ul>
Second Amendment Act, 1952	<ul style="list-style-type: none"> <li>Readjusted the scale of representation in the Lok Sabha by providing that one member could represent even more than 7, 50,000 persons.</li> </ul>
Third Amendment Act, 1954	<ul style="list-style-type: none"> <li>Empowered the Parliament to control the production, supply and distribution of the foodstuffs, cattle fodder, raw cotton, cotton seed and raw jute in the public interest.</li> </ul>
Fourth Amendment Act, 1955	<ul style="list-style-type: none"> <li>Made the scale of compensation given in lieu of compulsory acquisition of private property beyond the scrutiny of courts.</li> <li>Authorized the state to nationalize any trade.</li> <li>Included some more Acts in the Ninth Schedule.</li> <li>Extended the scope of Article 31 A (savings of laws).</li> </ul>
Fifth Amendment Act, 1955	<ul style="list-style-type: none"> <li>Empowered the president to fix the time-limit for the state legislatures to express their views on the proposed Central legislation affecting the areas, boundaries and names of the states.</li> </ul>
Sixth Amendment Act, 1956	<ul style="list-style-type: none"> <li>Included a new subject in the Union list i.e., taxes on the sale and purchase of goods in the course of inter-state trade and commerce and restricted the state's power in this regard.</li> </ul>
Seventh Amendment Act, 1956	<ul style="list-style-type: none"> <li>Abolished the existing classification of states into four categories i.e., Part A, Part B, Part C and Part D states, and reorganised them into 14 states and 6 union territories.</li> <li>Extended the jurisdiction of high courts to union territories.</li> <li>Provided for the establishment of a common high court for two or more states.</li> <li>Provided for the appointment of additional and acting judges of the high court.</li> </ul>
Eight Amendment Act, 1960	<ul style="list-style-type: none"> <li>Extended the reservation of seats for the SCs and STs, and special representation for the Anglo-Indians in the Lok Sabha and the state legislative assemblies for a period of ten years (i.e., up to 1970).</li> </ul>
Ninth Amendment Act, 1960	<ul style="list-style-type: none"> <li>Facilitated the cession of Indian territory of Berubari Union (located in West Bengal) to Pakistan as provided in the Indo-Pakistan Agreement (1958).</li> </ul>
Tenth Amendment Act, 1961	<ul style="list-style-type: none"> <li>Incorporated Dadra and Nagar Haveli in the Indian Union.</li> </ul>
Eleventh Amendment Act, 1961	<ul style="list-style-type: none"> <li>Changed the procedure of election of the vice-president by providing for an electoral college instead of a joint meeting of the two Houses of Parliament.</li> <li>Provided that the election of the president or vice-president cannot be challenged on the ground of any vacancy in the appropriate electoral college.</li> </ul>
Twelfth Amendment Act, 1962	<ul style="list-style-type: none"> <li>Incorporated Goa, Daman and Diu in the Indian Union.</li> </ul>
Thirteenth Amendment Act, 1962	<ul style="list-style-type: none"> <li>Gave the status of a state to Nagaland and made special provisions for it.</li> </ul>

Fourteenth Amendment Act, 1962	<ul style="list-style-type: none"> <li>• Incorporated Puducherry in the Indian Union.</li> <li>• Provided for the creation of legislatures and council of ministers for the Union Territories of Himachal Pradesh, Manipur, Tripura, Goa, Daman and Diu, and Puducherry.</li> </ul>
Fifteenth Amendment Act, 1963	<ul style="list-style-type: none"> <li>• Enabled the high courts to issue writs to any person or authority even outside its territorial jurisdiction if the cause of action arise within its territorial limits.</li> <li>• Increased the retirement age of high court judges from 60 to 62 years.</li> <li>• Provided for appointment of retired judges of the high courts as acting judges of the same court.</li> <li>• Provided for compensatory allowance to judges who are transferred from one high court to another.</li> <li>• Enabled the retired judge of a high court to act as ad hoc judge of the Supreme Court.</li> <li>• Provided for the procedure for determining the age of the Supreme Court and high court judges.</li> </ul>
Sixteenth Amendment Act, 1963	<ul style="list-style-type: none"> <li>• Empowered the state to impose further restriction on the rights to freedom of speech and expression, to assemble peaceably and to form associations in the interests of sovereignty and integrity of India.</li> <li>• Included sovereignty and integrity in the forms of oaths or affirmations to be subscribed by contestants to the legislatures, members of the legislatures, ministers, judges and CAG of India.</li> </ul>
Seventeenth Amendment Act, 1964	<ul style="list-style-type: none"> <li>• Prohibited the acquisition of land under personal cultivation unless the market value of the land is paid as compensation.</li> <li>• Included 44 more Acts in the Ninth Schedule.</li> </ul>
Eighteenth Amendment Act, 1966	<ul style="list-style-type: none"> <li>• Made it clear that the power of Parliament to form a new state also includes a power to form a new state or union territory by uniting a part of a state or a union territory to another state or union territory.</li> </ul>
Nineteenth Amendment Act, 1966	<ul style="list-style-type: none"> <li>• Abolished the system of Election Tribunals and vested the power to hear election petitions in the High Courts.</li> </ul>
Twentieth Amendment Act, 1966	<ul style="list-style-type: none"> <li>• Validated certain appointments of district judges in the UP which were declared void by the Supreme Court.</li> </ul>
Twenty-First Amendment Act, 1967	<ul style="list-style-type: none"> <li>• Included Sindhi as the 15th language in the Eighth Schedule.</li> </ul>
Twenty-Second Amendment Act, 1969	<ul style="list-style-type: none"> <li>• Facilitated the creation of a new autonomous State of Meghalaya within the State of Assam.</li> </ul>
Twenty-Third Amendment Act, 1969	<ul style="list-style-type: none"> <li>• Extended the reservation of seats for the SCs and STs, and special representation for the Anglo-Indians in the Lok Sabha and the state legislative assemblies for a further period of ten years (i.e., up to 1980).</li> </ul>
Twenty-Fourth Amendment Act, 1971	<ul style="list-style-type: none"> <li>• Affirmed the power of Parliament to amend any part of the constitution including fundamental rights.</li> <li>• Made it compulsory for the president to give his assent to a Constitutional Amendment Bill.</li> </ul>
Twenty-Fifth Amendment Act, 1971	<ul style="list-style-type: none"> <li>• Curtailed the fundamental right to property.</li> <li>• Provided that any law made to give effect to the Directive Principles contained in Article 39 (b) or (c) cannot be challenged on the ground of violation of the rights guaranteed by Articles 14, 19 and 31.</li> </ul>
Twenty-Sixth Amendment Act, 1971	<ul style="list-style-type: none"> <li>• Abolished the privy purses and privileges of the former rulers of princely states.</li> </ul>
Twenty-Seventh Amendment, 1971	<ul style="list-style-type: none"> <li>• Empowered the administrators of certain union territories to promulgate ordinances.</li> <li>• Made certain special provisions for new Union Territories of Arunachal Pradesh and Mizoram.</li> <li>• Authorised the Parliament to create the legislative assembly and the council of ministers for the new state of Manipur.</li> </ul>

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Twenty-Eighth Amendment Act, 1972	<ul style="list-style-type: none"> <li>Abolished the special privileges of ICS officers and empowered the Parliament to determine their service conditions.</li> </ul>
Twenty-Ninth Amendment Act, 1972	<ul style="list-style-type: none"> <li>Included two Kerala Acts on land reforms in the Ninth Schedule.</li> </ul>
Thirtieth Amendment Act, 1972	<ul style="list-style-type: none"> <li>Did away with the provision which allowed appeal to the Supreme Court in civil cases involving an amount of ₹20,000, and provided instead that an appeal can be filed in the Supreme Court only if the case involves a substantial question of law.</li> </ul>
Thirty-First Amendment Act, 1972	<ul style="list-style-type: none"> <li>Increased the number of Lok Sabha seats from 525 to 545.</li> </ul>
Thirty-Second Amendment Act, 1973	<ul style="list-style-type: none"> <li>Made special provisions to satisfy the aspirations of the people of the Telengana region in Andhra Pradesh.</li> </ul>
Thirty-Third Amendment Act, 1974	<ul style="list-style-type: none"> <li>Provided that the resignation of the members of Parliament and the state legislatures may be accepted by the Speaker/Chairman only if he is satisfied that the resignation is voluntary or genuine.</li> </ul>
Thirty-Fourth Amendment Act, 1974	<ul style="list-style-type: none"> <li>Included twenty more land tenure and land reforms acts of various states in the Ninth Schedule.</li> </ul>
Thirty-Fifth Amendment Act, 1974	<ul style="list-style-type: none"> <li>Terminated the protectorate status of Sikkim and conferred on it the status of an associate state of the Indian Union. The Tenth Schedule was added laying down the terms and conditions of association of Sikkim with the Indian Union.</li> </ul>
Thirty-Sixth Amendment Act, 1975	<ul style="list-style-type: none"> <li>Made Sikkim a full-fledged State of the Indian Union and omitted the Tenth Schedule.</li> </ul>
Thirty-Seventh Amendment Act, 1975	<ul style="list-style-type: none"> <li>Provided legislative assembly and council of ministers for the Union Territory of Arunachal Pradesh.</li> </ul>
Thirty-Eighth Amendment Act, 1975	<ul style="list-style-type: none"> <li>Made the declaration of emergency by the president non-justiciable.</li> <li>Made the promulgation of ordinances by the president, governors and administrators of union territories non-justiciable.</li> <li>Empowered the president to declare different proclamations of national emergency on different grounds simultaneously.</li> </ul>
Thirty-Ninth Amendment Act, 1975	<ul style="list-style-type: none"> <li>Placed the disputes relating to the president, vice-president, prime minister and Speaker beyond the scope of the judiciary. They are to be decided by such authority as may be determined by the Parliament.</li> <li>Included certain Central acts in the Ninth Schedule.</li> </ul>
Fortieth Amendment Act, 1976	<ul style="list-style-type: none"> <li>Empowered the Parliament to specify from time to time the limits of the territorial waters, the continental shelf, the exclusive economic zone (EEZ) and the maritime zones of India.</li> <li>Included 64 more Central and state laws, mostly relating to land reforms, in the Ninth Schedule.</li> </ul>
Forty-First Amendment Act, 1976	<ul style="list-style-type: none"> <li>Raised the retirement age of members of State Public Service Commission and Joint Public Service Commission from 60 to 62.</li> </ul>

<p>Forty-Second Amendment Act, 1976</p>	<ul style="list-style-type: none"> <li>• Added three new words (i.e., socialist, secular and integrity) in the Preamble.</li> <li>• Added Fundamental Duties by the citizens (new Part IV A).</li> <li>• Made the president bound by the advice of the cabinet.</li> <li>• Provided for administrative tribunals and tribunals for other matters (Added Part XIV A).</li> <li>• Froze the seats in the Lok Sabha and state legislative assemblies on the basis of 1971 census till 2001.</li> <li>• Made the constitutional amendments beyond judicial scrutiny.</li> <li>• Curtailed the power of judicial review and writ jurisdiction of the Supreme Court and high courts.</li> <li>• Raised the tenure of Lok Sabha and state legislative assemblies from 5 to 6 years.</li> <li>• Provided that the laws made for the implementation of Directive Principles cannot be declared invalid by the courts on the ground of violation of some Fundamental Rights.</li> <li>• Empowered the Parliament to make laws to deal with anti-national activities and such laws are to take precedence over Fundamental Rights.</li> <li>• Added three new Directive Principles viz., equal justice and free- legal aid, participation of workers in the management of industries and protection of environment, forests and wild life.</li> <li>• Facilitated the proclamation of national emergency in a part of territory of India.</li> <li>• Extended the one-time duration of the President's rule in a state from 6 months to one year.</li> <li>• Empowered the Centre to deploy its armed forces in any state to deal with a grave situation of law and order.</li> <li>• Shifted five subjects from the state list to the concurrent list, viz, education, forests, protection of wild animals and birds, weights and measures and administration of justice, constitution and organisation of all courts except the Supreme Court and the high courts.</li> <li>• Did away with the requirement of quorum in the Parliament and the state legislatures.</li> <li>• Empowered the Parliament to decide from time to time the rights and privileges of its members and committees.</li> <li>• Provided for the creation of the All-India Judicial Service.</li> <li>• Shortened the procedure for disciplinary action by taking away the right of a civil servant to make representation at the second stage after the inquiry (i.e., on the penalty proposed).</li> </ul>
<p>Forty-Third Amendment Act, 1977 (Enacted by the Janata Government to nullify some of the distortions introduced by the 42nd Amendment Act of 1976)</p>	<ul style="list-style-type: none"> <li>• Restored the jurisdiction of the Supreme Court and the high courts in respect of judicial review and issue of writs.</li> <li>• Deprived the Parliament of its special powers to make laws to deal with anti-national activities.</li> </ul>

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Forty-Fourth Amendment Act, 1978 (Enacted by the Janata Government mainly to nullify some of the other distortions introduced by the 42nd Amendment Act, 1976)	<ul style="list-style-type: none"> <li>• Restored the original term of the Lok Sabha and the state legislative assemblies (i.e., 5 years).” Restored the provisions with regard to quorum in the Parliament and state legislatures.</li> <li>• Omitted the reference to the British House of Commons in the provisions pertaining to the parliamentary privileges.</li> <li>• Gave constitutional protection to publication in newspaper of true reports of the proceedings of the Parliament and the state legislatures.</li> <li>• Empowered the president to send back once the advice of cabinet for reconsideration. But, the reconsidered advice is to be binding on the president.</li> <li>• Deleted the provision which made the satisfaction of the president, governor and administrators final in issuing ordinances.</li> <li>• Restored some of the powers of the Supreme Court and high courts.</li> <li>• Replaced the term ‘internal disturbance’ by ‘armed rebellion’ in respect of national emergency.</li> <li>• Made the President to declare a national emergency only on the written recommendation of the cabinet.</li> <li>• Made certain procedural safeguards with respect to national emergency and President’s rule.</li> <li>• Deleted the right to property from the list of Fundamental Rights and made it only a legal right.</li> <li>• Provided that the fundamental rights guaranteed by Articles 20 and 21 cannot be suspended during a national emergency.</li> <li>• Omitted the provisions which took away the power of the court to decide the election disputes of the president, the vice-president, the prime minister and the Speaker of the Lok Sabha.</li> </ul>
Forty-Fifth Amendment Act, 1980	<ul style="list-style-type: none"> <li>• Extended the reservation of seats for the SCs and STs and special representation for the Anglo-Indians in the Lok Sabha and the state legislative assemblies for a further period of ten years (i.e., up to 1990).</li> </ul>
Forty-Sixth Amendment Act, 1982	<ul style="list-style-type: none"> <li>• Enabled the states to plug loopholes in the laws and realize sales tax dues.</li> <li>• Brought about some uniformity in tax rates on certain items.</li> </ul>
Forty-Seventh Amendment Act, 1984	<ul style="list-style-type: none"> <li>• Included 14 land reforms Acts of various states in the Ninth Schedule.</li> </ul>
Forty-Eighth Amendment Act, 1984	<ul style="list-style-type: none"> <li>• Facilitated the extension of President’s rule in Punjab beyond one year without meeting the two special conditions for such extension.</li> </ul>
Forty-Ninth Amendment Act, 1984	<ul style="list-style-type: none"> <li>• Gave a constitutional sanctity to the Autonomous District Council in Tripura.</li> </ul>
Fiftieth Amendment Act, 1984	<ul style="list-style-type: none"> <li>• Empowered the Parliament to restrict the Fundamental Rights of persons employed in intelligence organizations and telecommunication systems set up for the armed forces or intelligence organizations.</li> </ul>
Fifty-First Amendment Act, 1984	<ul style="list-style-type: none"> <li>• Provided for reservation of seats in the Lok Sabha for STs in Meghalaya, Arunachal Pradesh, Nagaland and Mizoram as well as in the Legislative Assemblies of Meghalaya and Nagaland.</li> </ul>
Fifty-Second Amendment Act, 1985 (popularly known as Anti-Defection Law)	<ul style="list-style-type: none"> <li>• Provided for disqualification of members of Parliament and state legislatures on the ground of defection and added a new Tenth Schedule containing the details in this regard.</li> </ul>
Fifty-Third Amendment Act, 1986	<ul style="list-style-type: none"> <li>• Made special provisions in respect of Mizoram and fixed the strength of its Assembly at a minimum of 40 members.</li> </ul>
Fifty-Fourth Amendment Act, 1986	<ul style="list-style-type: none"> <li>• Increased the salaries of the Supreme Court and high court judges and enabled the Parliament to change them in future by an ordinary law.</li> </ul>
Fifty-Fifth Amendment Act, 1986	<ul style="list-style-type: none"> <li>• Made special provisions in respect of Arunachal Pradesh and fixed the strength of its Assembly at a minimum of 30 members.</li> </ul>



Fifty-Sixth Amendment Act, 1987	<ul style="list-style-type: none"> <li>Fixed the strength of the Goa Legislative Assembly at a minimum of 30 members.</li> </ul>
Fifty-Seventh Amendment Act, 1987	<ul style="list-style-type: none"> <li>Reserved seats for the STs in the legislative assemblies of the states of Arunachal Pradesh, Meghalaya, Mizoram and Nagaland.</li> </ul>
Fifty-Eighth Amendment Act, 1987	<ul style="list-style-type: none"> <li>Provided for an authoritative text of the Constitution in Hindi language and gave the same legal sanctity to the Hindi version of the Constitution.</li> </ul>
Fifty-Ninth Amendment Act, 1988	<ul style="list-style-type: none"> <li>Facilitated the extension of President's Rule in Punjab up to three years.</li> <li>Provided for the declaration of national emergency in Punjab on the ground of internal disturbance.</li> </ul>
Sixtieth Amendment Act, 1988	<ul style="list-style-type: none"> <li>Increased the ceiling of taxes on professions, trades, callings and employments from Rs 250 per annum to Rs 2,500 per annum.</li> </ul>
Sixty-First Amendment Act, 1989	<ul style="list-style-type: none"> <li>Reduced the voting age from 21 years to 18 years for the Lok Sabha and state legislative assembly elections.</li> </ul>
Sixty-Second Amendment Act, 1989	<ul style="list-style-type: none"> <li>Extended the reservation of seats for the SCs and STs and special representation for the Anglo-Indians in the Lok Sabha and the state legislative assemblies for the further period of ten years (i.e., up to 2000).</li> </ul>
Sixty-Third Amendment Act, 1989	<ul style="list-style-type: none"> <li>Repealed the changes introduced by the 59th Amendment Act of 1988 in relation to Punjab. In other words, Punjab was brought at par with the other states in respect of emergency provisions.</li> </ul>
Sixty-Fourth Amendment Act, 1990	<ul style="list-style-type: none"> <li>Facilitated the extension of the President's rule in Punjab up to a total period of three years and six months.</li> </ul>
Sixty-Fifth Amendment Act, 1990	<ul style="list-style-type: none"> <li>Provided for the establishment of a multi-member National Commission for SCs and STs in the place of a Special Officer for SCs and STs.</li> </ul>
Sixty-Sixth Amendment Act, 1990	<ul style="list-style-type: none"> <li>Included 55 more land reforms Acts of various states in the Ninth Schedule.</li> </ul>
Sixty-Seventh Amendment Act, 1990	<ul style="list-style-type: none"> <li>Facilitated the extension of the President's rule in Punjab up to a total period of four years.</li> </ul>
Sixty-Eight Amendment Act, 1991	<ul style="list-style-type: none"> <li>Facilitated the extension of the President's rule in Punjab up to a total period of five years.</li> </ul>
Sixty-Ninth Amendment Act, 1991	<ul style="list-style-type: none"> <li>Accorded a special status to the Union Territory of Delhi by designing it as the National Capital Territory of Delhi. The amendment also provided for the creation of a 70-member legislative assembly and a 7-member council of ministers for Delhi.</li> </ul>
Seventieth Amendment Act, 1992	<ul style="list-style-type: none"> <li>Provided for the inclusion of the members of the Legislative Assemblies of National Capital Territory of Delhi and the Union Territory of Puducherry in the electoral college for the election of the president.</li> </ul>
Seventy-First Amendment Act, 1992	<ul style="list-style-type: none"> <li>Included Konkani, Manipuri and Nepali languages in the Eighth Schedule. With this, the total number of scheduled languages increased to 18.</li> </ul>
Seventy-Second Amendment Act, 1992	<ul style="list-style-type: none"> <li>Provided for reservation of seats for the STs in the Legislative Assembly of Tripura.</li> </ul>
Seventy-Third Amendment Act, 1992	<ul style="list-style-type: none"> <li>Granted constitutional status and protection to the panchayati raj institutions. For this purpose, the Amendment has added a new Part-IX entitled as 'the panchayats' and a new Eleventh Schedule containing 29 functional items of the panchayats.</li> </ul>
Seventy-Fourth Amendment Act, 1992	<ul style="list-style-type: none"> <li>Granted constitutional status and protection to the urban local bodies. For this purpose, the Amendment has added a new Part IX-A entitled as 'the municipalities' and a new Twelfth Schedule containing 18 functional items of the municipalities.</li> </ul>
Seventy-Fifth Amendment Act, 1994	<ul style="list-style-type: none"> <li>Provided for the establishment of rent tribunals for the adjudication of disputes with respect to rent, its regulation and control and tenancy issues including the rights, title and interest of landlords and tenants.</li> </ul>

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Seventy-Sixth Amendment Act, 1994	<ul style="list-style-type: none"> <li>Included the Tamil Nadu Reservation Act of 1994 (which provides for 69 per cent reservation of seats in educational institutions and posts in state services) in the Ninth Schedule to protect it from judicial review. In 1992, the Supreme Court ruled that the total reservation should not exceed 50 per cent.</li> </ul>
Seventy-Seventh Amendment Act, 1995	<ul style="list-style-type: none"> <li>Provided for reservation in promotions in government jobs for SCs and STs. This amendment nullified the Supreme Court ruling with regard to reservation in promotions.</li> </ul>
Seventy-Eighth Amendment Act, 1995	<ul style="list-style-type: none"> <li>Included 27 more land reforms Acts of various states in the Ninth Schedule. With this, the total number of Acts in the Schedule increased to 282. But, the last entry is numbered 284.</li> </ul>
Seventy-Ninth Amendment Act, 1999	<ul style="list-style-type: none"> <li>Extended the reservation of seats for the SCs and STs and special representation for the Anglo-Indians in the Lok Sabha and the state legislative assemblies for a further period of ten years (i.e., up to 2010).</li> </ul>
Eightieth Amendment Act, 2000	<ul style="list-style-type: none"> <li>Provided for an 'alternative scheme of devolution' of revenue between the Centre and states. This was enacted on the basis of the recommendations of the Tenth Finance Commission which has recommended that out of the total income obtained from Central taxes and duties, twenty-nine per cent should be distributed among the states.</li> </ul>
Eighty-First Amendment Act, 2000	<ul style="list-style-type: none"> <li>Empowered the state to consider the unfilled reserved vacancies of a year as a separate class of vacancies to be filled up in any succeeding year or years. Such class of vacancies are not to be combined with the vacancies of the year in which they are being filled up to determine the ceiling of 50 per cent reservation on total number of vacancies of that year. In brief, this amendment ended the 50 per cent ceiling on reservation in backlog vacancies.</li> </ul>
Eighty-Second Amendment Act, 2000	<ul style="list-style-type: none"> <li>Provided for making of any provision in favour of the SCs and STs for relaxation in qualifying marks in any examination or lowering the standards of evaluation, for reservation in matters of promotion to the public services of the Centre and the states.</li> </ul>
Eighty-Third Amendment Act, 2000	<ul style="list-style-type: none"> <li>Provided that no reservation in panchayats need be made for SCs in Arunachal Pradesh. The total population of the state is tribal and there are no SCs.</li> </ul>
Eighty-Fourth Amendment Act, 2001	<ul style="list-style-type: none"> <li>Extended the ban on readjustment of seats in the Lok Sabha and the state legislative assemblies for another 25 years (i.e., up to 2026) with the same objective of encouraging population limiting measures. In other words, the number of seats in the Lok Sabha and the assemblies are to remain same till 2026. It also provided for the readjustment and rationalisation of territorial constituencies in the states on the basis of the population figures of 1991 census.</li> </ul>
Eighty-Fifth Amendment Act, 2001	<ul style="list-style-type: none"> <li>Provided for 'consequential seniority' in the case of promotion by virtue of rule of reservation for the government servants belonging to the SCs and STs with retrospective effect from June 1995.</li> </ul>
<b>Eighty-Sixth Amendment Act, 2002</b>	<ul style="list-style-type: none"> <li>Made elementary education a fundamental right. The newly-added Article 21-A declares that "the State shall provide free and compulsory education to all children of the age of six to fourteen years in such manner as the State may determine".</li> <li>Changed the subject matter of Article 45 in Directive Principles. It now reads—"The State shall endeavour to provide early childhood care and education for all children until they complete the age of six years".</li> <li>Added a new fundamental duty under Article 51-A which reads—"It shall be the duty of every citizen of India who is a parent or guardian to provide opportunities for education to his child or ward between the age of six and fourteen years".</li> </ul>
<b>Eighty-Seventh Amendment Act, 2003</b>	<ul style="list-style-type: none"> <li>Provided for the readjustment and rationalisation of territorial constituencies in the states on the basis of the population figures of 2001 census and not 1991 census as provided earlier by the 84th Amendment Act of 2001.</li> </ul>

<b>Eighty-Eighth Amendment Act, 2003</b>	<ul style="list-style-type: none"> <li>Made a provision for service tax (Article 268-A). Taxes on services are levied by the Centre. But, their proceeds are collected as well as appropriated by both the Centre and the states in accordance with the principles formulated by parliament.</li> </ul>
<b>Eighty-Ninth Amendment Act, 2003</b>	<ul style="list-style-type: none"> <li>Bifurcated the erstwhile combined National Commission for Scheduled Castes and Scheduled Tribes into two separate bodies, namely, National Commission for Scheduled Castes (Article 338) and National Commission for Scheduled Tribes (Article 338-A). Both the Commissions consist of a Chairperson, a Vice-Chairperson and three other members. They are appointed by the President.</li> </ul>
<b>Ninetieth Amendment Act, 2003</b>	<ul style="list-style-type: none"> <li>Provided for maintaining the erstwhile representation of the Scheduled Tribes and non-Scheduled Tribes in the Assam legislative assembly from the Bodoland Territorial Areas District (Article 332 (6)).</li> </ul>
<b>Ninety-First Amendment Act, 2003</b>	<ul style="list-style-type: none"> <li>Made the following provisions to limit the size of Council of Ministers, to debar defectors from holding public offices, and to strengthen the anti-defection law:               <ul style="list-style-type: none"> <li>The total number of ministers, including the Prime Minister, in the Central Council of Ministers shall not exceed 15% of the total strength of the Lok Sabha (Article 75(1A)).</li> <li>A member of either house of Parliament belonging to any political party who is disqualified on the ground of defection shall also be disqualified to be appointed as a minister (Article 75(1B)).</li> <li>The total number of ministers, including the Chief Minister, in the Council of Ministers in a state shall not exceed 15% of the total strength of the legislative Assembly of that state. But, the number of ministers, including the Chief Minister, in a state shall not be less than 12 (Article 164(1A)).</li> <li>A member of either House of a state legislature belonging to any political party who is disqualified on the ground of defection shall also be disqualified to be appointed as a minister (Article 164(1B)).</li> <li>A member of either House of Parliament or either House of a State Legislature belonging to any political party who is disqualified on the ground of defection shall also be disqualified to hold any remunerative political post. The expression “remunerative political post” means (i) any office under the central government or a state government where the salary or remuneration for such office is paid out of the public revenue of the concerned government; or (ii) any office under a body, whether incorporated or not, which is wholly or partially owned by the central government or a state government and the salary or remuneration for such office is paid by such body, except where such salary or remuneration paid is compensatory in nature (Article 361-B).</li> <li>The provision of the Tenth Schedule (anti-defection law) pertaining to exemption from disqualification in case of split by one-third members of legislature party has been deleted. It means that the defectors have no more protection on grounds of splits.</li> </ul> </li> </ul>
<b>Ninety-Second Amendment Act, 2003</b>	<ul style="list-style-type: none"> <li>Included four more languages in the Eighth Schedule. They are Bodo, Dogri (Dongri), Mathilli (Maithili) and Santhali. With this, the total number of constitutionally recognised languages increased to 22.</li> </ul>

## Landmark Updates of General Studies Subject

<b>Ninety-Third Amendment Act, 2005</b>	<ul style="list-style-type: none"> <li>Empowered the state to make special provisions for the socially and educationally backward classes or the Scheduled Castes or the Scheduled Tribes in educational institutions including private educational institutions (whether aided or unaided by the state), except the minority educational institutions (clause (5) in Article 15).</li> <li>This Amendment was enacted to nullify the Supreme Court judgement in the Inamdar case (2005) where the apex court ruled that the state cannot impose its reservation policy on minority and non-minority unaided private colleges, including professional colleges.</li> <li>The court declared that reservation in private, unaided educational institutions was unconstitutional.</li> </ul>
<b>Ninety-Fourth Amendment Act, 2006</b>	<ul style="list-style-type: none"> <li>Freed Bihar from the obligation of having a tribal welfare minister and extended the same provision to Jharkhand and Chhattisgarh. This provision will now be applicable to the two newly formed states and Madhya Pradesh and Orissa, where it has already been in force (Article 164(1)).</li> </ul>
<b>Ninety-Fifth Amendment Act, 2009</b>	<ul style="list-style-type: none"> <li>Extended the reservation of seats for the SCs and STs and special representation for the Anglo-Indians in the Lok Sabha and the state legislative assemblies for a further period of ten years i.e., upto 2020 (Article 334).</li> </ul>
<b>Ninety-Sixth Amendment Act, 2011</b>	<ul style="list-style-type: none"> <li>Substituted "Odia" for "Oriya". Consequently, the "Oriya" language in the Eighth Schedule shall be pronounced as "Odia".</li> </ul>
<b>Ninety-Seventh Amendment Act, 2011</b>	<ul style="list-style-type: none"> <li>Gave a constitutional status and protection to co-operative societies. In this context, it made the following three changes in the constitution:               <ul style="list-style-type: none"> <li>It made the right to form co-operative societies a fundamental right (Article 19).</li> <li>It included a new Directive Principle of State Policy on promotion of co-operative societies (Article 43-B).</li> <li>It added a new Part IX-B in the constitution which is entitled as "The Co-operative societies" (Articles 243-ZH to 243-ZT).</li> </ul> </li> </ul>
<b>Ninety-Eighth Amendment Act, 2012</b>	<ul style="list-style-type: none"> <li>Provided for special provisions for the Hyderabad- Karnataka region of the State of Karnataka.</li> <li>The special provisions aim to establish an institutional mechanism for equitable allocation of funds to meet the development needs over the region, as well as to enhance human resources and promote employment from the region by providing for local cadres in service and reservation in educational and vocational training institutions (Article 371-J).</li> </ul>
<b>Ninety-Ninth Amendment Act, 2014</b>	<ul style="list-style-type: none"> <li>Replaced the collegium system of appointing judges to the Supreme Court and High Courts with a new body called the National Judicial Appointments Commission (NJAC). However, in 2015, the Supreme Court has declared this amendment act as unconstitutional and void. Consequently, the earlier collegium system became operative again.</li> </ul>
<b>One Hundredth Amendment Act, 2015</b>	<ul style="list-style-type: none"> <li>Gave effect to the acquiring of certain territories by India and transfer of certain other territories to Bangladesh (through exchange of enclaves and retention of adverse possessions) in pursuance of the Land Boundary Agreement of 1974 and its Protocol of 2011. For this purpose, this amendment act amended the provisions relating to the territories of four states (Assam, West Bengal, Meghalaya and Tripura) in the First Schedule of the Constitution.</li> </ul>

<b>One Hundred and First Amendment Act, 2016</b>	<ul style="list-style-type: none"> <li>• Paved the way for the introduction of the goods and services tax (GST) regime in the country. The GST shall replace a number of indirect taxes being levied by the Union and the State Government.</li> <li>• It is intended to remove cascading effect of taxes and provide for a common national market for goods and services.</li> <li>• The proposed Central and State GST will be levied on all transactions involving supply of goods and services, except those which are kept out of the purview of the GST.</li> <li>• Accordingly, the amendment made the following provisions:               <ol style="list-style-type: none"> <li>1. Conferred concurrent taxing powers upon the Parliament and the State Legislatures to make laws for levying GST on every transaction of supply of goods or services or both.</li> <li>2. Dispensed the concept of “declared goods of special importance” under the constitution.</li> <li>3. Provided for the levy of Integrated GST on inter-state transactions of goods and services.</li> <li>4. Provided for the establishment of a Goods and Services Tax Council by a presidential order.</li> <li>5. Made the provision of compensation to the states for loss of revenue arising on account of introduction of GST for a period of five years.</li> <li>6. Substituted and omitted certain entries in the Union and State Lists of the Seventh Schedule.</li> </ol> </li> </ul>
<b>One Hundred and Second Amendment Act, 2018</b>	<ul style="list-style-type: none"> <li>• Conferred a constitutional status on the National Commission for Backward Classes which was set-up in 1993 by an Act of the Parliament.</li> <li>• Relieved the National Commission for Scheduled Castes from its functions with regard to the backward classes.</li> <li>• Empowered the President to specify the socially and educationally backward classes in relation to a state or union territory.</li> </ul>
<b>One Hundred and Third Amendment Act, 2019</b>	<ul style="list-style-type: none"> <li>• Empowered the state to make any special provision for the advancement of any economically weaker sections of citizens.</li> <li>• Allowed the state to make a provision for the reservation of upto 10% of seats for such sections in admission to educational institutions including private educational institutions, whether aided or unaided by the state, except the minority educational institutions. This reservation of upto 10% would be in addition to the existing reservations.</li> <li>• Permitted the state to make a provision for the reservation of upto 10% of appointments or posts in favour of such sections. This reservation of upto 10 % would be in addition to the existing reservation.</li> </ul>
<b>One Hundred and Fourth Amendment Act, 2020</b>	<ul style="list-style-type: none"> <li>• It extends by 10 years the deadline for the abolition of the reservation of seats in the Lok Sabha and State Legislative Assemblies for members of Scheduled Castes and Scheduled Tribes.</li> <li>• The reservation of seats for the SCs and STs was set to expire on 26 January 2020 as mandated by the 95th Amendment.</li> <li>• The amendment, however, does not extend the period of reservation of the two Lok Sabha seats and seats in State Legislative Assemblies reserved for members of the Anglo- Indian Community.</li> <li>• Thus, the practice of the President of India (Governor in the states) nominating two members of the Anglo-Indian Community (one in the state) on the recommendation of the Prime Minister of India (CM in states) was effectively abolished.</li> </ul>
<b>One Hundred and Fifth Amendment Act, 2021</b>	<ul style="list-style-type: none"> <li>• It restores the power of State Governments to identify and specify Socially and Economically Backward Classes (SEBCs).</li> <li>• As per the Act, every State or Union territory may prepare and maintain a list of socially and educationally backward classes, for its own purposes.</li> <li>• The entries in these state lists may be different from the Central List.</li> </ul>



## Landmark Updates of General Studies Subject

### Abrogation of Special Status under Article 370

The special status granted to the former state of Jammu and Kashmir under Article 370 was revoked by the Parliament. The act dividing the State of Jammu and Kashmir into the Union Territory of Ladakh and the Union Territory of Jammu and Kashmir was also passed by the Parliament.

#### Background

- The former state of Jammu and Kashmir was granted exceptional autonomy under Article 370 of the Indian Constitution.
- It was added as a clause that was only in effect temporarily, enabling the state to establish its own Constitution.
- The Parliament required the state government's approval before enforcing any other legislation, with the exception of those pertaining to communications, finance, foreign affairs, and defence.
- Jammu and Kashmir's unique situation was brought on by the conditions of the State's accession to India.
- The Indian government had stated that the people of the state of J&K will ultimately decide the state's constitution and the scope of the Indian government's authority through their constituent assembly.
- Hence, it was decided that the Constitution's provisions would only apply in a temporary manner to this State.
- This was the core of the clause contained in Article 370 of the Indian Constitution.
- The Constitution still has Article 370, but its original provisions that gave it a unique status have been repealed.

Status of J&K	
Before abrogation of Article 370	After abrogation of Article 370
Special status	No special status
Dual citizenship	Single citizenship
Separate flag for state	Tiranga will be only flag
No reservation for minorities such as Hindus and Sikhs	Minorities eligible for 16% reservation
India from other states cannot buy properties such as houses or land.	All Indian can buy and sale properties
RTI not applicable	RTI will be application
Duration of legislative assembly for six years	Duration will be five years
Women from J&K married outside state loss citizenship of state	Women will retain citizenship even after marriage outside J&K
Right to education not applicable to children	Children brought under RTE as per rest of country

#### Note: Article 35-A

It was incorporated into the Constitution in 1954 by a Presidential order issued under Article 370 (1) (d) of the Constitution. It empowered J&K legislature to define state's "**permanent residents**" and their special rights and privileges without attracting a challenge on grounds of violating the Right to Equality of people from other States or any other right under the Constitution. As a result of this- o It denied property rights to native women who marry from outside the State. The denial of these rights extends to her children also. It barred non-J&K state subjects to settle and buy property in J&K. It was contended to be violating fundamental rights under Article 14, 19 and 21 as it is discriminatory against non-residents as far as government jobs and real estate purchases are concerned.

### Assessment of condition in Kashmir after revocation of special status

#### 1. No Loss of Life due to protests:

- The history of Kashmir valley has been turbulent as and when any step had been taken against the state.
- Example:** Huge uproar and gatherings following the encounter of the terrorist Burhan Wani in 2016 or the agitation in 2008.
- However, since the 5th of August, there has been no loss of life in the protest against the state.

#### 2. Slow Normalisation setting:

- As the shops are opening, schools have started and hospitals are working fine.

- Example:** The daily OPD visit to the hospitals in the region has been 60,000 which highlights their normal functioning.
- It shows that the life of a common person has not witnessed much change in terms of daily essentials.
- Although people had grievance against the abrogation in the early days, but now many in regions have **reconciled** to this abrogation. Recently, the Confederation of Indian Industry (CII) has announced an industrial program in October.

#### 3. Terrorism:

- There hasn't been any major terror attack following the abrogation of special status. However there has been a change in **nature of terror attacks**.

- There has been targeting killing of labour, truck drivers, Apple traders, school staff and some events at mosques to create panic.
- There is an attempt to create a fear in the minds of residents regarding outsiders in terms of various opportunities in the state.

#### 4. Cross border infiltration:

- It has also facilitated reduction in infiltration attempts.
- Jammu and Kashmir Police (JKP) has been able to work much better in the current administrative system, since the control is under the LG.
- Earlier, the OGWs (**Over-Ground Workers**) had a fair idea of the working of the forces, which allowed them to man the **reception areas** where the terrorists could infiltrate.
- Now **Political patronage** has been eroded, so JKP is much better equipped to handle the issue.
- Further because communication system has been curbed, so this infiltration has come down.

#### 5. Governance:

- Following the division of the state and conversion into Union territories, there has been a better accountability framework in place.
- As per reports, villagers have responded that administrative implementation of various schemes has improved.
- However, it has also led to **excessive bureaucratisation**, which may work anti-thetical to the development of

democracy at the grassroots. For instance, in some regions, finding officials to sanction the finances is still a challenge.

#### 6. Democratic Processes:

- The recently concluded **panchayats elections** have been successful.
- It can be seen from the voting percentage, which has been around 98%.
- Even South Kashmir (Anantnag-94%), Jammu (99%) and Srinagar (100%) have witnessed good voting.
- As per government data, around 60-70 lakh has already been credited to accounts of Panchayats and equipments like JCBs have been bought in some villages.
- However, the house arrest of main political party cadres of the region remains a concern, which needs to be addressed.
- The Central Government has stated that once the situation improves, the UT of Jammu and Kashmir can be upgraded back to the status of a state.

#### 7. Exposed the Propaganda:

- **Pakistan-** Repeatedly convinced, its population about 'Kashmir Banega Pakistan' has been completely destroyed. Also, Pakistan has failed to convince the international community of its position on Kashmir.
- **Terrorists-** They are also facing a dilemma whether to tow the Pakistani line or follow independence movement. If they follow the former, then the call gets converted to Islamic Jihad. Today the recruitment is inspired by the caliphate and not by independence of Kashmir.

#### Note: Over-Ground Workers (OGWs)

There is no proper definition of OGWs but as per the Jammu and Kashmir Police, "**anybody who supports the militants**" is known as OGWs. A person providing a safe house, passage, information or acting as a messenger for suspected militants automatically comes under the radar of the police as an OGW. The OGWs also help militants plan and execute their activities. The 2018 data compiled by State Crime Record Bureau (SCRB) highlights that the number of Over Ground Workers (OGWs) was nearly ten times higher than the militants in the Jammu and Kashmir.

## Practice Questions

1. **A judge of the Supreme Court can be removed from his Office by an order of the president, for such removal should be supported by:**

- (a) Simple majority in each house of state assembly
- (b) Special majority in Lok Sabha only
- (c) Special majority in both Houses of Parliament
- (d) Absolute majority in both Houses of Parliament

**Ans (c)**

- The President can issue the removal order only after an address by Parliament has been presented to him in the same session for such removal.
- The address must be supported by a special majority of each House of Parliament (i.e., a majority of the total membership of that House and a majority of not less than two-thirds of the members of that House present and voting).
- The grounds of removal are two—proved misbehaviour or incapacity.
- The Judges Enquiry Act (1968) regulates the procedure relating to the removal of a judge of the Supreme Court by the process of impeachment.

2. **Which Government Ministry organised the EU-India Green Hydrogen Forum?**

- (a) Ministry of External Affairs
- (b) Ministry of Power
- (c) Ministry of Home Affairs
- (d) Ministry of New and Renewable Energy

**Ans (d)** EU-India Green Hydrogen Forum was organized jointly by the Delegation of the European Union and the Ministry of New and Renewable Energy. The forum served as a platform to exchange the best practices, policy frameworks, and production and application technologies for renewable Hydrogen as well as the opportunities for EU-India cooperation.

3. **Which of the following statement is *not* correct about the 13A amendment of Sri Lankan constitution?**

- (a) It favors Tamil minority in Sri Lanka.
- (b) It is already fully implemented.
- (c) It was brought in after the India-Sri Lanka agreement of 1987
- (d) It provided for devolution of power to Tamilian Minority.

**Ans (b)**

- 13A is the 13<sup>th</sup> amendment of the Sri Lankan constitution to give more power to the Tamil people in the country. Tamilians are the minority in Sri Lanka and they were demanding a separate state.
- In 1987, with the Indian Union Government's efforts, the Sri Lankan Government agreed to increase the powers of Tamilians in the country through 13A. But 13A was not implemented.
- Tamilians constituted 11% of the Sri Lankan population and the Sinhalese constituted 11.2%. After the British left the island in 1948, the demography of Sri Lanka started to

change. More Sinhalese were coming to power. Upcoming Sinhalese started disenfranchising the Tamilians. These changes led to the formation of the Liberation Tigers of Tamil Eelam (i.e., LTTE) in 1976 and further into civil war peak 1980's. Thus, India interfered. And in 2009, the war ended with the Sri Lankan Army killing the LTTE leader. Though the war ended, the condition of Tamilians in the Sri Lanka has not much improved.

4. **Which of the following statements is/are correct about 'Fundamental Duties'?**

- 1. They were incorporated by 42<sup>nd</sup> Constitutional Amendment Act.
- 2. It was amended by the 86<sup>th</sup> constitutional amendment act, 2002.

Choose the correct answer from the options given below.

- (a) 1 only
- (b) 2 only
- (c) 1 and 2 both
- (d) None

**Ans (c)**

- The idea of Fundamental Duties is inspired from the Russian (USSR) Constitution.
- These were incorporated in Part IV-A of the Constitution by the 42<sup>nd</sup> Constitutional Amendment Act, 1976 on the recommendations of Swaran Singh Committee.
- Initially 10 duties were there, one more duty was added through the 86<sup>th</sup> Constitutional Amendment Act, 2002. The duties are listed in Article 51-A of the Constitution (the sole Article in Part-IV-A).

5. **With respect to Article 342 of the Indian Constitution, consider the following statements:**

- 1. The President, without consultation with the Governor, can specify the tribes deemed to be ST in relation to that state.
- 2. The Parliament may by law include or exclude from the list of ST specified in the notification issued by President.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

**Ans (b)**

- Article 342 of the Indian Constitution: The President may, with respect to any State (after consultation with the Governor) or UT, by public notification, specify the tribes deemed to be ST in relation to that state or UT.
- The Parliament may by law include or exclude from the list of ST specified in the above notification. This means, the Presidential orders can be modified only through an Act of Parliament.
- The above Article also provides for listing of STs State/UT wise and not on an all-India basis.

6. **A judge of the Supreme Court can be removed from his Office by an order of the president, for such removal should be supported by:**

- (a) Simple majority in each house of state assembly
- (b) Special majority in Lok Sabha only
- (c) Special majority in both Houses of Parliament
- (d) Absolute majority in both Houses of Parliament

**Ans: (c)**

- The President can issue the removal order only after an address by Parliament has been presented to him in the same session for such removal.
- The address must be supported by a special majority of each House of Parliament (i.e., a majority of the total membership of that House and a majority of not less than two-thirds of the members of that House present and voting).
- The grounds of removal are two—proved misbehaviour or incapacity.
- The Judges Enquiry Act (1968) regulates the procedure relating to the removal of a judge of the Supreme Court by the process of impeachment.

**7. Consider the following with reference to the impeachment of a high court judge:**

1. The procedure for the impeachment of a judge of a high court is the same as that for a judge of the Supreme Court.
2. Only the Governor of India can pass the final order for the removal of a high court judge post-impeachment.

Which of the above statements is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

**Ans: (a)**

- The Judges Enquiry Act (1968) regulates the procedure relating to the removal of a judge of a high court by the process of impeachment.
- A removal motion signed by 100 members (in the case of Lok Sabha) or 50 members (in the case of Rajya Sabha) is to be given to the Speaker/Chairman.
- The Speaker/Chairman may admit the motion or refuse to admit it.
- If it is admitted, then the Speaker/Chairman is to constitute a three-member committee to investigate into the charges.
- The procedure is same for a SC judge.
- After the motion is passed by each House of Parliament by special majority, an address is presented to the president for removal of the judge.
- Finally, the president passes an order removing the judge.

**8. Consider the following statements:**

1. Article 110 of the Constitution of India provides for the transfer of High Court judges, including the Chief Justice.
2. The executive can transfer a judge, without consulting the Chief Justice of India.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

**Ans (d)**

- Article 222: It provides for the transfer of HC judges, including the Chief Justice.

- The President, after consultation with the CJI, may transfer a judge from one HC to any other HC and a compensatory allowance is provided to the transferred judge.

**9. With reference to Right to Information Act, 2005, consider the following statements:**

1. Since RTI is implicit in the Right to Freedom of Speech and Expression under Article 25 of the Indian Constitution, it is an implied Directive Principles of State Policy.
2. It replaced the former Freedom of Information Act, 2002.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

**Ans (b)**

- It sets out the rules and procedures regarding citizens' right to information.
- It replaced the former Freedom of Information Act, 2002.
- This act was enacted in order to consolidate the fundamental right in the Indian constitution 'freedom of speech'.
- Since RTI is implicit in the Right to Freedom of Speech and Expression under Article 19 of the Indian Constitution, it is an implied fundamental right.

**10. Which of the following constitutional amendment provided constitutional status to 'cooperative societies'?**

- (a) 61st
- (b) 85th
- (c) 91st
- (d) 97th

**Ans: (d)**

- The Ninety-Seventh Amendment Act of 2011 provided constitutional status cooperative societies. The following changes were made through this amendment:
  - ♦ Right to form cooperative societies was made a fundamental right (Article 19).
  - ♦ A new Directive Principle of State Policy on the promotion of cooperative societies (Article 43B) was included in the constitution.
  - ♦ It added a new Part IX-B in the constitution with the title 'The Cooperative Societies' (Article 243-ZH to 243-ZT).

**11. 'Triple test' requirement was seen in news recently. Which of the following statements about 'triple test' are correct?**

1. A dedicated commission is appointed to conduct an inquiry into the nature and implications of the backwardness of OBCs in local bodies.
2. The proportion of reservation required in local bodies is specified in light of recommendations of the commission.
3. It is ensured that reservation for all the categories including SCs/STs/OBCs taken together do not exceed an aggregate of 50 per cent of the total.

Choose the correct answer using the options given below.

- (a) 1 and 2
- (b) 2 and 3
- (c) 1 and 3
- (d) 1, 2 and 3



## Landmark Updates of General Studies Subject

**Ans: (d)**

**Triple test' requirement:**

- The Allahabad High Court verdict that the Uttar Pradesh government should hold the urban local body elections without reservation for Other Backward Classes (OBCs) because the 'triple test' requirement for the OBC quota had not been fulfilled.
- The triple test requires the government to complete three tasks to finalise the reservation for OBCs in the local bodies. These are:
  1. To appoint a dedicated commission to conduct an empirical inquiry into the nature and implications of the backwardness of OBCs in local bodies.
  2. To specify the proportion of reservation required in local bodies in light of recommendations of the commission.
  3. To ensure reservation for all categories including SCs/STs/OBCs taken together does not exceed an aggregate of 50 per cent of the total seats.
- These triple test/conditions were outlined by the Supreme Court in the case of *Vikas Kishanrao Gawali vs. State of Maharashtra and others*, 2021.

**12. Which of the following statements about 'delimitation commission' are correct?**

1. Delimitation commission is appointed by the President of India.
2. Delimitation Commissions have been set up four times

Choose the correct answer using the options given below.

- |                  |            |
|------------------|------------|
| (a) 1 only       | (b) 2 only |
| (c) 1 and 2 both | (d) None   |

**Ans: (c)**

- Delimitation is carried out by an independent Delimitation Commission.
- The Delimitation Commission is appointed by the President of India under provisions of the Delimitation Commission Act.
- The commission works in collaboration with the Election Commission of India. It is composed of the following: a retired Supreme Court judge, the Chief Election Commissioner of India and respective State Election Commissioners.
- Delimitation Commissions have been set up four times — 1952, 1963, 1973 and 2002

**13. Right to Privacy is protected as an intrinsic part of Right to Life and Personal Liberty. Which of the following in the Constitution of India correctly and appropriately imply the above statement?**

- (a) Article 18 and the provisions under the 42nd Amendment to the Constitution
- (b) Article 15 and the Directive Principles of State Policy in Part IV.
- (c) Article 28 and provisions under the 44th Amendment to the constitution.
- (d) Article 21 and freedom guaranteed in part III

**Ans (d)**

- Privacy is a constitutionally protected right which emerges primarily from the guarantee of life and personal liberty in Article 21 of the Constitution.
- Elements of privacy also arise in varying contexts from the other facets of freedom and dignity recognized and guaranteed by the fundamental rights contained in Part III.

**14. Which article of Indian Constitution deals with the right to freedom of speech and expression?**

- |                |                |
|----------------|----------------|
| (a) Article 14 | (b) Article 16 |
| (c) Article 19 | (d) Article 22 |

**Ans: (c)** Article 19 (2) lists down eight grounds on which the right to freedom of speech and expression can be reasonably restricted. The Supreme Court has ruled with a 4:1 majority that statements made by a minister, even if these statements are traceable to any affairs of the State or for protecting the government, cannot be attributed to the government.

**15. Which Article of the Constitution of India deals with the Pardoning Power of the Governor?**

- |                 |                 |
|-----------------|-----------------|
| (a) Article 161 | (b) Article 159 |
| (c) Article 161 | (d) Article 169 |

**Ans: (a)**

- Article 161 deals with the Pardoning Power of the Governor.
- The Governor can grant pardons, reprieves, respites and remissions of punishments or suspend, remit and commute the sentence of any person convicted of any offence against any law relating to a matter to which the executive power of the state extends.

**16. "Protection of monuments and places and objects of national importance" is a provision in:**

- (a) Directive Principles of State Policy
- (b) Preamble of the Constitution
- (c) Fundamental Rights
- (d) Fundamental Duties

**Ans: (a)**

- Art 49 [DPSP] of the Indian Constitution deals with protection of monuments and places of national importance.
- Articles 36-51 under Part-IV of the Indian Constitution deal with Directive Principles of State Policy (DPSP).

**17. "To develop scientific temper, humanism and the spirit of inquiry and reform" is provision in:**

- (a) Fundamental Duties
- (b) Directive Principles of State Policy
- (c) Fundamental Rights
- (d) Preamble of the Constitution

**Ans: (a)**

- In the forty-second amendment in 1976, Article 51 A(h) was added under the Fundamental Duties that states: [It shall be the duty of every citizen of India] To develop scientific temper, humanism and the spirit of inquiry and reform.

**18. Consider the following statements:**

1. The President has the power to constitute a Constitution Bench and refer cases to it.
2. A Constitution Bench of the Supreme Court consists of at least three judges.



Which of the statements given above is/are correct?

- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2

**Ans: (d)**

- The Chief Justice of India has the power to constitute a Constitution Bench and refer cases to it.
- A Constitution Bench is a bench of the Supreme Court having five or more judges on it.
- A vast majority of cases before the Supreme Court are heard and decided by a bench of two judges (called a Division Bench), and sometimes of three.

**19. Consider the following statements about the Food Safety and Standards Authority of India:**

1. The administrative ministry for FSSAI is the Ministry of Home Affairs.
2. It is responsible for protecting and promoting public health through the regulation and supervision of food safety.

Which of the statements given above is/are correct?

- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2

**Ans: (b)**

- Food Safety and Standards Authority of India (FSSAI) is a statutory body established under the Food Safety and Standards Act, 2006 (FSS Act).
- The administrative ministry for FSSAI is the Ministry of Health & Family Welfare.
- It is responsible for protecting and promoting public health through the regulation and supervision of food safety.

**20. Consider the following statements about the NITI Aayog:**

1. It was established with the aim to achieve sustainable development goals by active involvement of the state government in the planning process.
2. It was established in 2010 via an executive resolution by replacing the Planning Commission of India.

Which of the statements given above is/are correct?

- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2

**Ans: (a)**

- NITI AYOOG is a premiere policy think tank of the Government of India. It was established with the aim to achieve sustainable development goals by active involvement of state government in the planning process.
- This premiere policy think tank was established in 2015 via an executive resolution by replacing the Planning Commission of India.



## Unit V

# Science & Technology

## A. Noble Wining Concepts, Innovations And Theories



- The Nobel Prize was established in 1895 by the will of Swedish scientist Alfred Nobel.
- The award is named after Alfred Nobel, who was famous for the discovery of dynamite.
- The Nobel Prize is awarded “to those who, in the preceding year, have conferred the greatest benefit to mankind.”
- Nobel Prizes were first awarded in 1901.
- The prize in economic science was started in 1969.
- The award was suspended from 1940 to 1942 for World War II.
- Although the Nobel Prize is not awarded posthumously, the prize is presented if a person is awarded the prize and dies before receiving it.
- According to Alfred Nobel’s will of 1895, the Nobel Prize is awarded in five separate fields.
- The 5 separate fields are Physics, Chemistry, Physiology or Medicine, Literature, and Peace.
- In 1968, Sveriges Riksbank (Sweden’s central bank) funded the establishment of a prize in economic science in memory of Alfred Nobel.

### Noble awards of 2022

Category	Winners	Description	Special Remarks
Physics	Alain Aspect, John F. Clauser, and Anton Zeilinger.	For experiments with entangled photons, establishing the violation of Bell inequalities and pioneering quantum information science	<ul style="list-style-type: none"> <li>• Quantum mechanics is the physics of the sub atomic particles.</li> <li>• Quantum entanglement is a counterintuitive phenomenon that explains how two subatomic particles can be intimately linked to each other even if separated by billions of light years of space.</li> <li>• Despite their vast separation, a change induced in one will affect the other, if both are quantum entangled.</li> <li>• Einstein called entanglement Spooky action at a distance.</li> <li>• Applications - Help in developing Quantum cryptography, and precise timekeeping as is done in atomic clocks.</li> </ul>

## Landmark Updates of General Studies Subject

Chemistry	Carolyn R. Bertozzi, Morten Meldal, and K. Barry Sharpless.	For the development of click chemistry (in which molecular building blocks snap together quickly and efficiently) and bio orthogonal chemistry.	<ul style="list-style-type: none"> <li>Adopting an alternative approach to producing new complex molecules in the laboratory or industry, this minimises waste and increases overall efficiency.</li> <li>The click chemistry is a functional form of chemistry, where reactions occur quickly and the unwanted by-products are avoided.</li> <li>In click chemistry, molecular building blocks snap together quickly and efficiently.</li> <li>Bio orthogonal Chemistry: Click reactions that work inside living organisms, in order to map an elusive bio molecule on the surface of cells - glycans (carbohydrate-based polymers made by all living organisms.)</li> <li>Applications - Used to explore cells and track biological processes, improved the targeting of cancer pharmaceuticals.</li> </ul>
Medicine	Svante Pääbo.	For discoveries concerning the genomes of extinct hominins and human evolution.	<ul style="list-style-type: none"> <li>Established new scientific discipline called, Paleogenomics.</li> <li>Palaeogenomics - It is the study of ancient hominins by extracting their DNA.</li> <li>It is the science of reconstructing and analyzing the genomes of organisms that are not alive in the present day.</li> </ul>
Literature	French author Annie Ernaux.	For the bravery and clinical precision with which she discovers the origins, estrangements, and collective restrictions of personal memory.	<ul style="list-style-type: none"> <li>Her work ranges from a history of France to her first sexual experience and the shame around it to her mother's illness and death to her abortion to her class-linked shame.</li> <li>Some of her famous works:               <ol style="list-style-type: none"> <li>Cleaned Out (1974)</li> <li>Shame (1997)</li> <li>Happening (2001)</li> <li>Getting Lost (2001)</li> <li>The Years (2008)</li> <li>A Girl's Story (2016)</li> </ol> </li> </ul>
Peace	Ales Bialiatski (Belarus), Russian human rights organisation Memorial, Ukrainian human rights organisation Center for Civil Liberties	For outstanding champions of human rights, democracy and peaceful co-existence in the neighbour countries Belarus, Russia and Ukraine.	<ul style="list-style-type: none"> <li>Ales Bialiatski: Founded the organisation Viasna (Spring) in 1996 in response to the controversial constitutional amendments that gave the president dictatorial powers and that triggered widespread demonstrations.</li> <li>Memorial - The memorial organisation was established in 1987 by human rights activists in the former Soviet Union who wanted to ensure that the victims of the communist regime's oppression would never be forgotten.</li> <li>The Center for Civil Liberties - It was founded in Kyiv in 2007 for the purpose of advancing human rights and democracy in Ukraine. After Russia's invasion of Ukraine in February 2022, Center for Civil Liberties has engaged in efforts to identify and document Russian war crimes against the Ukrainian civilian population.</li> </ul>

### Noble awards of 2021

Category	Name of Winner	Work
Physics	Giorgio Parisi (Italy), Syukuro Manabe (Japanese-born American) and Klaus Hasselmann (Germany)	Groundbreaking contributions to our understanding of complex physical systems, discovery of the interplay of disorder and fluctuations in physical systems from atomic to planetary scales
Chemistry	Benjamin List (Germany) and David W.C. MacMillan (Scotland)	Developing a new way for building molecules known as asymmetric organocatalysis.

## Landmark Updates of General Studies Subject

Physiology or Medicine	David Julius (America) and Ardem Patapoutian (America)	Discoveries of receptors for temperature and touch which could pave the way for new pain-killers.
Literature	Abdulrazak Gurnah (Tanzania)	Portrayal of the effects of colonialism and the refugee situation in the gap between cultures and continents
Peace	Maria Ressa (Filipino-American) and Dmitry Muratov (Russia)	For their efforts to safeguard freedom of expression

### Indian who won Noble Prize

- Till now, 12 Indians (5 Indian citizens and 7 of Indian origin or residency) have been awarded Nobel Prize
- The first person of Indian origin and also first Asian to be awarded the Nobel Prize was Rabindranath Tagore for his works “Gitanjali” in 1913.
- First Indian recipient of Nobel Prize in Physics was C. V. Raman for his work on the scattering of light and for the discovery of the effect named after him” in 1930.
- First Indian recipient of Nobel Prize for Peace was Mother Teresa in 1979.
- First Indian recipient of Nobel Prize in Economics was Amartya Sen in 1998.
- First Indian recipient of Nobel Prize in Physiology or Medicine was Har Gobind Khorana for their interpretation of the genetic code and its function in protein synthesis in 1968.

- First Indian recipient of Nobel Prize in Chemistry was Venkatraman Ramakrishnan for studies of the structure and function of the ribosome in 2009.
- The only woman from India in the list of Nobel Prize recipient is Mother Teresa

### Sveriges Riksbank Prize in Economic Sciences

- The Royal Swedish Academy of Sciences has decided to award the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2022 to three people for their research on banks and financial crises.
- Winners: US economists Ben S. Bernanke, Douglas Diamond, Philip H. Dybvig.
- Their research reduces the risk of financial crises developing into long-term depressions with severe consequences for society.

## B. THE ALTERNATIVE ENERGY

### 1. Nuclear Fusion

#### New Discovery

The researchers at the Lawrence Livermore National Laboratory in California achieved a net energy gain in a fusion experiment utilizing lasers for the first time.

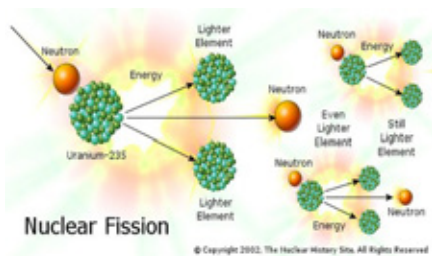
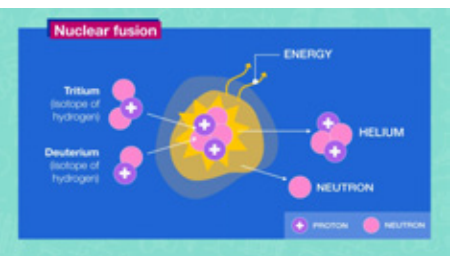
- **Achieving Ignition:** First time ever, nuclear fusion was ignited by scientists, meaning they were able to start a nuclear process that produces more energy than it uses.
- **Performance:** Hydrogen nuclei were heated and compressed using strong lasers. Heat is produced during nuclear fusion. The phenomenon is referred to as ignition when this heat is equal to or higher than the heat provided to the container.

#### About Nuclear Fusion

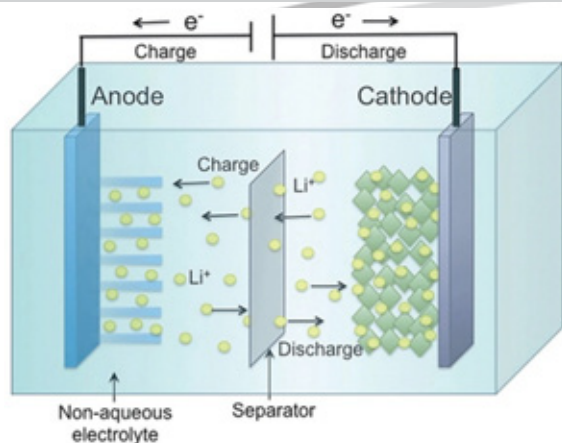
- The process by which two light atomic nuclei (for example tritium and deuterium) combine to form a single heavier (Helium) one while releasing massive amounts of energy. The fusion reactions take place in a state of matter called plasma a hot, charged gas made of positive ions and free-moving electrons with unique properties distinct from solids, liquids, or gases.

- **Challenge to fusion:** Strong repulsive electrostatic forces between the positively charged nuclei prevent them from getting close enough together to collide and for fusion to occur.
- **When does it happen:** If the attractive nuclear force (which binds protons and neutrons together in atomic nuclei) between the nuclei outweighs the repulsive (electrostatic) force, then a fusion reaction can occur. Such conditions can occur when the temperature increases, causing the ions to move faster and eventually reach speeds high enough to bring the ions close enough together.
- **Conditions for fusion**
  - ✓ The temperature of more than 100 million °C.
  - ✓ It maintaining a high enough density for a long enough time so that the rate of fusion reactions will be large enough to generate the desired power.
- **Advantages of fusion:** abundant energy, fuels are widely available, don't emit harmful gases like CO<sub>2</sub>, much less radioactive waste compared to fission etc.

### Nuclear Fission Vs Nuclear Fusion

Nuclear Fission	Nuclear Fusion
 <p><b>Nuclear Fission</b></p> <p>© Copyright 2002, The Nuclear History Site. All Rights Reserved</p>	 <p><b>Nuclear fusion</b></p>
It is splitting of nucleus into smaller particles	It is combination of two smaller atoms to create one large atom releasing energy
It is not common in nature	It is common in stars such as the Sun
It may require high-speed neutron	It require high temperature and high pressure conditions
It produce high energy	The reaction of light nuclei produce a very high energy and reaction of heavy nuclei may not produce high energy
Example: Neutron Bombardment of Uranium-235 and radioactive decay in unstable isotope	Example: Fusion between Deuterium and tritium

### 2. Lithium-Ion Battery



- It is a type of rechargeable battery.
- It use an intercalated (Intercalation is the reversible inclusion or insertion of a molecule into materials with layered structures) lithium compound as one electrode material, compared to the metallic lithium used in a non-rechargeable lithium battery.
- The battery consists of electrolyte, which allows for ionic movement, and the two electrodes are the constituent components of a lithium-ion battery cell.
- Lithium ions move from the negative electrode to the positive electrode during discharge and back when charging.

#### Applications of Lithium-ion Battery

- Electronic gadgets, Tele-communication, Aerospace, Industrial applications.
- Lithium-ion battery technology has made it the favourite power source for electric and hybrid electric vehicles.

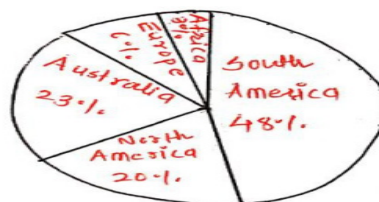
#### Advantage of Li-ion Batteries

- High specific charge density

- High voltage
- High energy density
- Low self discharge

#### Disadvantages of Li-ion Batteries

- Long charging times.
- Safety issues as instances of batteries catching fires have been there.
- Expensive to manufacture.
- While the Li-ion batteries are seen as sufficiently efficient for applications such as phones and laptops, in case of EVs, these cells still lack the range that would make them a viable alternative to internal combustion engines.
- Lack of availability of lithium raw material
- Thermal runaway due to melting of electrolyte, high operational temperature.



**Lithium Reserve:** The Lithium is lightest solid metal. It is currently produced from hard rock or brine mines. Australia is the world's biggest supplier, with production of Lithium from hard rock mines, while Argentina, Chile and China are producing it from salt lakes.

#### Lithium Distribution in India

- First traces of Lithium in India discovered in the ancient igneous rock of Karnataka's Mandya district.
- Recently Lithium reserves were also discovered in J&K.
- Currently India imports all its lithium needs, with China and Hong Kong biggest suppliers.



## Landmark Updates of General Studies Subject

### Comparison of various battery types

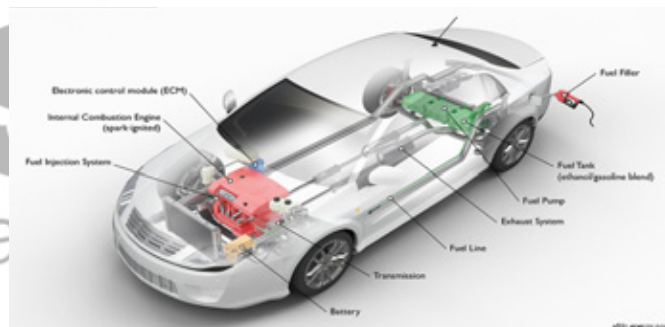
Type	Advantage	Disadvantage
Lead Acid batteries	A Mature technology, low cost and ruggedness compared with other battery technologies.	Heavy and bulky, do not cycle well.
Nickel-cadmium batteries	Availability in all sizes, can be moved around easily, can be stored, or used for up to 5 years, offer more than 1,000 charge and discharge cycles.	Environmental concerns related to cadmium. Prone to memory effect that can cause a battery to lose electrical storage area. Higher self discharge rate than Lithium-ion.
Nickel metal hydride batteries	Widely used in consumer electronics, addresses the issues arising from the environmental effects of cadmium.	Not considered for large stationary applications because of high cost of Nickel, also have a high self-discharge rate and generally take a long time to charge.
All solid-state Batteries	High energy densities and charge or discharge current limits, a higher life even in harsh conditions, lower charging time.	Challenges in both manufacturing and fundamental technology understanding.
Metal air	High energy density than lithium-ion batteries, only anode replacement needed, comparatively longer shelf life than lithium-ion.	Not electrically rechargeable, lower charge or discharge rates compared with Lithium-ion batteries
Sodium ion batteries	Wider operational temperature range and are safer. Cheaper than Lithium-ion.	Lower energy density than lithium-ion batteries.

### 3. Flex Fuel

Updates: Ministry of Road Transport & Highways has launched first of its kind pilot project on Flexi-Fuel Strong Hybrid Electric Vehicles (FFV-SHEV) in India.

#### Flex Fuel vehicles (FFV)

Similar to traditional vehicles, flex fuel vehicles have an internal combustion engine, however instead of regular petrol, it can run on blended fuel like petrol with ethanol or methanol. The ethanol mix can vary between 20% and 85%. Unlike electric hybrid vehicles, no bulky parts need to be added to the basic gasoline vehicle architecture. Upgrading existing vehicles is possible but expensive and not considered feasible. An FFV-SHEV possesses a flex-fuel engine and an electric power train. This setup extends dual advantages of higher ethanol use and greater fuel efficiency, as it can run on its EV mode for a good amount of time, while the engine stands shut off.



Importance of FFV: Less polluting, check on diversion of sugar used in ethanol blending, burn with whatever proportion of mixture is in its combustion chamber, reduced import bill etc.

Issues of FFV: lack of adequate infrastructure, issue with ethanol supply since this largely comes from sugarcane in India, less mileage etc.

Fuel Types	Importance	Challenges
Ethanol	It is renewable domestically produce transportation fuels. It has high octane number than gasoline which provides increase power and performance. The production of ethanol also creates jobs in rural areas.	Sporadic availability of ethanol. It can also cause corrosion and damage to engine. Not economical as gasoline as it does not provide same fuel efficiency.
Flex	It offer best economy cost for consumers	Benefits for environment is less as compare to battery's Electronics Vehicle or hydrogen fuel cell as vehicle of future.
Biodiesel	It can be produce from direct domestic resources. It has potential for near-zero GHGs emission	It very difficult to store hydrogen as it has low energy density. It has high production cost.

Hydrogen	It is lean burning, renewable substitute for petroleum diesel. It increase improves fuels lubricity and raise the cetane number of fuels. It is safer than petroleum diesel because it is less combustible.	It has higher viscosity lower energy content, higher nitrogen oxide emission, lower engine speed and power.
Electricity	It increase fuel economy, lower fuel cost and reduce emission.	Public charging station is not ubiquitous as gas station. The advance battery in electric vehicle is design for extended life but will wear out eventually.
Natural Gas	Available domestically, has established distribution network, relatively low cost and emission benefits.	Driving range of Natural Gas vehicles is generally less than comparable gasoline and diesel vehicle.

#### 4. Fuel Cell bus

Updates: Recently, the Council for Scientific and Industrial Research (CSIR) and the private company KPIT Technologies Ltd. built India's first indigenous hydrogen fuel cell bus.

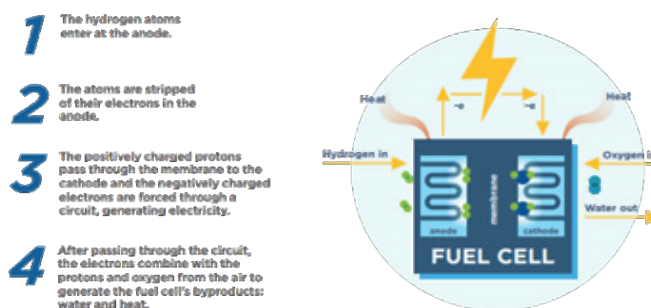
##### Fuel Cell

The electrochemical devices that allows chemical energy to be transformed into electrical energy. A supply of hydrogen and an oxygen source are required for the fuel cells to continue producing power; unlike batteries, they do not need to be recharged on a regular basis (usually air). The fuel cell gets its name from the hydrogen supply.

- Applications of Fuel Cell: Transport, Portable (military applications, Auxiliary Power Units, laptops etc.), Stationary (power to industrial/commercial/residential buildings etc.),
- Benefits of Fuel Cell: Lower operational costs due to higher efficiency and high energy density of hydrogen, Noise free operation, operating times are much longer.
- Issues with Fuel Cell: Transportation, flammability and storage of hydrogen gas, High cost, Technological challenges like system size, management of air, heat and water etc.

##### HOW FUEL CELLS WORK

A fuel cell is an electrochemical energy conversion device – it utilizes hydrogen and oxygen to generate electricity, heat, and water.



##### Government's initiatives

- India is aiming to achieve E10 by 2022 and E20 by (20% ethanol blend) by 2025.
- Bharat Stage Norms: India directly shifted from BS-IV to BS-VI norms.
- Government has included automobile & auto components of flex fuel engines into the Production Linked Incentive (PLI) scheme.

## C. DEFENCE

#### 1. Solid Fuel Ducted Ramjet (SFDR) Technology

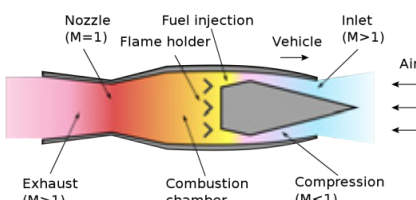
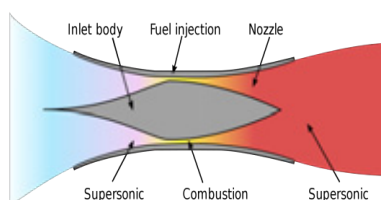
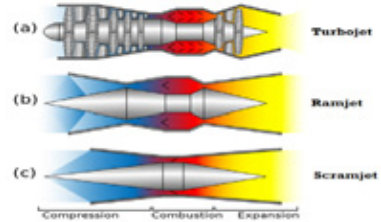
It is a missile propulsion system that combines a missile booster with a reduced smoke nozzle-less ducted rocket with thrust modulation. The first flight of the SFDR, built as part of a collaborative Indo-Russian R&D initiative, took place in 2018. The object had reached Mach 3 velocity. The technology makes use of a solid-fuelled air-breathing Ramjet engine. The Ramjet, unlike solid-propellant rockets, absorbs oxygen from the atmosphere while in flight. It can carry more fuel because it is less in weight. Air targets with ranges ranging from 70 to 340 kilometres.

##### Importance of SFDR Technology

- ↳ It enables the missile to intercept aerial threats at very long range of supersonic speed and high accuracy.
- ↳ It helps to develop long-range air-to-air missile.
- ↳ It can also be applied for surface-to-air missile.
- ↳ The air-to-air missiles with SFDR technology can achieve longer ranges as they do not require oxidisers.

## Landmark Updates of General Studies Subject

### Comparison between Ramjet, Scramjet and Dual Mode Ramjet (DMRJ)

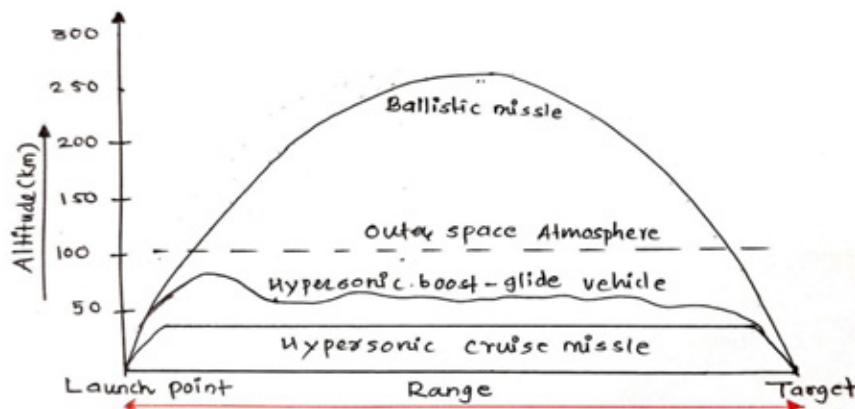
Ramjet	Scramjet	Dual Mode Ramjet (DMRJ)
It uses the vehicles forward motion to compress the incoming air for combustion without rotating compressor.	It is efficiently operates at the hypersonic speed and can allow supersonic combustion.	It can be develop when ramjet transform into Scramjet over Mach 4-8
It work at supersonic speed around Mach 3 and can operate up to the speed of 6 Mach	It uses hydrogen as fuel gas and atmospheric oxygen from atmospheric air as oxidiser.	It is operate both in subsonic and supersonic combustion modes.
The efficiency initiate to drop at hypersonic speed	Both the Ramjet and Scramjet do not have moving part.	
Unlike turbojet engine It does not have any turbines		
		

## 2. BRAHMOS

The BrahMos is a multipurpose, long-range supersonic cruise missile system that can be fired against both surface-based targets and those stationed at sea. India's Defense Research and Development Organization (DRDO) and Russia are working together to develop the BrahMos (NPO Mashinostroyeniya). The Moskva and Brahmaputra rivers are symbolized by the

name. It is a two-stage missile with a liquid ramjet acting as the second stage and a solid propellant booster engine acting as the first stage. It operates on the "fire and forget" principle. The missile's range was initially limited to 290 kilometers due to Missile Technology Control Regime requirements (MTCR). It was intended to increase the range to 450 km and then to 600 km later on after India's entrance into MTCR in 2016.

Basis	Cruise Missile	Ballistic Missile
<b>About</b>	An unmanned self-propelled (till the time of impact) guided vehicle that sustains flight through aerodynamic lift for most of its flight path. They fly within the earth's atmosphere and use jet engine technology.	It has as a ballistic trajectory over most of its flight path, regardless of whether it is a weapon-delivery vehicle. It is powered by rockets initially but then they follow an unpowered, free-falling trajectory toward their targets
<b>Classification</b>	Subsonic (around 0.8 Mach speed), Supersonic (around 2-3 Mach speed), Hypersonic (More than 5 Mach speed)	Based on launch mode, range, propulsion system.
<b>Examples</b>	BrahMos, Harpoon (USA), Exocet (France)	Prithvi I, Prithvi II, Agni I, Agni II and Dhanush ballistic missiles



## D. HEALTH

### 1. Global Center for Traditional Medicine (GCTM)

Updates: The first and only Global Center for Traditional Medicine (GCTM) in the world was recently opened in Jamnagar, Gujarat, by WHO.

#### About Traditional medicine

- The World Trade Organization (WTO) defines traditional medicine (TM) as the combination of knowledge, skill, and practices for treating physical and mental disease that are founded on the theories, beliefs, and experiences that are unique to many cultures.
- The terms complementary medicine (CM) and alternative medicine (AM) are used to describe different types of medical care that are not fully included into the country's predominant medical system or its own local tradition or conventional medicine.
- Ayurveda, Yoga, Unani, Siddha, and Homeopathy are all part of India's traditional and complementary medicine (T&CM), as well as Sowa Rigpa.
- It is governed by the AYUSH Ministry.

#### Goals of GCTM

- To create a database of traditional knowledge system
- To create international standards for testing and certification of TMs
- To evolve as platform where global experts TMs share experiences
- To mobilize fundings for research
- To develop protocols for holistic treatment of specific disease.

### 2. Global Antimicrobial Resistance and Use Surveillance System (GLASS) Report-WHO

Antimicrobial Resistance (AMR) is the ability of a microorganism (like bacteria, viruses, and some parasites) to stop an antimicrobial (such as antibiotics, antivirals and antimalarials) from working against it. WHO has declared AMR as one of the top 10 global public health threats facing humanity. Antibiotic resistance has been found in all regions of the world.

Impacts of AMR: Inability to treat common infections, increased threat to medical procedures such as organ transplantation, adverse impact on animal health, Endangers SDGs etc.

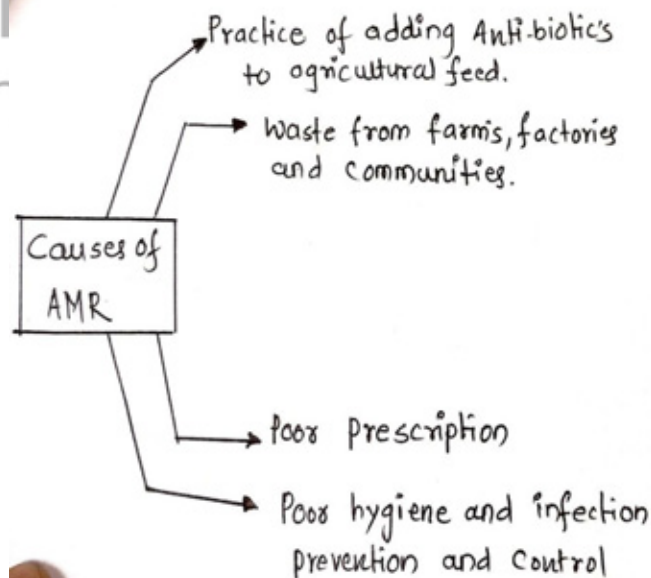
#### Initiatives taken for tackling AMR

##### 1. Worldwide initiatives

- The Global Action Plan on AMR during the 2015 World Health Assembly.
- WHO is working closely with Food and Agriculture Organization (FAO) and World Organisation for Animal Health in a 'One Health' approach to tackle AMR.
- The Global Antibiotic Research and Development Partnership, a joint initiative of WHO and the Drugs for Neglected Diseases Initiative.

##### 2. Initiative undertaken by India

- National programme on AMR containment (2012-17)
- National Action Plan on Antimicrobial Resistance
- Red Line campaign to discourage the over-the-counter sale of antibiotics.
- FSSAI guidelines limiting the antibiotics in food products.
- A separate Schedule H-1 incorporated in Drug and Cosmetic rules to regulate sale of antimicrobials.



##### 3. Self-Amplifying Messenger RNA (mRNA) Vaccine

Updates: The Self-amplifying messenger RNA (mRNA) vaccine showed encouraging effects against Covid-19.

#### About m-RNA Vaccine

RNA vaccines employ a portion of the virus' own genes to trigger an immune response, as opposed to traditional vaccinations, which inject a weakened version of a virus or bacterium into



## Landmark Updates of General Studies Subject

the body. A traditional mRNA vaccine, like those made by Pfizer and Moderna, employs mRNA that is used to encode the corona virus spike protein. The spike protein that sets off an immune response inside of human bodies when a genuine infection occurs is taught to cells by the mRNA vaccinations. It is an improvement over a standard mRNA vaccination since it encodes four additional proteins in addition to the vaccine antigen. These proteins allow the original strand of RNA to be amplified inside the cell.

### Advantage:

- Making storage easy,
- Minimizing dose of RNA,
- Lowering the cost of vaccines
- It is safe and non-infectious as not made with pathogen particle or inactive pathogen.
- It can generate a stronger type of immunity
- It can produce more rapidly

## 4. Rice Fortification

Updates: The Department of Food and Public Distribution recently released a Standard Operating Procedure (SOP) to ensure that the Rice Fortification program is implemented in accordance with the required quality requirements.

SOP: To address malnutrition, anaemia and micronutrient deficiencies.

- Rice Specification: Milled rice in which Fortified Rice Kernels (FRK) will be blended should comply with rice specification as per Food Safety and Standards (Food Products Standards and Food Additives) Regulations, 2011.
- The packaging of fortified food: Takes into consideration the nature of the fortificant added and its effect on the shelf life of such food.
- The fortified food package shall contain, Fortified with (name of the fortificant) and the +F logo on its label.

- It may also carry a tagline “Sampoorna Poshan Swasth Jeevan” under the logo.
- The Food fortified with Iron shall carry a warning statement for People with Thalassemia.

### About Rice Fortification

It is a method for incorporating micronutrients into rice. The Food Safety and Standards (Fortification of Foods) Regulations, 2018, specify the minimum levels of micronutrients that must be included in fortified rice (Iron, Folic Acid, and Vitamin B12), as well as the maximum levels (Zinc, Vitamin A, Thiamine, Riboflavin, Niacin, and Pyridoxine). Iron, folic acid, and vitamin B-12 must all be present in fortified rice in order to comply with FSSAI standards. Moreover, rice may be enriched with micronutrients including zinc, Vitamin A, Vitamin B1, Vitamin B2, Vitamin B3, and Vitamin B6.

### Methods for addition micronutrients:

1. Dusting: This method uses electrostatic force to add micronutrients onto the surface of the rice grains. This methodology provides poor nutrient protection when rice is clean, soaked or cooked in excess water, which is then discarded.
2. Coating and extrusion: It is two-step process. Initially, fortified kernels are created using coating or extrusion technologies, and then, at a ratio of 0.5% to 2%, the fortified kernels are combined with non-fortified rice.
3. In India, milled rice is ground up and combined with a premix of vitamins and minerals to create fortified rice using an extrusion process. Traditional rice is mixed with FRK in a ratio of 1:50 to 1:200.

### Benefits of rice fortification

- It aids in eliminating malnutrition and anaemia in a cost efficient manner.
- It protects the body from cretinism, goiter, thyrotoxicosis, and brain damage.
- It enhance the foetal and neonatal health care

## 5. Viral Diseases

Viral Disease	Descriptions
<b>Avian Influenza or Bird flu</b>	It is a viral disease which is contagious and can spread from one bird to other birds and animals. It is caused by Influenza Type A viruses which generally affect poultry birds such as chickens and turkeys. Depending on the origin host, influenza A viruses can be classified as avian influenza (H5N1, H9N2 etc.), swine influenza (H1N1 and H3N2), etc. It also affects humans through direct contact with infected animals or contaminated environments.
<b>Acute Encephalitis Syndrome (AES)</b>	AES is characterized as acute-onset of fever and a change in mental status and new-onset of seizures in a person of any age at any time of the year. It most commonly affects children and young adults and can lead to considerable morbidity and mortality. The viruses are the main causative agents in AES cases, although other sources such as bacteria, fungus, parasites, spirochetes, chemicals, toxins and non-infectious agents have also been reported.
<b>Canine Distemper</b>	The Gujarat Biotechnology Research Centre completed the first trials of the Canine Distemper Virus (CDV) vaccine for the Asiatic lion. The canine distemper is caused by the paramyxovirus virus and it spreads through body fluids like infected urine, blood and saliva. The virus attacks the respiratory, gastrointestinal and nervous systems of puppies and dogs and can be transmitted to lions, tigers, leopards and other wild cats as well as seals. There is no known cure for CDV.



<b>Porcine Virus</b>	Porcine virus is identified as the possible reason for death of the first patient to have Xenotransplantation (animal to human transplants). Porcine Virus is a herpes virus found in the tissues throughout the body including the nose of newborn piglets where it causes inflammation (rhinitis). It is common among pigs across the world while similar infections with related viruses occur in many other species. Eight Herpes Viruses routinely infect only humans such as Herpes Simplex Virus types 1 and 2
<b>White spot syndrome (WSSV)</b>	It is a DNA based highly contagious viral infection of crustaceans that can cause high levels of mortality in cultured shrimp. The virus infects only crustaceans (prawns, lobsters and crabs etc.) and appears not to be related to any other known viruses. At present there is no treatment available to interfere with the unrestrained occurrence and spread of the disease.
<b>Lumpy Skin Disease (LSD)</b>	It is a homologous, live attenuated vaccine specifically targeted to protect cattle against LSD virus. The LSD is a vector-borne pox disease that is caused by Capri poxvirus and is an emerging threat to livestock worldwide. It is genetically related to the goat pox and sheep pox virus family. LSD infects cattle and water buffalo mainly through vectors such as blood-feeding insects. The disease has been endemic in most African countries, and since 2012 it has spread rapidly through the Middle East, Southeast Europe and West and Central Asia. LSD was reported for the first time in India in 2019 from Odisha. The disease is not zoonotic, meaning it does not spread from animals to humans.
<b>Tomato Flu (Tomato Fever)</b>	Tomato flu has been reported from Kerala, Tamil Nadu, Haryana, and Odisha. It is characterised by fever, joint pain, and red, tomato-like rashes usually seen in children below age of five years and adults with weaker immunity. It is caused by a virus and shows symptoms similar to those of COVID-19 but is not related to SARS COV-2. There is no specific treatment or vaccine available for disease.
<b>African Swine Fever (ASF)</b>	ASF is a highly contagious and deadly viral disease affecting pigs and wild boar with up to 100% case fatality rate. ASF is not a threat to human health and cannot be transmitted from pigs to humans. Currently, there is no effective vaccine against ASF. It was first reported in India in 2019.
<b>Marburg virus disease (MVD)</b>	It's a highly infectious viral hemorrhagic fever with a fatality ratio of up to 88 percent. It was first identified in 1967 in Germany's Marburg and Frankfurt. It belongs to same family as Ebola. The fruit bats of Pteropodidae Family are key carriers of the disease. It is transmitted to people from fruit bats and spreads among humans through human-to human transmission. Currently there are no vaccines or antiviral treatments approved for MVD.
<b>Zombie Virus</b>	Zombie virus is virus emerged due to thawing of permafrost as global temperature is rising. Researchers examined ancient viruses samples collected from permafrost in the Siberia region of Russia. The oldest virus is 48,500 years old, called Pandoravirus yedoma. Pandoravirus was discovered below the bottom of a lake in Yukechi Alas in Yakutia, Russia. It has the potential to be infectious and hence pose a "health danger" after researching live cultures.
<b>Epstein Barr Virus (EBV)</b>	EBV viruses are widely present in the human population. They are usually harmless, but the virus gets reactivated inside the body in some unusual conditions like immunological stress or immunocompetent.
<b>Human Papilloma Virus (HPV)</b>	The HPV is a sexually transmitted virus that may cause cervical cancer. The Cervical cancer is the second most common cancer of women in India despite being largely preventable. The Cervical cancer can be eliminated if all prepubertal girls are given HPV vaccination globally.
<b>Monkey pox</b>	WHO recently recommended new name "mpox" for monkeypox disease as the current name was perceived to be racist and stigmatising. Monkeypox is zoonotic disease caused by the virus belonging to the Orthopoxvirus genus. The Orthopoxvirus genus also includes variola virus (which causes smallpox), vaccinia virus (used in the smallpox vaccine), and cowpox virus. It was first discovered in 1958, largely occurring close to tropical rainforests of Central and West Africa. Animal-to-human transmission can occur from direct contact with the blood, bodily fluids, or cutaneous or mucosal lesions of infected animals.

## E. SPACE TECHNOLOGY

### 1. Mars Orbiter Mission (MOM) or Mangalyaan

On November 5, 2013, the mission was launched aboard PSLV-C25. In its first attempt, the MOM spacecraft was successfully inserted into Martian orbit in September 2014. It was India's first interplanetary mission. The mission made India the first Asian country and the fourth in the world to reach the planet, following Roscosmos, NASA (National Aeronautics and Space Administration), and the European Space Agency. China referred to India's successful Mangalyaan as the "Pride of Asia".

#### Important facts

It carried 850 kg of fuel and five science payloads, including a Mars Color Camera (MCC), which it had been using to study the Martian surface and atmosphere since successfully entering orbit. MOM's extremely elliptical orbit shape allowed MCC to get images of Mars' "Full disc" at its furthest point and finer features at its closest position. The MCC has produced more than 1000 images and published a Mars Atlas.

#### Objectives

- It was aimed at studying the Martian atmosphere.
- To explore Martian surface features, mineralogy, morphology and atmosphere using indigenous scientific instruments.
- A crucial objective of MOM was to develop technologies required in planning, designing, management and operations of an interplanetary mission.

#### Various Mars Missions

1. Exo-Mars rover (2021) (European Space Agency)
2. Tianwen-1: China's Mars Mission (2021)
3. UAE's Hope Mars Mission (UAE's first-ever interplanetary mission) (2021)
4. Mars 2 and Mars 3 (1971) (Soviet Union)
5. NASA's Perseverance Rover

### 2. Polar Satellite Launch Vehicle (PSLV)

ISRO's Launch Vehicles		
Launch Vehicle	Stages	Payload capacity and Orbits
Small Satellite Launch Vehicle (SSLV)	3 stage Launch Vehicle: Three Solid Propulsion Stages and liquid propulsion-based Velocity Trimming Module as a terminal stage.	Mini, Micro, or Nano satellites (10 to 500 kg mass) to a 500 km orbit.
Polar Satellite Launch Vehicle (PSLV)	Four-stage launch vehicle (1st & 3rd stage: Solid; 2nd & 4th: Liquid)	Up to 1,750 kg to Sun-Synchronous Polar Orbits, 1,425 into Geosynchronous and Geostationary orbits
Geosynchronous Satellite Launch Vehicle (GSLV) Mark II	Three-stage launch vehicle (1st: Solid, 2nd: Liquid; 3rd: Cryogenic Upper Stage)	Up to 2,250 into Geosynchronous Transfer Orbits, up to 6 tonne in Low Earth Orbits
Geosynchronous Satellite Launch Vehicle Mk-III (LVM3)	Three-stage launch vehicle (1st: Liquid, 2nd: Solid; 3rd: Cryogenic Upper Stage)	Up to 4 tonne into Geosynchronous Transfer Orbits, 8 tonne into Low Earth Orbits



Fig: Satellite launch vehicles of India

### Different types of Orbits

Mass Orbiter mission (MOM)  
or  
Mangalyaan

#### Types of Orbits

Orbits	Descriptions
Geostationary Orbit (GEO)	The satellites in GEO circle Earth above the equator from west to east following the rotation of the Earth. This makes satellites in GEO appear to be stationary over a fixed position.
Low Earth Orbit (LEO)	An orbit that is relatively closer to Earth's surface. Normally at an altitude of 1000 km but could be as low as 160 km above Earth.
Polar orbit	Satellite in this orbit usually travel past Earth from North to South rather than from West to East, passing roughly over Earth's poles.
Sun-Synchronous orbit (SSO)	It is a particular kind of polar orbit. Satellites in this orbit, travelling over the polar region and synchronous with the Sun.

### 3. ARTEMIS I

- **Aim:** To build a long term human presence at the Moon.
- **Mission specifications:** An unscrewed flight test that will provide a foundation for human deep space exploration. With Artemis, NASA is planning to land the first woman on the Moon. First integrated test of NASA's deep space exploration systems, which include (refer image).
- **Future Missions:** Artemis I will be followed by Artemis II (Planned for 2024) and Artemis III (Planned for 2026)

#### Objectives of ARTEMIS I

1. To demonstrate Orion's heat shield can withstand the high speed and high heat condition when returning through earth's atmosphere.
2. To study the radiation environment of deep space that is present for mission to moon and beyond.
3. To retrieving Orion's after splashdown will provide information to engineer for the future mission
4. To accomplish flight test objectives like certifying the Orion's optical navigation system and deploying cube slats.
5. To study the Moon to learn more about origin and history about Earth, the Moon and Our Solar System.

Major missions of the Moon	
Countries	Missions
USSR	Luna1, Luna2 (first spacecraft to impact moon surface), and Luna3
USA	Lunar Orbit1, Apollo 11 (First human to land on moon), and Lunar reconnaissance Orbit (LRO)
Japan	Hiten
China	Chang'e1
India	Chandrayaan1 and Chandrayaan 2

### 4. JAMES WEBB SPACE TELESCOPE

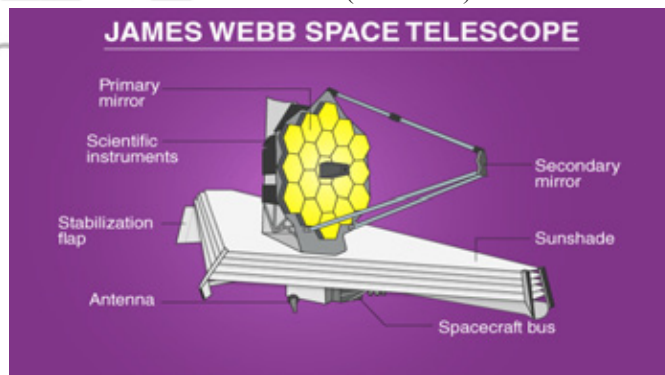
**Updates:** The James Webb Space Telescope has supplied scientists with a fresh vision of the early cosmos. MACS0647 galaxy cluster and distant galaxy MACS0647-JD were photographed with a telescope. Scientists believe this might be the result of a galaxy merger in the early cosmos. Because of gravitational lensing, the distant galaxy is seen.

#### About James Webb Space Telescope

It is also known as JWST or Webb, it is NASA's largest and most powerful space science telescope. It was formerly known as the "Next Generation Space Telescope" (NGST). It is developed by International collaboration between NASA, European Space Agency (ESA), and Canadian Space Agency (CSA).

#### Significant features of Webb

1. **Visibility Spectrum:** Webb views the universe in infrared. It will be the only infrared specialized telescope in space that can see long distances.
2. **Mirrors:** Its primary mirror is 6.5 metres in diameter. A larger the mirror area collecting light, more details it can capture of a star or galaxy. Recently, a secondary mirror was also deployed, reflecting light from primary mirror to the instruments.
3. **Location/Orbit:** It will not be in orbit around Earth but will orbit Sun, 1.5 million kilometres away from the Earth at second Lagrange point or L2. The L2 lets telescope stay in line with Earth as it moves around Sun. This allows satellite's large sunshield to protect telescope from light and heat of Sun and Earth (and Moon).



**Major instruments:** Contained within the Integrated Science Instrument Module (ISIM) which is one of three major elements that comprise JWST. The others are Optical Telescope Element (OTE) and Spacecraft Element (Spacecraft Bus and Sunshield). **Main instruments:** ISIM is main payload.

#### It houses four main instruments:

1. Near-Infrared Camera\ (NIRCam),
2. Near-Infrared Spectrograph (NIRSpec),
3. Mid-Infrared Instrument (MIRI) and
4. Fine Guidance Sensor/ Near InfraRed Imager and Slitless Spectrograph (FGS/NIRISS).

## Landmark Updates of General Studies Subject

### Significance of JWST

- ⇒ It will allow us to see galaxies that formed just 100 millions years after Big Bang.
- ⇒ It will scan atmosphere of Earth like exoplanets, searching for gases associated with life.
- ⇒ It will monitor Jupiter, Saturn, Uranus and Neptune to see how their atmosphere change over the time.
- ⇒ It will determine, from asteroid belt to Kuiper belt, JWST what makes up some of our solar system smallest objects.

### Comparison between Hubble vs. Webb vs. Herschel

Basis	Hubble	Webb	Herschel Space Observatory
Distance from Earth	507 Km	1.5 million Km at Second Sun-Earth Lagrange point (L2)	Second Sun-Earth Lagrange point (L2)
Primary Mirror Diameter	2.4 meter	6.5 meter	3.5 meter
Searching for	Young Galaxies (12.5 billion years ago)	Newborn Galaxies (13.5 billion years ago)	Most actively star-forming galaxies
Serviceable	Yes	No	No
Wavelengths	Visible, UV, Part of near infrared	Near and mid infrared	Far infrared and submillimeter

## 5. Space Sustainability

Space sustainability refers to ensuring that all humanity can continue to use outer space for peaceful purposes and socioeconomic benefit now and in the long term.

**Updates:** United Nations Office of Outer SPACE Affairs and government of AUSTRIA organized World Space Forum (WSF) 2022 under theme “Sustainability in Space for sustainability on Earth”. World Space Forum is a platform, including governmental institutions, international organizations etc., to promote discussions on the role of space science and technology in global sustainable development.

### Threats to space sustainability

- Orbital crowding and Space Debris:** It poses a direct threat to operations and safety. Physical crowding of orbits can lead to a chain reaction called Kessler syndrome.
- Militarisation and weaponisation of the space:** Development and testing of destructive anti satellite (ASAT) weapons by countries like US, Russia, China, and India
- Rendezvous and proximity operations (RPO):** It involves altering the trajectory of one or more space objects to bring them into proximity to each other.
- Space weather can impact satellites by damaging onboard electronics and disrupting communications or navigation signals.

### Initiatives taken towards space sustainability

#### A. Global Initiatives

- U.N. Office for Outer Space Affairs (UNOOSA):** It supports governments in global space activities.
- Conference on Disarmament (CD):** It is the international forum with one of its core focus areas is the prevention of an arms race in outer space (PAROS).
- Guidelines on space sustainability:** Adopted by U.N. Committee on the Peaceful Uses of Outer Space (COPUOS) in 2019.
- Space Sustainability Rating (SSR):** By World Economic Forum to implement sustainable and responsible space missions.
- ASAT test-ban resolution:** A non-binding resolution (India abstained) passed by United Nations General Assembly (UNGA) calling for a ban on kinetic ASAT tests.

#### B. Indian Initiatives

- Project NETRA:** Initiated by ISRO to provide first-hand information on the status of debris.
- Space Situational Awareness:** IIIT Delhi is currently working on a research project on SSA.  
Digantara, a space sector start-up of India, is going to set-up India's first commercial SSA observatory in Garhwal region of Uttarakhand. Further, India and US have also signed a bilateral SSA arrangement.
- SPADEX:** To provide in-orbit servicing, ISRO is developing a space docking experiment called ‘SPADEX’.

## 6. Black Holes

A place in the space where gravity pulls so much that even light cannot pass through it. This develops when star is dying. The presence of black hole can be inferred by detecting their effect on other matter nearby them. The study of black is significant for understanding of gravitational force and testing fundamental theories.

**Updates:** The first photograph of Sagittarius A, a super massive black hole situated at the centre of the Milky Way, was revealed by astronomers of the Event Horizon Telescope (EHT). EHT is an international collaboration (of observatories) capturing



images of black holes using a virtual Earth-sized telescope. In 2019, astronomers captured the first ever photograph of a black hole M87 in a distant galaxy called Messier 87.

#### Basic parts of Black Hole

- ① Schwarzschild Radius: this is event horizon's radius, at which escape velocity is equal to speed of light.
- ② Ergosphere: if black hole is rotating, then as it spins, its mass causes the space time around the black hole to rotate as well. This region is called Ergosphere.

#### Types of Black Hole

- ① Tiny Black Hole: these can be as small as one atom but have a mass of large mountains. This formed when universe began.
- ② Stellar Black Hole: It has mass upto 20 times more than mass of sun. It formed when center of very big star falls upon itself or collapse. It is associated with supernova activity.
- ③ Supermassive Black Hole: It has a mass more than 1 million suns together. It formed at the same time as the galaxy they are in.

#### Note: General Theory of Relativity

This theory was proposed by **Albert Einstein** in 1915. Essentially, it's a theory of gravity whose basic idea is that instead of being an invisible force that attracts objects to one another, gravity is a curving or warping of space. The more massive an object, the more it warps the space around it. In the first major test of general relativity, astronomers in 1919 measured the deflection of light from distant stars as the starlight passed by our sun, proving that gravity does, in fact, distort or curve space. In 2016, the discovery of gravitational waves (subtle ripples in the fabric of space time) was another confirmation of general relativity.

#### Elements of a black hole

##### Accretion disc

A swirling mass of matter destined to spiral into the black hole or be ejected into space

##### Event horizon

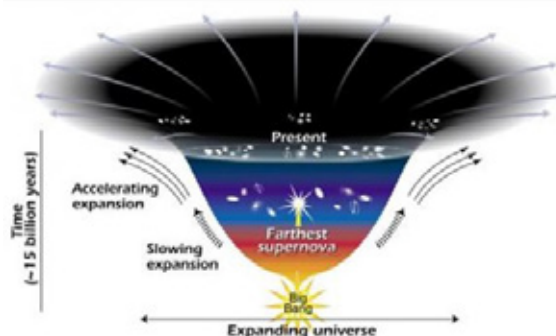
Gravitational boundary beyond which neither light nor matter can escape

##### Relativistic jets

Matter and radiation extending out hundreds of thousands of light years

## 7. DARK MATTER

**Updates:** A test run of LZ detector in U.S. has shown it to be the most sensitive dark matter detector yet created.



#### About Dark Matter

- It is a visible universe which includes Earth, sun, other stars, and galaxies.
- It is made of protons, neutrons, and electrons bundled together into atoms.
- This ordinary matter, also called baryonic, makes up less than 5 percent of the mass of universe.
- Rest of the universe appears to be made of a mysterious, invisible substance called dark matter (~25 percent) and a force that repels gravity known as dark energy (~70 percent).
- The Dark energy is the name given to the mysterious force that's causing the rate of expansion of our universe to accelerate over time, rather than to slow down.
- Unlike normal matter, dark matter does not interact with electromagnetic force. This means it does not absorb, reflect, or emit light, making it extremely hard to spot.
- The Scientists study dark matter by looking at the effects it has on visible objects. It is believed that dark matter is what gives galaxies extra mass, generating extra gravity they need to stay intact.

#### Dark Energy

- Universe has been known to be expanding as a consequence of the Big Bang about 14 billion years ago.
- The Dark Energy was first hypothesized by Albert Einstein in 1917 and was represented by a term, the "cosmological constant".
- However, he later rejected the idea of a cosmological constant.
- Subsequently, direct evidence for the existence of this component, which was dubbed dark energy, was first presented in 1998.
- It was discovered that this expansion is accelerating (Nobel Prize in Physics 2011 was awarded to Saul Perlmutter, Brian Schmidt and Adam Riess for this discovery).
- The Dark energy is the name given to the mysterious force that's causing the rate of expansion of universe to accelerate over time.



## Landmark Updates of General Studies Subject

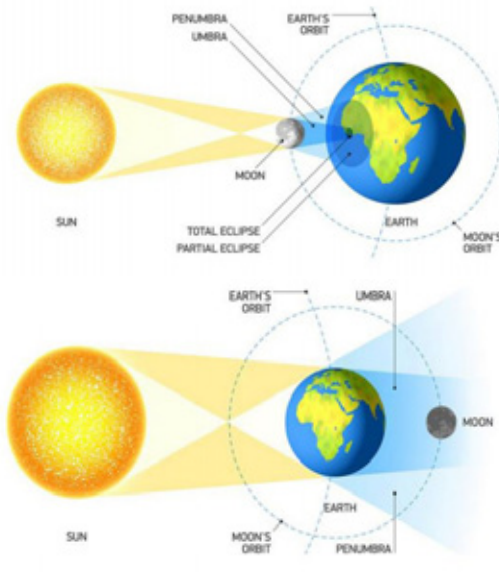
### Significance of dark matter study

1. It helps to understand the unexplained motion of stars in the galaxies
2. It helps in understanding of evolution of universe.
3. To determine if the universe is open or flat

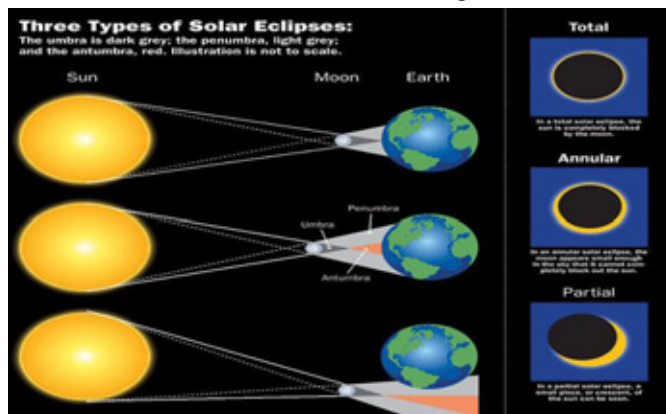
### Space Phenomenon and Experiments

**1. Solar Eclipse:** It occurs when Moon gets between Earth and Sun, and moon casts a shadow over Earth. It happens only at the new moon phase.

#### Types of solar eclipses



- Total solar eclipse:** When moon passes between Sun and Earth, **completely blocking face of Sun**. It is only visible from a small area on Earth.
- Partial solar eclipse:** When sun, moon and Earth are not exactly lined up. Only a part of the Sun will appear to be covered, giving it a crescent shape.
- Annular solar eclipse:** When moon is farthest from Earth. It does not block entire view of the sun. This looks like a ring around the moon.
- Hybrid solar eclipse:** Because Earth's surface is curved, sometimes an eclipse can shift between annular and total as Moon's shadow moves across the globe.

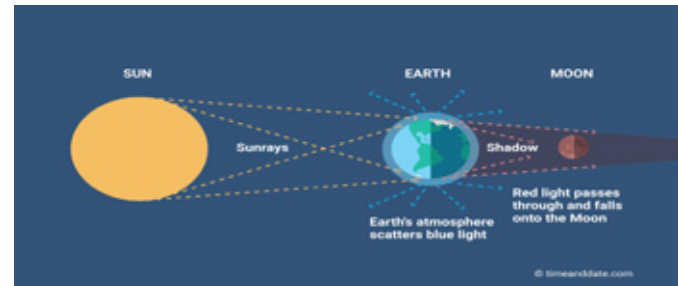


### 2. Blood Moon

This was witnessed in parts of India. It is commonly known as total lunar eclipse, occurs when moon passes through darkest part of Earth's shadow, known as the umbra. It is called blood moon because of reddish hue.

#### Types of Lunar Eclipse:

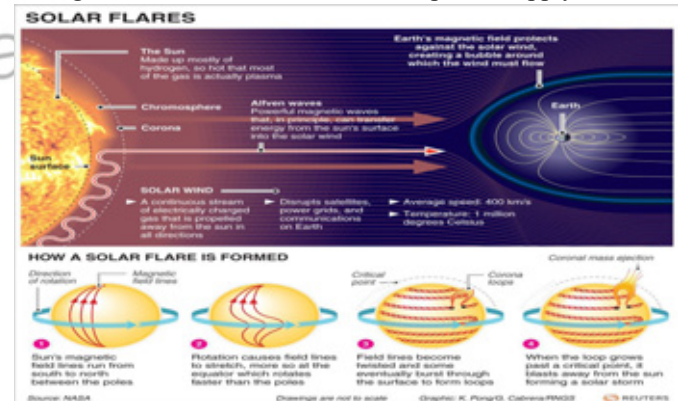
- Partial Lunar Eclipse:** When only a part of moon enters earth's shadow.
- Penumbral Lunar Eclipse:** When the moon enters the Earth's penumbra.



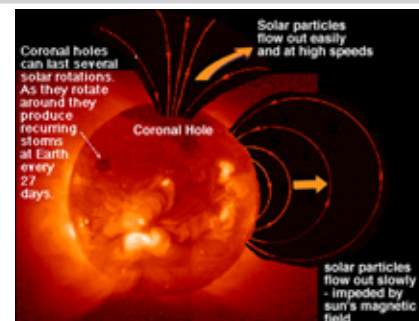
### 3. Geomagnetic Storm (GMS)

The GMS is a disturbance in the earth's magnetosphere, which is the area around the planet controlled by its magnetic field. When Coronal Mass Ejections (CME) collides with the Earth, it causes GMS. CME is a large expulsion of plasma and magnetic field from the sun's corona, or upper atmosphere.

**Impact of geomagnetic storms:** Disrupt high-frequency radio broadcasts and global positioning system (GPS) devices, damage satellite electronics, can affect power supply on earth.



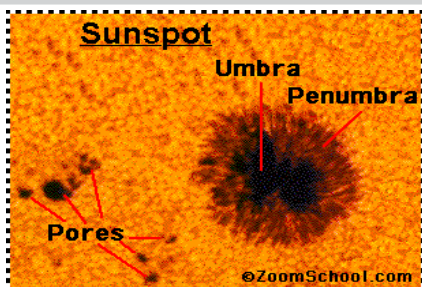
### 4. Coronal Holes



These are regions on the sun's surface from where fast solar wind gushes out into space. Because they contain little solar material, they have lower temperatures and thus appear much darker than their surroundings. The holes are not a unique phenomenon, appearing throughout the sun's approximately 11-year solar cycle. These coronal holes can cause a solar storm on Earth as they release a complex stream of solar winds

It is called AR3038, grew to almost twice its size in the span of 24 hours. These are areas that appear dark on the surface of the Sun. They appear dark because they are cooler than other parts of the Sun's surface. These are relatively cool as they form at areas where magnetic fields are particularly strong thus keeping some of the heat within Sun from reaching the surface. The magnetic field lines near sunspots can cause a sudden explosion of energy called a solar flare.

## 5. Sunspots



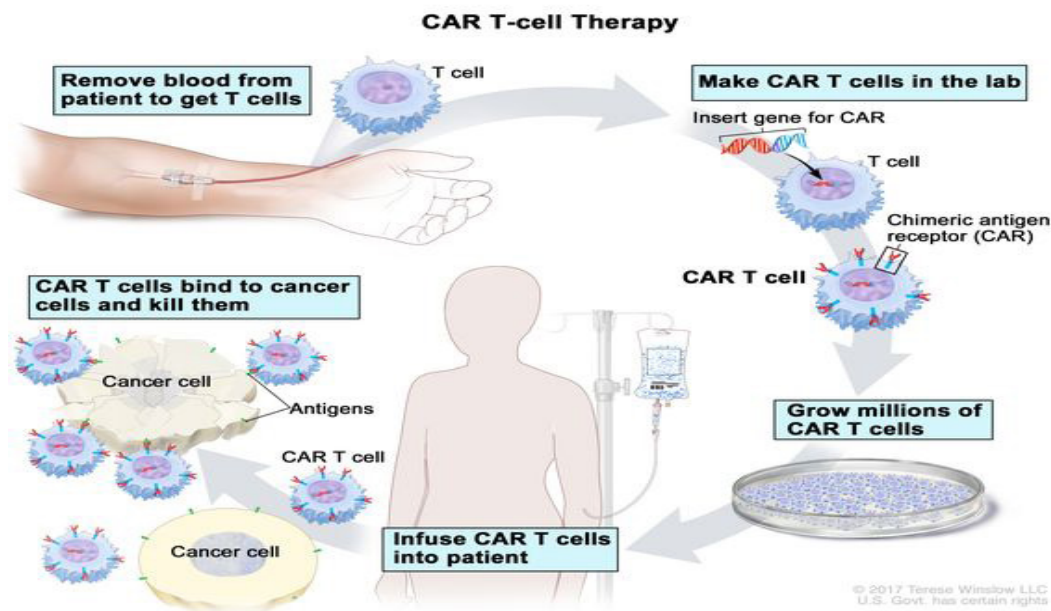
## F. Biotechnology

### CHIMERIC ANTIGEN RECEPTOR T-CELL THERAPY (CAR-T)

Update:- first time indigenously developed CAR-T therapy was tested on patients in India. This study is part of National Biopharma mission (NBM), & it was conducted by IIT Bombay & Tata Memorial Centre under Biotechnology Industry Research Assistance Council (BIRAC).

#### About CAR-T Therapy

- it is process <sup>that use</sup> ~~by using~~ immune T cell to fight cancer by editing them in the lab.
- T cell is type of white blood cell that attack foreign pathogen.
- T cell are taken from blood of patients, then edited by adding gene for man-made receptor (CAR).
- CAR is special receptor, which created in laboratory that is designed to bind to certain protein on cancer cell.
- CAR is then added to T cell, to help them better identify specific cancer cell antigen.
- This changed/modified cell is known as CAR-T cells.
- Then this CAR-T cell given by to patients.



### Benefits of CAR-T Therapy

- ⇒ CAR-T technology hold promise of curing certain types of cancer, while existing treatment work toward increasing life of patient
- ⇒ Unlike chemotherapy, CAR-T is administered only once to a patient.
- ⇒ It took shorter treatment time & more rapid recovery.

### Note:-

#### T and B cell

- Immune system cell: Innate and acquired
- Innate immune cell: it is body's first line of defence that quickly response to fight infection.
- Acquired immunity (Adaptive immunity): It use T-cell and B-cell when invading organism slip through first line of defence.
- It ~~cell~~ also called as lymphocytes
- B cell produce antibodies which are used to attack invading bacteria, virus and toxin.
- T cell are direct fighters for foreign invaders & produce cytokine which help to active other part of immune system.



## GENOME SEQUENCING

Update: Recently, first-ever sequencing of human genome has been done.

### About

Genome Sequencing means deciphering the order of DNA nucleotide, in a genome that is the order of:-

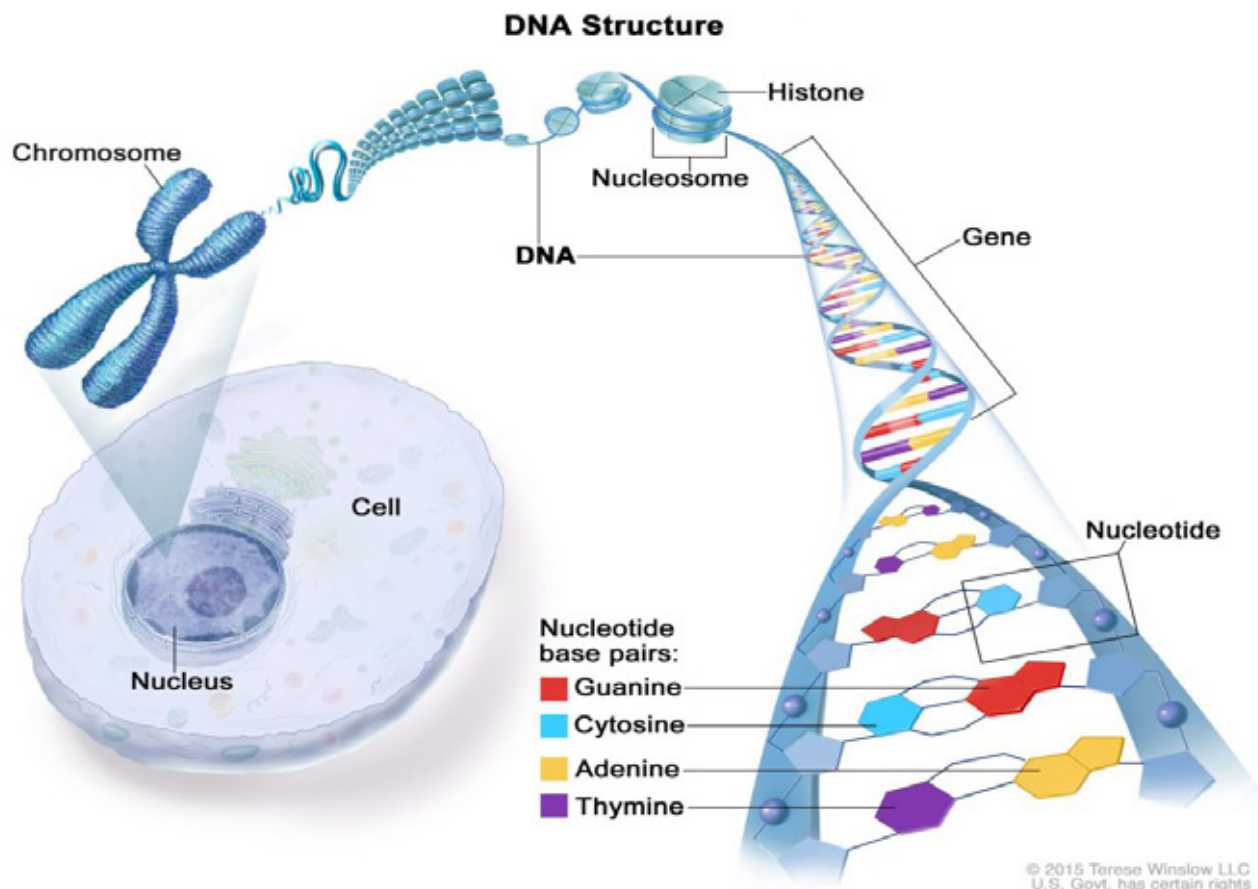
- ① Adenine (A)
- ② Cytosine (C)
- ③ Guanine (G)
- ④ Thymine (T)

### Note: Genome

It is an organism's complete set of DNA. It includes all the chromosomes, which house DNA & Genes.

### Application of Genome Sequencing

- ↳ It helps in better understanding of evolution and biology
- ↳ It helps in identifying genome causes of rare disease, neurodegenerative condition and cancers etc.
- ↳ It helps in identifying genetic mutation in a virus, its evolution and spread.





## CLONING

Update:- Recently, china successfully cloned a wild arctic wolf for first time in world.

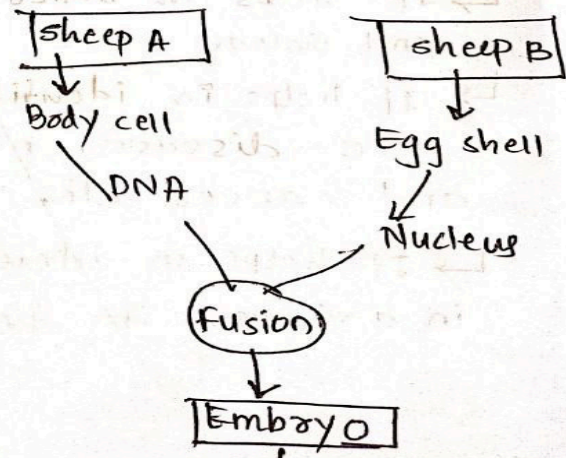
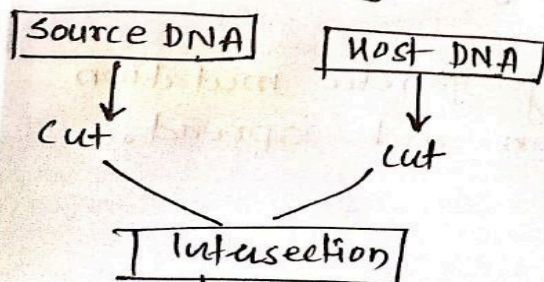
### About

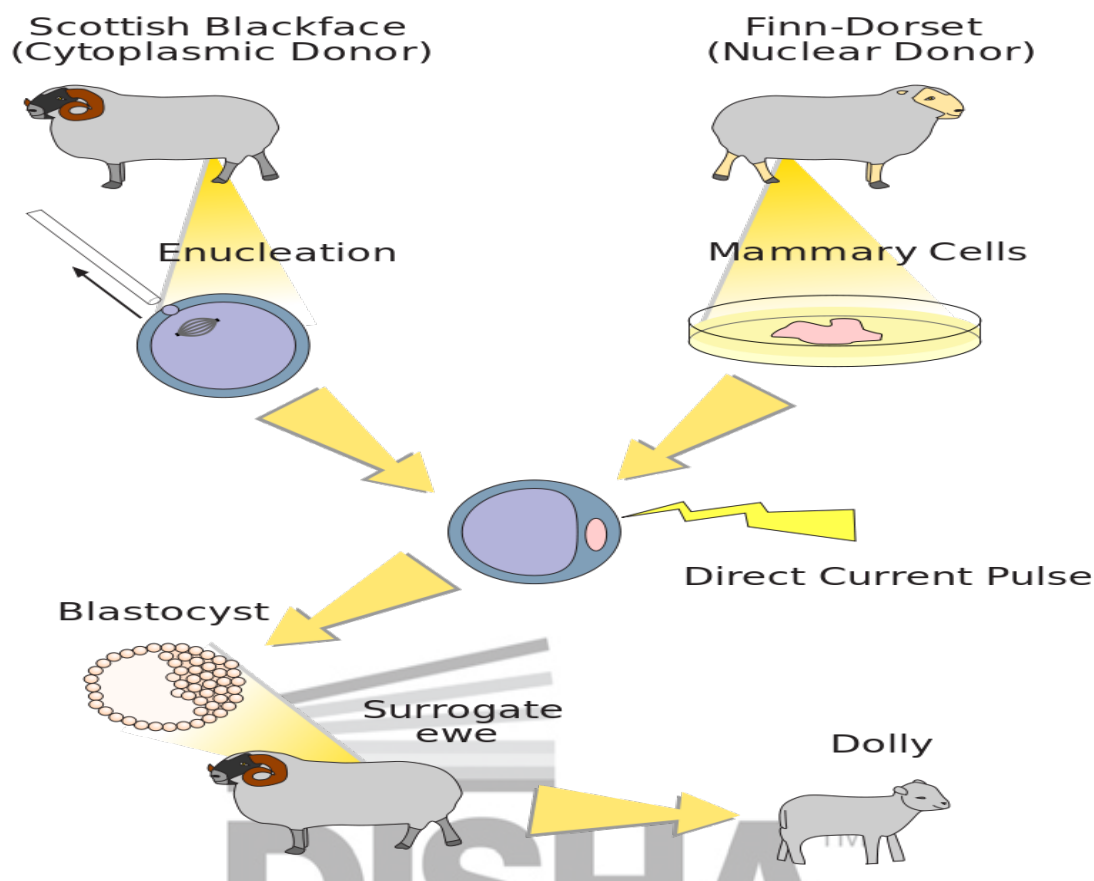
- clone is an copied material, which has same genetic makeup as the original.
- The process of producing genetically identical copies of a biological entity (genes, cells, tissues and even entire organism), either by natural or artificial means.
- Despite having same genetic materials ~~clone~~ clone do not always ~~look~~ look identical as environment also play a role in deciding physical feature of an organism.

### Example

#### Animal cloning

#### DNA cloning





### Application of cloning

- ↳ It helps in studying disease
- ↳ Helps in recreating species
- ↳ cloned embryo could produce stem cell
- ↳ ensure food security.

### Indian Biological Data Center

**Updates:** Recently, Indian Biological Data Center (IBDC) was inaugurated at Faridabad, Haryana.

#### About (IBDC)

It is the first national repository for life science data in India, where the data will not only be submitted from across India but can be accessed by researchers from across India. It is mandated to archive all life science data in IBDC generated from publicly funded research in India. It is supported by the Department of Biotechnology (DBT). It is being established at the RCB in collaboration with the National Informatics Centre (NIC), Bhubaneswar. It costed around 85 crore rupees to be set up.

#### Objectives:

- Provide IT platform for perpetually archiving biological data in the country.
- Development of standard operating Procedures (SOPs) for storing and sharing the data as per FAIR (Findable, Accessible, Interoperable and Reusable) Principle.

- Perform quality control, curation/annotation of data, data backup and management of data life cycle.
- Development of web-based tools/Application Programming Interface (API) for data sharing/retrieval.
- Organization of training programs on 'Big' data analysis and benefits of data sharing.

#### Key Features:

- The digitised data will be stored on a four-petabyte supercomputer called 'Brahm'. A petabyte equals 10,00,000 gigabytes (gb).
- Different sections of IBDC would typically deal with particular type(s) of life science data.
- Each IBDC section would have dedicated data submission and access schema.
- IBDC has a backup data 'Disaster Recovery' site at NIC.
- Further, IBDC shall also develop highly curated data sets in order to facilitate knowledge discovery in various domains of life sciences.
- It would also provide infrastructure and expertise for biological data analysis.

## Landmark Updates of General Studies Subject

- It currently accepts nucleotide sequences — the digitised genetic makeup of humans, plants, animals, and microbes.
- There are now 200 billion base pair data in the bio-bank, including 200 human genomes sequenced under the '1,000 Genome Project', which is an international effort to map the genetic variations in people.
- The project will also focus on populations that are predisposed to certain diseases.
- It will also help researchers in studying zoonotic diseases.
- Although the database currently only accepts such genomic sequences, it is likely to expand later to storage of protein sequences and imaging data such as copies of Ultrasound and Magnetic Resonance Imaging (MRI).

### Data Access:

IBDC would have majorly two data access types:

1. Open access/time-release access: Data submitted at IBDC would be freely accessible across the globe as

per international open-access standards. The submitter, however, may choose to restrict the data access for a defined period of time.

2. Restricted access: The data would not be made accessible freely. It can only be accessed through prior permission through IBDC from the original data submitter.

### Significance:

- It will reduce the dependency of Indian researchers on American and European data banks.
- It will not only provide a platform to researchers to securely store their data within the country, it will also provide access to a large database of indigenous sequences for analyses.
- Such databases have traditionally played a key role in determining the genetic basis of various diseases and finding targets for vaccines and therapeutics.

## G. IT and Computer

### 1. National Geospatial Policy

**Updates:** The Ministry of Science and Technology has notified a National Geospatial Policy (NGP) 2022, with the goal of making India a world leader in the Global Geospatial Sector. India's geospatial economy is expected to cross Rs 63,000 crore by 2025 at a growth rate of 12.8% and to provide employment to more than 10 lakh people

#### About National Geospatial Policy

It is a citizen-centric policy based on Geo-Spatial technology, which seeks to strengthen the Geospatial sector to support national development, economic prosperity and a thriving information economy. The policy is aimed to set up high resolution topographical survey and mapping, with a high-accuracy Digital Elevation Model (DEM) by 2030.

#### Vision and Goals:

- It aims to make India a World Leader in Global Geospatial space with the best in the class ecosystem for innovation.
- To develop a coherent national framework in the country and leverage it to move towards a digital economy and improve services to citizens.
- To develop Geospatial infrastructures, Geospatial skill and knowledge, standards, Geospatial businesses.
- To promote innovation and strengthen the national and sub-national arrangements for generation and management of Geospatial information.

#### Institutional framework:

- A Geospatial Data Promotion and Development Committee (GDPDC) at the national level shall be the apex body

for formulating and implementing strategies related to promotion of the Geospatial sector.

- GDPDC would replace and subsume the functions and powers of the National Spatial Data Committee (NSDC) constituted in 2006 and GDPDC constituted in 2021.
- Department Of Science & Technology shall continue to be the nodal Department of the Government and GDPDC shall make suitable recommendations to DST in the discharge of its functions relating to the Geospatial regime.

### Milestones towards Realization of the Policy's Vision:

#### 1. Year 2025:

Put in place an enabling policy and legal framework that supports liberalization of Geospatial sector and democratization of data for enhanced commercialization with Value Added Services.

#### 2. Year 2030:

High resolution topographical survey & mapping (5-10 cm for urban & rural areas and 50 cm-100 cm for forests & wastelands).

#### 3. Year 2035:

High resolution/accuracy Bathymetric Geospatial Data of inland waters and sea surface topography of shallow/deep seas - to support Blue Economy.

National Digital Twin of major cities and towns. The Digital Twin is a virtual replica of a physical asset, process or service that lies at the core of the new digital revolution.

National Digital Twin would be an ecosystem of smart, dynamic, connected Digital Twins, enabled by secure and interoperable data sharing, to facilitate better decision-making.

**Significance:**

- Geospatial technology and data can act as agents of transformation for achieving the Sustainable Development Goals (SDGs).
- This is a vibrant initiative to promote the Start-Up & reduce the last mile dependencies on the foreign soil.
- Geospatial data play a vital role in a wide spectrum of frequencies for critical data management applications, such as military operations, disaster and emergency management, environmental monitoring, land and city planning.

**Note: Geospatial Technology**

- It uses tools like GIS (Geographic Information System), GPS (Global Positioning System) and Remote Sensing for geographic mapping and analysis.
- These tools capture spatial information about objects, events and phenomena (indexed to their geographical location on earth, geotag). The location data may be Static or Dynamic.
- Static location data include position of a road, an earthquake event or malnutrition among children in a particular region while dynamic location data include data related to a moving vehicle or pedestrian, the spread of an infectious disease etc.
- The technology may be used to create intelligent maps to help identify spatial patterns in large volumes of data. The technology facilitates decision making based on the importance and priority of scarce resources.





## Practice Questions

### 1. Consider the following statements regarding Lumpy Skin Disease:

1. It is a bacteria infection in cattle.
  2. It spreads through houseflies and mosquitoes.
- Which of the above statements is/are correct?
- (a) 1 only                                      (b) 2 only  
(c) Both 1 and 2                              (d) Neither 1 nor 2

**Ans: (b)**

- Several states, including Gujarat and Rajasthan, have been battling the outbreak of Lumpy Skin Disease (LSD), a viral infection of cattle.
- LSD is caused by the lumpy skin disease virus (LSDV), which is a virus of the capripoxvirus genus in the poxviridae family.
- The LSDV mainly affects cattle — cow and its progeny, and the Asian water buffaloes.
- The LSDV spreads through blood-sucking vectors like ticks and mites like houseflies, mosquitoes, etc.
- It also spreads through contaminated water, fodder and feed.

### 2. Consider the following statements:

1. A ramjet is a form of air-breathing jet engine that uses the vehicle's backward motion to compress incoming air for combustion with a rotating compressor.
2. Ramjets work most efficiently at hypersonic speeds around Mach 10 and above.

Which of the given above statements is/are correct?

- (a) 1 only                                      (b) 2 only  
(c) Both 1 and 2                              (d) Neither 1 nor 2

**Ans: (d)**

- A ramjet is a form of air-breathing jet engine that uses the vehicle's forward motion to compress incoming air for combustion without a rotating compressor.
- Fuel is injected in the combustion chamber where it mixes with the hot compressed air and ignites.
- A ramjet-powered vehicle requires an assisted take-off like a rocket assist to accelerate it to a speed where it begins to produce thrust.
- Ramjets work most efficiently at supersonic speeds around Mach 3 (three times the speed of sound) and can operate up to speeds of Mach 6. However, the ramjet efficiency starts to drop when the vehicle reaches hypersonic speeds.
- A scramjet engine is an improvement over the ramjet engine as it efficiently operates at hypersonic speeds and allows supersonic combustion.
- Thus it is known as Supersonic Combustion Ramjet, or Scramjet.

A dual mode ramjet (DMRJ) is a type of jet engine where a ramjet transforms into scramjet over Mach 4-8 range, which means it can efficiently operate both in subsonic and supersonic combustor modes.

### 3. Which vaccine maker of Covid-19 has applied for trials on children?

- (a) Covishield                                      (b) Covaxin  
(c) Sputnik                                      (d) The ZyCoV-D

**Ans. (d)**

ZyCoV-D vaccine trials in children aged 3 years to 12 years old. The ZyCoV-D vaccine is also the world's first DNA vaccine against Covid-19.

### 4. What is QSim?

- (a) It's a password to a website.  
(b) It's a new computer game.  
(c) It's a new type of mobile SIM.  
(d) It's 'Quantum Computer Simulator (QSim) Toolkit.'

**Ans: (d)**

QSim is the first-of-its-kind toolkit, indigenously developed in India. It is meant to be a vital tool for learning and understanding the practical aspects of programming with the help of Quantum Computers. It will thus bring about a new era of Quantum Computing research in India.

### 5. First 3D-Printed Human Cornea in India was developed by which of the following institutions?

- (a) IIT Delhi                                      (b) IIT Hyderabad  
(c) IIT Madras                                      (d) IIT Bombay

**Ans: (b)** India's First 3D-printed Human cornea made from human donor corneal tissue has been created by researchers from the L V Prasad Eye Institute (LVPEI), Indian Institute of Technology-Hyderabad (IIT-H), and the Centre for Cellular and Molecular Biology (CCMB).

### 6. With reference to the Genetically Modified mustard (GM mustard) developed in India, consider the following statements:

1. GM mustard has the genes that allow the plant cross-pollination and hybridization.
  2. GM mustard was developed by scientists at IIT Delhi.
- Which of the statements given above is/are correct?
- (a) 1 only                                      (b) 2 only  
(c) Both 1 and 2                              (d) Neither 1 nor 2

**Ans: (a)**

- GM mustard is developed by using three genes viz., barnase, barstar and bar from *Bacillus amyloliquefaciens* for hybrid seed production.
- It has mainly two genes ('barnase' and 'barstar') that allow for cross-pollination and hybridisation in mustard, which is largely a self-pollinating plant because of its individual flowers containing both female and male reproductive organs.
- GM mustard was developed by scientists at Delhi University and the project was part-funded by the Department of Biotechnology, a division of the Science Ministry.

### 7. With reference to the term 'Bluebugging' consider the following statements:

1. It is a form of hacking that lets attackers access a device through its IMEI connection.

2. Once a device or phone is bluebugged, a hacker can listen to the calls, read and send messages and steal and modify contacts.

Which of the statements given above is/are correct?

- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2

**Ans: (b)**

- It is a form of hacking (started out as a threat for laptops with Bluetooth capability) that lets attackers access a device through its discoverable Bluetooth connection.
- Once a device or phone is bluebugged, a hacker can listen to the calls, read and send messages and steal and modify contacts.

**8. Consider the following statements regarding Polar Satellite Launch Vehicle (PSLV) and Geosynchronous Satellite Launch Vehicle (GSLV):**

1. PSLV was developed to launch high-Earth Orbit satellites into polar and sun synchronous orbits.
2. GSLV was developed to launch the light INSAT class of geosynchronous satellites into orbit.

Which of the above statements is/are correct?

- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2

**Ans: (d)**

- India has two operational launchers- Polar Satellite Launch Vehicle (PSLV) and Geosynchronous Satellite Launch Vehicle (GSLV).
- PSLV is the third generation launch vehicle of India and the first Indian launch vehicle which is equipped with liquid stages.
- GSLV, on the other hand, is the fourth generation launch vehicle and is a three-stage vehicle with four liquid strap-ons.
- PSLV was developed to launch low-Earth Orbit satellites into polar and sun synchronous orbits. It has since proved its versatility by launching geosynchronous, lunar and interplanetary spacecraft successfully.
- On the other hand, GSLV was developed to launch the heavier INSAT class of geosynchronous satellites into orbit. In its third and final stage, GSLV uses the indigenously developed cryogenic upper stage.
- PSLV is designed mainly to deliver the earth observation or remote sensing satellites, whereas, GSLV has been designed for launching communication satellites.
- GSLV delivers satellites into a higher elliptical orbit, Geosynchronous Transfer Orbit (GTO) and Geosynchronous Earth Orbit (GEO).
- PSLV can carry satellites up to a total weight of 2000 kgs into space and reach up to an altitude of 600-900 km. GSLV can carry weight up to 5000 kgs and reach up to 36,000 km.

**9. Which of the following statement about James Webb Space Telescope are correct?**

1. The telescope is the outcome of an international collaboration between NASA, the European Space Agency (ESA) and the Canadian Space Agency.
2. It was launched in December 2021.
3. It's the largest and the most powerful infrared space telescope.

Choose the correct answer using the options given below.

- (a) 1 only (b) 1 and 2  
(c) 2 and 3 (d) 1, 2 and 3

**Ans: (d)**

**James Webb Space Telescope**

- The telescope is the outcome of an international collaboration between NASA, the European Space Agency (ESA) and the Canadian Space Agency and it was launched in December 2021.
- It is currently at a point in space known as the Sun-Earth L2 Lagrange point. Objects positioned at these L2 point are relatively stable and require minimal external energy or fuel to maintain their position
- It is the largest, most powerful infrared space telescope.
- It is a successor to Hubble Telescope.

**10. Which of the following became the first country to approve Covid booster vaccine targeting original and Omicron strains in August 2022?**

- (a) USA (b) India  
(c) UK (d) China

**Ans: (c)**

The United Kingdom has authorized the first ever covid-19 vaccine for Omicron variant. It is the first country to do so.

**11. The oldest documented light in the history of the universe, which was recently released, was captured by which telescope?**

- (a) Hubble Space Telescope  
(b) James Webb Space Telescope  
(c) Voyager Space Telescope  
(d) Akash Space Telescope

**Answer: (b)**

US President Biden unveiled an image taken by the James Webb Space Telescope. It is the oldest documented light in the history of the universe from 13 billion years ago. The image is called by the name of SMACS 0723. It is a patch of sky visible from the Southern Hemisphere on Earth and visited by Hubble and other telescopes in search of the past.

**12. Which of the following statements about 'Vande Bharat Express' are correct?**

1. It is indigenously designed and manufactures.
2. It is a semi-high speed train.
3. First Vande Bharat Express train was manufactured by Rail Coach Factory, Kapurthala.

Choose the correct answer from the options given below.

- (a) 1 and 2 (b) 1 and 3  
(c) 2 and 3 (d) 1, 2 and 3

**Ans: (a)**

- Vande Bharat Express is an indigenously designed and manufactured semi high speed, self-propelled train. It is considered as major leap forward for the Indian Railways in terms of speed and passenger convenience.
- The first Vande Bharat was manufactured by the Integral Coach Factory (ICF), Chennai under 'Make in India' programme'.
- The Vande Bharat was India's first try towards the train set technology compared with conventional systems of passenger coaches hauled by locomotives.