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Prelim Bits Compilation

INDEX

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1. HISTORY, ART & CULTURE

1.1 Lothal dockyard of Harappan Civilisation

Recently a new study by the Indian Institute of Technology-Gandhinagar has found evidence for Lothal dockyard of Harappan Civilization.

- **Geographical location** – It is situated approximately 30 km inland from the Gulf of Khambhat on the western coast of India in Gujarat.

- **Economy** – It served as a bustling port during the Bronze Age Harappan period (2600 BCE to 1900 BCE)

- It was connected to a series of Harappan production and distribution centres along the Gulf of Kachchh and the Rann of Kachchh.

- **Significance** - It is renowned for its well-preserved ***brick-walled dockyard and warehouse***.

- **Lothal dockyard theory** – It is reevaluated using multi-sensor data, cloud computing, and multiple platforms.

- **Path of Sabarmati River** – It used to flow by Lothal during IVC period but *currently, it flows 20 km east* of Lothal.

- The lower reaches of the River underwent significant migration during the late Holocene period which was discovered by the satellite images of the old channels of the River Sabarmati.

- **Travel Route** - There was also a travel route connecting Ahmedabad, through Lothal, the Nal Sarovar wetland, and the Little Rann, to Dholavira.

1.2 Sakthan Thampuran

Recently, Minister of State for Tourism pledged to renew the statue of Sakthan Thampuran.

- **Sakthan Thampuran** – It is the other name of *Raja Rama Varma Kunjipillai* or Rama Varma IX.

  - **Parents** - Ambika Thampuran and Chendose Aniyan Namboodiri.

  - He was raised by an aunt who called him Sakthan, meaning 'powerful'.

- **Ruler** – He ruled the Kingdom of Cochin

- **Ruling Period** - 1790 to 1805.

- **Cochin kingdom** - It was part of the Late Chera Empire, covered the regions between Ponnani in Malappuram and Thottappally in Alappuzha.

- **Heir apparent** - He became heir apparent in 1769 as an 18-year-old.

- **Strategist** - He advised his king to maintain friendly relations with both the Dutch and the English.

- **Travancore Invasion** - He is said to have orchestrated Mysore's attempt to invade the Travancore kingdom.

- **Powney treaty** - It freed the Cochin kingdom from its allegiance to Mysore, and helped formalise its relations with the British.

- **Ending Yogiatirippads** – He entrusted temple management to the government from Yogiatirippads.
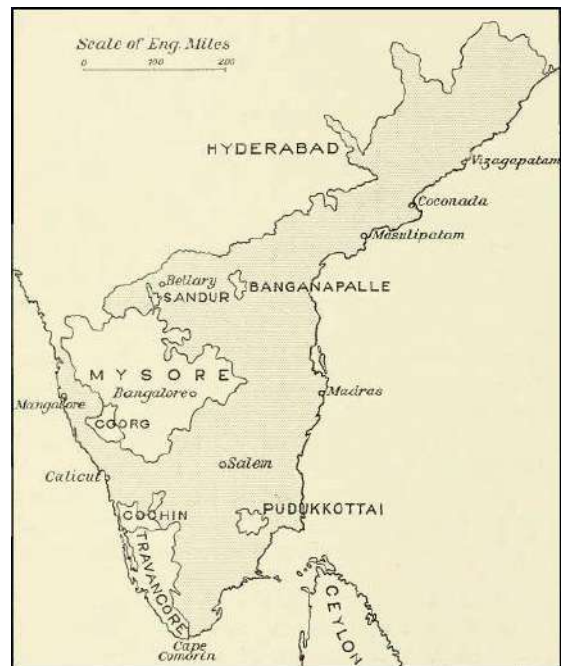
- Yogiatirippads are erstwhile spiritual heads of the Vadakkumnathan and Perumanam temples.

- **Capital Transfer** – He transferred the seat from Thrippunithura to modern-day Thrissur.

- **Trade Encouragement** - He encouraged merchants of all religions and British officials to relocate to the city.

- **Revenue Management** - He also overhauled and firmed up the kingdom's finances, personally overseeing revenue management.

- **Thrissur Pooram** – He started the Thrissur Pooram in 1797 as an alternative to the Arattupuzha Pooram.

- The Thrissur Pooram was conceived as an opportunity for the major temples in Thrissur to come to pay their respects to Lord Shiva, the presiding deity at the Vadakkumnathan Temple.

1.3 Port Blair renamed as Sri Vijaya Puram

Union Minister recently that Port Blair will now be known as 'Sri Vijaya Puram'.

- **Name change** – It is to pay homage to the ancient **_Sri Vijaya Empire_**, which held influence over the region.

- **Port Blair** - It is the **_capital of the Union Territory of Andaman and Nicobar Islands_** and the entry point of the Andaman and Nicobar Islands.

  o It was named after **_Archibald Blair,_** a naval surveyor and lieutenant in the Bombay Marine.

  o He was the 1st officer to carry out a thorough survey of the Andaman Islands.

- Once he reached the natural harbor, he initially named it as **_Port Cornwallis_** but later the island was renamed after him.

- **British Colony** - EEIC colonized it mainly to establish it as a safe harbour from which it could check the activities of the Malay pirates.

- **Penal Colony** – It is called so as several convicts were transported to the islands to serve unpaid labour.

> **Archibald Blair's survey missions** includes those in the Chagos archipelago, Diamond Harbour located in the south of Calcutta, and along the Hooghly River in late 1780s.

- On account of severe disease and death there, EEIC stopped operating it in 1796.

- **Revival of the colony after 1857 revolt –** 1857 revolt resulted in a large number of prisoners for the British, prompting the immediate renovation and resettlement of Port Blair as a penal colony.

- Most of the convicts received life imprisonment at Port Blair.

- Several of them were hanged, while many died due to disease and the degrading conditions in the region.

- **Kaala pani -** With the strengthening of the Indian Independence Movement in the late 19th century, a huge cellular jail was established here by 1906.

- Popularly known as Kaala Paani, it housed several freedom fighters, including **_Veer Damodar Savarkar._**

Andaman and Nicobar Islands

- **Connection with the Cholas**- Historical records suggest that the Islands were used as a strategic _naval base_ by the 11th century _Chola emperor, Rajendra I_ to carry out an attack on **_Srivijaya, which is in present day Indonesia._**

- As per an inscription found at Thanjavur dated to 1050 CE, the Cholas referred to the island as Ma-Nakkavaram land (great open/ naked land), possibly led to the modern name of Nicobar under the British.

- **Historical significance** – It hold a prominent place in India's fight for independence.

- It is also the place that hosted the _first unfurling of our Tiranga by Netaji_ Subhash Chandra Bose ji.

1.4 Karma Festival or Karma Naach

Festival Karma starts with great pomp in Jharkhand recently.

- **Karma Naach** – It is also known Karma dance, a traditional _tribal performance_ that is conducted to commemorate the **_harvest festival_** and to honor the _revered Karam tree_.

- **Spread**- _Eastern India_, especially in Chota Nagpur plateau, covering states of Chhattisgarh, Jharkhand, Madhya Pradesh, Odisha, and West Bengal celebrated this tribal festival.

- **Central deity** –Karam tree, regarded as a symbol of Karam Devta or Karamsani, the deity representing strength, vigor, and vitality.

- **Dance - _Both males and females_** actively gather to form a circle, intertwining their arms around each other's waists & dances in a circle around a sacred tree, honored as Karma.

- **Instrument** - Thumki, Chhalla, Payri, and Jhumki instruments.

- **Celebrated by -** Munda, Ho, Oraon, Baiga, Kharia, and Santhal tribes.

- **Celebrated on -** The Ekadashi tithi (the eleventh day) of the lunar fortnight in the month of Bhado/Bhadra, which corresponds to August-September in the Gregorian calendar.

- **Nature of Celebration** - A week prior to the festival, young women gather clear sand from the river to sow 7 varieties of grains.

- On the festival day, a branch from the Karam tree is planted in a courtyard or 'akhra'.

- In addition they also planted the stems of Chirchitti (chaff flower) and Sindwar (chaste tree) in their rice fields, which, according to Tirkey, served as natural pest deterrents.

- Devotees present jawa (hibiscus) flowers, and the pahan (priest) performs rituals for Karam Raja.

- The festival concludes with the immersion of the Karam branch in a river or pond, where devotees share the jawa among themselves.

- Towards the conclusion of Karam, branches from sal or bhelua trees are often placed in fields, symbolizing the hope that Karam Raja/Devta will safeguard their crops.

1.5 The Great Stupa of Sanchi

External Affairs Minister recently stopped by the replica of the East Gate of Sanchi's Great Stupa standing in front of Humboldt Forum museum in Berlin.

> **Stupa** is a hemispherical structure whose origins can be traced to pre-Buddhist burial mounds found in India. Now, it is a Buddhist commemorative monument usually containing sacred relics of the Buddha or other venerable saints.

- It is the largest and oldest structure in a complex of Buddhist monuments comprising numerous other stupas, temples, and monasteries.

- It is one of the oldest _stone_ structures in India

- **Geographical location** – It is located in the village of Sanchi in _**Madhya Pradesh.**_

  - Sanchi was an important religious center from the 3rd century BC to the 13th century AD.

- **Built by** – The _**Mauryan emperor Ashoka**_ in the 3rd century BCE.

- **Enlargement** – It was enlarged by using local _**sandstone**_ during the _**Sunga period**_, which began about 50 years after Ashoka's death.

- During the _**Gupta period**_, additional structures were built at Sanchi, including a _Buddhist temple and a lion pillar._

- **Features** – Originally, it is about half the size and built from large bricks and mud mortar.

- It had raised terraces at the base, was enclosed by a wooden railing, and was crowned by a stone umbrella.

- **Vedika –** It is a stone railing surrounding a circumambulatory walkway.

- Circumambulation or pradakshina is an important part of ritual and devotional practices in Buddhism.

- **Harmika -** The main body of the stupa symbolises the cosmic mountain which is topped by a 'harmika', a square structure to hold the _triple umbrella, or 'chhatraveli'._

  - It represents the 3 jewels of Buddhism – the Buddha, the Dharma, and the Sangha.

- **Gateways** - The gateways at the 4 cardinal points or Toranas are the highlights of the structure, with a series of detailed carvings showing Buddhist symbols and important historical and religious scenes.

- It were added later, in the 1st century BC.

- **Toranas** – It comprise of <u>two stone pillars</u> surrounded by capitals.

- **Chronological sequence of Gateways** – Southern, Northern, Eastern and Western.

- The sculpture of Buddha in dhyana-mudra at the eastern side of the stupa, added to the site in the 5th century AD by the Guptas.

- **Significance** – An inscription celebrating the victory of Chandragupta II is found on the railing of the Great Stupa, which dates back to the fourth century A.D.

- **Decline** – It began to decline as a major religious site around the same time that Buddhism itself was declining in the Indian subcontinent.

- **Recognition** – It has been a **<u>UNESCO World Heritage Site</u>** since 1989.

2. GEOGRAPHY

2.1   Indian Ocean Biodiversity Ocean Information System (IndOBIS)

Recently Centre for Marine Living Resources and Ecology (CMLRE) organised a national-level workshop on IndOBIS.

- **IndOBIS** – It is the Indian regional node of the global Ocean Biodiversity Information System (OBIS).

- **Developed by** - Centre for Marine Living Resources and Ecology (CMLRE).

- **Function** - It collects data of taxonomically resolved marine species occurrence records from the Indian Ocean.

> *CMLRE is a premier research institution under the Ministry of Earth Sciences, established in 1998 at Kochi.*

- It accepts several categories of marine biodiversity data types, including literature and occurrence, abundance records, DNA-derived or genomic profiles, etc.

- **Use** - It can be used in innovative studies such as tracking species distribution, identifying biodiversity hotspots, and accessing climate change impacts.

Ocean Biodiversity Information System (OBIS)

- OBIS – It is one of the largest global repositories of information on marine species, marine science, conservation, and education.

- It emanated from the Census of Marine Life (2000-2010).

- **Established by** - Intergovernmental Oceanographic Commission (IOC) of UNESCO.

- It is now an integral component of the International Oceanographic Data and Information Exchange (IODE) of IOC.

- **Features** - It is supported by a network of nearly 30 regional nodes contributing data.

- It contains millions of records from thousands of datasets contributed by researchers, governments, and organisations worldwide.

- It provides detailed information on **_species distribution across the world's oceans_**, including data on their occurrence, habitats, and environmental parameters.

- It provides free and open access to, and application of, biodiversity and biogeographic data on marine life.

- It offers tools and services that allow users to search, visualise, and download biodiversity data.

Ocean Eyes

- It is a *citizen-centric mobile app for community-engagement* approach to data collection, sharing, and analysis in marine biodiversity monitoring and research.

- **Developed by** - Centre for Marine Living Resources and Ecology

- Citizens and users can record sightings of marine species, log environmental conditions, and upload geotagged photos directly through the mobile.

2.2   Gold nuggets in orogenic quartz veins

A study explored why gold nuggets accumulate in orogenic quartz veins found in mountainous areas.

- **Gold Nuggets** - They are naturally occurring pieces of gold which contains 75 to 97 % gold.

- **Formation-** Most nuggets originate from the quartz veins formed in orogenic gold systems found around the world.

- Quartz, a piezoelectric crystal, develops a voltage when squeezed or mechanically distorted.

- **Piezo catalytic chemical reactions** - Piezoelectric field distorts the electronic properties of the crystal.

- It makes the charged particles, like electrons, flow from the crystal to an aqueous solution on its surface or vice versa.

- This drives electrochemical reactions at the material-solution interface and causes *gold to be deposited from the solution* to the slabs' surface.

Orogenic refers to mountain formation driven by tectonic plate convergence and deformation.

- **Earthquake** - Seismic activity can repeatedly squeeze quartz crystals, leading to piezo catalytic reactions and the gradual accumulation of gold in quartz veins.

- Over time, this process results in large gold nuggets.

2.3   Earth's 3rd Energy Field - Polar Wind

NASA scientists have detected and measured Earth's 3rd energy field using a suborbital rocket as part of the Endurance Mission.

- **Ambipolar Electric Field** – It is a *weak, planet-wide electric field*, **counteracts gravity** and ejects particles into space as fundamental as Earth's gravity and magnetic fields.

- *Any planet with an atmosphere* should have an ambipolar field.

- **Formation** - Scientists theorized this electric field should begin at around **250 kilometers altitude**, where atoms in our atmosphere break apart into negatively charged electrons and positively charged ions.

- **Bidirectional or ambipolar** – The field works in both directions.

  o Ions pull the electrons down with them as they sink with gravity.

  o Electrons lift ions to greater heights as they attempt to escape to space.

- The net effect of the ambipolar field is to extend the height of the atmosphere, lifting some ions high enough to escape with the polar wind.

- **A key driver of the polar wind** – It is a steady *outflow of charged particles into space* that occurs above Earth's poles.

- **Polar wind** – It was strangely made up of particles moving at **supersonic speeds** even though they remained cold, contrary to expectations.

- Hydrogen ions, which are in abundance in the polar wind, are pushed into space by an electric field that is **10.06 times stronger than gravity.**

- It was found to push hydrogen ions into space and *increase the ionosphere's density* by 271%, which helps maintain its density at higher altitudes.

- The field acts like a conveyor belt which lifts the atmospheric particles into space.

2.4   Sahariya Tribes

At least 172 cases of malnourished children have been identified among Sahariya tribals in Baran district within 2 weeks.

- They are one among the ***Particularly Vulnerable Tribal Group (PVTG)*** in India.

- **Location** – These ethnic group are primarily found in ***Madhya Pradesh, Rajasthan and Chhattisgarh***.

- Their main residential area is the Shahabad forest, which stretches from Rajasthan to Guna in Madhya Pradesh.

- **Other names** - They are also known as Seher, Sair, Sawar, Saor, Sahara, etc.

- **History -** They traditionally trace their origins *back to the Ramayana* and beyond.

- **Language -** They speak a ***Munda language*** that belongs to the Austro-Asiatic language family.

- **Religion –** The members of Sahariya tribes believe in animism.

- They ***practice Hinduism*** and worship local deities like Bhavani, Gond Devta and Bundela Devta.

- **Social structure -** All adults in their community to be part of a governing council, which is ***led by a Patel.***
  - **The Pardhan** – A leader at the society level, and attends social functions like marriages.

- **Economy -** They are skilled in gathering forest products and making ***catechu from Khair trees.***

- **Occupation -** The Saharia farmers use the "*slash and burn" method* of cultivation along the hill slopes.

- Shamans are religious leaders who cure the sick by magic, communicate with the spirits, and control events.

- **Longlongs -** They are *quarters* within the village that is inhabited by one patrilineage called a ***birinda.***

- **Living arrangements** - They often live in separate areas of villages called "Seharana".

2.5   Mission Mausam

The Union Cabinet recently approved Mission Mausam with a budget outlay of 2,000 crores over two years.

- **Aim** – To make India ***'Weather Ready' and 'Climate Smart'***.

- **Mission** – To enhance the country's weather & climate observations, understanding, modelling and forecasting.

- **Mission Period** - 2024-26.

- **Nodal Ministry** - ***Ministry of Earth*** Sciences.

- **Implementing Agencies**
  - India Meteorological Department(IMD), Mausam Bhavan, New Delhi
  - National Centre for Medium Range Weather Forecasting (NCMRWF), Noida
  - Indian Institute of Tropical Meteorology, Pune

- **Objectives**
  - Develop Cutting Edge Weather Surveillance Technologies & Systems
  - Implement Higher resolution atmospheric observations
  - Implement Next-generation radars, and satellites with advanced instrument payloads
  - Implement High-Performance Computers (HPC).
  - Improve understanding of weather and climate processes and prediction capabilities
  - Develop improved earth system models, and data-driven methods (use of AI/ML)
  - Develop state-of-art dissemination system for last mile connectivity

- **Features** – The mission will establish
  - 50 Doppler Weather Radars (DWR)
  - 60 Radio Sonde/Radio Wind (RS/RW) stations
  - 10 Wind Profilers

- o 100 disdrometers
  - o 25 radiometers
  - o 1 Ocean Research station
  - o 10 Marine Automatic Weather Stations with upper air observation.

> A disdrometer is a device that measures the size and velocity of falling raindrops, snowflakes, and hail. It can also differentiate between different types of precipitation.

- **Benefits** – It will _improve forecasts on both spatial and temporal scales_ and air quality data and help strategize weather management/intervention in the long run.

2.6 Typhoon Yagi

Super Typhoon Yagi, one of Vietnam's strongest storms in 30 years, struck northern and central regions of the country.

- **Journey-** After passing through **_Hainan Island in China_** as a tropical cyclone, it got intensified into a super typhoon and made landfall in Quang Ninh province and Hai Phong City, Vietnam.

- **Impact-** It has become the most **_powerful storm in Asia in 2024_** and severely impacted countries including the Philippines, China, Laos, Myanmar, Thailand, and especially Vietnam.

> Typhoon yagi is the 2nd most powerful storm globally in 2024 after Hurricane Beryl.

Formation of Tropical Cyclones

- **Conditions-** Form over Warm Ocean waters near the **_equator._**

- **Process-** Warm, moist air rises, creating a low-pressure area.

- **Warm ocean temperatures** – They form in tropical oceans with sea temperatures of **_at least 27°C._**

- **Low pressure** - Areas of low pressure form over the warm ocean waters, drawing in surrounding winds.

- **Converging winds** - Winds near the ocean surface converge, forcing air to rise and form storm clouds.

- **Low wind shear** - Winds do not vary greatly with height, allowing storm clouds to rise vertically.

- **Distance from the equator** - The cyclone is far enough from the equator for the Coriolis force to take effect and cause the cyclone to spin.

- Surrounding high-pressure air moves into this low-pressure zone, also becoming warm and moist, then rises to form clouds and thunderstorms.

Climate Change and Tropical Cyclones

- **Impact-** There is a consensus that **_rising global temperatures_** are making tropical cyclones more intense.

- **Study findings-** Tropical cyclones in Southeast Asia are forming closer to coastlines, intensifying more rapidly, and lingering longer over land.

- **Sea surface temperature-** Global mean sea surface temperature has increased by 0.9°C since 1850 and by 0.6°C in the _last four decades._

- **Effect-** Higher sea surface temperatures cause marine heat waves, escalating the intensity of storms with stronger winds, heavier rainfall, and increased flooding.

> **_Classification of cyclones-_** _The strength of tropical cyclones is categorized using the Saffir-Simpson Hurricane Wind Scale into 5 categories based on sustained wind speeds._

> The **_Saffir–Simpson hurricane wind scale_** _is based on the highest wind speed averaged over a one-minute interval 10 m above the surface._

3. POLITY

3.1 Food Import Rejection Alerts (FIRA) Portal

FIRA portal launched recently during the 2nd edition of the Global Food Regulators Summit 2024 hosted by FSSAI at Bharat Mandapam in New Delhi.

- **Aim** – To _notify the public and relevant food safety authorities_ about food import rejections at Indian borders.

- **Developed by -** The Food Safety Standards Authority of India (_**FSSAI**_).

- **Features -** It will generate alerts on a food consignments rejected by India due to poor safety standards

- It will also enable relevant food authorities to take immediate action for prevention and control of risks before it causes harm.

- It has an online interactive interface for rapid dissemination of information to ensure enhanced traceability and transparency.

- It helps for tracking rejected food products and for further strengthening of the risk management system.

Food Safety and Standards Authority of India (FSSAI)
- It is an independent _statutory body_, established under the _**Food Safety and Standards Act, 2006**_.   **Nodal ministry** - Ministry of Health and Family Welfare.   **Headquarters** - New Delhi.   **Aim** – To regulate the manufacture, storage, distribution, sale, and import of food articles, while also establishing standards to ensure food safety.   **Setting standards** - It sets science-based standards for food, including horizontal standards that apply to various food categories and vertical standards that apply to specific food products.   **Regulating food** - It regulates the manufacture, storage, distribution, sale, and import of food.   **Providing technical support** - The FSSAI provides scientific advice and technical support to the government.   **Inspecting food** - It inspects the food premises of the FBOs and grants the FSSAI license, a mandatory requirement to carry on the food business.   **Issuing license** - The FSSAI issues a 14-digit license number to the Food Business Operators (FBOs) who comply with the regulations and rules under the FSS Act.   **Promoting awareness** - The FSSAI promotes awareness about food safety and standards.

3.2 Constitution Amendment Bills

The Union Cabinet has cleared the proposal to hold simultaneous elections in India, as recommended by Kovind committee with 15 amendments to the Constitution of India.

- It is a bill that seeks to amend the Constitution of India.

- **Constitutional provisions** – _**Article 368**_ states that the Parliament may, in exercise of its constituent power, amend by way of addition, variation or repeal any provision of the Constitution.

- **Introduction** - In _**either House of Parliament, by a minister or a private member**_ in both houses can introduce the bill without the President's prior permission.

- A simple majority is required to adopt the motion for introducing the bill.

- **Passage** – It must be passed by both the Lok Sabha and the Rajya Sabha _by a special majority._

- **Special majority** - More than half of the total membership of the House must vote for the bill, and at least two-thirds of the members present and voting must also vote for it.

- **Federal bills** – If the bill impacts federal relations, it must also be ratified by at least half of the State Legislatures.

- After both Houses of Parliament pass the bill, and the State Legislatures ratify it where necessary, the bill is presented to the President for assent.

- **Number of amendments -** As of September 2024, there have _**been 106 amendments**_ to the Constitution of India since it was enacted in 1950.

3.3 Doctrine of Constructive Possession

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The Supreme Court called for the need to have sex education programs in schools in an effort to mitigate the menace of child pornography.

- **Constructive possession** - It refers to a legal theory whereby an individual can be considered in possession of an item *without having physical control over it*.

- It is the *ability and intent to exercise control* over an object, even if it is not physically on one's person.

- **Usage** – Courts use this doctrine to extend liability and responsibility to individuals who, while not directly holding an item, have dominion and control over it.

- It legally functions as actual possession in a variety of ways.

  o In criminal law, establishing constructive possession is often done to further prosecutions for possession crimes, such as possession of illegal drugs.

  o In property law, establishing constructive possession grants the owner the right to obtain physical control and/or a variety of rights over someone else's physical control of that property.

- Generally, for a court to find that a person had constructive possession of an object, the person must have had knowledge of the object, and as well as the ability to control it.

- **Legal Criteria-** For a successful prosecution of constructive possession, certain criteria must be met.

  o **Knowledge of the Item's Presence -** The individual must be aware that the item exists. Mere proximity to an item without knowledge does not constitute constructive possession.

  o **Ability to Exercise Control -** The person must have the capability to maintain dominion over the item. This means having the power and intention to control its use.

  o **Intent to Possess -** There must be an intent to possess the item. This can often be inferred from circumstances, such as the location of the item and the individual's actions or statements.

3.4 Declaration of Fact Check Unit as Unconstitutional

Bombay High Court officially strikes down Centre's Fact Check Unit, calls amended IT Rules 'unconstitutional' in its recent verdict.

Amended Information Technology Rules, 2023
• It empowered the Centre to *set up a fact check unit (FCU)*. • **FCU** – To *identify fake, false and misleading information* about the government & its establishments on social media. • **Requirements** – It requires social media intermediaries to make reasonable efforts to *prevent users from uploading or transmitting* any content flagged by the Centre's FCU as misinformation. • Such flagged content have to *be taken down within 36 hours* if the intermediaries wanted to retain their "safe harbour" protection.   *Safe harbour protection refers to legal protection for Internet service providers (ISPs) and other intermediaries that host or transmit third-party content online.*

- **Violation of rights** – It violates multiple fundamental rights provisions enshrined in the Indian Constitution

  o **Article 14** - Right to equality

  o **Article 19** - Freedom of speech and expression

  o **Article 19(1)(g)** - Freedom and right to profession

- **Split verdict** – One Judge pronounced that the rule promoted censorship and did *not fall within* the ambit of reasonable restrictions permitted *under Article 19(2)* of the Constitution.

- Other one reasoned that the government is best positioned to provide accurate information about itself and that the rules were intended solely to combat misinformation.

- **Tie-breaker rule** - Following the split verdict, the Chief Justice of the High Court appointed a Justice to hear the matter afresh and deliver a tie-breaking ruling, in accordance with the HC rules.

- **Intervention by Supreme Court** – While the verdict for awaited the Centre notified the FCU under the Press Information Bureau.

- This prompted the Supreme Court to *stay the operation* of the notification until tie-breaking verdict comes.
- **Final verdict** - The expression "fake, false and misleading" in the rules *was "vague and hence wrong"* in the absence of any definition.
- It created a "chilling effect" on intermediaries by *jeopardising their safe harbour protection.*
- **Further actions** – The Centre has the option of challenging High Court ruling in Supreme Court.

4. GOVERNMENT INTERVENTIONS & SCHEMES

4.1   Digital Bus initiative

The Digital Bus initiative has so far empowered young adults in remote areas with over three lakh beneficiaries.

- **Digital Bus** – These are *mobile classrooms* that bring IT courses, assessment, and certification, as well as access to the world of information and knowledge, to students in remote areas.
- **Joint venture** – It is between the National Digital India Mission and the NIIT Foundation.
  - **Digital India** – It was launched in 2015 for connecting rural areas with high-speed Internet networks and improving digital literacy.
  - **NIIT Foundation** – It is an Education NGO registered under the Societies Registration Act, 1860 to provide skilling and education to underserved communities.
- **Launched** – 2017
- **Objective**

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Reducing the Digital divide for those living in remote areas
Awareness of computers as a window to knowledge
Linkages to Government programs and initiatives
Enhancing interest-levels in learning
Introducing the multidisciplinary approach to education

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Using computers as a tool for daily tasks
Encouraging collaborative learning
Developing interpersonal skills
Providing awareness on technology amongst rural community
Providing equal opportunities for rural youth

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- **Components of the program**

Provide Digital Literacy at the Village Doorstep	IT Education	Entrepreneurship Development Program	Common public utility services	Video conferencing consultation	Dissemination of Government policies

Features of the Bus	Types of Courses
- Solar-powered 5G-enabled with computers and Internet - Camera/video capabilities - Preinstalled e-courses.	- Using e-mail, the Internet, and applications like MS Office. - Financial Literacy - Cyber Security

4.2   AgriSURE Fund

Recently, the Union government launched the AgriSURE Fund and Krishi Nivesh Portal.

- **AgriSURE Fund-** Agri Fund for Startups and Rural Enterprises.

- **Aim –** To *foster innovation and sustainability* in India's agricultural sector.

- **Target –** To support *approximately 85 agri startups* with investment sizes of up to Rs 25 crore each.

- **Managed by -** *NABVENTURES*, a wholly owned subsidiary of *NABARD*.

- **Ministry –** Ministry of Agriculture & Farmers Welfare.

- **Features -** It will support through investments in sector-specific, sector-agnostic, and debt Alternative Investment Funds (AIFs).

- It will offer both equity and debt support, focusing on high-risk, high-impact activities in the agriculture value chain.

Quick Facts
Agriculture Infrastructure Fund (AIF) scheme – It was launched in 2020 for creation of Post-harvest Management infrastructure and Community farming assets.   **Krishi Nivesh Portal** - This portal will be a one stop place for availing the benefits promulgated by different Government departments and ministries in agriculture sector.

4.3   Schemes for improving farmers' lives and livelihoods

The Union Cabinet approved 7 schemes to improve farmers' lives and increase their incomes.

Digital Agriculture Mission
Aim – To integrate modern technologies such as ***AI and big data into the farming*** process to improve decision-making and efficiency.   **3 main pillars**   - Agri Stack   - Krishi Decision Support System   - Soil Profile Maps

Crop Science for Food and Nutritional Security
Aim – To bolster agricultural research and education, with a focus on various key areas critical to ensuring food security in the future.   **Research and education-** Enhancing academic and research capabilities in agriculture.   - Research on insects, microbes, pollinators, etc.   - Addressing issues that impact crop health and productivity.   **Plant genetic resource management-** Conserving and utilising genetic resources for crop improvement.

- **Genetic improvement for food and fodder crops-** Focusing on pulses, oilseeds, and commercial crops.

Strengthening Agricultural Education, Management and Social Sciences

- **Under-** *Indian Council of Agricultural Research (ICAR).*
- **Aim** – To modernise agricultural education in line with the ***New Education Policy 2020.***
- It will incorporate the latest technologies, including digital public infrastructure, artificial intelligence (AI), big data, and remote sensing.

Sustainable Livestock Health and Production

- **Animal health management & veterinary education-** Improving animal healthcare and veterinary education.
- **Dairy production & technology development-** Enhancing dairy production capabilities.
- **Animal genetic resource management-** Managing and improving animal genetics.
- **Animal nutrition and small ruminant production-** Developing sustainable practices for animal nutrition and the production of small ruminants.

Sustainable Development of Horticulture

- **Coverage** – Cultivation of tropical, sub-tropical, and temperate crops, as well as root, tuber, bulbous, and arid crops.
- It will also focus on vegetables, floriculture, mushrooms, and the development of plantation, spices, medicinal, and aromatic plants.

Krishi Vigyan Kendra and Natural Resource Management

- **Aim** – To provide farmers with the necessary knowledge and tools to manage their resources effectively and sustainably.

Natural Resource Management (NRM)

- **Objective** – Promoting sustainable use of natural resources to meet current needs while ensuring future generations can also meet their needs.

4.4 Digital Agriculture Mission (DAM)

Recently, Union Cabinet has approved the Rs 2,817-crore Digital Agriculture Mission.

- **Aim** - Creation of Digital Public Infrastructure (DPI) in the farm sector.
- It is conceived as ***an umbrella scheme*** to support digital agriculture initiatives, such as
  - Creating Digital Public Infrastructure
  - Implementing the Digital General Crop Estimation Survey (DGCES)
  - Taking up other IT initiatives.
- **Ministry -** Ministry of Agriculture & Farmers Welfare.
- **Digital General Crop Estimation Survey (DGCES)** – It is a tech-based ecosystem to provide accurate estimates of agricultural production.
- **Digital Public Infrastructure (DPI) for Agriculture** – It aims to provide comprehensive and useful data on farmers comprising of
  - Authenticated demographic details

- o Land holdings
- o Crops sown
- It will include cultivators & tenant farmers, as per the policy of the State Government.
- **Stakeholders** - Central Government, State Governments, and Academic and Research Institutions.
- **Funding** – Shared between Union and State/UTs.
- **Components of DAM**.
    - o AgriStack
    - o Krishi Decision Support System (DSS)
    - o Soil Profile Maps
- Each of these DPI components will provide solutions that will allow farmers to access and avail of various services.

AgriStack	- It is a farmer-centric DPI being built in a federated structure. - A collaborative project between the agencies of the Central and State Governments. - It consists of three foundational registries or databases in the agriculture sector. - **Farmers' Registry** - Under Farmer's Registry, farmers will be given a digital identity (**Farmer ID**) similar to Aadhaar. - This will be linked dynamically to the State's land records, livestock ownership, crops sown, demographic details, family details, schemes and benefits availed etc. - **Geo-referenced village maps -** The maps will link geographic information on land records with their physical locations. - **Crop sown Registry** - Crops sown by farmers will be recorded through mobile-based ground surveys to be conducted in each season. - **Implementation** – All these registries are created and maintained by the State Governments/ Union Territories.
Krishi Decision Support System (Krishi DSS)	It will create a comprehensive geospatial system to unify remote sensing-based information on Crops, Soil, Weather, water resources, etc.
Soil Profile Map	Detailed Soil Profile Map on a *__1:10,000 scale__* of about 142 million ha of the country's agricultural land will be prepared.

4.5   Swachh Bharat Mission (SBM)

Recent report found that districts with more toilets constructed under SBM corresponds with fewer infant deaths.

- **SBM** - A massive mass movement that seeks to create a *Clean India by 2019*.
- **Components**
    - o **SBM Rural** - Implemented by Ministry of Drinking Water and Sanitation.
    - o **SBM Urban** - Implemented by Ministry of Housing and Urban Affairs
- **Swachh Bharat Mission Phase I (2014-12019)**
    - o **Launched in** - October 2, 2014.
    - o **Objective** – *Eliminate Open Defecation* by 2 October 2019.
- **Swachh Bharat Mission Phase II (2019-2025)**
    - o **SBM Urban 2.0** – Launched in 2021 to achieve *Garbage Free Status for all cities.*
    - o **SBM Gramin 2.0** – To transform *all the villages from ODF to ODF Plus Model*.

- **Performance** - From 2014 to 2020, the government constructed 109 million household toilets and declared that more than 600,000 villages were free from open defecation.

- **Relation between SBM & IMR** - Districts with over 30% toilets constructed under SBM corresponded with 5.3 fewer infant deaths and 6.8 fewer child deaths per 1,000 births.

- Every _10% increase in district-level toilet access_, corresponded with

  o A reduction in district-level _IMR by 0.9 points_

  o A reduction in district-level _U5MR by 1.1 points_.

4.6 SAMRIDH Scheme

The 2nd Cohort of SAMRIDH Scheme was launched recently.

- **SAMRIDH -** Startup Accelerators of MeitY for Product Innovation, Development and Growth.

- It is a flagship programme for startups acceleration under National Policy on Software Products - 2019.

- **Launched in -** August 2021.

- **Aim –** To support 300 tech Start-Ups in _3-year duration_ with cohort size of _5-10 Start-Ups._

- **Implemented by -** MeitY Start-up Hub (MSH), Digital India Corporation (DIC).

- **Funding -** One-to-one matching funding support of _up to Rs.40 lakh._

- **Eligibility -** Have been in the business of incubation for more than 3 years and supported more than 50 start-ups of which at least 10 have received non-public investment.

- **Accelerators -** Registered as section 8 company under companies act 2013/societies registered under Societies Registration Act (Not-for-profit).

- The Accelerator should have an experience of running startup program cohorts with activities.

Startup accelerators	Incubators
These programs are _for startups that are already running_ and are looking to scale quickly.	These organizations _help entrepreneurs develop their business ideas_ and bring them to market.
They offer mentorship, capital, and connections to investors and business partners.	They focus on building the foundational elements of a startup, such as market research, product development, and business model validation.

Accelerators *typically last 1 to 6 months* and are cohort-based, with a public pitch event or demo day at the end.	Incubators can provide support *for a longer period* of time, and don't have a specific duration attached to the transformation.

4.7   Subhadra scheme

The government of Odisha is set to launch flagship initiative Subhadra scheme.

- **Aim-** To transfer ___Rs 10,000 per year to eligible women beneficiaries___.

- It is named after Goddess Subhadra, the younger sibling of Lord Jagannath, the presiding deity of Odisha.

- **Duration -** Over five years _until 2028-29_.

- **Transfers** – It will be made in 2 instalments of Rs 5,000 each, on

    o Rakhi Purnima (Raksha Bandhan, which typically falls in August), and

    o International Women's Day (March 8) every year.

- The government has made ___e-KYC mandatory___ for the scheme.

- The money will be deposited directly into the beneficiary's Aadhaar-enabled single-holder bank account.

- **Eligibility-** ___Women aged 21-60 in Odisha___, except those from affluent families, government employees, taxpayers, or already getting ₹1,500+ monthly from other government schemes.

- More than 50 lakh women have already registered for the scheme.

- **SUBHADRA Card-** It is an ___ATM-cum-debit___ card provided to all beneficiaries to create a sense of identity and facilitate financial transactions.

- An incentive of Rs 500 will be provided to 100 beneficiaries in each gram panchayat and urban local body area with the highest number of digital transactions.

- **Opt out option-** The beneficiaries can opt out of the scheme through the SUBHADRA Portal if they become ineligible or wish to transfer benefits to others.

4.8   New Pension Scheme (NPS) Vatsalya Scheme

The Union Finance Minister launched the New Pension Scheme (NPS) Vatsalya Scheme recently.

- It is a significant initiative enables parents or guardians including NRIs, or OCIs, to open ___a pension account for minors___ by creating long-term financial security.

- It can be opened both offline and online.

- **Managed by -** The Pension Fund Regulatory and Development Authority (PFRDA).

- **Eligibility -** ___Any minor citizen (up to 18 years old)___ can participate.

- **PRAN Cards -** Permanent Retirement Account Number cards to newly registered minors to avail this scheme.

- **Contribution -** As little as Rs 1,000 annually.

- For NRI and OCI subscribers, contributions can be made from their NRE (Non-Resident External) and NRO (Non-Resident Ordinary) accounts.

- **Withdrawal** - After a _lock-in period of 3 years_, withdrawals of up to 25% are allowed for specific purposes like education, illness, or disability.

- This can be done a ___maximum of 3 times.___

- **Exit -** Once the minor turns 18, it automatically transitions to an NPS Tier-I account under the 'All Citizen' category.

    o If the total savings (corpus) is more than Rs 2.5 lakh, 80% must be used to purchase an annuity, and 20% can be withdrawn as a lump sum.

    o If the corpus is Rs 2.5 lakh or less, the entire amount can be withdrawn as a lump sum.

- **Death of the minor-** In case of the minor's death, the entire corpus will be returned to the guardian.

NRI	OCI
It refers to people who are either citizens of India or of Indian origin, but who live outside of India.	It is an immigration status that allows foreign nationals of Indian origin to live and work in India indefinitely.

4.9 Credit Guarantee Fund Trust for Micro and Small Enterprises (CGTMSE) Scheme

The Andhra Pradesh Cabinet has recently sanctioned Rs.5,000 crore as credit guarantee fund for the MSME sector through the Credit Guarantee Fund Trust for Micro and Small Enterprises (CGTMSE) scheme.

- It is a credit guarantee scheme to make available ***collateral-free Credit*** to the Micro and Small Enterprises.

- **Launched in –** 2000.

- **Established by -** Ministry of Micro, Small and Medium Enterprises (MoMSME) and Small Industries Development Bank of India (SIDBI).

- Under the revamped CGTMSE scheme, both new and existing micro and small enterprises, including manufacturing and service enterprises are eligible for a credit facility of up to Rs. 5 crores.

- **Funding -** Contributed by the Government of India and SIDBI in the ratio of 4:1.

- **Interest Rates -** As per RBI's Guidelines is eligible for coverage under CGTMSE.

- **Eligible Activities**
  - Manufacturing and Services including Retail trade is allowed.
  - Educational and Training institutions, Self Help Groups (SHGs), and agriculture-related activities are not eligible

- **Loan Amount**
  - **For Micro and Small Enterprises (MSEs)** – Credit facility up to Rs. 500 lakh can be covered on an outstanding basis.
  - **For Regional Rural Banks (RRBs) and Select Financial Institutions** – Credit facilities up to Rs. 50 lakh is allowed.

- **Guarantee Coverage -** From 75% – 85% (50% Coverage for retail activity)

- **Collateral / Third Party Guarantee -** Not required.

- **Annual Guarantee Fee for amount up to Rs. 1 crore-** Fee reduced to as low as 0.37%.

- **Benefits**
  - Ceiling for Guarantee coverage raised from Rs. 200 lakh to Rs. 500 lakh
  - Guarantee fee reduced to diminish the overall cost of borrowings to MSEs
  - Micro Finance Institutions as Member Lending Institutions (MLIs) are now eligible
  - Concessions related to fees and increased coverage to SC/STs
  - Reduced Guarantee fee by 10% and coverage extent increased to 85% to Women, ZED Certified Units and Units in Aspirational Districts
  - Annual Guarantee Fee structure revised and fee reduced to as low as 0.37%.

5. INTERNATIONAL RELATIONS

5.1 Munich Agreement

On this day 85 years ago in September 1, 1939, German troops marched into Poland, triggering the beginning of World War II.

- **Munich Agreement-** It is a settlement reached ***by Great Britain, France, and Italy with Germany*** that permitted German annexation of the Sudetenland, in western Czechoslovakia to ensure peace in Europe.

- **Signed** - September 29-30, 1938.

- **Sudetenland –** It is the region in the *vicinity of the Sudeten Mountain ranges* which had a predominately German population and was incorporated into Czechoslovakia in 1918–19.

- **Sudeten Annexation –** *Czechoslovakia, though not officially party* to the Agreement, was forced to agree to the deal under pressure from Great Britain and France.

- Following the Munich Agreement, German troops occupied these areas between October 1 and October 10, 1938.

- The annexation was part of Hitler's plan to create a "Greater Germany."

- **Violation of the agreement -** Six months after the agreement, Hitler violated it by invading the rest of Czechoslovakia on outbreak of World War II

- **WWII Outbreak –** On September 1, 1939 German troops marched into Poland, triggering the beginning.

- Great Britain and France, which had assured help to Poland, declared war on Germany and its allies on September 3.

5.2   MoU between CAG and UAEAA

The Comptroller and Auditor General of India (CAG) has signed a Memorandum of Understanding (MoU) with the UAE Accountability Authority (UAEAA).

- **Objective-** To promote cooperation and strengthen the professional capacity of CAG and UAEAA.

- To improve methodologies in the field of public sector audit.

- **Areas of cooperation-** Exchange of knowledge and experiences in public auditing.

> *The UAE Accountability Authority (UAEAA) is the supreme institution for financial audit and accounting in the UAE, reporting directly to the President.*

- Conducting capacity development programs at SAI India or SAI UAE as needed.

- **Significance-** It reaffirms the shared values and goals of the two institutions.

- It enhances opportunities for ***knowledge exchange and strengthens bilateral ties.***

Comptroller and Auditor General of India (CAG)
- It is a ***constitutional body established under Article 148*** of the Constitution of India. - CAG is the *head of the Indian Audit and Accounts Department*. - **Duty** - Uphold the Constitution of India and laws of Parliament in the field of financial administration.

Constitutional Provisions

Article 148 - Comptroller and Auditor-General of India

Article 149 - Duties and Powers of the Comptroller and Auditor-General

Article 150 - Form of Accounts of The Union and of The States

Article 151 - Audit Reports

Article 279 - Calculation of "net proceeds", etc.

To read more about the Comptroller and Auditor General of India (CAG), click here

5.3   UK-India Infrastructure Financing Bridge (UKIIFB)

Recently UKIIFB agreement was signed between NITI Aayog and City of London Corporation in London.

- **UKIIFB** - It is a collaborative initiative led jointly by ***NITI Aayog and the City of London Corporation***.

- It was agreed during the UK Economic and Financial Dialogue (EFD) in 2023 and signed in 2024.

- **Agreement Period** – 2 years.

- **Aim** – To _facilitate international investments_ into India's ambitious infrastructure projects.

> _The FTA negotiations between India and UK is still undergoing and is not signed yet._

- **Functions** - Accelerate the mobilisation of international private sector investment into Indian sustainable infrastructure.

- Make recommendations on addressing barriers to international private sector investment in Indian sustainable infrastructure.

- Work together towards developing knowledge and best practices on sustainable infrastructure projects and make it investable and attractive to international investors.

- **Steering Committee** – It consists of representatives of both the countries from

- **Identified Projects** - 8 projects, including _Delhi-Meerut Regional Rapid Transit System_, highways and a few related to green hydrogen and renewables, have been identified for support and funding under the UKIIFB.

5.4 Brunei

Modi become 1st Indian Prime Minister to travel to Brunei on a bilateral visit recently.

- Geographical location – It is located along the northern coast of the **_Borneo Island_** in Southeast Asia.

- It is situated both in the Northern and Eastern hemispheres of the Earth.

- **Bordered by -** The South China Sea in the north and on all other sides by Malaysia.

- Brunei is divided into 2 non-contiguous parts by a portion of the Malaysian State of Sarawak.

- Brunei shares its maritime borders with China and Malaysia.

- **Capital** - Bandar Seri Begawan.

- **_Bukit Pagon_** is the highest point along the border with Malaysia in the eastern mountainous region.

- **Rivers -** Belait, Pandaruan, and Tutong.

- It is a major **_oil producer in Southeast Asia_**.

5.5 G20 Agriculture Ministerial Meeting

India Participated in G20 Agriculture Ministerial Meeting in Cuiabá, Brazil.

- **2024 G20 Presidency** - Brazil has assumed the presidency of the G20 until November 2024.

- **G20 Countries** - Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Mexico, Russia, Saudi Arabia, South Africa, South Korea, Turkey, United Kingdom, and United States.

- **Aim** – To promote international cooperation in addressing critical issues for global agriculture such as food security, sustainable agriculture, technological innovation, and climate change adaptation.

- **Venue** - Cuiabá, Brazil.

- **Priority Areas** – The meeting centered around **_4 key priority areas_** for global agriculture.

- **Sustainability** - Sustainability of agriculture and food systems in their multiple paths

- **International Trade** - Enhancing international trade's contribution to food security and nutrition

- **Inclusiveness** - Elevating the essential role of family farmers, smallholders, indigenous peoples and local communities in sustainable, resilient and inclusive agriculture and food systems

- **Aquaculture** - Promote the integration of sustainable fisheries and aquaculture into local and global value chains.

5.6   Poltava

49 people killed in Ukraine's Poltava after Russia Launches 2 Ballistic Missiles recently.

- Poltava is a city in ***east-central Ukraine.***

- It lies along the ***Vorskla River.***

- **History -** Archaeological evidence dates the city from the ***8th to the 9th century***, although the first documentary reference is from 1174, when it was variously known as Oltava or Ltava.

- Destroyed by the ***Tatars in the early 13th century***, it was the centre of a Cossack regiment by the 17th century.

- In 1709 Peter I the Great inflicted a crushing defeat on Charles XII of Sweden outside Poltava after Charles had laid siege to the town for 3 months.

- In 1802 it became a provincial centre.

- The modern city of Poltava is largely new, having been reconstructed after it suffered severe damage during ***World War II.***

5.7   Pact for the Future

United Nations General Assembly (UNGA) Global leaders recently embraced the Pact for the Future.

- Aim – To foster a safer, more peaceful, sustainable, and inclusive world for future generations.

- **Focus areas**
  - Sustainable development
  - International peace and security
  - Science and technology
  - Youth and future generations and
  - Transforming global governance.

- Multilateral financial institutions and the United Nations have come up short seeking solutions to 21st century problems, the pact lays out.

- **Pledges for UN memebers** - Turbocharge the Sustainable Development Goals (SDGs) and the Paris Agreement on climate change, 2 landmark 2015 agreements that have slower progress and missed milestones.

- Listen to young people and include them in decision-making, at the national and global levels

- Build stronger partnerships with civil society, the private sector, local and regional authorities and more

- Redouble efforts to build and sustain peaceful, inclusive just societies & address the root causes of conflicts.

- Protect all civilians in armed conflict.

- Accelerate the implementation of our commitments on women, peace and security.

- In annex Global Digital Compact and Declaration on Future Generations was also adopted unanimously.

Global Digital Compact

- The Global Digital Compact marks the first truly worldwide agreement on the ___international regulation of artificial intelligence (AI).___

- It outlines commitments to ensure that digital technologies contribute to sustainable development and human rights, while addressing risks like digital divides, cybersecurity, and misuse of technology.

- The Compact aims to bridge the digital divide and ensure AI technologies are used responsibly, fostering global cooperation on both AI capabilities and security threats.

- Governments are also obligated to form an impartial worldwide Scientific Panel on AI and start an international conversation about AI governance inside the UN.

Declaration on Future Generations

- The Declaration on Future Generations focuses on securing the well-being of future generations, also highlighting the need to include their interests in decision-making processes.

- It also underlines the importance of protecting the environment, promoting intergenerational equity, and ensuring that long-term consequences of today's actions are considered.

5.8   Minerals Security Finance Network (MSFN)

India is now formally a part of the Minerals Security Finance Network

- It is a ___US-led initiative___, a new initiative that stems from the Minerals Security Partnership (MSP), a framework established by the US in 2022.
  - India was inducted to the MSP in June 2023.

- **Aim -** To strengthen cooperation among Indo-Pacific region and Europe ___to secure supply chains for critical minerals.___

- **Coordination and Collaboration** -The network encourages cooperation among members to align policies, share best practices, and streamline efforts to secure critical mineral supply chains.

- **Investment Facilitation** - The MSFN aims to mobilize private sector investment in mineral projects that are deemed critical for energy transition technologies and national security.

- **Technical Assistance** - It provides technical support to help member countries develop their mineral resources responsibly and sustainably, focusing on environmental and social governance (ESG) standards.

- **Market Development** - The network works to identify and promote market opportunities for critical minerals and improve infrastructure for mining and processing.

- **Geological and Economic Assessments** - It includes initiatives for shared research and assessment of mineral resources to better understand the availability and potential of critical minerals globally.

- **Policy Advocacy** - It advocates for policies that can enhance mineral security, such as trade policies and regulatory frameworks that support sustainable mineral extraction and processing.

- **Members -** As of now, it has 15 member countries

- o United States, Australia, Canada, **India,** Japan, European Union, Finland, France, Germany, Italy, Netherlands, Norway, Sweden, United Kingdom, South Korea.

- **Significance for India**— It helps India to diversify and secure its supply of critical minerals from nations like Argentina, Chile, Australia, and select African countries.

6. ECONOMY

6.1   India Post Payment bank (IPPB)

Recently the India Post Payments Bank celebrated its 7th Foundation Day.

- **India Post Payments Bank (IPPB) -** It is a *public sector payments bank* with 100% equity owned by Government of India.

- **Established -** September, *2018*

- **Nodal ministry-** Department of Posts, Ministry of Communications

- **Objective-** To provide every household in India an *access to efficient banking services* and enable them financially secured and empowered.

> *Payment banks are a new type of financial institution that was introduced in 2014 to provide basic banking services to people who are currently unbanked or underbanked.*

- **Services provided** – It offers various Personal and Merchant banking products and services.

- **Aadhaar services** – Aadhaar enrolment for children up to 5 years old and mobile number update through Child Enrolment Lite Client (CELC) service.

  - o Aadhaar-enabled payment systems

- **Door Step Banking** - It provides paperless, cashless, and present less banking facilities at the doorstep, even in remote areas.

- **Postmen and Gramin Dak Sevaks-** They are functioning as mobile banks through IPPB, delivering various services at the doorstep.

- It promotes the initiative *"Aapka Bank, Aapke Dwar"* (Your Bank at Your Doorstep).

- **Fincluvation** – It is Innovation for Financial Inclusion initiative to invite Fintech Start-up community to co-create solutions for financial inclusion.

Deposits	• Savings Account • Current Account
Money Transfer	• Simple & Secure • Instant 24x7
Direct Benefit Transfers	• MGNREGA • Scholarships • Social welfare benefits & other Government subsidies
Third Party products	• Loans & Investments • Insurance • Digital life certificates • Post Offices Saving Schemes
Bill & Utility payments	• Mobile, DTH Recharge • Electricity, water and gas bills.
Enterprise & Merchant Payments	• Postal Products • Digital Payments of e-commerce delivery (CoD)

Key Achievements of India Post Payments Bank (IPPB)

- Acquired over 9.88 crore customer accounts.

- On-boarded more than 12 lakh merchants.

- Successfully disbursed over Rs.45, 000 crore in Direct Benefit Transfers (DBT) to beneficiaries under various government schemes.

- Facilitated mobile number updates for Aadhaar cards for over 7.10 crore customers.

- Enabled Digital Life Certificate services for more than 20 lakh pensioners.

6.2   Vertical Fiscal Imbalance

The 15th Finance Commission had noted that India has had a larger, and rising, vertical imbalance than most other federations.

- **Fiscal imbalance-** It occurs when there is a mismatch between a government's future debt obligations and future income streams.

- **Types** - Vertical and horizontal fiscal imbalance.

> *A fiscal deficit is the shortfall in a country's revenue stream compared to its spending*

- **Horizontal fiscal imbalance-** It occurs when revenues do not match expenditures *for different regions* of the country.

- **Vertical fiscal imbalance-** It occurs when revenues do not match expenditures *for different government levels.*

- It is a structural issue that can be resolved if revenue and expenditure responsibilities can be reassigned.

- **Constitutional provision - *Article 280 addresses the issue of "vertical fiscal imbalance"*** by establishing a Finance Commission, tasked with recommending the distribution of tax revenues between the central government and state governments.

- It reviews the fiscal conditions of the Centre and states from time to time and suggests resource transfer from the Centre to the states.

- For the transfer of central resources, the constitution itself points out what tax resources of the Centre have to be shared with the states.

- **Divisible pool -** Tax sources of the Centre that must be shared with the states is known as the divisible pool.

- It consists of all taxes, except surcharges and cess levied for specific purpose, net of collection charges.

Status of Vertical Fiscal Imbalance in India

- VFI in India is calculated ***after the devolution of taxes to the States.***

- VFI measurement should be at the level of "all States", and not separately for each State.

- **Suggested Ratio** = The sum of the Own Revenue Receipts (ORR) and the tax devolution from the Union government for all States / Own Revenue Expenditure (ORE) for all States

- If this ratio is less than 1, it implies that the sum of own revenue receipts and tax devolution of the States is inadequate to meet the ORE of the States.

- If we subtract this ratio from 1, we get the deficit in receipts. It is this deficit that we use as a proxy for VFI after devolution.

- As the 15th Finance Commission noted, States incur 61% of the revenue expenditure but collect only 38% of the revenue receipts.

- The role of the 16th Finance Commission should be to eliminate vertical fiscal imbalance in federal relations.

- Many States have raised the demand that the share of tax devolution from the net proceeds must be fixed at 50% by the 16th Finance Commission.

- They substantiate this demand by pointing to the exclusion from the net proceeds of the substantial amounts of cesses and surcharges, which trims the net proceeds within the gross tax revenue.

6.3 Bharat Start up Knowledge Access Registry (BHASKAR)

The Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce and Industry is set to launch the Bharat Startup Knowledge Access Registry (BHASKAR).

- **Aim –** To bring together a diverse array of stakeholders ranging from entrepreneurs and government bodies to investors and academic institutions onto a single, integrated platform.

- To build the world's largest digital registry for stakeholders within the startup ecosystem.

- **Ecosystem Stakeholders**

- **Umbrella scheme-** *Startup India program.*

- **Vision-** To accelerate growth and foster cross-collaboration within the entrepreneurial community.

- **Networking-** Bridges gaps between startups, investors, mentors, and other stakeholders for seamless interaction.

- **Centralized access to resources-** Provides immediate access to critical tools and knowledge for ***faster decision-making and scaling***.

- **Personalized identification-** Assigns unique BHASKAR IDs to each stakeholder for personalized & tailored platform interactions.

- **Enhanced discoverability-** Powerful search features for easy location of relevant resources, collaborators, and opportunities.

- **Supporting India's global brand-** Facilitates *cross-border collaborations* to promote India as a global hub for innovation.

- **Impact on India's Startup Ecosystem-** It will serve as a ***central hub*** for startups, investors, service providers, and government bodies to collaborate and accelerate growth.
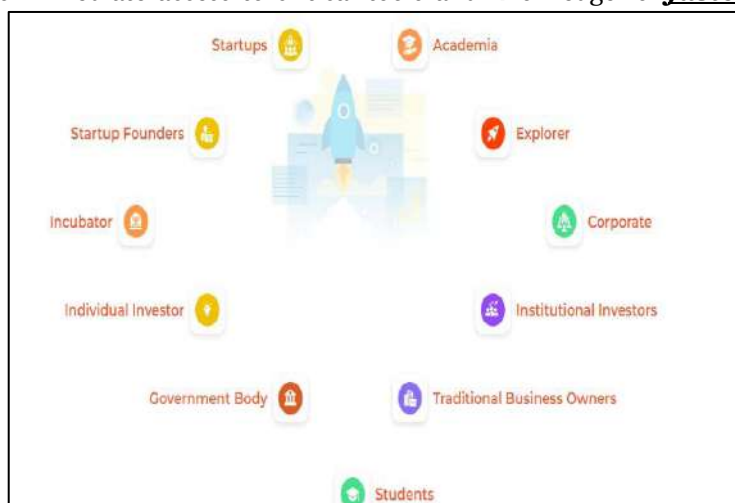
6.4   Forecasting GDP growth of India

OECD recently revises India's FY25 growth forecast upward to 6.7% in its Interim Economic Outlook.

Analysis

- **OECD** – It revises growth upward to 6.7% in FY25 and that growth is expected to increase to 6.8% in FY26.

- **Asian Development Bank** – It retained India's growth at 7% for FY25, projecting a pick up to 7.2% in FY26.

- **World Bank** – It has raised its growth forecast for India's economy to 7 per cent for the current financial year (FY25), up from an earlier projection of 6.6 per cent

- **Nomura -** Lowered its FY25 economic growth forecast for India to 6.7% from 6.9%.

- **RBI-** Upgraded its GDP growth projection for FY25 to 7.2%.

- **Morgan Stanley -** Raised its India GDP growth forecast for FY25 to 6.8%.

Trends

- **Inflation -** Inflation is also projected to be higher at 4.5% compared with 4.3% projected in May.

- Prices would likely inch towards the RBI's mid-point target of 4% in FY26.

- **Consumer inflation** – It remained below 4% in July and August and economists expect it to rise to 5% in the coming months.

- **Gross Domestic Product (GDP)** - It reflects demand in the economy, grew by 6.7% in the quarter under consideration, compared to 8.2% during the same period of the last fiscal and 7.8% in the previous quarter.

- **Gross Value Added (GVA) -** It reflects supply in the economy, rose to 6.8% during Q1 of FY25 compared to 8.3% in the corresponding quarter of the last fiscal and 6.3% of the previous quarter.

> *Global GDP growth is projected to stabilize at 3.2% in 2024 and 2025.*

- **Manufacturing -** Accounts for about 17% of India's GDP, grew by 7% year-on-year in the April-June quarter, compared to an 8.9% expansion in the previous quarter.

- **Agricultural output -** Grew 2% year-on-year in the same period, up from 1.1% in the previous quarter.

6.5   CASA

The recent liquidity concerns in the face of loan growth outpacing deposit growth made the regulators and the government to press for higher augmentation of overall deposits, specifically the CASA component.

- **CASA** – Current Account and Savings Account, which is mostly used in West Asia and South-east Asia.

- **CASA deposit** – It is the amount of *money that gets deposited* in the *current and savings accounts* of bank customers.

Two Types of Banks Accounts

- **Term deposits** – It includes *fixed or recurring deposits.*

- It is *valid for a fixed period of time* and in return the bank pays interest at a fixed rate with the condition that you do not touch the money in the interim.

  o For example, you put in Rs 10,000 in a fixed deposit for a period of 7 years and the bank pays you an interest at the rate of 12% per annum.

- **Non-term deposits** – It includes *current or savings accounts*.

- They are used *for daily operations* and are valid as long as the customer wants them to be.

- They have *lower interest rates than term deposits* depending on the bank's terms and conditions.

  o For example, in an urban area ICICI Bank pays 4.0% interest on a savings account with cheque book on a minimum balance of Rs 10,000.

- **Features** – Since interest rates are lower than term deposits, **CASA is a cheaper source of funds** for banks.

- The *savings accounts portion pays more interest* compared to current accounts.

- **CASA Ratio** – It is the p*ercentage of total bank deposits that are in a CASA*, an important metric to determine the bank's liquidity.

- It indicates how much of a bank's total deposits accounts are in both current and savings.

  o **Higher CASA Ratio** - A bank has a higher proportion of stable deposits available for lending.

- **Significance** – *CASA ratio reflects the bank's financial health* and the bank's capacity to raise money with lower borrowing costs.

> *CASA deposits involve a multitude of transactions day in and day out in terms of withdrawal, remittance, statements of accounts, mandates, linkage to gateways and so on. All these transactions entail significant costs that are not accounted for while banks calculate CASA cost.*

> **CASA Ratio** = CASA Deposits ÷ Total Deposits

> *The current account portion of CASA is called as a checking account. The customer can withdraw cash and write checks against the balance and it earns no interest.*

7. AGRICULTURE

7.1 Third Advance Estimates of Horticultural Crops for 2023-24

The Department of Agriculture and Farmers' Welfare has released the Third Advance Estimates of 2023-24 of Area and Production of various Horticultural Crops.

- **Horticulture production 2023-24** - It is estimated to be about 353.19 million Tonnes, decrease of about 22.94 Lakh Tonnes (0.65%) over 2022-23 (Final Estimates).

- Production of Fruits, Honey, Flowers, Plantation Crops, Spices and Aromatics & Medicinal Plants were increased.

- **Production of Fruits** - It is expected to increase by 2.29 % over 2022-23 i.e. to 112.73 million Tonne.

- **Major contributors** - Production of mango, banana, lime/lemon, grapes, custard apple have increased.

- Production of apple, sweet orange, mandarin, guava, litchi,

Total Horticulture	2022-23	2023-24 (2nd Adv. Est.)	2023-24 (3rd Adv. Est.)
Area (Million Ha)	28.44	28.63	28.98
Production (Million Tonne)	355.48	352.23	353.19

pomegranate, pineapple are expected to decrease as compared to 2022-23.

- **Production of Vegetables** - It is envisaged to be around 205.80 million Tonnes.

- Increase is expected in production of tomato, cabbage, cauliflower, tapioca, bottle gourd, pumpkin, carrot, cucumber, bitter gourd, parwal.

- Decrease in production is envisaged in potato, onion, brinjal, elephant foot yam, capsicum, and other vegetables.

- **Production of Onion** – It is expected to be at 242.44 Lakh Tonne in 2023-24.

- **Potato production** - It is expected to around 570.49 Lakh Tonne in 2023-24.

- It is, mainly due to decrease in production reported in Bihar and West Bengal.

- **Production of Tomato** – It is expected to be 213.20 Lakh Tonne in 2023-24 compared to around 204.25 Lakh Tonne last year, an increase by 4.38.

8. ENVIRONMENT

8.1 Green Haryana manifesto, 2024

In a first-of-its-kind initiative, People for Aravallis group initiated the process of creating 'Haryana Green Manifesto 2024' to address urgent environmental concerns.

- **Aim-** To include their ***environmental demands*** in the manifestoes of various political parties ahead of the ***upcoming Haryana Assembly election.***

Environmental concerns in Haryana
- **Degradation of land -** Desertification and Land Degradation Atlas of India, 2021, shows that 8.24% of the total geographical area of Haryana has degraded.   - **Air pollution-** Haryana is home to ***8 of the 50 most polluted places in the world.***   - **Waste management-** Unsegregated waste is dumped across the state, leading to toxic landfills, affecting natural ecosystems and water bodies.   - **Groundwater depletion-** Groundwater levels have dropped significantly, especially in South Haryana, reaching depths of 1,500-2,000 feet.   - **Industrial pollution-** Chemical waste from industries is polluting water sources, affecting both humans and animals with ailments like skin diseases and breathing problems.

- **Critical Ecological Zones -** The main demand is to legally designate the Aravallis including the Bhood areas and the Shivaliks as ***'Critical Ecological Zones'.***

- **Deemed forests -** It asks for legal protection be given to all the state's forests by including un-notified forests as 'deemed forests' under the Punjab Land Preservation Act (PLPA).

- **Tree Act-** A demand for a strict 'Tree Act' for Haryana, similar to the Delhi Preservation of Trees Act 1994.

- It asks to declare all open natural ecosystems (ONEs), such as the blackbuck natural habitat in Fatehabad district, as conservation or community reserves.

- **Increasing tree Cover-** A call for an action plan to reach a target of 10% native forest and tree cover within 4 years.

- **Crop-Diversification** – It is to ensure
  o Guaranteed purchase of every crop grown by the farmers on the MSP announced by the Centre,
  o Creating an action plan to restore soil and its microbial diversity
  o Incentivising natural farming practices that improve soil health.

8.2 Star Rating for Vehicles

The National Green Tribunal (NGT) has sought responses from some ministries of the Union government on a plea seeking implementation of a star-rating system.

- **2016 notification** – Ministry of Road Transport and Highways notified the amendment of the *Central Motor Vehicle Rules 1989* in order to introduce the star-rating system for all vehicles.

- It had specified the design of the star-rating stickers that were to be *placed on the windows of vehicles*

- The onus of putting them lying on the manufacturers.

- **Need** - India's *vehicular pollution accounts for 40% of the total air pollution* as per the Ministry of Earth Sciences.

- **Star rating systems for vehicles**- It is rating based on fuel efficiency and carbon dioxide (CO2) emissions across all vehicles.

- **Aim** – To *raise the consciousness* of customers on the importance of fuel efficiency, with the assumption that properly informed people will always buy fuel-efficient vehicles.

- **Information** – The key information that are common in many countries are

    o *Fuel consumption per litre* for a stipulated number of kms (it could be separate for urban and rural)

    o *CO2 emissions in grams/km*

    o Annual fuel cost based on certain parameters

    o Fuel economy

    o *Greenhouse gas emission ratings*

> *India had unveiled the Bharat New Car Assessment Programme (Bharat NCAP) in 2023 to increase the road safety.*

- **Global practices** – Also called as *vehicle fuel efficiency labelling (VFEL),* issued elsewhere since 1978.

    o For instance, in the Asia Pacific Economic Cooperation (APEC) region, *more than 13 countries* have already implemented VFEL.

- APEC countries include Australia, Canada, China, Japan, Korea, US, Vietnam and Thailand.

- Also implemented in non-APEC countries like Brazil, the UK and Germany.

- **Learnings from global practices** – Data signifies that a voluntary implementation of the system for vehicles has seen low coverage, with very few auto firms implementing it

- But a mandatory rule has been more effective.

8.3   A study on Plastic Pollution

A recent study says that India has secured the top spot as biggest plastic polluter in the world, releasing 9.3 million tonnes (Mt) annually, amounts to roughly one-fifth of global plastic emissions.

- **Findings of the study –** It defined plastic emissions as materials that have moved from the managed or mismanaged system (controlled or contained state) to the unmanaged system (uncontrolled or uncontained state, the environment).

- Of the unmanaged waste, roughly 43% or 22.2 mt is the form of unburned debris and the rest, some 29.9 mt, is burnt either in dumpsites or locally.

- **Global findings -** Globally, roughly 69% or 35.7 Mt per year of the world's plastic waste emissions come from 20 countries, of which

    o 4 are low-income countries,

    o 9 are lower-middle-income countries and

    o 7 are upper-middle-income.

- Furthermore, *high-income countries have higher plastic waste generation* rates, but none are ranked in the top 90 polluters, as *most have 100% collection coverage and controlled disposal*.

- **Dominant Source**

    o In Global North- Littering

    o In global South- uncollected waste

- **In India** –It is the *largest plastic polluter* in the world, releasing 9.3 million tonnes (Mt) annually, amounts to roughly one-fifth of global plastic emissions.

- India's official waste generation rate, approximately 0.12 kilograms per capita per day.

- Taking the 2nd and 3rd spots were Nigeria, with 3.5 Mt of emissions and Indonesia, with 3.4 Mt.

Top 10 plastic polluters ranked

1 Mt could fill
x 65 Taj Mahals
or
x 260,000 double decker buses

Measured in million tonnes (Mt) per year

8.4   Global Plastics Treaty

In 2022, World Countries agreed to develop a Treaty on plastic pollution by 2024 to reduce greenhouse gas emissions from plastic production, use and disposal.

- It is a ***legally binding agreement*** between over ***175 United Nations*** member countries to reduce the use of plastics.

- **Reducing plastic production** - Setting deadlines for countries to reduce plastic production.

- **Eliminating unnecessary uses** - Banning certain uses of plastics that create waste.

- **Prohibiting certain chemicals** - Banning specific chemicals used in the production of plastics.

- **Setting recycling goals** - Setting targets for recycling plastics.

- **Addressing the entire lifecycle of plastics** - The treaty addresses the entire life cycle of plastics, from design to production to disposal.

- **Considering vulnerable workers** - The treaty may consider the impact on vulnerable workers.

- **Chemical testing mandates** - The treaty may include mandates for testing certain chemicals in plastics to ensure safety and environmental protection.

- **Regular evaluations** - The treaty may include regular evaluations to assess progress.

8.5   Teal Carbon

Recently, India's 1st study on 'teal carbon' was undertaken at Keoladeo National Park (KNP) in Rajasthan.

- **Teal Carbon** – It is the organic carbon stored in ***non-tidal freshwater wetlands***.

- It is color-based terminology that reflects the classification of the organic carbon based on its ***functions and location*** rather than its physical properties.

- **Components** - It encompasses carbon sequestered in ***vegetation, microbial biomass, and dissolved and particulate organic matter***.

- **Sources** - Peatlands, freshwater swamps, and natural freshwater marshes.

- **Global level storage** - Across the ecosystems, 500.21 petagrams of teal carbon (PgC) is strored.

- **Climate Mitigation Tool** - It can be used as a tool to mitigate climate change caused by anthropogenic pollution in the wetlands.

- **Benefits of teal carbon ecosystem** –Increase in the ground water level, flood mitigation and heat island reduction, supporting a sustainable urban adaptation.

  - o **Regulating GHG** - Equivalent to coastal wetlands, they have the capacity to regulate greenhouse gases.

Petagrams of carbon (PgC) is a unit to measure carbon and it is equivalent to 10^{15} grams.

Other Carbon Forms	
- **Black and Brown carbons** - They are primarily produced by incomplete combustion of organic matter from sources such as wild fires, fossil fuel combustion, and industrial activities. - **Blue carbon** - It is the carbon stored in coastal and marine ecosystems. - Coastal wetlands, including seagrass meadows, mangroves and tidal marshes, are major blue carbon ecosystems and are often termed "blue forests".	

8.6 Operation Bhediya

Recently 5th wolves were trapped in Bahraich after deadly attacks.

- **Aim** – To **_capture wild wolves_** in the Bahraich region.

- It has been carried out in about 35 villages in Bahraich District under threat of wolf attacks.

- **Launched by** – Forest Department of Bahraich District, **_Uttar Predesh_**.

- **Operation** – It includes increased monitoring of known wolf habitats and areas with frequent attacks to track their movements and prevent further incidents.

- **Wildlife management** - Improve overall wildlife management practices, including better waste management.

- **Prevention** - Creation of barriers to prevent wolves from entering human settlements.

- **Thermal drones** – They are being deployed to track the wolf's movements.

- **Camera Traps** - They were installed to automatically trigger by motion in its vicinity by the presence of the animal.

- **Pugmarks** - Identifying pugmarks and gathering intelligence from residents.

- **Tranquilise** - Permission to tranquilise the animals has also been granted by the Chief Wildlife Warden.

- **Wildlife Disaster area** - Uttar Pradesh government has declared the Bahraich district as a 'Wildlife Disaster' affected area.

- It will expedite the ongoing 'Operation Bhediya' to catch the animals involved in the attack on humans and help the affected families to get an ex-gratia amount without much trouble.

To know more about the wolves, click here

8.7 Herpetofauna Survey

The 1st ever preliminary herpetofauna survey conducted in Grass Hills National Park and Karian Shola National Park.

- **Key Findings-** The survey revealed rich biodiversity, identifying **_20 species of reptiles and 34 species of amphibians_**.

- **Grass Hills National Park -** It is a protected area located in the *__Anamalai Hills__* of Tamil Nadu, India.

  - Recorded 11 reptile species and 12 amphibian species.

  - Montane shola grassland ecosystem unique to the Western Ghats.

- **Karian Shola National Park -** It is part of the Anamalai Tiger Reserve in Tamil Nadu, featuring tropical rainforest ecosystems.

  > *Anamalai Tiger Reserve is located in the Western Ghats of Tamil Nadu, India. It also encompasses important ecological zones like the Grass Hills and Karian Shola.*

  - Recorded 9 reptile species and 22 amphibian species.

  - Grassland surrounded by semi-evergreen and deciduous forest.

- **Critically endangered and endangered species**

  - Anaimalai flying frog (Rhacophorus pseudomalabaricus).

  - Deccan night frog (Nyctibatrachus deccanensis).

  - Cold stream torrent frog (Micrixalus frigidus).

  - Resplendent Shrubfrog (Raorchestes resplendens).

- **Rare and newly described reptiles**

  - Three-lined Shieldtail (Platyplectrurus trilineatus), last seen in 2018.

  - Anamudi dwarf gecko (Cnemaspis anamudiensis), first report since discovery.

  - Newly described species: Cnemaspis anaimalaiensis and Tail-spot Shieldtail (Uropeltis caudomaculata).

- **Ecological significance-** Nearly *__85% of the species__* recorded are endemic to the Western Ghats.

- Many species are restricted to the Anamalai sub-cluster, highlighting the *__region's unique biodiversity.__*

8.8 World Ozone Day, 2024

In India, the Ministry of environment, forest and climate change celebrated the 30th world ozone day in New Delhi recently.

- **International Day for the Preservation of Ozone Layer** – It is celebrated *__annually__* on *__September 16.__*

- **Designed by** – United Nations General Assembly.

- India has been celebrating this day since 1995.

  > *Montreal Protocol was signed on 1987 to eliminate production of the Ozone Depleting Substances. It has been ratified by all the UN member states.*

- **Theme, 2024 -** "Montreal Protocol: Advancing Climate Actions".

- **Ozone (O3) –** It is a reactive gas, consisting of three oxygen atoms which can be natural or man-made and found in the Earth's high atmosphere (stratosphere).

- It is continuously created in the high atmosphere by the interaction of solar UV radiation with atmospheric oxygen.

  - **Dobson Unit (DU)** – It is the unit of measurement for measuring the amount of ozone in a column of air above the Earth's surface.

- The average total ozone concentration is usually around 300 DU (low at poles and higher at the equator).

- **Stratospheric Ozone** – It is present at a height of around 15 to 30 km is produced naturally by the interaction of solar ultraviolet light with molecular oxygen (O2).

- It protects the planet Earth from the harmful ultraviolet radiations from the Sun.

TYPES OF OZONE

Depending on where it is found in the atmosphere, ozone can be either helpful or harmful

STRATOSPHERIC
- Naturally occurring
- Protects the earth from the sun's ultraviolet radiation

50 km

TROPOSPHERIC
- Created by chemical reactions between man-made emissoins
- Powerful greenhouse gas
- Air pollutant that harms human health, crop production and ecosystems

10 km

cacoalition.org/ozone

- **Ozone hole** – It refers to areas or regions harmed by damaging UV radiations.

- The ozone hole reached its biggest historical extent of 28.4 million square kilometres in September 2000.

- **Tropospheric Ozone** – Also known as ground-level ozone is principally produced by photochemical processes that involve volatile organic compounds (VOC) and nitrogen oxides.

- It is an explosive, pale blue gas with a distinct odour.

- **Recent condition of O3**- The ozone layer is depleted in both hemispheres of the Earth, specifically Antarctica in the Southern Hemisphere and the Arctic in the Northern Hemisphere.

- However, the phenomenon is ***more recognised in Antarctica than in the Arctic***.

- The mechanism of the ozone hole is intimately related to the temperature of the stratosphere.

- If the temperature goes ***below -78 degrees Celsius***, stratospheric clouds form, worsening the status of the ozone hole.

- **Action plan of India -** To phase out CFC, the Indian government has brought the Indian Cooling Action Plan (ICAP) document to phase out demand for refrigerants by 2037-38.

- It is a major gas which is contributing to rapid depletion of the Ozone layer and warming climate.

> *CFCs are nearly 2,000 times more potent than carbon dioxide (Co2) in terms of their global warming potential.*

- Because of this, the world has come together to phase out the CFC by 2040 at their 28th Meeting of the Parties on 15 October 2016 in Kigali, Rwanda under the Montreal Protocol.

8.9 Melting of Glaciers in Central Asian Countries

Tian Shan mountain range, home to thousands of glaciers that are melting at an alarming rate in Central Asia pose a significant risk for towns and cities in Kyrgyzstan.

- **Tian Shan mountain range** – It extends into China, Kazakhstan, and Uzbekistan.

- 8 to 10 years ago, the glacier was visibly snow-covered.

- The Tien Shan is regarded as the ***"Water tower of Central Asia,"*** being a solid reservoir of freshwater resources and also a natural and early warning indicator of climate change.

> *According to a report by the Eurasian Development Bank between 14% and 30% of glaciers in the Tian-Shan and Pamir, 2 main mountain ranges in Central Asia have melted over the last 60 years.*

- **Decline of glaciers** – Until the end of the 1960s, the glaciers of the entire Central Asian region, and not only the region but the world as a whole, remained in a more or less stable state.

- In the early 1970s, there was a sharp acceleration in the rate of degradation.

- Conventionally, from 1973 to 1978, the winter glacier mass balance decreased by more than three times.

- **Cause** - Climate change are notably pronounced in Central Asia, which has been increasingly plagued by extreme weather events.

> *Adygene glacier has retreated by around 16 centimetres (six inches) every year.*

- **Key Findings -** The retreat of glaciers poses a significant threat to the landlocked region that is already facing water scarcity.

- Melted glacial waters comprise up to 50% of the glacial runoff, the annual runoff during the vegetative season.

- The glaciers cannot regenerate due to rising temperatures.

- The receding glaciers have introduced a new Risk for Kyrgyz towns and cities, as meltwater forms new lakes that can overflow and create dangerous torrents, as this water carries rocks.

- Increasing demand for substantial natural resources in the area, particularly gold extraction, may accelerates ice melting through chemical processes.

- Forecasts show Central Asia's glaciers will halve by 2050 and disappear completely by 2100.

- **Measures**- Natives of this region have installed a sensor about 50 centimeters above the water level that will transmit radio alerts in case of flooding.

- **UN Response** - United Nations, responded to the initiative of the government of Tajikistan, declared next year the Year of Glacier Conservation.

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8.10   Elephant culling in Zimbabwe

Zimbabwe to Cull 200 Elephants to Alleviate Food Shortages amid Drought.

- **Elephant rich countries -** Estimated about 200,000 elephants inhabit a conservation zone that spans across 5 southern African nations - Zimbabwe, Zambia, Botswana, Angola, and Namibia.

- Zimbabwe is home to over 84,000 ***African savanna elephant (Loxodonta africana)***, also known as the _African bush elephant_, second highest worldwide.

- It holds approximately $600 million in ivory stockpiles that remain unsellable.

- **Culling -** The cull, the first of its kind in the nation since 1988.

- **Reason for Culling**- Overpopulation of Elephants highlights that it leads to resource depletion and escalating human-wildlife conflicts.

- The nation has been advocating to the U.N.'s Convention on International Trade in Endangered Species (CITES) to allow the resumption of ivory and live elephant trading.

- African elephants in Botswana, Namibia, South Africa and Zimbabwe are included in ***CITES Appendix II.***

- This means that CITES Parties have agreed that

    o Although the species is "not necessarily now threatened with extinction" in these States,

    o It may become so unless international trade in specimens from these States is strictly regulated in order to "avoid utilization incompatible with their survival".

- **Center for Natural Resource Governance** - In Zimbabwe, denounced the culling that elephants have an inherent right to exist, and future generations should experience them in the wild.

- **MIKE Program** - Under CITES aims to

    o Help range States improve their ability to monitor elephant populations,

    o Detect changes in levels of illegal killing, and

    o Use this information to provide more effective law enforcement and

    o Strengthen any regulatory measures required to support such enforcement.

8.11   Integrated Development of Wildlife Habitats scheme (IDWH)

Cabinet gives nod to Rs. 2,602 crore Wildlife Habitats Development scheme recently.

- IDWH – It is a _centrally sponsored scheme_ to develop wildlife habitats in India.

- **Nodal -** Ministry of Environment.

- **Components of the scheme**

    o Support to Protected Areas (National Parks, Wildlife Sanctuaries, Conservation Reserves and Community Reserves)

    o Protection of Wildlife Outside Protected Areas

    o Recovery program for saving critically endangered species and habitats

- **Role** – It has helped improve the habitats of critically endangered species like the Asiatic lion, snow leopard, and great Indian bustard.

- It also helps reduce human-wildlife conflict, generate employment opportunities, and improve the livelihoods of people living near protected areas.

- **Sub-schemes** – It includes Project Tiger, Project Elephant, Project Dolphin, and Project Lion.

- Project Tiger – It currently uses technology such as the M-STrIPES (Monitoring System for Tigers, Intensive Protection and Ecological Status) mobile application for day-to-day management practices.

- **The Project Dolphin** – It is proposed to be supported by provisioning equipment such as Remotely Operated Vehicles (ROVs) and passive acoustic monitoring devices for enumeration of dolphins as well as their habitat.

- **Project Lion** – It is under the Development of Wildlife Habitat, will be strengthened as per activities envisaged.

- **Project Elephant** – It is envisaged to leverage information and communication technology interventions.

8.12 Ideas4LiFE portal

The union government recently launched the Ideas4LiFE portal.

- **Aim –** It is for inviting ideas related to products and services for inducing behavioral changes related to environment-friendly lifestyles.

- **Developed by-** The portal is developed in partnership with ***UNICEF YuWaah.***

- **Ministry -** Ministry of Environment, Forest and Climate Change.

- The winning ideas under each of the 7 themes of Mission LiFE will be recognized and awarded with attractive prizes for individuals as well as for institutions.

- **Themes**
  - Water Conservation
  - Energy Efficiency
  - Waste Reduction
  - E-Waste Management
  - Minimizing Single-Use Plastics
  - Embracing Sustainable Food Practices
  - Fostering Healthy Lifestyles

Mission LiFE

- Mission LiFE - LiFEStyle for Environment is a campaign that aims to encourage people to adopt environmentally conscious lifestyles.

- It was announced at the UN Climate Change Conference (UNFCCC COP26) in 2021.

- **Goals**
  - Mobilizing at least one billion people to take action to protect the environment
  - Making at least 80% of villages and urban local bodies environment-friendly by 2028
  - Encouraging people to engage in small, everyday actions that can halt climate change

- It emboldens the spirit of the ***P3 model*** i.e. Pro Planet People.

- It unites the people of the earth as pro planet people, uniting them all in their thoughts.

- It functions on the basic principles of 'Lifestyle of the planet, for the planet and by the planet'.

8.13 Barak Bhuban Wildlife sanctuary

The National Green Tribunal's (NGT) eastern bench in Kolkata has ordered a stay on road construction work inside the Barak Bhuban wildlife sanctuary in Assam's Cachar district.

- It is situated in Barak valley of ***Assam***.

- It is named after the second-largest river in the northeast, the Barak.

- It spreads between the Barak and Sonai rivers.

- **Faunas**
  - The area has 8 recording species of primates like slow loris, rhesus macaque, pig-tailed macaque, stump-tailed macaque, Assamese macaque, capped langur, hoolock gibbon and phayre's leaf monkey.
  - **Endemic –** King Cobra, Gorals, Himalayan Serow.

Barak valley
• **Location** – It is a region in the southern part of Assam.   • **Bordered by** - Mizoram, Tripura, Bangladesh, Meghalaya, and Manipur.   • It is known for its tea cultivation and is nicknamed the "Valley of Peace".

- It is considered part of the ***Indo-Myanmar biodiversity hotspot.***
- **Features** – It is a ***horseshoe-shaped plain***.
- **Main city** - Silchar, which is also the administrative divisional office for the region.
- It is made up of 3 administrative districts - Cachar, Karimganj, and Hailakandi.
- **Official languages** – Bengali and Meitei (Manipuri).
- Assam's 1st sanctuary ***'Borel Wildlife Sanctuary'*** is in Barak Valley itself.

8.14   World Gorilla Day

Uganda Celebrates Conservation Success on World Gorilla Day titled Over 30 Years of Impact in Mountain Gorilla Conservation.

- It is an annual event held on ***September 24***.
- **Established on -** It dates back to 2017 when the Karisoke Research Centre celebrated its 50th anniversary.
- Dr. Dian Fossey, a renowned primatologist, founded the centre in 1967 to conserve and research gorillas in ***Rwanda's Volcanoes National Park.***
- It celebrates gorillas & empowers global communities to take action to protect this critically endangered species.
- It also provides an opportunity for people to safeguard their future in alignment with the ***Convention on the Conservation of Migratory Species of Wild Animals.***

Gorillas

- Gorillas are the ***largest living primates.***
- **Weight -** Males weighing up to 485 pounds and reaching heights of 5.5 feet.
- **Appearance -** Gorillas have black hair and skin, large nostrils, and prominent brow ridges. They have small eyes and lack hair on their face, hands, and feet.
- **2 Species**
  - The eastern gorilla(*G. beringei*) - (The mountain gorilla(*G. beringei beringei*) is a subspecies of the eastern gorilla) and
  - The western gorilla(*Gorilla gorilla*).
- **Habitat -** Gorillas live in the tropical forests of equatorial Africa.
- **Distribution –** 2 types of gorillas live on opposite sides of the Republic of the Congo, separated by the Congo basin forest.
  - The eastern gorillas are found in Rwanda, Uganda, and the Republic of the Congo.
  - Western gorillas live in Angola, Cameroon, Central African Republic, the Democratic Republic of the Congo, Equatorial Guinea, Gabon, and Nigeria.
- **Closest relatives -** Gorillas share 98.3% of their genetic code with humans, making them our closest cousins after chimpanzees and bonobos.
- **Structure –** Gorillas are social animals and live in family ***groups called troops***.
- They are *polygamous* a single adult male gorilla, called a *silverback*, leads a troop and mates with multiple females.
- **Diet –** Vegetarians.
- **Threats -** Habitat loss, fragmentation, disease, hunting, illegal logging, palm oil plantations, and forest fires.
- **Conservation status - IUCN** - Both types are classified as ***"Critically Endangered".***

8.15   CO2-to-methanol plant

India's first CO_2-to-methanol pilot plant with a capacity of 1.4 tons per day (TPD) to come up at Thermax Limited in Pune, Maharashtra.

- The plant marks a pioneering effort in carbon reduction and conversion technology.
- **Implemented by -** The public-Private Partnership (PPP) model between the Indian Institute of Technology (IIT), Delhi, and Thermax Limited.
- **Fund** – Estimated cost of Rs. 31 crore.
- **Supported by –** Department of Science and Technology under the Ministry of Science and Technology.
- **Features -** The project will act as a living lab for CCU research, focusing on developing new catalysts and processes for converting captured CO_2 into chemicals.
- It includes both pre-combustion and post-combustion carbon capture techniques, which aim to reduce CO_2 emissions significantly.

CO_2-to-methanol

- The carbon capture and utilization (CCU) process of converting carbon dioxide (CO_2) to methanol involves capturing carbon emissions before they enter the atmosphere.
- **Carbon capture -** CO_2 is captured from sources like power plants or directly from the air using direct air capture (DAC) technologies.
- **Hydrogenation -** The captured CO_2 is then reacted with hydrogen to produce methanol.
- **Methanol use -** Methanol can be used as a fuel or as a base material to produce other chemicals.
- The CO_2-to-methanol process can help reduce greenhouse gas emissions and create a sustainable fuel source.
- It can also help reduce the demand for fossil-based methanol production, which contributes to global CO_2 emissions.

8.16   Joint Hunting by Octopus and Fish

A new study lifts the veil on what happens when octopuses and fish hunt together.

Cross Species Relationship
• It is the cooperation between individuals from different species.   • **In mammals** – There is a close relationship between *dogs and humans* in the context of herding sheep or hunting where both the dog and the human work together to achieve a goal.   • **In underwater species** – A nice example is the *joint hunting behaviour of moray eels and grouper*.   • The *grouper approaches the moray and signals* that it wishes to hunt & eel responds in kind, and off they go.   • The *eel can scare the prey fish* from hiding places among the coral, while the grouper patrols over the top.

- **Hunting by Octopus and Fish -** There is a cross species interactions between the usually solitary day octopus (Octopus cyanea) and several fish species, such as goatfish and groupers.
- They share a common goal, to increase their hunting efficiency.
- **Traditional view** – In this scenario, the octopus would be solely in charge of decisions and the fish just follow (that is, it's an exploitative, despotic relationship).
    - **Octopus -** The producer, with its long, flexible arms, it explores all the nooks and crannies of the hunting ground, flushing out prey the fish can then take advantage of.
    - **Fish -** It simply follow along and opportunistically pick up the scraps.
- **Democratic relationship -** New findings reveal that each partner in the interaction plays a specific role and there is no true leader.
    - **Fish -** They were responsible for *exploring the environment* and deciding where to move.
    - **Octopus** – It would *decide if and when to move*.
- **Controlled experiments -** They showed the *octopuses were guided by social information* provided by the fishes.

- o **Octopus with blue goatfish** - Its foraging tactics where more focused and efficient.
  - o **Octopus with blacktip groupers** - They were less focussed and efficient.
- **Significance of the study** – The nature of the hunting relationship varied depending on who's involved.
- The success rates for capturing prey were higher for the octopus when foraging with fishy partners.

8.17 Swachh Vayu Survekshan Award 2024

Recently Union Environment Ministry presented Swachh Vayu Survekshan Awards for the year 2024.

- **Swachh Vayu Diwas** – It is the International Day of Clean Air for Blue Skies is celebrated on 7 Sept, 2024.
- **Current year host** - Rajasthan State Pollution Control Board.
- **Swachh Vayu Survekshan Awards** – They were presented to the best performing 9 National Clean Air Program (NCAP) cities.

Category	No. of Cities	Population	List of cities
Category 1	47 cities	above 10 Lakh plus population (5 nos. of NCAP funded cities are also Million plus cities (MPCs) apart from 42 MPCs under XV-FC)	List of 47 cities are attached at **Annexure-I.**
Category 2	44 cities	above 3 to 10Lakh population	List of 44 cities are attached at **Annexure-II.**
Category 3	40 cities	under 3 Lakh population	List of 40 cities are attached at **Annexure-III.**

*Population 2011 census

Award Category	Winners
Category-1 (Population over 10 Lakhs)	Surat, Jabalpur, and Agra
Category-2 (Population between 3 and 10 Lakhs)	Firozabad, Amravati, and Jhansi
Category-3 (Population under 3 Lakhs)	Raebareli, Nalgonda, and Nalagarh

- The Municipal Commissioners of winner cities were awarded with cash prizes, trophy, and certificate.
- **Evaluation Criteria** - The Criteria for Ranking of cities for ambient air quality will be on population basis.
- 131 NCAP cities are divided into 3 categories mentioned below:

National Clean Air Program

- **Year-** 2019
- **Ministry**- Ministry of Environment, Forest and Climate Change.
- **About**- The program is a pollution control initiative, the government committed funds as well as set targets for 131 (non-attainment cities) of India's most polluted cities.
- **Non-attainment cities**- They are called as non-attainment cities as they did not meet the national ambient air quality standards (NAAQS) for the period of 2011-15 under the National Air Quality Monitoring Program (NAMP).
- **Goal-** To meet prescribed annual average ambient air quality standards at all locations in the country in a stipulated timeframe (long-term).
- **Objectives-**
  - o Stringent implementation of mitigation measures for prevention, control and abatement of air pollution.
  - o Augment public awareness and capacity building measures.
  - o Augment and strengthen air quality monitoring network across the country
- **Tenure-**

- o **Mid-term**- *5 years action plan* to begin with keeping 2019 as base year.
  - o **Long term**- The program is further extendable to *20-25 years* after mid-term review of the outcomes
- **Phase-I** - It proposes a tentative national target of 20%-30% reduction in PM2.5 and PM10 concentrations by 2024, with 2017 as the base year for comparison.
- **Phase-II**-The government set a new target of a 40% reduction in particulate matter concentration, by 2026.
- **Fund**- The program is backed by *15th Finance Commission*.
- **Cities responsibilities**- Cities are required to take measures to improve air quality inter-alia include solid waste management, control of pollution from biomass burning and air pollution from construction & demolition activities.
- **Non-binding**- The program is considered as a scheme rather than legal binding document hence there are no specified penal actions against cities that fail to meet the targets outlined in the program.
- **PRANA**– Portal for Regulation of Air-pollution in non-attainment cities, is a portal for monitoring of implementation of National Clean Air Programme (NCAP).
- **Status of air quality**- Out of 131 identified cities, decrease in PM10 Concentration has been observed in 88 cities during 2022-23 as compared to levels during FY 2017-18.
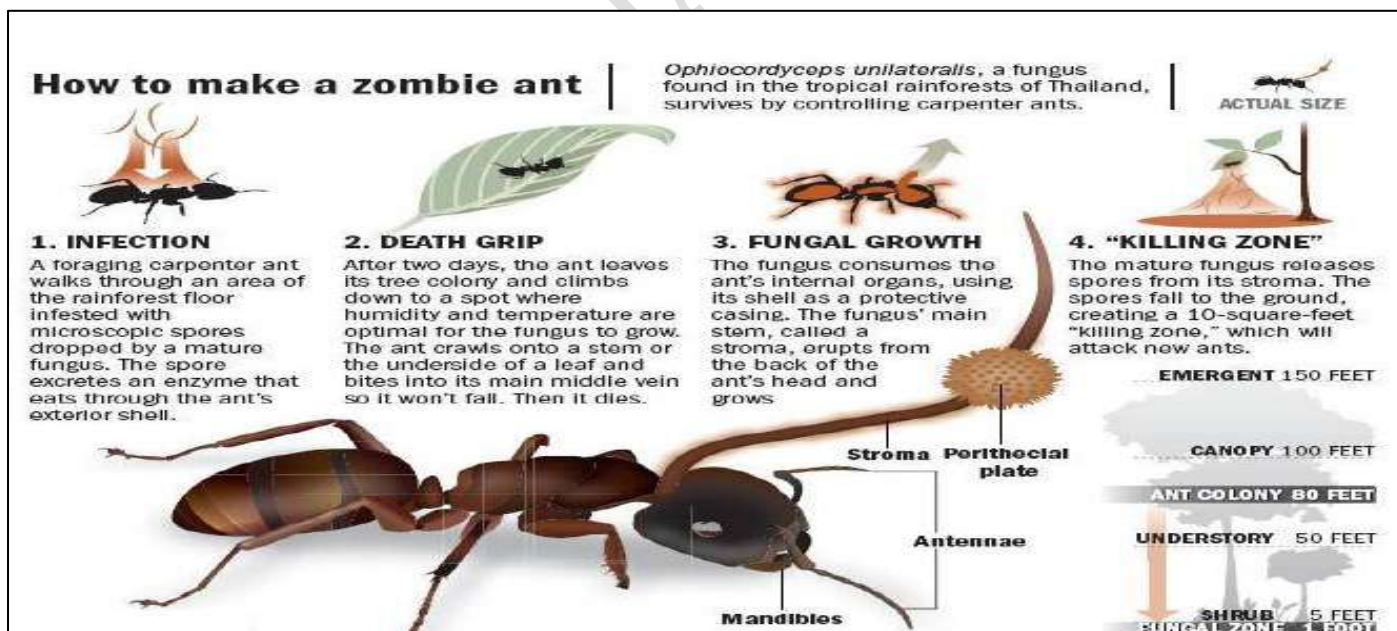
SPECIES IN NEWS

8.18   Zombie Fungus

Recently, a field researcher found *a dead tarantula that was infected by zombie fungus.*

- **Zombie Fungus** – It is a species of parasitic fungus that generally infects ants and alters their behaviour before killing them.
- **Scientific name** - Ophiocordyceps unilateralis.

  > *It is the first time it has infected a tarantula. It does not infect humans.*

- It is referred to simply as "cordyceps".
- **Prevalence** – They are found predominantly in *tropical forest ecosystems.*

How to make a zombie ant | *Ophiocordyceps unilateralis*, a fungus found in the tropical rainforests of Thailand, survives by controlling carpenter ants. | ACTUAL SIZE

1. INFECTION — A foraging carpenter ant walks through an area of the rainforest floor infested with microscopic spores dropped by a mature fungus. The spore excretes an enzyme that eats through the ant's exterior shell.

2. DEATH GRIP — After two days, the ant leaves its tree colony and climbs down to a spot where humidity and temperature are optimal for the fungus to grow. The ant crawls onto a stem or the underside of a leaf and bites into its main middle vein so it won't fall. Then it dies.

3. FUNGAL GROWTH — The fungus consumes the ant's internal organs, using its shell as a protective casing. The fungus' main stem, called a stroma, erupts from the back of the ant's head and grows.

4. "KILLING ZONE" — The mature fungus releases spores from its stroma. The spores fall to the ground, creating a 10-square-feet "killing zone," which will attack new ants.

EMERGENT 150 FEET
CANOPY 100 FEET
ANT COLONY 80 FEET
UNDERSTORY 50 FEET
SHRUB 5 FEET
FUNGAL ZONE 1 FOOT

Stroma Perithecial plate
Antennae
Mandibles

- **Lifecycle** - It begins its life cycle as a sticky spore on the forest floor.
- **Infection** - The Spore attaches to the body of a passing carpenter ant and germinates infective hyphae (threadlike strands) to breach the insect's exoskeleton.
- **Growth** - Once successfully inside the ant body, the fungus grows and manipulates the ant's behaviour.
- It makes the ant position itself in a warm, humid location near the ground that will best serve to distribute a new crop of fungal spores.

- **Death** - After the ant dies, the fungus finishes digesting the cadaver from the inside out and erects a triumphant stalk from the base of its conquest's head.
- **Spread** - The stalk releases spores from characteristic lateral cushions, and the cycle continues.

8.19 Arabian wolf & Indian wolf

Recently about 9 deaths in the riverine plains of Bachrach, Uttarpradesh is suspected to be caused by Indian Wolves.

- **Wolf (Canis lupus)** – It is a wide ranging and highly adaptive species.
- **Habitats** - With almost _40 subspecies_, the wolf lives in a wide variety of habitats
  - High mountains like the Himalayas
  - Plains like the Indo-Gangetic Plain of South Asia
  - The Deccan Plateau
  - The icy tundra of the Arctic
  - Deserts like the Thar
  - The taiga.
- **Southern Wolves** – _Indian and Arabian Wolves_ are southern subspecies of grey wolf species.
- They inhabit mostly arid landscapes.
- The Arabian wolf is the smallest grey wolf in the world and is endangered due to human persecution.

Characteristics	Indian Wolf	Arbian Wolf
Scientific Name	Canis lupus pallipes	Canis lupus arabs
IUCN Status	Endangered	Endangered
CITES	Appendix I	Appendix II
WPA Status	Schedule I	Not Available
Size	Medium in size	Smallest
Distribution	India, Pakistan, Afghanistan, Nepal, Bhutan, Israel, Turkey, Iran, and Syria	Arabian Peninsula, the Negev Desert, the Sinai Peninsula, and Jordan
Habitat	Open grasslands, thorn forests, and scrublands	Desert-adapted subspecies
Hunting	Indian wolves are territorial and hunt during the night	Nocturnal and Hunt during Night

8.20 Newly added species in the Ginger family

The scientists from the Indian Institute of Science Education and Research (IISER), discovered 6 new species of Ginger.

- **Classification-** It belongs to the **_Genus Globba._**
  - Species within this genus are popular as **_ornamental plants_**, often known as dancing girls, weeping goldsmith, snowball, Singapore gold, white dragon, and ruby queen.
  - The common name for this genus is **_dancing girl or dancing lady ginger._**
- Members of Zingiberaceae family are **_perennial, rhizomatous herbs_** that usually grow in moist shady **Genus - Habitat-** It is commonly found in tropical regions such as Southeast Asia, India, and the Eastern Himalayas.

Globba corniculata	Named for horn-shaped structure at the base of the labellum. Found in West Bengal's Darjeeling district.
Globba paschimbengalensis	Named after West Bengal.
Globba polymorpha	Named for the variation in bracteole colour within the species population, found in West Bengal.
Globba tyrnaensis	Named after Tyrna, a village in Meghalaya's East Khasi Hills district.
Globba janakiae	Named in honour of botanist E.K. Janaki Ammal, found in Meghalaya.
Globba yadaviana	Found in Mizoram's Mamit district, named after the late Rajesh Yadav, father of lead author Ritu Yadav.

- **Taxonomic collection challenges -** In the northeastern States it is a significant challenge in identifying species from these sacred groves since voucher collections from these locations are prohibited.

8.21   Curcuma ungmensis

A newly identified species of 'Curcuma,' named Curcuma ungmensis, was recently discovered by researchers in Ungma Village, located in Mokokchung district of Nagaland.

- It is a <u>rhizomatous herb</u> with underground stems (subterranean stem).

- **Genus** – Curcuma.

- **Family-** Zingiberaceae.
    - Curcuma is among the largest and most significant genera within this family, with well-known members like turmeric (Curcuma longa), black turmeric (Curcuma caesia), and mango ginger (Curcuma amada).

- **Nomenclature -** Curcuma ungmensis is named after Ungma village, where it was found.

- **Size** - It reaches heights of 65-90 cm.

- **Appearance** – Yellow flowers at maturity, flowering occurs during the rainy season.

- **Growing conditions –** It thrives in <u>warm, tropical climates</u>.

- **Distribution –** South Asia, Southeast Asia and in southern China.

- Some can also be located in northern Australia and the South Pacific.

- **In India** – Approximately 40 species of this genus are present, predominantly in the northeastern and southern states, along with the Andaman and Nicobar Islands.

- **Uses** – Its vibrant inflorescence makes it a promising candidate for use as a cut flower.

- Once domesticated, it has potential as an <u>ornamental ground cover in gardens</u>.

8.22   New Study on butterfly species

*A recent study published in the Journal of the Bombay Natural History Society highlights conservation gaps and calls for reassessing conservation status of several species.*

- It highlights that the <u>highest diversity is found t in the southern Western Ghats</u> and gradually diminishes northward.

- **Distribution**

Region	Species
Western Ghats	337 butterfly species.
Kerala	328 (highest number)

| Tamil Nadu	326
Karnataka	317

- **Diversity-** The southern and central Western Ghats each have 324 species, while the northern Western Ghats have only 255 species.

- **Butterfly families-** The species belong to 6 families:
    - Papilionidae (19)
    - Pieridae (34)
    - Nymphalidae (100)
    - Riodinidae (2)
    - Lycaenidae (99)
    - Hesperiidae (83)

- **Endemic-** There are *40 strictly endemic species* in the Western Ghats.

- **Listed Threatened Species**
    - **IUCN Red List-** Less than 7% (22 species).
    - **Wildlife (Protection) Act-** 71 species (21%) are protected under this act with amendments up to 2022.
    - **Near threatened-** 2 species and rest as 'least concern'.
    - Common species like crimson rose, Indian common rose, and Indian tiny grass blue could be excluded from the IUCN Red List.

- **Concerns**
    - Some strictly endemic and rare species are not protected under WLPA; and
    - While certain common species are listed on the IUCN Red List, some truly threatened and rare species are not included.

- **Suggested species for WLPA inclusion-** Sahyadri green yellow, Nilgiri clouded yellow, red-eye bushbrown, Palni bushbrown, Nilgiri fritillary, and cloud-forest silverline.

- **Rare species for IUCN Red List re-evaluation-** Abnormal silverline, yellow-base flitter, Malabar banded swallowtail, and Travancore evening brown.
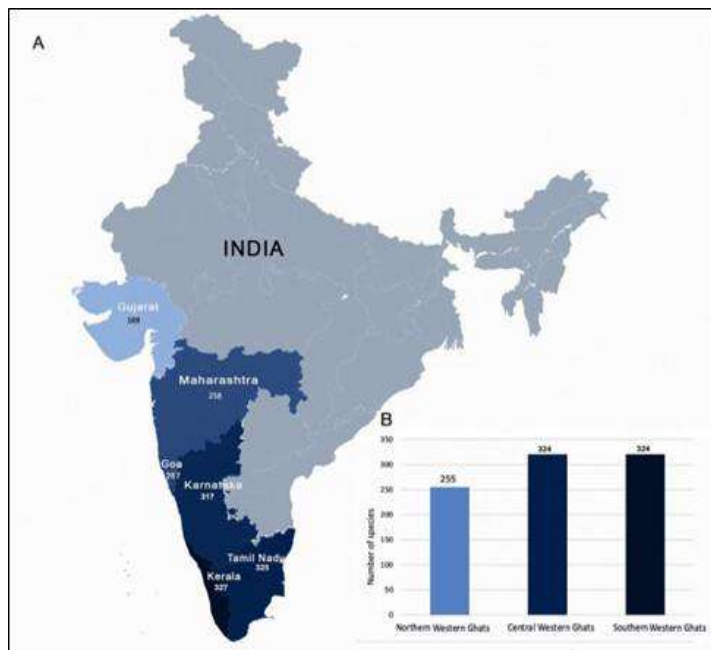
8.23   Carrhotus piperus – Jumping Spider

A new species of jumping spider, Carrhotus piperus, has been identified in the lower Palani Hills of Tamil Nadu.

- **Carrhotus piperus** – It is a new species of ***jumping spider*** of genus Carrhotus Thorel.

- **Sex** – It is male carrhotus species.

- **Habitat** – On Pepper (Piper nigrum) plants.

- **Piperus** – It is the specific epithet that describes the spider's distinctive pepper plant (*Piper nigrum*) habitat.

- **Unique feature** - Unique prolateral protrusion and beak-shaped embolus distinguish it from its closely-related species.
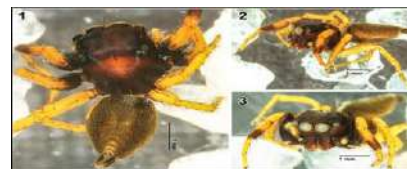
Carrhotus Thorell

- It is a jumping spider genus that was described by Thorell in 1891.

- It encompasses 36 currently valid species and with 9 known from India.

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Information is Empowering

- **Number of Species** – With the new discovery, the number of *Carrhotus* species in India **increased to 10, and to 37 globally**.
- **Distribution** - Asia, Europe, Africa, and Brazil
- **Description** - 16 described based on both sexes, 11 on males alone, and 9 on females alone.
- **In India**- *No Carrhotus species are known solely from females*.
- There are several species from Nepal, Bhutan, and Sri Lanka known only from female specimens.

Jumping Spiders

- Jumping spiders are a group of spiders that constitute the **family Salticidae**.
- It the largest family of spiders with 13% of all species.
- As of 2019, this family contained over 600 described genera and over 6,000 described species.
- They *leap great distances* to move and stalk prey.
- Unlike other jumping insects that rely on large, muscular back legs, jumping spiders have a **hydraulic system that propels** them forward.

8.24   Onitis visthara – Dung Beetle

Entomologists from the Ashoka Trust for Research in Ecology and the Environment (ATREE) recently discovered Onitis visthara in the Hesaraghatta grasslands in northwest Bengaluru.

- It is a **new species of dung beetle** of the genus Onitis.
- **Spread –** They are found in the Afrotropical, Oriental, and Palaearctic regions.

> *An average cow produces approximately 30 kg of dung daily, amounting to over 10 tons per year with India having the world's largest livestock population, exceeding 535 million heads.*

- **Tunnellers** – They bury large quantities of cattle dung beneath the dung pat to provide food for their larvae.
- It process and *decompose cow dung* by feeding, breeding, and nesting in it.
- Cattle dung is a major source of greenhouse gas emissions and contributes significantly to climate change.
- Additionally, these beetles enhance nutrient cycling, improve soil aeration, aid in secondary seed dispersal, and help control parasites.
- **Other species -** The team also discovered 2 other new species
    - **Onitis Kethai** - Biligiri Rangaswamy Temple Tiger Reserve, Karnataka, and
    - **Onitis Bhomorensis** -Tezpur, Assam.
- **Nomenclature**
    - Kethai is named after the entomologists' field assistant late Ketha Gouda and
    - Onitis bhomorensis after the bridge Kolia Bhomora across Brahmaputra, from where the new species was collected.

Hesaraghatta Lake

- It is a human made reservoir located in the north-west of Bengaluru, *Karnataka*.
- It is a fresh water lake created in the year 1894 across the **Arkavathy River** to meet the drinking water needs of the city.
- It was part of 'Chamarajendra Water Works' project.

8.25   Trilobite species – Marine Arthropods

A recent study reveals that fossils of a trilobite species from upstate New York show an additional set of legs under its head.

- **Trilobite-** They are ***extinct marine arthropods*** that form the class Trilobita.

- **Anatomy-** It has bodies segmented into a head, thorax, and tail.

- The head region is composed of ***several fused segments***, with appendages serving various functions such as sensing, feeding, and locomotion.

- **Finding-** It suggests that having a ***5th pair of head appendages*** might be more widespread among trilobites than previously thought.

- The newly recovered Triarthrus eatoni fossils revealed an additional leg, resolving the mismatch between the counting methods.

- Comparisons with the trilobite Olenoides serratus revealed that the trilobite head had 6 segments i.e. one with the eyes, one with antennae, and four with walking legs.

8.26 Syntretus perlmani – A Parasitoid Wasp

New Parasitoid Wasp Species, Syntretus perlmani recently discovered by Researchers in Mississippi in Eastern US.

- Parasitic feature – It is a new species of wasp that ***lays eggs inside living, adult fruit flies***, which then burst from the hosts' abdomens while they're still alive.

- It use their needle-like ovipositor organ, the stinger in stinging wasps to stab and deposit an egg within a fruit fly's abdomen.

- The egg then hatches into a tiny wasp larva, which grows inside the fly for about 18 days before leaving its host for dead.

- It is the ***1st wasp found to infect adult fruit flies***.

- Previously, similar wasp species are known to target flies during their younger, more vulnerable larva and pupa life stages.

- The wasps are ***parasitoids rather than parasites*** because they ***always kill their hosts***, while parasites usually don't.

8.27 Spotted Deer

Pench Tiger Reserve in Madhya Pradesh faces Habitat Strain recently due to Spotted Deer Overpopulation.

- The chital deer, also known as the spotted deer, chital deer, or axis deer, is a deer species native to the Indian subcontinent.

- **Scientific Name -** Axis axis.
  - **Family -** Cervidae.

- **Size -** 35 inches tall and weighs about 187 pounds.

- **Distribution** - Sri Lanka, India, USA and Australia as well.

- **Habitat** - Dense deciduous or semi-evergreen forests and open grasslands.

- **Appearance** - The deer's ***golden-rufus coloring is speckled with white spots***, and it has a white underbelly.

- **3-pronged antlers**- They are curved, extend nearly 3 feet which are ***shed each year***.

- **Diet –** They are herbivores, they feed upon tall grass and shrubs.

- **Breeding** - It has a prolonged mating season, as the perpetually warm climate allows females to remain fertile and to give birth to fawns any time of year.

- It is a social animal, usually occurs in herds of 10 to 50 individuals.

- **Conservation status**
  - **IUCN** – Least concern

- o Not listed in CITES
- o **WPA, 1972** - Schedule III

8.28 Rare Dung Beetle Species

Recently, a new dung beetle species has been identified from elephant waste in a bamboo-dominated secondary forest near Nongkhyllem Wildlife Sanctuary in Meghalaya.

- **Dung Beetles** – They are beetles that *feed on faeces.*

- **Scientific name** - Onitis bordati

- **Range** – Previously, it was found only in *Vietnam and Thailand*.

- **Features** - Some can *bury dung under the soil* up to 250 times their weight in a single night to lay their eggs and extract micronutrients.

- The species belonging to the *genus Onitis are tunnellers*.

- Males of most species possess unique forelegs that are elongated, slender, and curved, often featuring teeth or spines.

- **Ecological functions** – They also roll dung to their burrows over considerable distances, which *aids in soil fertility*.

> *Onitis bordati stands out due to its unique context, as it was **located in elephant faeces**, in contrast to the discoveries of other species in Assam and Karnataka, which were associated with cattle waste.*

- It helps in seed dispersal, nutrient recycling, pest regulation, and plant growth enhancement.

- **Threats** - Habitat loss and climate change

- With this discovery, the number of Onitis species in the subcontinent has increased to 20, and the total for the Oriental region has reached 26.

Quick Facts

- **The Oriental region** – It is a *biogeographic region* that includes India, mainland and much of insular Southeast Asia.

- It is also known as the Indian or Sino-Indian region.

- **Nongkhyllem Wildlife Sanctuary** – It is located in Meghalaya, and is rich in biodiversity of flora and fauna.

- It hosts various wildlife, including the rare Clouded Leopard, majestic Elephants, the formidable Himalayan Black Bear, and Great Slaty Woodpecker that resides in the area.

8.29 World Rhino Day

World Rhino Day is celebrated worldwide recently.

- It is celebrated each year on *22 September.*

- **Aim-** To raising awareness about the critical conservation status of rhinoceroses and the threats they face.

- **Significance** – It highlights the need to conserve the *5 rhino species in the world.*

- It addresses key issues like poaching and habitat loss.

IUCN Protection Status of Rhinos
- There are totally *5 species of rhinoceros* globally.   **Critically Endangered** – *3 species*, Black, Javan and Sumatran.   **Near Threatened** – White Rhino (Northern White is Critically Endangered).   **Vulnerable** – Greater One Horned Rhino.

- **Rhino Population in India -** India is home to *greater one horned rhinoceros.*

- Kaziranga National park in Assam contains the largest number of greater one horned rhinoceros.

- **Project Rhino in India -** It aims to protect India's rhino population.

- It focuses on preventing poaching, improving habitats, and raising public awareness.

- It strengthens law enforcement to combat poaching threats.

- Relocation of rhinos to safer areas has improved their security.

- **Indian Rhino Vision 2020 (IRV 2020) -** A flagship conservation program to increase the population of the Greater One-Horned rhino in Assam, focusing primarily on areas where rhino had gone extinct.

> *The rhino finds a mention in the Baburnama, the autobiography of Babur, Founder of Mughal Empire written initially in Chagatai Turkic and later translated into Farsi or Persian.*
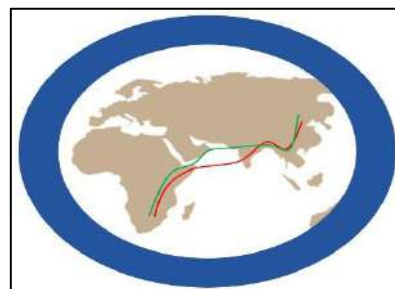
8.30 Amur Falcons

The Tamenglong district in Manipur has imposed a ban on hunting, catching, killing, and selling Amur falcons ahead of their migratory arrival.

- It is a small ***migratory bird*** of prey that belongs to the family Falconidae.

- They are locally known as '***Kahuaipuina'***.

- **Scientific name**- Falco amurensis.

- **Size-** It is small raptors, measuring around 28-30 cm in length.

- **Migratory pattern-** In autumn, they leave their breeding grounds in the ***Amur River*** region in northeastern Asia, and start their journey south.

- First they head south, to round the Himalayas, and then ***stop in Nagaland***, northeastern India.

> *Nagaland has earned the well-deserved title of 'Amur Falcon capital of the world'.*

- When leaving Nagaland, they head south again, either crossing the Bengal Bay or taking an inland route over India, to ***reach the Western Ghats and the west coast of India***.

- From the Indian coast, they start crossing the Indian Ocean and they steer their way through east Africa, to *finally arrive in South Africa*.

- They undertake one of the most remarkable migrations of any raptor, traveling ***around 22,000 kilometres annually***.

- **Breeding -** Breeds in South-east Russia and northern China.

- **Diet** - Amur falcons are carnivores (insectivores).

- **Conservation Status**
    - **IUCN Status-** Least Concern.
    - **Wildlife Protection Act, 1972** - Schedule IV.

8.31 White Rhinos

The number of white rhinos increased slightly but so have the killings, mostly in South Africa, as poaching fed by huge demand for rhino horns.

- They are the ***2nd largest land mammal*** after elephants.

- **Nomenclature -** Their name comes from the Afrikaan's, a West Germanic language, word "weit" which means wide and refers to the animal's mouth.

- **Color**- They aren't white ***but grey in colour.***

- It is also known as the ***square-lipped rhinoceros***, as they have a square upper lip with almost no hair.

- **Subspecies**
    - The northern white rhinoceros (*Ceratotherium simum cottoni*)
    - The southern white rhinoceros (*Ceratotherium simum simum*).
- **Scientific Name** - Ceratotherium simum
- **Height** - 5-6 feet, Male white rhinos are noticeably larger than females.
- **Habitats** - Long and short grass savanna areas in grasslands.
- **Distribution** – They are native to Africa.
- **Diet –** They feed on grasses and their broad upper lip is adjusted to this type of food, Mega herbivores.
- **Behavior** - They are semi-social and territorial.
- Females and subadults generally are social, but ***bulls are often solitary***.
- **Conservation status**
    - **IUCN** - near threatened.
    - **CITES** - Appendix II.
- **Threats** – poaching

8.32   Exostoma sentiyonoae - Catfish

A new species of catfish was recently discovered in the Dzuleke River.

> *Dzuleke River is a tributary of the Barak River in Nagaland.*

- It is a new species of ***glyptosternine catfish*** in Genus Exostoma.
- **Genus -** Exostoma is a genus of ***sisorid catfishes native to Asia.***
    - It is the 1st known member of this genus discovered from the Dzuleke River in Nagaland.
- **Endemic to** – The Mekong River basin, particularly found in Thailand.
- **Nomenclature—**Dr Limatemjen, who discovered the species, named it in honor of his daughter, combining "Senti" from the Ao Naga language with "Yono" from the Angami Naga language.
- This marks ***the 4th species*** of Exostoma described from the Barak drainage.

9. SCIENCE AND TECHNOLOGY

PHYSICAL SCIENCE

9.1   Advanced PAP (A-PAP) pen, paper based device sensing contaminants

Scientists have recently developed fabricating paper-based devices using an Advanced PAP (A-PAP) pen.

- **A-PAP pen** – It is a ***hydrophobic barrier pen*** used in laboratory applications to draw barriers on glass slides to confine the flow of reagents.
- ***It does not require any machinery or heating/drying*** steps and adopts a DIY approach.
- **Recent analysis** - Using the A-PAP pen, the fabrication of 2-dimensional (2D) paper-based devices for chemical detection of heavy metal and nitrite can be done.
- *Biological sensing* using 2D lateral flow paper-based devices for the detection of dopamine can be done.
- The technique is also validated for fabricating complex 2-dimensional (3D) paper-based devices using a *paper origami technique for heavy metals sensing*.

- **Benefits -** This technique provides a valuable tool for creating affordable, efficient, and accessible chemical and biological testing solutions.

- Its versatility extends to fabricating simple and complex devices like lateral-flow-based and 3D origami devices.
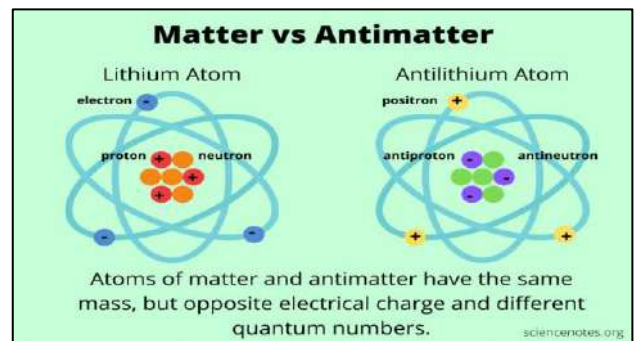
Paper-based devices

- Also known as paper-based analytical devices (PADs) or microfluidic paper-based analytical devices (μPADs).

- **Made by** - Patterning paper to create channels & barriers.

- **Usage** – It can be used with a variety of detection methods.

- **Detection -** It can detect biological analytes associated with disease, such as glucose, or foodborne pathogens.

- **Monitoring -** It can monitor environmental, health, and food issues.

- **Diagnosis -** It can be used for clinical diagnosis.

- **Drug development -** It can be used in drug development.
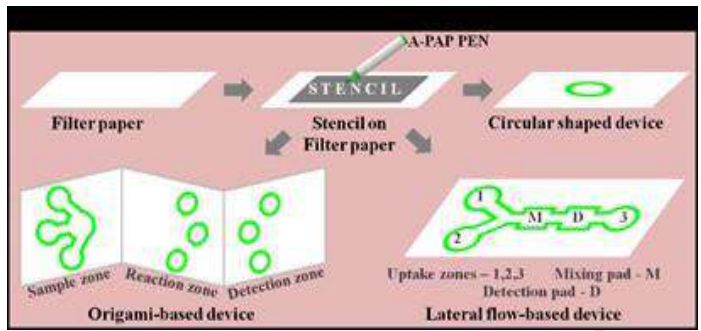
9.2   Antimatter

- **Antimatter** – It is the ***twin of almost all the subatomic particles*** that make up the universe.

- **Subatomic particles** – It includes *protons and neutrons* (also known as baryons), *electrons and neutrinos* (also known as leptons), and a variety of other particles in the Standard Model of Particle Physics.

> The matter in universe comes in many forms like **solids, liquids, gasses, and plasmas**. These forms of matter all consist of subatomic particles that give matter its mass and volume.

- Protons and neutrons are themselves made up of particles known as quarks and gluons.

- All the subatomic particles in matter either ***have their own anti-twins*** (antiquarks, antiprotons, antineutrons, and antileptons such as antielectrons).

- **Property** – Anti-particles can combine to form anti-atoms and, in principle, could even form anti-matter regions of the universe.

- They might have an opposite electrical charges like ***positrons*** (positively charged electrons).

- When they meet their matching matter particles, they cancel each other out, *releasing a lot of energy*.

- **Occurrences** – They are rare in the observable universe, but scientists find it in places with lots of energy, like cosmic rays and certain experiments in labs.

- **Artificial creation** - Humans have created antimatter particles using ultra-high-speed collisions at huge particle accelerators such as the Large Hadron Collider, located outside Geneva and operated by CERN, European Organization for Nuclear Research.

> Positrons were discovered by American California Institute of Technology physicist ***Carl Anderson.***

- Several experiments at CERN create antihydrogen, the antimatter twin of the element hydrogen.

- The most complex antimatter element produced to date is ***antihelium***, the counterpart to helium.

9.3   PARAM Rudra Supercomputers

PM Modi launched 3 Param Rudra supercomputers and an HPC system for weather research recently.

- **Developed by** - Centre for Development of Advanced Computing, ***C-DAC in Pune***.

- **Umbrella scheme** - ***National Supercomputing Mission.***

- **Deployed to -** It have been deployed *in Pune, Delhi and Kolkata* to facilitate pioneering scientific research.

- In Pune, the Giant Metre Radio Telescope (GMRT) will leverage the supercomputer to explore Fast Radio Bursts (FRBs) and other astronomical phenomena.

- In Delhi, the Inter-University Accelerator Centre (IUAC) will enhance research in fields such as material science and atomic physics.

- In Kolkata, S N Bose Centre will use supercomputing technology to drive advanced research in areas such as physics, cosmology, and earth sciences.

| National Supercomputing Mission |
|---|

- **Launched in –** 2015.

- **Aim –**To enhance the capabilities of Indian academic and R&D institutions by setting up a network of over 70 high-performance computing (HPC) facilities across the country.

- To boost India's supercomputing infrastructure amid increasing demand in sectors such as academia, researchers, MSMEs, and startups.

- It is a _**first of its kind attempt**_ to boost the country's computing power.

- **Developed by -** A collaboration between the Ministry of Electronics and Information Technology (MeitY) and the Department of Science and Technology (DST).

- **Implemented by -** C-DAC, Pune and the Indian Institute of Science (IISc), Bengaluru.

- **Network -** These supercomputers will also be networked on the National Supercomputing grid over the _**National Knowledge Network (NKN).**_

  o The NKN is another programme of the government which connects academic institutions and R&D labs over a high speed network.

- Academic and R&D institutions as well as key user departments/ministries would participate by using these facilities and develop applications of national relevance.

- Under the mission, the _**first indigenously assembled supercomputer, named PARAM Shivay**_, was installed at IIT (BHU) in 2019.

9.4	Soft Tiling

Recently, scientists have found a new kind of cell that doesn't follow shape rules but involves in tiling.

- **Tiling** – In mathematics, it refer to the process where any geometric shape _covers a surface_ such that they _**leave no gaps between them.**_

  o Example: Square tiles in house cover the floor completely.

- **Classical shapes** - The shapes most commonly used as tiles has _**positive curvature**_ at its vertices having _sharp corners and straight edges_.

  o Example: Triangles, squares, hexagons, cubes, and other polyhedral shapes typically the tiles that fill 2- and 3-dimensional spaces with no gaps.

- **Soft cells** – It is a new class of shape that stands apart from classical geometric forms by having a _**form of distributed curvature**_.

  o **In 2D** - 2 pointed corners

  o **In 3-D** – No corners

  o **Edges** - Rounded edges

- Here, the _curvature is spread smoothly_ along their edges instead of sharp deviations at specific points as in classical shapes.

- **Soft cell tiling** – Mathematically, this distribution _minimises the number of high-curvature points_ i.e. corners while still allowing the shape to tile a space.

- Many natural structures like _muscle cells, zebra stripes, and the layers of onion_ bulbs are covered in 2D tiles.

- These natural systems display a _biological preference for curved, smooth-edged shapes._

- **Tiling in Nautilus shell** - The chambers inside these shells _lack sharp corners in 3D._
    o When they're _sliced open, they reveal a 2D soft-cell tiling_.
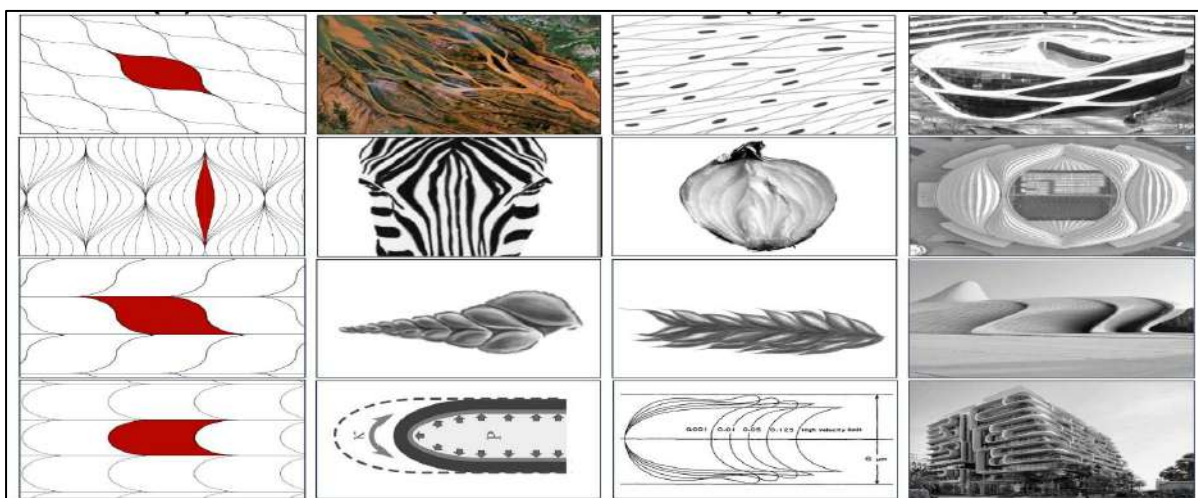
- This relationship between 2D and 3D forms illustrates how soft cells could be involved in both biological tissue formation and processes like tip growth.

- **Significance** - The mathematics of soft cells also suggests nature prefers to minimise sharp corners _for structural reasons and functional efficiency_.

- It opens new avenues of mathematical study and has significant implications for _biology, architecture, and materials science_.

> _The researchers found they could make 3D soft cells by softening the edges and eliminating sharp corners completely. Here, the cells acquire a smooth, curved form that seamlessly fills a 3D volume without the need for angled protrusions._
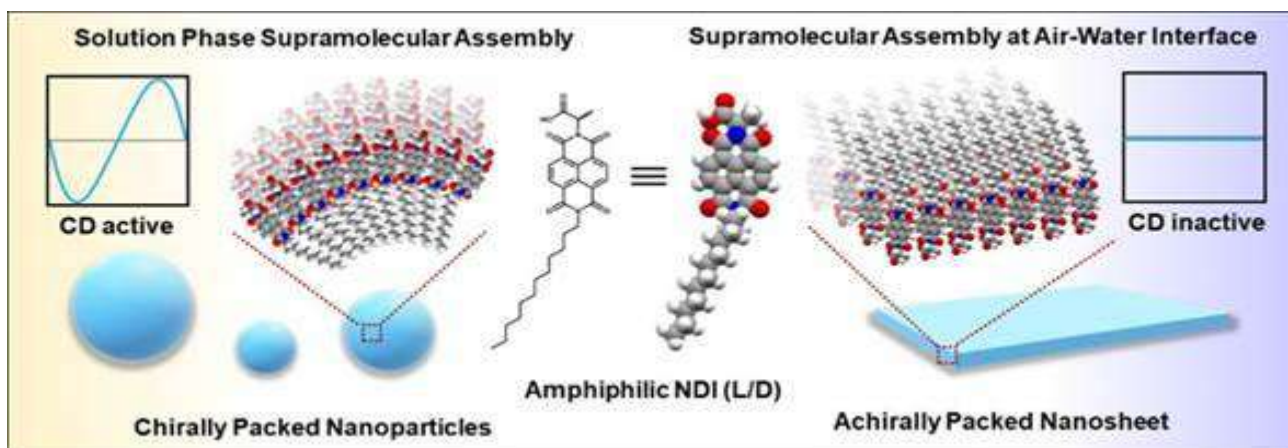
9.5   Supramolecular self-assembly

A new breakthrough in understanding the process of controlling the assembly of tiny molecular units into complex structures.

- **Supramolecular self-assembly** – It is a process where small molecules spontaneously organize into larger, well-defined structures without external direction.

- **Research findings by** – It is done by _2 autonomous institutes_ in Bengaluru under Department of Science and Technology (DST)

    o Centre for Nano and Soft Matter Sciences (CeNS)

    o Jawaharlal Nehru Centre for Advanced Scientific Research

- **Key findings** – They explored the _self-assembly behaviour_ of specific molecules called **_chiral amphiphilic naphthalene diimide_** derivatives (NDI-L and NDI-D).

- They experimented with 2 different methods of assembling.

	Solution Phase Assembly	**Air-Water Interface Assembly**
Assembly Environment	In a liquid solution	At the boundary between air and water
End product	Forms spherical nanoparticles.	Forms into a flat, two-dimensional layers with irregular edges
Properties	Unique optical properties, such as strong mirror-imaged circular dichroism (CD) signals, which are important for materials that interact with light in precise ways.	not exhibit the same optical properties as the solution-assembled nanoparticles

- It indicates that the environment in which molecules assemble plays a critical role in determining their final structure and properties.
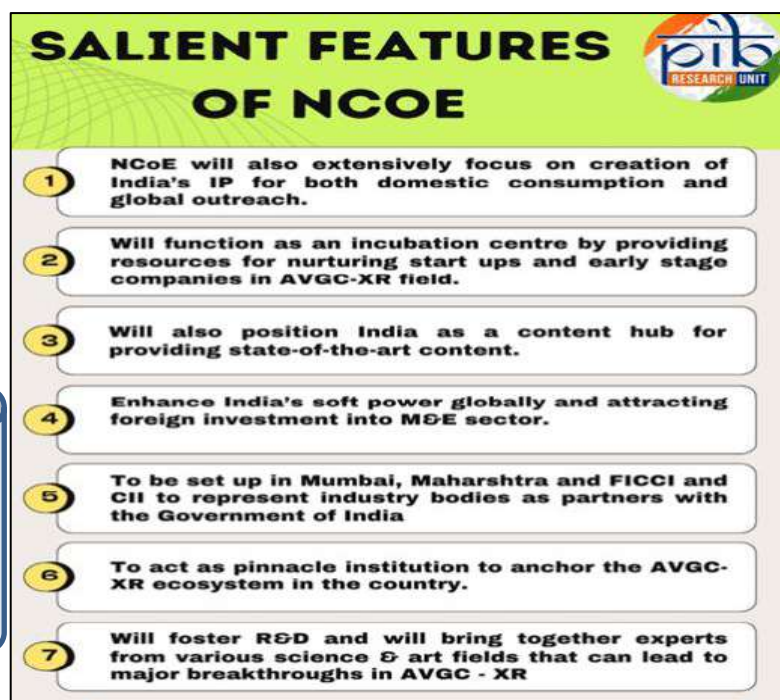

Solution Phase Supramolecular Assembly — Supramolecular Assembly at Air-Water Interface — CD active — CD inactive — Amphiphilic NDI (L/D) — Chirally Packed Nanoparticles — Achirally Packed Nanosheet

- **Significance** – Understanding this process is crucial _for creating new organic materials_ that can be used to develop nanodevices.

- It not only advance the _field of material science_ but also provide a foundation _for future innovations_ in various industries.

- For example,

  o **In biomedicine**, it could be used to develop _more effective drug delivery_ systems that target specific areas of the body.

  o **In electronics**, these materials could lead to the development of _faster, more efficient devices_.

9.6   National Centre of Excellence (NCoE) for AVGC

Union Cabinet Approves National Centre of Excellence for AVGC-XR in Mumbai.

- **NCoE AVGC** - Provisionally named the _**Indian Institute for Immersive Creators (IIIC)**_.

- It will be modelled after institutions like the Indian Institutes of Technology (IITs) and Indian Institutes of Management (IIMs).

- **Mission** – To revolutionize the AVGC sector and _foster innovation_ in immersive technologies and to _create a world class talent pool_ in India to cater to the Indian as well as global entertainment industry.

- **Key Objectives** - Focusing of creating Indian IP and leveraging our cultural heritage in new age

- Create a multiplier effect in the industry.

- An industry led initiative, in partnership with state and academia.

- Integrated focus on education, skilling industry, development, innovation.

- Hub and spoke model of development to be followed.

- IIIC as the hub and several center's as its spokes dedicated innovation and research fund to promote start-up ecosystem.

**National Centre of Excellence (NCoE)** _will be set up as a Company under the Companies Act, 2013 in India with FICCI and CII representing the industry bodies as partners with the Government of India._

SALIENT FEATURES OF NCOE

1. NCoE will also extensively focus on creation of India's IP for both domestic consumption and global outreach.

2. Will function as an incubation centre by providing resources for nurturing start ups and early stage companies in AVGC-XR field.

3. Will also position India as a content hub for providing state-of-the-art content.

4. Enhance India's soft power globally and attracting foreign investment into M&E sector.

5. To be set up in Mumbai, Maharshtra and FICCI and CII to represent industry bodies as partners with the Government of India

6. To act as pinnacle institution to anchor the AVGC-XR ecosystem in the country.

7. Will foster R&D and will bring together experts from various science & art fields that can lead to major breakthroughs in AVGC - XR.

AVGC-XR

- **AVGC-XR** – Animation, Visual Effects, Gaming, Comics and Extended Reality.

- This sector that is set to be the future of the media and entertainment industry.

- **In India** – According to the *FICCI-EY 2024 report*, India now boasts the *2nd largest anime fan base globally* with a *growth rate of 25%* and an estimated value of Rs.46 billion by 2023.

- It is projected to *contribute 60% to the worldwide growth in anime* interest in the coming years.

SPACE

9.7 Indian Space Situational Assessment Report (ISSAR), 2023 & IS4OM

Recently ISSAR for 2023 has revealed that more space objects were placed in orbit last year as compared to 2022.

- **Compiled by**- ISRO System for Safe and Sustainable Space Operations Management (*IS4OM*)

- **Global scenario**- A rise in the number of space objects placed in orbit in 2023 compared to 2022, suggesting improved accessibility to space and the broadening applications of space technology in everyday life.

- **Indian scenario-** It saw the *successful launch of 7 ISRO missions*, placing 5 Indian satellites, 46 foreign satellites, and 8 rocket bodies into orbit.

- **Spacecraft decommissioning**- A controlled *re-entry of Meghatropiques-1* into the Earth's atmosphere over an uninhabited area in the South Pacific Ocean.

- **Indian space operations**- It outlined India's role in space operations, including the number of satellites re-entering the atmosphere and rocket bodies placed in orbit.

- **Close approach alerts**- ISRO receives close approach alerts from *USSPACECOM* and conducts assessments using accurate orbital data.

- **Collaborative efforts**-While numerous close approaches were detected, coordination with international agencies helped mitigate risks, and no critical incidents warranted *collision avoidance manoeuvres* (CAM).

- **Space congestion**- It notes an increasing trend in CAMs, reflecting the growing congestion in outer space.

- But no concerns of CAMs were detected for specific missions like Chandrayaan-3 and Aditya-L1.

IS4OM

- **Location-** Bengaluru

- **Aim**- To ensure safety of India's space assets and sustaining the utilization of outer space for national development.

- **Observation**- It observes and monitors space objects and the space environment.

- **Orbit determination-**It processes observations to determine the orbits of space objects.

- **Object characterization**- It characterizes and catalogs space objects.

- **Space environment analysis**- It analyzes the evolution of the space environment.

- **Risk assessment** - It assesses risks and implements mitigation strategies.

- **Data exchange**- It facilitates data exchange and collaboration.

- **Compliance with International guidelines**- IS4OM adheres to international guidelines on post-mission disposal and satellite end-of-life operations.

9.8 Helium in Rockets

Boeing's Starliner spacecraft landed uncrewed in a New Mexico desert recently, due to Helium leakage in the rocket system.

Helium

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- It is the 2nd most abundant element in the universe after hydrogen.
- It is a _colorless & odorless inert_ gas.
- It does not react with other substances or combust.
- It is the 2nd lightest element after hydrogen.

Helium Properties	
Atomic Number	2
Atomic Weight	4.002602
Melting Point	none
Boiling Point	−268.9 °C (−452 °F)
Density (1 atm, 0 °C)	0.1785 gram/litre
Oxidation State	0
Electron Configuration	$1s^2$

- **Use of Helium in Rocket** – As Helium has a _**very low boiling point (-268.9° C),**_ it to remain a gas even in super-cold environments.
- Many rocket fuels are stored in that temperature range.
- Helium is used to _**pressurize fuel tanks**_, ensuring fuel flows to the rocket's engines without interruption and for _**cooling systems**_.
- As fuel and oxidizer are burned in the rocket's engines, helium fills the resulting empty space in the tanks, maintaining the overall pressure inside.
- Because it is non-reactive, it can safely mingle with the tanks' residual contents.
- **Leakage Prone** – As Helium is small in atomic size and low in molecular weight, its atoms can escape through small gaps or seals in storage tanks and fuel systems.
- **Easy to Detect** - Because there is very little helium in the Earth's atmosphere, leaks can be easily detected
- **Alternatives** - Argon and nitrogen, which are also inert and can sometimes be cheaper.

9.9   Planetary Protection

Planetary protection ensures that Earth and other celestial bodies are shielded from cross-contamination by microbial life during space missions.

- **Planetary protection-** It is the principle of _**preserving the biospheres**_ of both Earth and other planetary bodies from _**contamination by microbial life**_ during space missions.
- **Planetary Protection Policy** – It's an important principle of interplanetary missions, such as from the earth to the moon or Mars.
- It has been formulated by various agencies
    o The Committee on Space Research (COSPAR)
    o Committee of the International Science Council (ISC)
- This principle is grounded in _**Article IX**_ of the _**Outer Space Treaty (1967**_).
- **Compliance-** The spacecraft are sterilized by assembling them fully and baking them in a dry room _**at 120°C for 3 days**_ to prevent contamination.
- **Applications-** _NASA's Viking 1_ (the 1st spacecraft to land on Mars in 1976) and China's upcoming _**Tianwen-3 Mars**_ sample-return mission (planned for 2028).

Outer Space Treaty	

- It is formally the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.
- It is a _**multilateral treaty**_ that forms the basis of international space law in 1967.
- **Adopted by** - _United Nations General Assembly_ in 1966
- **Entered into force in** - 1967.
- **Establishes rules** – For the peaceful use of space & prohibits the stationing of weapons of mass destruction in space.

Outer Space Treaty	
Adopted in	1966
Members	As of June 2024, 115 nations ratified 23 countries have signed but yet to ratify it.
India	Signed in 1967 and ratified it in 1982.

- It also defines the rights of nations to the moon and other celestial bodies.

- **Peaceful use -** The treaty establishes legally binding rules for the peaceful exploration and use of space.

- **No weapons of mass destruction** - It prohibits the stationing of weapons of mass destruction in space.

- **No military activities** - The treaty prohibits military activities on celestial bodies.

- **Free exploration** - The treaty declares that space is an area for free use and exploration by all.

- **Sharing of knowledge** - The treaty enshrines the principle of sharing scientific findings and knowledge.

9.10 DART Mission for Didymos & Dimorphos

A new study found that rocky debris blasted away from a football stadium-sized asteroid, Dimorphos, during the DART mission could create the 1st human-made meteor shower known as the Dimorphids.

DART Mission

- **DART -** Double Asteroid Redirection Test (DART), a part of the NASA's larger planetary defence strategy.

- **Launched by** – NASA in 2021.

- **Aim** - To test the kinetic impactor method, allowing a spacecraft to crash into an asteroid and change its course.

- **Targets** - Asteroid Didymos and its moonlet Dimorphos, was chosen as they pass relatively close to Earth.

- **Methodology** - It is the *1st Kinetic Impactor Method* that involves sending one or larger, high-speed spacecraft into the path of an approaching near-earth object.

- This could deflect the asteroid into a different trajectory, steering it away from the Earth's orbital path.

> *Didymos* means "twin" in Greek was discovered in 1996 through observation at Kitt Peak National Observatory in Tucson, Arizona. The asteroid and its small moonlet Dimorphos make up a <u>binary asteroid system</u>. The small moon (Dimorphos) orbits the larger body (Didymos).
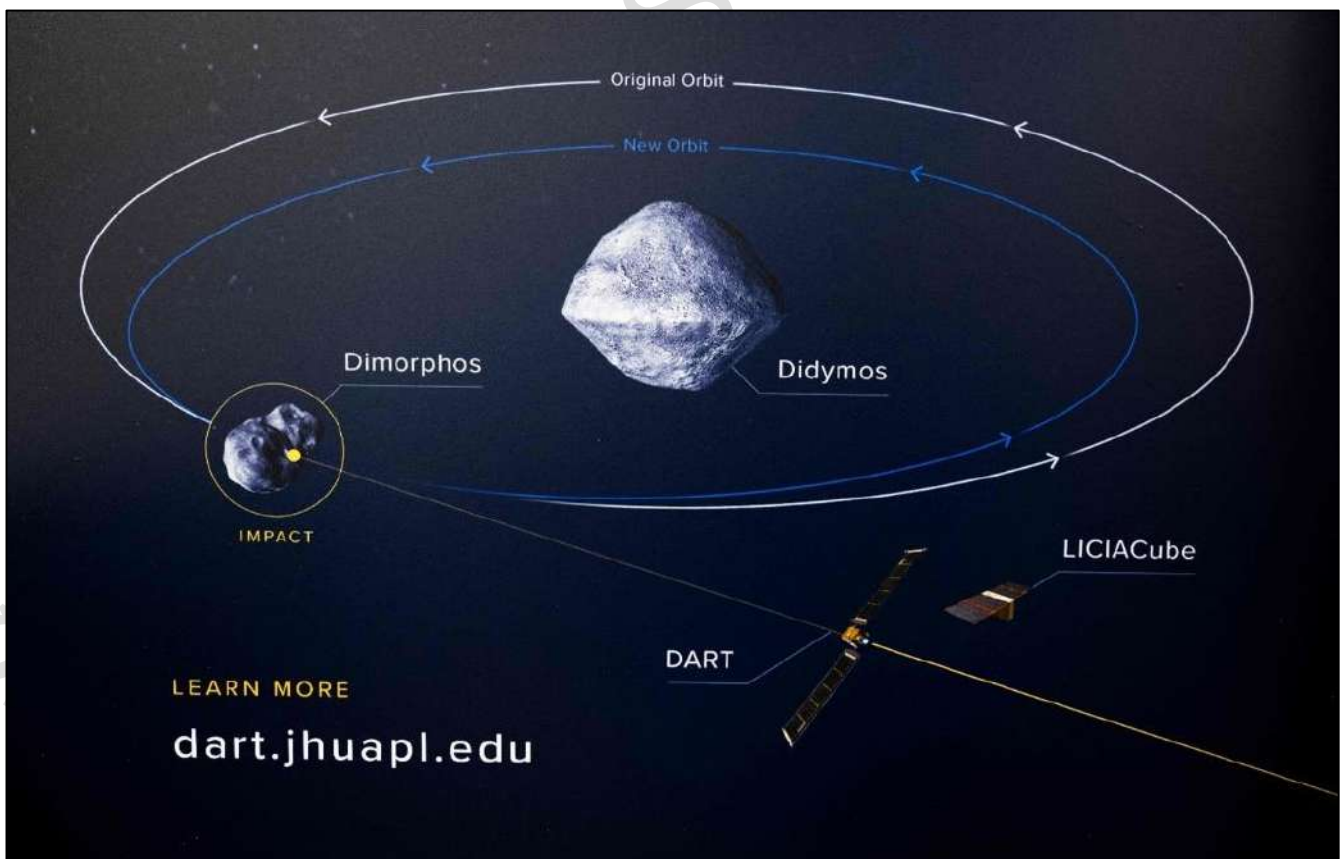
- **Propellant** - It has 2 solar arrays and uses hydrazine propellant for manoeuvring the spacecraft.

- **Thruster** - It also carries about 10 kg of xenon which will be used to demonstrate the new thrusters called *NASA Evolutionary Xenon Thruster–Commercial (NEXT-C)* in space.

- o NEXT-C gridded ion thruster system provides a combination of performance and spacecraft integration capabilities that make it uniquely suited for deep space robotic missions.
  - o It's a type of electric propulsion that uses electricity to accelerate xenon propellant to speeds of up to 90,000 miles per hour.

- **Imager** – It carries a high-resolution imager called ***Didymos Reconnaissance and Asteroid Camera for Optical Navigation (DRACO).***

- Images from DRACO will be sent to Earth in real-time to study the impact site and surface of Dimorphos.

- **Impact** – It changed not only the *motion* of the asteroid, but also its *shape*.

- The entire shape of the asteroid has changed, from a relatively symmetrical object to a ***'triaxial ellipsoid'*** – something more like an oblong watermelon.

9.11   Asteroid 2024 PT5

The Earth is about to have a temporary Asteroid or mini-moon named 2024 PT5.

Mini moons are temporary satellites that are difficult to detect due to their small size and speed, often being mistaken for space debris. However, astronomers are confident that 2024 PT5 is a natural object.

- **Discovered by** – The ***Asteroid Terrestrial-impact Last Alert System (ATLAS)*** in 2024.

- **Size** – It is a *small asteroid*, about ***33 feet*** in size, due to this size it is only be visible through special telescopes.

> *An asteroid is a small rocky body that orbits the Sun, primarily found in the asteroid belt between Mars and Jupiter.*

- **Revolution** – It will be captured temporarily by Earth's gravity but it will only make a half-revolution in a ***horseshoe-shaped orbit*** around Earth.

- It will stay in Earth's orbit for about 56 days, from September 29 to November 25, before continuing its journey.

- It is rare for an asteroid to be temporarily captured by Earth's gravity without burning up or missing Earth.

9.12   Venus Orbiter Mission (VOM)

The Union Cabinet chaired by the PM has recently approved the development of Venus Orbiter Mission (VOM).

- **Launching agency -** Indian Space Research Organisation (ISRO).

- **Aim** – For scientific exploration and for better understanding of Venusian atmosphere, geology and generate large amount of science data probing into its thick atmosphere.

- It is expected to be accomplished during March 2028.

- **Significance** - By studying Venus, we can unlock answers to key questions about planetary evolution, particularly Venus, despite its similarities to Earth, developed so differently.

Venus

- It is the 2nd planet from the Sun Earth's closest planetary neighbor.

- **Size -** It is the 6th largest planet and is similar in size to Earth.

- Due to its similar size and composition, it is often referred to as ***Earth's "twin".***

- **Hot temperature -** It is believed to have once harbored conditions suitable for life.

- However, the planet underwent a dramatic transformation, evolving into an extremely hostile environment with surface *t*emperatures ***exceeding 450°C*** and an atmosphere filled with toxic gases.

- Venus's dense atmosphere creates an intense greenhouse effect, trapping heat and making it the ***hottest planet in the solar system.***

- NASA explained that its surface temperatures are so extreme that *they can melt lead.*

- **Features** –It has volcanic landscapes and distorted mountain ranges.

- **Distance from the Sun** - It is said to orbit the Sun at an average distance of 67 million miles or **_0.72 astronomical units (AU)._**

- At this range, sunlight takes about 6 minutes to reach Venus.

> *1 AU represents the distance between Earth and the Sun.*

- **No Moon-** It does not have a moon in our solar system beside Mercury.

- But it have a *quasi-satellite called Zoozve.*

9.13 Saturn-like ring on Earth

A study suggested that earth may have once had a Saturn-like ring formed from the debris of a destroyed asteroid around 466 million years ago.

- The ring persisted for tens of millions of years during the **_Ordovician period._**

The Ordovician period was a geologic period that occurred between 485.4 and 443.8 million years ago

- Formation – It formed when an asteroid passed too close to Earth, was stretched by its gravity to the point it broke down into lots of small and large pieces.

- These pieces jostled around and gradually evolved into a **_debris-laden ring_** orbiting Earth's equator.

- Transformation - Over time, the material from the ring was pulled towards Earth, once again courtesy gravity.

- While most of the smaller pieces would have been burnt up in the planet's atmosphere, the larger pieces would have formed impact craters on Earth surface, close to the equator.

- Analysis of 21 crater sites dated to between 488 million and 443 million years ago to the Ordovician period, found that the impacts all occurred close to the equator.

- Earth's ancient ring – It may have contributed to significant climate changes.

Impact of Ring on Earth
- A ring over Earth's equator would have had a profound impact on the planet.
- **Giant Parasol**- It would shade both the hemispheres during winter while slightly increasing solar flux, amount of solar energy to reach Earth during the summer period.
- It could accentuate winter cooling while slightly increasing summer heating.
- Overall, scientists theorise that a ring would lead to *global cooling* by effectively acting as a giant parasol.
- **Dramatic Cooling** - The period in which the ring existed Earth did witness dramatic cooling.
- By 445 million years ago Earth was seeing the peak of the Hirnantian Ice Age, the coldest period in the past half a billion years.

9.14 Palomar 5

Astrophysicists suggests in a recent study that a stellar cluster known as Palomar 5 may harbor a hidden swarm of over 100 stellar-mass black holes.

- **A globular cluster-** It is a dense and spherical, containing between 100,000 and 1 million ancient stars.

- These clusters are often regarded as '*fossils' from the early Universe*.

- **Discovered by-** Walter Baade in 1950 and independently by Albert George Wilson in 1955.

- **Age-** It is estimated to be around 11.5 billion years old.

- **Location-** It is located in the *constellation Serpens*, about 65,000 light-years from Earth.

- **2 Tidal tails-** They stretch across more than 20 degrees of the sky and they contain more mass than the cluster itself that's shows evidence of stellar density gaps and clumps.

- **Black holes-** It has *more than 100 black holes*, which is about three times more than expected for a globular cluster. Each black hole has a mass of about 20 times the mass of the sun.

- **Density** – It has a relatively low mass and density among the lowest of all globular clusters in the Milky Way.

- **Disruption** - It is being disrupted by the Milky Way's gravity, and many stars are leaving the cluster in the form of a *stellar stream*.

- Recent study reveals that it will dissolve in approximately 1 billion years, leaving behind a trail of black holes orbiting the Milky Way's center.

Globular clusters
- They are associated with all types of galaxies and are much larger than open clusters.   - They are far more densely populated, with populations ranging from tens of thousands to millions of stars.   - They are populated by older, redder stars than open clusters (which might disperse before their stars can become really old).   - The intense gravitational attraction between the closely packed stars gives globular clusters their regular, spherical shape and also makes them very stable.   - Thus, they can be extremely long-lived, surviving to be billions of years old.

9.15 Sun's chromosphere

Astronomers from the Indian Institute of Astrophysics (IIA), have mapped the variation in the rotation speed of the Sun's chromosphere using 100 years of daily records at the Kodaikanal Solar Observatory.

Sun's Atmosphere
- Sun is a ball of gas with no solid form, different regions rotate at different rates.   - The sun's equatorial regions rotate in about 24 days, while the Polar Regions take more than 30 days to make a complete rotation.   - It is made up of several layers, mainly the photosphere, the chromosphere and the corona.   **Photosphere** – It means "sphere of light", the layer where most of the sun's energy is emitted.   **Chromosphere –** The layer above the photosphere is the chromosphere.   **Corona** - The 3rd layer of the sun's atmosphere is the corona.   - Like the chromosphere, it can only be seen during a total solar eclipse (or with NASA's Solar Dynamics Observatory).   Inner Core / Radiative Zone / Convection Zone / Subsurface Flows / Photosphere / Chromosphere / Corona
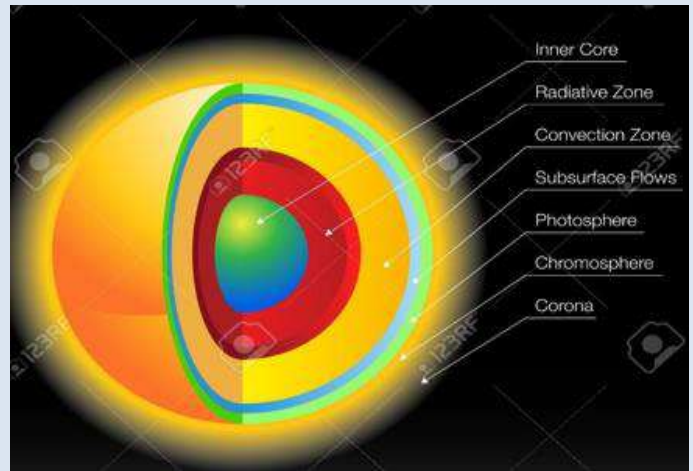
- **Chromosphere -** The word "chromo" means color, thus chromosphere means sphere of color.

- It contains both hydrogen and calcium. The chromosphere has several important features, such as spicules, filaments, and other anomalies.

- The chromosphere emits a reddish glow as *super-heated hydrogen* burns off. But the red rim can only be seen during a total solar eclipse.

- At other times, light from the chromosphere is usually too weak to be seen against the brighter photosphere.

- **Temperature**
    - Minimum – around 6700 degrees Farenheit or 3700 degree Celsius.
    - Maximum – 14,000 degrees Farenheit or 7760 degree Celsius.

- The chromosphere play a role in conducting heat from the interior of the sun to its outermost layer, the corona.

- **Recent Findings –** It revealed a picture of the Sun's differential rotation faster at the equator (13.98 degrees per day) and slower towards the poles (10.5 degrees per day at 80 degrees latitude).

DEFENCE

9.16   Su-30MKI Fighter Aircraft

The Cabinet Committee on Security approved the procurement of aero engines for the Sukhoi Su-30 MKI fighter jets under the 'Buy (Indian)' category from Hindustan Aeronautics Limited (HAL) recently.

- It is a 2-seater, twinjet multirole combat fighter aircraft for the Indian Air Force (IAF).

- **Developed by -** The Sukhoi Design Bureau, Russia and Hindustan Aeronautics Limited (HAL).

> The "Buy (Indian)" category is a category in the Defence Procurement Procedure that refers to the purchase of products from Indian vendors.

- It is one of the most advanced and versatile fighter jets in the IAF's inventory.

- It is equipped with thrust vectoring control and canards.

- **Maiden Flight-** November 2000.

- **Service Entry-** September 2002.

- **Maximum Speed-** Mach 2.

- **Range-** 3,000 km.

- It supports **all-weather, air-to-air and air-to-surface** deep interdiction missions.

Su-30 MKI vs Rafale

Features	Su-30MKI	Rafale
Design and Role	• It performs roles like air-to-ground and maritime strike missions. • It has a larger airframe and is designed for long-range missions and heavy payloads.	• It performs missions like air superiority, ground attack, reconnaissance, and nuclear deterrence. • It is known for its advanced avionics and sensor suite, making it a highly capable multirole aircraft.
Weaponry	Air-to-air and air-to-ground missiles, rockets, bombs, and even anti-ship missiles, giving it considerable firepower.	Meteor beyond-visual-range air-to-air missiles, Scalp cruise missiles for long-range strike capability, and various precision-guided munitions.
Maximum speed	2,120 km/h (Mach 2.0)	1,912 km/h (Mach 1.8)
Armament capacity	Up to 8,130 kg	Up to 9,500 kg
Generation	4th -generation fighter aircraft	4.5-generation fighter aircraft
Range	3,000 km at a high altitude 1,270 km at low altitude	1,850 km on penetration mission (combat range)
Hard points	12 hardpoints	14 hardpoints
Ferry range	8,000 km	3,700 km
Service ceiling	17,300 m (56,800 ft)	15,835 m (51,952 ft)
Rate of climb	300 m/s (59,000 ft/min)	304.8 m/s (60,000 ft/min)

9.17   New Defence Procurements

Recently, the Defence Acquisition Council has approved 10 capital acquisition proposals.

- **Objective-** Modernizing India's defence capabilities of Army, Navy and Indian Coast Guards.

- **Future Ready Combat Vehicles**– FRCVs are futuristic main battle tanks to replace the ageing Soviet-origin T-92 tanks.

> The Defence Acquisition Council (DAC), chaired by the Minister of Defence, is responsible for formulating new policies and approving capital acquisitions for the Army, Navy, Air Force, and the Indian Coast Guard.

- **Features** - Advanced mobility, all-terrain capability, multi-layered protection, precision weaponry, and real-time situational awareness.

- **Air Defence Fire Control Radars** – It can detect and track aerial targets, and provide firing solutions.

- ADFCR in conjunction with Anti-Aircraft Guns forms a Ground Based Air Defence system

- It is against air threats at short and very short ranges during day and night under all weather conditions.

- **Forward Repair Team (Tracked)** – It has suitable cross-country mobility for carrying out in-situ repair during mechanised operations.
    - **Developed by** - Armoured Vehicles Nigam Ltd

- **Dornier-228 aircraft** – It is a most advanced high-wing aircraft with capabilities of long range, high utilization rates and high payload.

- **Next Generation Fast Patrol Vessels** – High operational features in rough weather conditions.

- **Next Generation Offshore Patrol Vessels** – It can be operated in both deep waters and coastal areas.

- It is equipped with a sophisticated electronic warfare (EW) suite.

- **Stealth Frigates** – These are a class of stealth guided-missile frigates developed under _Project-17 Bravo frigates (P-17B)_ or Next Generation Frigates (NGF).
    - **Developed by** - Garden Reach Shipbuilders and Engineers (GRSE) and Mazagaon Dock Shipbuilders Limited (MDL).

- **Mode of Procurement-** 99% of the procurement cost will be sourced from indigenous manufacturers under the "Buy (Indian)" and "Buy (Indian-Indigenously Designed Developed and Manufactured)" categories.

9.18 Vertical Launch Short Range Surface-to-Air Missile (VLSRSAM)

DRDO and the Indian Navy successfully conducted back-to-back flight tests of the Vertical Launch Short Range Surface-to-Air Missile (VLSRSAM).

- **VL SRSAM** – It is the indigenously built **_short-range_** surface-to-air missile.

- It is designed to neutralise various **_aerial threats_** at close ranges, including sea-skimming targets.

- **Missile Developed by** - Defence Research and Development Organisation (DRDO).

- **Operational range** – 80 Km

- **Flight altitude** - 16 km (52,000 ft)

- **Maximum speed** - Mach 4.5

- **Guidance Technology**- During mid-course flight, the missile uses **_fibre-optic gyroscope_** based inertial guidance mechanism while in terminal phase uses **_active radar homing_**.

- **VLS** - Each Vertical Launch System (VLS) can hold forty missiles in a twin quad-pack canister configuration.

- **Replacing Barak** - VL-SRSAM intended to replace older Barak 1 surface to air missile system onboard Indian Navy warships.

- **Flight Test** - The flight test was carried out from a land-based vertical launcher, targeting a high-speed aerial target flying at a low altitude.

- The missile system successfully tracked and engaged the target.

- **Testing site** - Integrated Test Range (ITR) in Chandipur, off the coast of Odisha.

9.19 Robotic mule

The Army has procured and inducted 100 robotic mules in forward areas under the fourth trance of emergency procurements (EP) recently.

- It is a Multi-Utility Legged Equipment (MULE), a ***dog-shaped robot*** that can be used for surveillance and transporting light loads across difficult terrain.

- **Features** – It can climb stairs, steep hills and other hurdles.

- It is a high-endurance, agile and durable all-weather ground robot.

- **Operating temperature -** It can operate in extreme temperatures, ranging from -40 to +55 degrees Celsius.

- **Payload -** It carry a payload of 15kg.

- **Durability** - It can able to walk up to 3 years.

- **Water proof -** It can go inside water and cross rivers.

- **Sensing -** It has the ability to recognise objects around as there are electro-optics, infrared.

- **Control –** It is controlled by an easy-to-use remote control and can also be operated using Wi-Fi or Long-Term Evolution (LTE).

- **Pre-fed missions -** It can be programmed to complete missions using waypoints or recorded missions.

- **Integration with small arms -** It can be integrated with small arms for combat purposes.

9.20 Peak Pods

DTECH 360 Innovations announced the field launch of its Peak Pods.

- Peak Pods is a ***high-altitude habitat (tent)*** designed for sub-zero temperature regions.

- **Temperature control –** It aims to achieve 15° C inside the shelter in sub-zero temperatures, even when the outside temperature is touching minus 40° C.

- **Bio-toilets** – It is equipped with bio-toilet and overhead warm water tank.

- **High portability** – 100% modular, relocatable, easy to install and dismantle.

- **Endurance** – It can withstand winds upto 90km/h

- **Pure air quality** – It can maintain optimum CO_2, O_2 and humidity levels for safe ambience.

- **Eco-friendly** – Solar powered and has zero carbon emissions.

- **Fuel** - No fuel or electricity needed.

- It is ideal for high-altitude military bases, research stations, adventure tourism destinations, fast-track hospitals, disaster relief camps among others.

HEALTH

9.21 Mice study on COVID's True Cause

A recent study suggests that fibrin, a key player in blood clotting, may be the primary driver of long COVID symptoms, rather than just a consequence of the disease.

- COVID – It is an infectious disease caused by the ***SARS-CoV-2 virus.***

- It is well-known as a vasculopathic agent, a damager of blood vessels.

- The dominant respiratory symptoms associated with COVID-19 are largely ***due to clotting and inflammation in the blood vessels*** of the lungs (rather than the direct involvement of the airways).

- Its more severe complications, including neurological ones like stroke, are rooted in vasculopathy as well.

Recent findings

- **Role of fibrin-** *Fibrinogen* binds with the SARS-CoV-2 spike protein, forming fibrin, which causes inflammation and complications in the lungs and brain.

> **Fibrinogen** is a glycoprotein complex, produced in the liver that circulates in the blood of all vertebrates.

- This contradicts the earlier view that inflammation due to the virus was responsible for clotting.

- **Spike protein interaction-** The *spike protein binds with fibrinogen* in the lungs, altering the clot structure and triggering an immune response.

- This interaction may drive long COVID symptoms even after active infection is gone.

- **Implications for treatment-** A *monoclonal antibody* was found to block the interaction between the spike protein and fibrinogen without affecting normal clotting functions.

> A spike protein is a protein that forms a large structure known as a spike or peplomer projecting from the surface of an enveloped virus.

- This antibody is undergoing clinical trials, offering potential for new treatments.

  o Monoclonal antibodies are proteins made in a lab that bind to one antigen only.

- **Limitations-** It is a *preliminary mouse model*, not long-term human studies, and require further research for confirmation.

9.22   Digital Solutions for Universal Access to Healthcare

Recently, a National Conference on Universal Access to Healthcare was organized by National Human Rights Commission (NHRC) in collaboration with other stakeholders.

- **Objective-** To bring together practitioners, experts, policymakers, and innovators in the field of healthcare and digital healthcare technology.

- To discuss universal access to affordable and quality healthcare, particularly in rural, remote, and hilly areas.

- **Participants-** NHRC, Sankala Foundation, supported by NITI Aayog and the Ministry of Health & Family Welfare (MoHFW).

Digital Health Initiatives of India

- Universal access to healthcare has emerged as a basic human right.

- India has committed to achieve Universal Health Coverage by 2030, by utilizing digital health solutions to strengthen primary-level public health infrastructure.

- **Bridgital Model** - Ministry of Health and Family Welfare addressed overcrowding in AIIMS, New Delhi, by the Bridgital Model for registration and appointments.

- **Digital Nerve Centre (DiNC)** – A unique healthcare delivery model to enable quick access to primary health care and provide a well-coordinated continuum of care for citizens visiting government health facilities.

- **Global Initiative on Digital Health (GIDH)** - India launched along with the WHO during the 2023 G20 Health Ministerial Meeting.

- **National Digital Health Mission (NDHM)** – It is implemented by National Health Authority aims to make India Self-reliant in providing universal health coverage to all the citizens in the country.

- D**igital Health Incentive Scheme** – It aims at digitising patients' health records and linking them with the Ayushman Bharat Digital Health Account.

9.23   Kawasaki Disease

A Pediatric study recently revealed that Kawasaki disease cases among children have increased in India after COVID-19 pandemic.

- It is a *rare disease* that is sometimes called *mucocutaneous lymph node syndrome*.

- **Susceptible population** – It most often affects the *heart arteries in children* from 6 months to 5 years of age.

- Those arteries supply oxygen-rich blood to the heart.

- **Cause** – It is unknown, but it may be due to an immune system reaction to a virus or a genetic link.

- **Transmission** - It is _not contagious_ and cannot be spread from one person to another

- **Symptoms -** A high fever, red eyes, swollen lymph nodes in the neck, a red rash on the middle of the body, a red tongue, and swollen hands and feet.

- Cardiovascular complications include aneurysm formation, heart failure, myocardial infarction, and valvulitis.

- **Prevention** - There is _no way to prevent_ Kawasaki disease.

- **Treatment** - With early treatment, most children get better and have no long-lasting problems.

Multisystem inflammatory disease in children (MIS-C) vs Kawasaki Disease

- A recent study revealed that hyperinflammatory shock with clinical features similar to those of Kawasaki disease (KD) after COVID-19 infection in 2020.

- The clinical manifestations of MIS-C overlap with those of KD, including fever, skin rashes, conjunctivitis, and mucocutaneous manifestations.

- It is more commonly associated with _**left ventricular dysfunction (30%–40%)**_ and shock, gastrointestinal abnormalities, and neurological manifestations than KD.

- It also revealed that KD following SARS-CoV-2 infection has clinically different characteristics from conventional KD.

9.24 PresVu

Recently, a Mumbai-based company has developed a new eye drop to reduce dependency on reading glasses for individuals affected by presbyopia.

- **PresVu** – It is a first of its kind eyedrop in India to _**treat presbyopia**_.

- **Developed by** - Entod, Mumbai-based pharmaceuticals company.

- **Active Ingredient** – It contains 1.25% concentration of _Pilocarpine_.

> _In India, the government decides on the ceiling price of pilocarpine in 4% and 2% concentrations._

- **Working** – It contracts the iris muscles, which control the size of the pupil, to focus better on nearby objects.

- It uses advanced dynamic buffer technology essentially, a base solution, to adapt to the pH level of tears.

- This ensures that the eye drop has consistent efficacy and safety for extended use.

- **Impact** - It is a prescription-only medicine and its impact is unlikely to last beyond four to six hours.

- Regular use may lead to itching and redness, eyebrow pain, and muscle spasms in the eyes.

Presbyopia
- It is an _**age-related farsightedness**_ condition in which the eyes gradually _**lose the ability to focus on nearby objects**_.   - It usually starts around the age of 40.   **Symptoms** - Blurry close-up vision, headaches, and eye strain.   **No Cure** - There's no cure for presbyopia, but there are several treatments, including corrective lenses, contact lenses, and surgery.
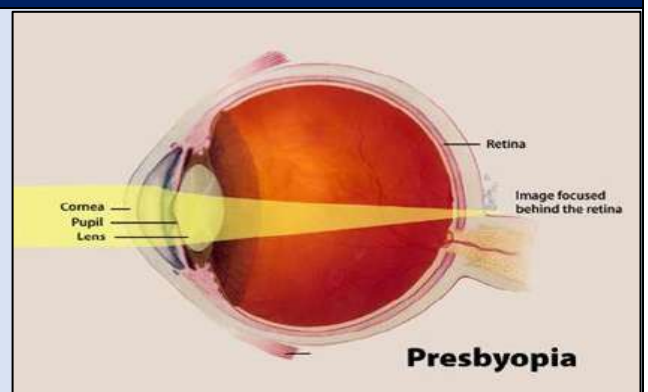
9.25 Global Guidance on Antibiotics Pollution from Manufacturing

Recently, 1st ever global guidance to tackle antibiotic pollution from manufacturing process was released.

- **Guideline** – Guidance on _**wastewater and solid waste management**_ for manufacturing of antibiotics.

- **Released by** - World Health Organization (WHO)

- **Aim** – To foster a collective effort to mitigate the environmental impact of antibiotic manufacturing.

- **Framework** – It offers a scientific framework for regulators, industry players and other stakeholders to implement effective controls against antibiotic pollution.

- **Comprehensive Approach** - It covers all steps from the manufacturing of active pharmaceutical ingredients (APIs) and formulation into finished products, including primary packaging.

- **Antibiotic pollution control standards** – It provides scientific basis for regulators, procurers, inspectors and industries to include robust antibiotic pollution control in their standards.

- **3 Core elements** – It outlines three core elements and the parties responsible for implementing each one.

  o **Targets** - Defining targets for resistance selection and ecological effects, based on exposure and risk assessments.

  o **Risk Management** - Establishing risk management processes to achieve these targets

  o It is done by tools such as hazard analysis and critical control points, alongside internal audits and public communications.

  o **Audits** - Conducting independent audits to verify that targets are being met.

- **Guiding Principles**

  o Precautionary approach for target setting

  o Progressive improvement towards meeting these targets.

Anti-Microbial Resistance (AMR)
• AMR occurs when bacteria, viruses, fungi, and parasites no longer respond to medicines.   • It makes people sicker and increasing the risk of spread of infections that are difficult to treat, illness and deaths.   • **Causative factors** - AMR is driven largely by the misuse and overuse of antimicrobials.   • The emergence and spread of AMR caused by antibiotic pollution could undermine the effectiveness of antibiotics globally.   • **Antibiotic Pollution** - _Pharmaceutical waste_ from antibiotic manufacturing and the unscientific disposal of anbiotics as waste after use.   • High levels of antibiotics in water bodies downstream of manufacturing sites have been widely documented.   • Currently, antibiotic pollution from manufacturing is largely unregulated and quality assurance criteria typically do not address environmental emissions.

9.26 Cellulitis Disease

There has been an upsurge in number of cellulitis cases in Karimnagar, Telangana.

- **Cellulitis-** It is a common, potentially serious ***bacterial skin infection.***

- It is caused by ***Streptococcus and Staphylococcus bacteria***, which live on the skin's surface.

- In some cases, Methicillin-resistant Staphylococcus aureus *(MRSA) can cause cellulitis.*

- **Infection –** It can occur anywhere on the body, but it most often affects the lower legs.

- It typically affects the skin's deeper layers, including the dermis and subcutaneous tissue.

- The affected skin is swollen and inflamed and is typically painful and warm to the touch.

- **Symptoms-** Redness, swelling, warmth, Pain, Fever and blisters.

- Left untreated, the infection can spread to the lymph nodes and bloodstream and rapidly become life-threatening. It isn't usually spread from person to person.

- **Affected Population-** Common among those working in agriculture, construction, and people prone to cuts, bruises, and other injuries.

- People who are overweight, have a weakened immune system, or have other skin diseases are at higher risk for developing cellulitis.

- **Diagnosis-** It is done through a physical examination of the affected area.

- In severe cases, ***blood tests*** may be conducted to check for a more widespread infection.

- **Treatment-** The primary treatment is a course of ***antibiotics.***

- The disease can be treated successfully with antibiotics, and most people recover fully within 24 hours.

9.27   Lenacapavir, Potential Preventive HIV Drug

Patent applications for a drug called lenacapavir have shown to be capable of virtually eliminating new HIV infections through sex opposed in India.

- **Lenacapavir Drug –** It functions as a fusion capsid inhibitor.

- It disrupts the HIV capsid, which is the protein structure that safeguards the genetic material and enzymes essential for the virus's replication.

- This medication is delivered via subcutaneous injection, with a dosing schedule of once every 6 months.

- Administration – It is given through biannual injections as numerous clinical trials have shown it to be more effective than traditional oral preventive treatments, known as pre-exposure (PrEP).

- **PrEP, or pre-exposure prophylaxis-** It involves the administration of antiretroviral medications to reduce the risk of HIV infection in individuals who are considered to be at high risk.

- The primary medication utilized in PrEP is Truvada, which consists of a combination of two antiretroviral agents - Tenofovir disoproxil fumarate (TDF) and Emtricitabine.

- There are multiple forms of PrEP, including daily oral pills and a long-acting injectable form.

- **UNAIDS-** It could play a pivotal role in the global effort to eradicate AIDS, provided that it is accessible to all.

HIV/AIDS

- **HIV (human immunodeficiency virus)-** It is a virus that attacks the immune system, and AIDS (acquired immunodeficiency syndrome) is the most advanced stage of HIV infection.

- It is particularly targeting CD4 cells (T cells) that are essential for combating infections.

- **Transmission –** It can spread through sexual contact, illicit injection drug use or sharing needles, contact with infected blood, or from mother to child during pregnancy, childbirth or breastfeeding.

- **Treatment –** There is ***no vaccine*** to prevent HIV infection and no cure for HIV/AIDS.

UNAIDS
- It serves as a paradigm for reform within the United Nations and stands as the sole cosponsored Joint Programme in the UN framework.   - It leverages the knowledge and skills of 11 Cosponsors from the United Nations system and uniquely includes civil society representation on its governing board.   - UNAIDS is at the forefront of the international initiative to eliminate AIDS as a public health concern by the year 2030, aligning with the Sustainable Development Goals.

9.28   World Patient Safety Day, 2024

On the eve of World Patient Safety Day, the World Health Organization (WHO) urged all stakeholders to commit to reducing diagnostic errors and improving patient safety.

- World Patient Safety Day, observed ***annually*** on September 17.

- **Established by -** World Health Organization (WHO) in 2019 following the adoption of resolution WHA72.6 by the World Health Assembly.
  - The resolution was a response to the high global rate of avoidable medical errors and patient harm, highlighting the urgent need for action to minimize harm in healthcare.

- **Aim -** To raise awareness about the critical importance of patient safety in healthcare systems worldwide.

- **2024 Theme -** Get it right, make it safe!

- **Objectives -** To increase public awareness & commitment to patient safety.

- To promote global solidarity and action and to address specific patient safety issues.

> *Global Patient Safety Action Plan 2021-2030 indicated that only 47% of countries are addressing diagnostic safety.*

- **Raise awareness -** It educates healthcare professionals, policymakers, and the general public on the importance of safety in medical care.

- **Prevent harm** - The day advocates for the prevention of errors, the reduction of avoidable harm, and the improvement of healthcare outcomes.

- **Patient-centred care** - It promotes a culture where patients are empowered and actively involved in their care decisions, fostering transparency and communication between healthcare providers and patients.

BIO-TECHNOLOGY

9.29　Intranasal vaccine

Recently, Indian Immunologicals Ltd (IIL) in collaboration with Griffith University has developed a live-attenuated needle-free intranasal booster vaccine targeting SARS-CoV-2.

- **Intranasal Vaccines** – These are vaccines that are administered through nasal pathways.

- **Features** - The nasal route has excellent potential for vaccination due to the organized immune systems of the nasal mucosa.

  o　Non-invasive, Needle-free.

  o　Ease of administration – does not require trained health care workers.

  o　Elimination of needle-associated risks (injuries and infections).

  o　High compliance

  o　Scalable manufacturing – able to meet global demand.

- **Mucosal Immunity** – It helps prevent the virus from establishing an infection at its entry point, the nasal passages.

- It stimulates a broad immune response of neutralizing IgG, mucosal IgA, and T cell responses.

- **Localized Immunization** - It helps in blocking both infection and transmission of COVID-19.

- **Immunity Period** - It could offer protection for ***up to a year with just one dose.***

- **IIL's Vaccine** - It is a live-attenuated booster vaccine that utilises codon deoptimization technology.

- **Codon deoptimization technology** – It involves modifying the virus in such a way that it mimics a natural infection without causing harm.

- It is an efficient virus attenuation strategy, where the degree of attenuation can be regulated as required.

- It is extremely safe and takes less time than the conventional way of attenuating viruses which usually takes several years.

9.30　India's BioE3 Policy

- It focuses on driving ***innovation in biotechnology***, with a key area being precision therapeutics.

- BioE3 - Biotechnology for Economy, Environment and Employment

- **Aim –** To foster High Performance Biomanufacturing.

- **High performance bio-manufacturing –** It is the ability to

  o　Produce products from medicine to materials,

  o　Address farming and food challenges, and

  o　Promote manufacturing of bio-based products through integration of advanced biotechnological processes.

- **Ministry -** Ministry of Science & Technology.
- **Themes**
  - Bio-based Chemicals and Enzymes
  - Functional Food and Smart Proteins
  - Precision Biotherapeutics
  - Climate Resilient Agriculture
  - Biofuels and Carbon Capture
  - Futuristic Marine and Space Research
- Significance – It supports innovation-driven support to R&D and entrepreneurship across thematic sectors.

- It will accelerate technology development and commercialization by establishing Biomanufacturing & Bio-AI hubs and Biofoundry.
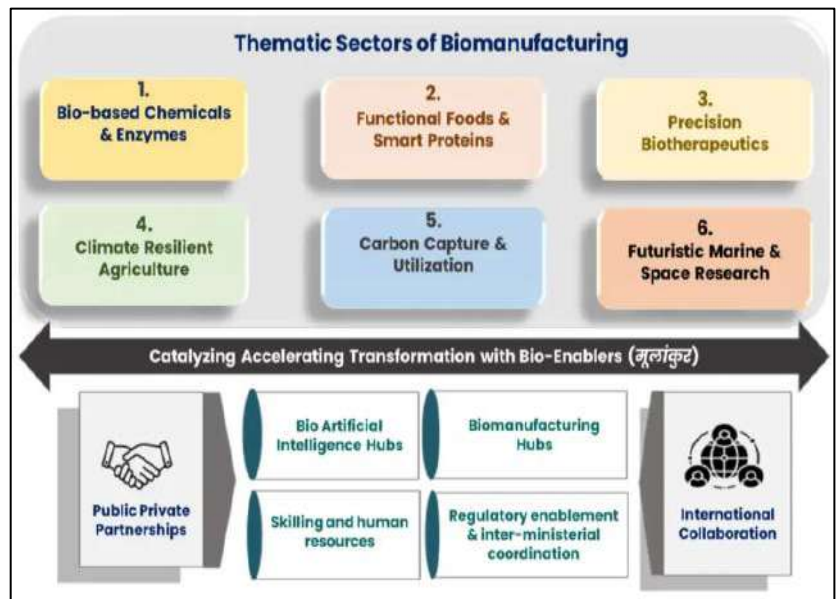
9.31 Bio-RIDE Scheme

The Union Cabinet approved the Biotechnology Research Innovation and Entrepreneurship Development (Bio-RIDE) scheme to support cutting-edge research and development in biotechnology.

- The 2 umbrella schemes of Department of Biotechnology (DBT)
  - Biotechnology Research and Development (R&D) and
  - Industrial and Entrepreneurship Development (I&ED) merged as one scheme-'Biotechnology Research Innovation and Entrepreneurship Development (Bio- RIDE)'.
- **Aim -** To accelerate research, enhance product development, and bridge the gap between academic research and industrial applications.
- It is designed to foster innovation, promote bio-entrepreneurship, and strengthen India's position as a global leader in biomanufacturing and biotechnology.
- **Components**
  - Biotechnology Research and Development (R&D).
  - Industrial & Entrepreneurship Development (I&ED).
  - Biomanufacturing and Bio foundry (a new component).
- **Implementation –** During the 15th Finance Commission period (2021-2026).
- **Promote Bio-Entrepreneurship-** Seed funding, incubation, and mentorship for startups.
- **Advance Innovation-** Grants and incentives for cutting-edge research in areas like synthetic biology, biopharmaceuticals, bioenergy, and bioplastics.
- **Facilitate Industry-Academia collaboration-** Strengthen partnerships between academic institutions, research organizations, and industry to commercialize biotech products.
- **Encourage sustainable biomanufacturing-** Focus on environmentally sustainable practices aligned with India's green goals.
- **Support researchers-** Extramural funding for researchers in biotechnology fields like agriculture, healthcare, and environmental sustainability.
- **Nurture human resources-** Develop skilled manpower through holistic support and capacity building in biotechnology.

9.32 Drug Repurposing

Researchers at the Institute of Advanced Study in Science and Technology (IASST) have found the repurpose potential of an antidepressant drug for cancer management.

- **Drug Repurposing** – It is the technique of using an ***existing drug or drug candidate for a new treatment*** or medical condition for which it was not indicated before.

- It is also known as ***drug repositioning or drug reprofiling***.

- It bypasses the pre-clinical work and *facilitate targeted treatment*.

- **Application** – Pharmaceutical companies are undertaking drug repurposing projects for rare diseases, oncology, infectious and autoimmune diseases and more.

- **Benefits** - *Fasten the drug discovery process* and find quicker solutions.

- Helps in quickly identify compounds with an established safety profile and known therapeutic advantages.

- It is particularly useful where traditional drug development is not cost-effective.
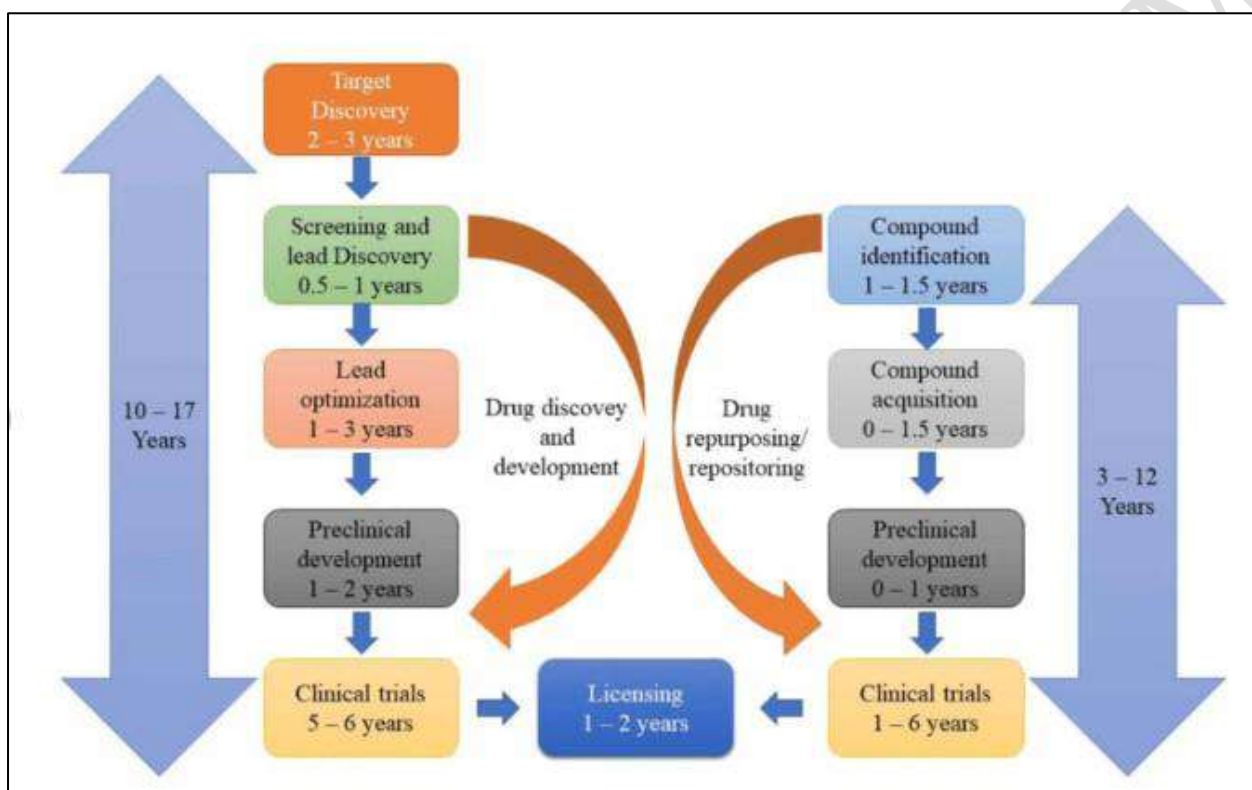

Selegiline Repurpose

- **Selegiline (L-deprenyl)** – It is an antidepressant drug from a class of drugs called monoamine oxidase (MAO) inhibitors.

- Researchers at IASST have found the repurposing potential of it for Cancer treatment.

- **IASST** -Institute of Advanced Study in Science and Technology (IASST) in Guwahati.
  - It is an autonomous institute under the Department of Science & Technology (DST), Govt. of India.

- **Function** - Selegiline interacts with genes intricately linked to various types of cancer.

- Particularly, it can induce cell death in breast cancer cells.

9.33 Organ-on-Chip Technology

Recent advancements in human-relevant 3D culture models have shown promising results in the field of precision therapeutics include organ-on-chips could boost BioE3 goal to personalise medicine.

- **Organ-on-chip-** A technology designed to ***mimic the dynamic functions of human organs*** in a controlled environment, offering a more accurate platform for drug testing.

- It works by integrating cells derived from a human body with a well-defined in-vitro biological environment (i.e. in the lab) that mimics the body's conditions.

- It offers a more reliable method for testing drugs, providing better insights into a drug's efficacy and toxicity in human-relevant models.

- It provides a solution to the limitations of animal testing in drug development.

- It offers potential for personalized medicine by enabling precise testing of drugs on human-derived cells.

- **Technology enabled countries - United States -** The U.S. FDA Modernisation Act 2.0 allows the use of organ-on-chips as alternatives in preclinical drug testing.

- **European Union -** The EU is working on phasing out animal testing for cosmetics and developing regulations for NAMs, including organ-on-chips.

- **India -** India amends the New Drugs and Clinical Trials Rules, 2019 to permit the use of human organs-on-chips and other NAMs prior to and in conjunction with animal testing when evaluating new drugs.
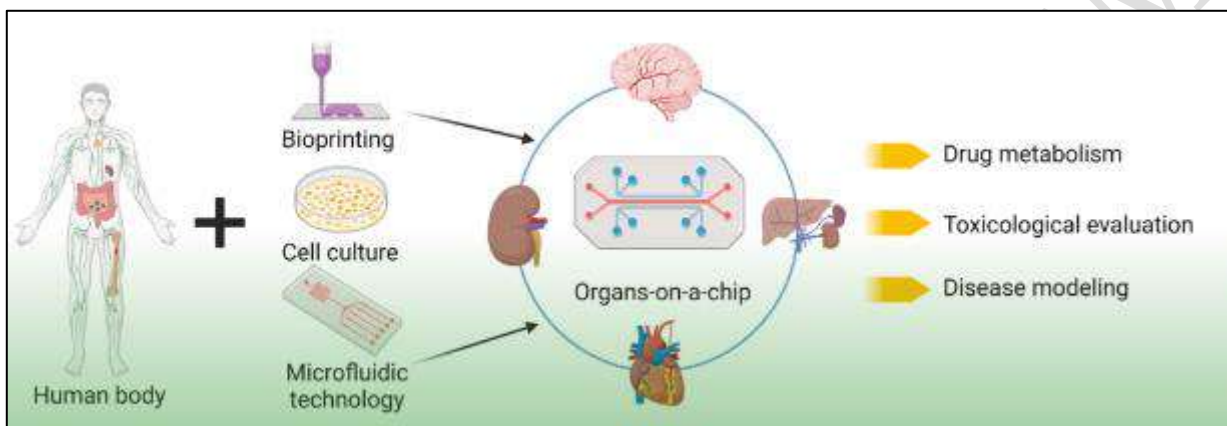
9.34   Antimicrobial Resistance Surveillance Network (AMRSN)

The report published by the ICMR's Antimicrobial Resistance Surveillance Network (AMRSN) shows that UTIs, blood stream infections, typhoid and pneumonia show resistance to commonly used antibiotics.

- **Initiated by** – Indian Council of Medical Research (ICMR) in 2013 to collate nationally representative data.

- **Aim** – To understand the molecular mechanisms of bacterial resistance, how bacteria evolve, acquire and transmit antibiotic resistance is vital for forecasting and addressing the problem.

- **Goals** – Establish network of hospitals to monitor trends in the antimicrobial susceptibility profile of clinically important bacteria and fungi limited to human health.

- Include comprehensive molecular studies for identifying the clonality of drug-resistant pathogens and their transmission dynamics.

- Disseminate information on AMR in pathogenic organisms to stakeholders to promote interventions that reduce AMR

- Create data management system for data collection and analysis.

- **Recent findings - A**ntibiotic overuse and misuse are the biggest drivers of AMR.

- The experts brainstormed and identified the following 6 pathogens as focus areas for ICMR-AMRSN

    o Enterobacteriaceae causing sepsis,

    o Gram-negative non-fermenters,

    o Enteric fever pathogens,
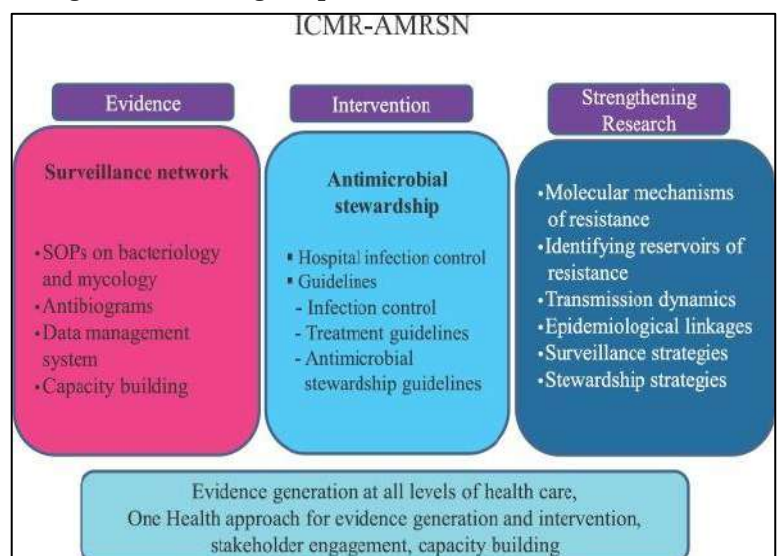
- o Diarrhoeagenic bacterial organisms,

- o Gram-positives - staphylococci and Enterococci, and

- o Fungal pathogens (excluded in the WHO priority pathogens)-yeasts (Candida and Cryptococcus spp.) and mycelial fungi (Aspergillus spp. and Zygomycetes spp.).

- Data collected from the network is used to track resistance trends and to better understand mechanisms of resistance in the key priority pathogens using genomics and whole genome sequencing (WGS).

- **Diseases affected by AMR**- Urinary tract infections (UTIs), bloodstream infections, pneumonia, and typhoid are showing resistance to commonly used antibiotics.

INFORMATION TECHNOLOGY

9.35	**Vishvasya Blockchain Technology Stack**

Recently Government has launched Vishvasya-Blockchain Technology Stack and other block chain related Initiatives.

- **Vishvasya** – It is a Blockchain Technology Stack, consists of blockchain related platforms and frameworks.

- It facilitates in enabling trust by developing new types of distributed software architectures and providing a single source of truth.

> Blockchain is a technology suitable for developing applications with transactional data stored across network of nodes. It provides tamper resistant storage with audit trail for future verification.

- **Nodal Ministry** – Ministry of Electronics & IT.

- It contains BaaS, NBF, NBFLite, Praamaanik, and National Blockchain Portal.

- **Vishvasya BaaS** – Blockchain as a Service (BaaS) model that provides security assurance of various Blockchain components across the stack.

- It enables technological support to organizations in developing and deploying Blockchain applications.

- It provides geographically distributed infrastructure designed to support various permissioned Blockchain based applications.

- **National Blockchain Framework** – It aims to create trusted digital platforms for promoting research and application development.

- It facilitates state of the art, transparent, secure and trusted digital service delivery to citizens.

- **Features**

  - o Distributed Infrastructure

  - o Core Framework functionality

  - o Smart Contracts & API Gateway

  - o Security, Privacy & Interoperability

  - o Applications development offering Blockchain as a Service (BaaS).
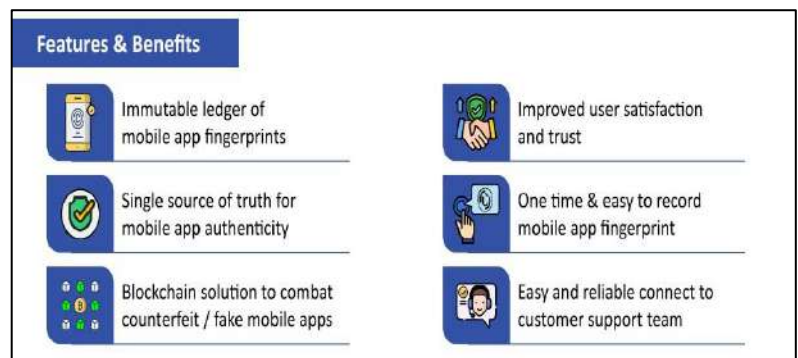
- NBF currently supports two permissioned Blockchain platforms and is extensible.

- **NBFLite** – It is a Blockchain sandbox platform developed especially for startups/academia for rapid prototyping of applications, carrying out research and capacity building.

- **Developed by** - Collaborating efforts of C-DAC, NIC, IDRBT Hyderabad, IIT Hyderabad, IIIT Hyderabad and SETS Chennai.

- **Praamaanik**- It is a solution that harnesses Blockchain technology to verify mobile app origins.

- It is powered by the National Blockchain Framework.

- **National Blockchain Portal** - It is developed to manage the contents related to the National Blockchain Framework initiatives.

9.36   Whitelisting URLs

Over 3,000 registered senders complied with the new requirement by whitelisting as per TRAI.

- **Website Whitelist** – A whitelist (*allowlist*) is a cybersecurity strategy that ***approves a list*** *of email addresses, IP addresses, domain names or applications*, while denying all others.

- It refers to the process of *explicitly allowing certain trusted websites to access* specific resources or perform actions on a computer or network.

- **Importance** – It is a quick and easy way to help safeguard computers and networks from potentially harmful threats or inappropriate material on local networks or across the internet.

- It also blocks external tracking and advertising websites.

TRAI's directive on whitelisting

- **Directive** – It instructing all access providers to block any traffic containing URLs, Android Package Kits (APKs) or over-the-top (OTT) links that have not been whitelisted.

- It is all set to come into effect from October 1st 2024.

- **Aim** – To curb the misuse of Uniform Resource Locators (URLs) in messages.

- To safeguard consumers from unsolicited messages containing malicious links while fostering a transparent and secure communication system.

- **Features** - To ensure smooth flow of SMS traffic containing URLs, TRAI advises registered senders to promptly upload their whitelisted URL/APK/OTT links to the portal of the respective access providers.

- Senders who fail to whitelist their links by the due date will not be able to transmit any messages containing URL/APK/OTT links, the regulator added.
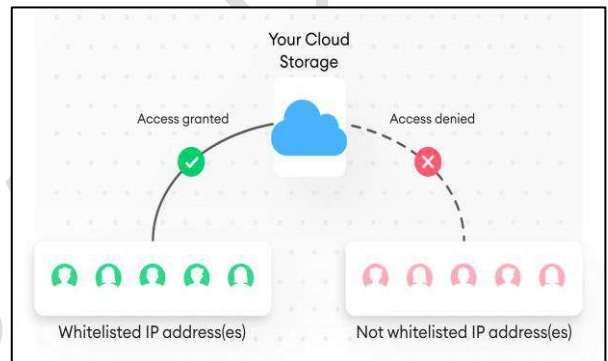
Recently, Bharti Airtel launched an artificial intelligence (AI) powered spam detection solution that will significantly solve the issue of spam calls and messages for its customers.

10.   INDEX AND REPORT

10.1   Global Cybersecurity Index 2024

India has achieved Tier 1 status in Global Cybersecurity Index 2024

- **Global Cybersecurity Index (GCI)** – It measures the commitment of countries to cybersecurity at a global level to raise awareness of the importance and different dimensions of the issue.

- **Publisher** - International Telecommunication Union (ITU)

- **Pillars of GCI** – It assesses national efforts based on five pillars.

  o   Legal

  o   Technical

  o   Organizational

- o Capacity Development
- o Cooperation.

- **Evaluation** – It is based on 83 questions, covering 20 indicators, 64 sub-indicators, and 28 micro-indicators.

- **Performance of India** - India's Scored 98.49 out of 100 in GCI 2024 .

- **Tier 1 Status** - India joins the ranks of 'role-modelling' countries, demonstrating a strong commitment to cybersecurity practices across the globe.
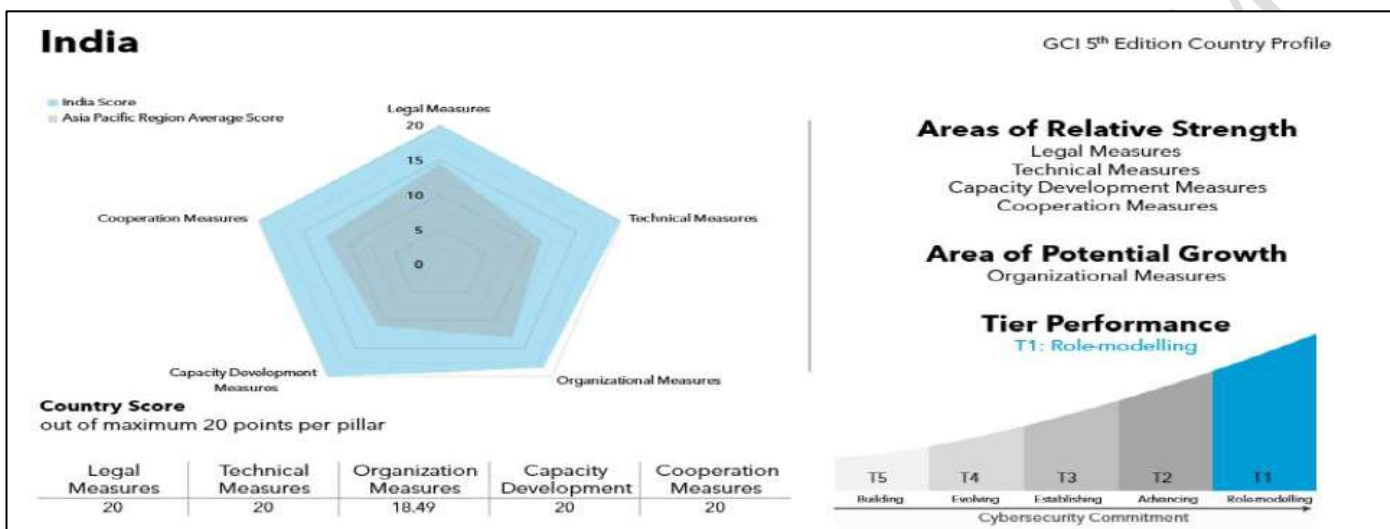
- **Nodal Department for India** - Department of Telecommunications, Ministry of Communications.

Cyber Security Initiatives of India
- **Nodal Ministry** - Ministry of Electronics and Information Technology
- **Indian Computer Emergency Response Team (CERT-In)** – It has been designated as the national agency for responding to cyber security incidents.
- **Sectoral Computer Incident Response Teams (CSIRTs)** – They provide sector-specific technical support and incident reporting, further strengthening India's cybersecurity capabilities.
- Sectoral Computer Emergency Response Teams (CERTs) have been setup for Power, Thermal, Hydro, Transmission, Distribution, Grid Operation and Renewable Energy sectors.
- **National Critical Information Infrastructure Protection Centre (NCIIPC)**- It has been established to ensure protection of critical information infrastructure in the country including power sector.

10.2 Periodic Labour Force Survey (PLFS)

Recently, the Periodic Labour Force Survey (PLFS) released its 7th annual report for July 2023 to June 2024.

- **PLFS-** It is a survey that estimates key employment and unemployment indicators in India.

- **Indicators**
  - o Labour Force Participation Rate (LFPR),
  - o Worker Population Ratio (WPR), and
  - o Unemployment Rate (UR)

- **Released by -** The Union Ministry of Statistics and Programme Implementation.

- It is an initiative of the National Sample Survey Office (NSSO).

Findings of the report

- **Stagnant Unemployment Rate** – It shows that there is ***no major change*** in the unemployment rate.

- The unemployment rate remains at 3.2%, like last year.

- Rural unemployment decreased from 5.3% (2017-18) to 2.5% (2023-24), and urban unemployment fell from 7.7% to 5.1% for the same period.

- **Agriculture -** Workforce participation in agriculture has increased for the fourth consecutive year, indicating a shift back to agriculture for employment, possibly due to lack of non-farm job opportunities.

- **Distribution in agriculture -** There is a ***minor increase*** in the distribution of workers in agriculture.

- **Manufacturing -** The manufacturing sector shows ***no growth*** in providing jobs compared to previous years.

- **Labour Force Participation Rate (LFPR) -** The labor force is made up of individuals aged 15 and older, who fall into one of two groups
  - Those who are currently employed
  - Those who are unemployed but eager to work and are actively searching for a job.

|	
Rural areas	Climbed from 50.7% in 2017-18 to 63.7% in 2023-24
Urban areas	Saw an increase from 47.6% to 52.0%
Males in India	Went up from 75.8% in 2017-18 to 78.8% in 2023-24
Females in India	From 23.3% in 2017-18 to 41.7%. 2023-24
Muslim women	Rose from 15% in 2021-22 to 21.4% in 2023-24
Hindu women	Rose from 26.1% in 2021-22 to 33.3% in 2023-24
Sikh and Christian women	19.8% to 26.7% and from 34.2% to 38.3%, respectively during same time line.

- **Concerns** – The employment situation remains grim, especially in non-farm jobs.

- The increase in agriculture jobs is seen as a sign of unpaid family labour being counted as employment, which is misleading.

- The manufacturing sector's share in employment has not improved, remaining at 11.4% and the construction sector's contribution to employment is stagnant at 12%.

10.3   Report on Green House Gas (GHG) Emissions in India

The recent report of European Commission's Joint Research Centre (JRC) says that India emerged as the third-highest CO2 emitter globally, accounted for 7.8% in 2023.

- It indicates that GHG emissions increased from 3,270.4 Mt CO2eq/year in 2014 to 4,133.6 Mt CO2eq/year in 2023.

- **Global -** China ranks the top in 2023 followed by USA

- **India -** India's overall GHG emissions have steadily increased over the years, measured in megatonnes of CO2 equivalent per year (Mt CO2eq/yr).

- India has the lowest per capita emissions amongst G20 nation.

- **Primary Contributor -** Power sector (46.6%), industrial combustion (20.9%), and transportation (11.5%).
  - The increase was particularly steep at 6% in 2023, following growth rates of 5.9% in 2022 and 7.2% in 2021.
  - Over the years, India's total GHG emissions have shown a consistent upward trend, measured in megatonnes of CO2 equivalent (Mt CO2eq/yr).

- **Secondary Contributor -** Burning of fossil fuels, methane emissions from livestock, aluminum and cement production.

> *GHG emissions are defined as gases released into the atmosphere that trap heat, thus contributing to the greenhouse effect and global warming include carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O).*

India records fastest growth in emissions in the last decade
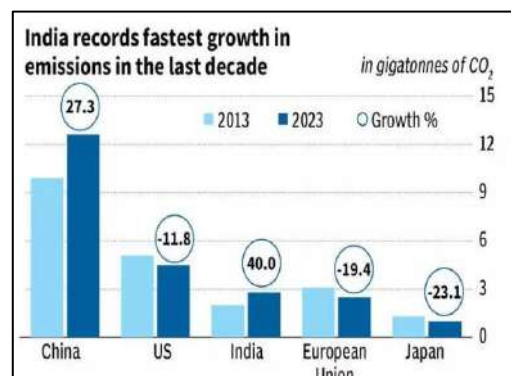
- **India's per capita GHG emissions -** It reached 2.9 CO2eq/cap/year in 2023, up from 2.5 CO2eq/cap/year

- Fossil fuels accounted for 88% of primary energy consumption in India and 77% of total electricity generation in 2022.

- International Energy Agency report says that CO2 Emissions in India's carbon emissions have surged during this decade, escalating from 2 Gigatonnes (Gt) in 2013 to 2.8 Gt in 2023, a 40% rise.

Emissions surge in India
Greenhouse gas emissions in India are rising sharply
in megatonnes of CO₂ equivalent per year

- Despite comprising approximately 17% of the global population from 1850 to 2019, India's cumulative contribution to global GHG emissions is only 4%.

- **India's Intended Nationally Determined Contribution (INDC) -** It targets a 33 to 35% reduction in emissions intensity of its GDP by 2030, compared to 2005 levels.

    - It establishes an extra carbon sink of 2.5 to 3 billion tonnes of CO2 equivalent through enhanced forest and tree cover by 2030.

- **Spearhead -** Global solar alliance, INSPA (International Agency for Solar Policy & Application), uniting all nations situated between the Tropic of Cancer and Tropic of Capricorn.
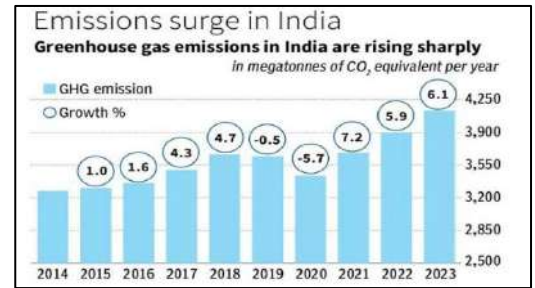
10.4   Asia Power Index, 2024

Ministry of Information and Broadcasting recently says that India surpasses Japan to become 3rd largest power in Asia power index.

- **Asia power Index -** The Asia Power Index measures resources and influence to rank the *relative power of states in Asia.*

- **Launched by -** The Lowy Institute in 2018.

- **Evaluation -** It evaluates 27 countries across the Asia-Pacific region, focusing on their ability to shape and respond to external geopolitical challenges.

- It is an analytical tool that helps sharpen debate on power in Asia and track shifts in the distribution of power over time.

- **Theme-** The project evaluates international power in Asia through *131 indicators* across *8 thematic measures*

    - Military capability and defence networks

    - Economic capability and relationships

    - Diplomatic and cultural influence

    - Resilience and future resources

India Overtakes Japan, 3rd in Asia Power Index
India's score surged by 2.8 points in 2024

Country	Power score 2024	Change from 2023
U.S.	81.7	1.0
China	72.7	0.2
India	39.1	2.8
Japan	38.9	1.7
Australia	31.9	1.0
Russia	31.1	-0.5
South Korea	31.0	1.5
Singapore	26.4	1.3
Indonesia	22.3	2.9
Thailand	19.8	1.1

Source: Lowy Institute's Asia Power Index 2024
Graphic: Samrat Sharma, Jaipal Sharma

- The 2024 edition includes Timor-Leste for the first time, reflecting its growing importance as a result of likely accession to the Association of Southeast Asian Nations (ASEAN) in coming years.
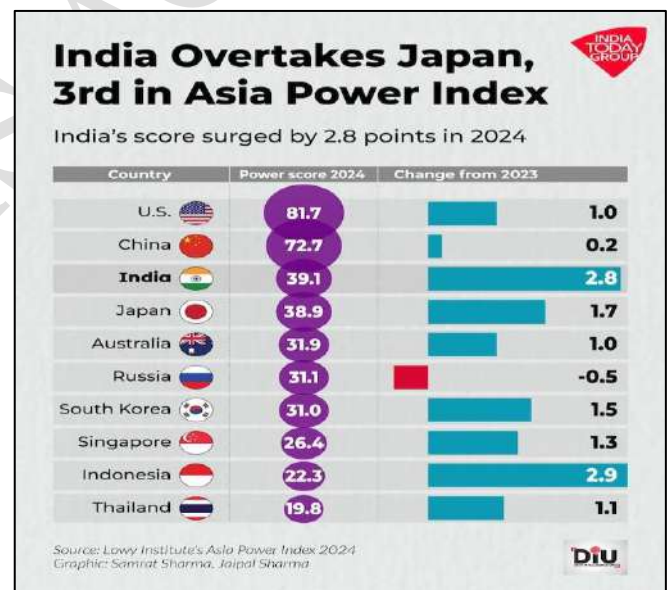
Status of India, 2024

- **Factors for growth -** India surpasses Russia and Japan due to its rise in dynamic growth, youthful population, and its expanding economy.

- **PPP -** India experienced a 4.2-point boost in Economic Capability, primarily driven by its strong GDP growth and status as the world's 3rd largest economy in Purchasing Power Parity (PPP) terms.

- **Resources -** India's Future Resources score also saw a notable increase of 8.2 points, highlighting its potential demographic advantage.

- **Youth population -** Unlike aging populations in China and Japan, India's youthful demographic is expected to fuel continued economic expansion and workforce growth in the coming years.

- **Diplomacy -** The report further noted India's growing influence in multilateral diplomacy and regional security.

- India's active participation in groups like the Quad and its leadership in regional dialogues have bolstered its position in regional security without the need for formal military alliances.

- **Geopolitics -** Additionally, defense deals such as the BrahMos missile agreement with the Philippines point to India's expanding geopolitical ambitions.

- The report also finds that India's ability to project power east of the Malacca Strait is limited.
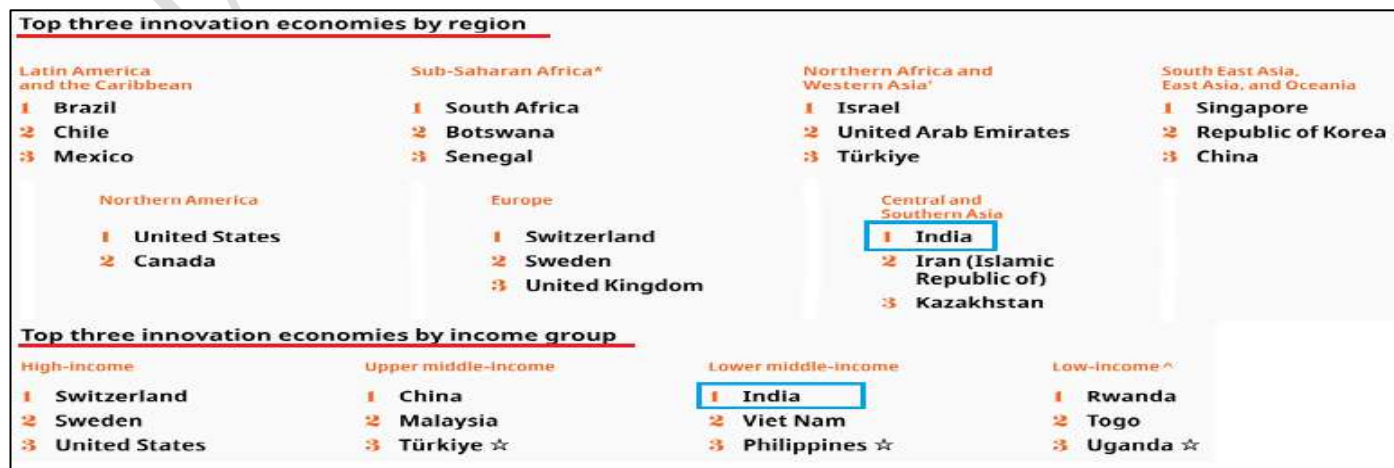
10.5   Global Innovation Index 2024

The 17th and 2024 edition of Global Innovation Index was released.

- **GII 2024** – A guide to the innovative performance of _133 countries_, as well as the _world's top 100 science and technology clusters_.

- **Special theme** – Unlocking the Promise of _Social Entrepreneurship_.

- **Findings** – There is a continued trend of strong progress from emerging economies.

  - **Highest riser in past 5 years** - Indonesia, Mauritius, Saudi Arabia, Qatar and Brazil

  - **Highest riser in past 10 years** - China, _India_, Iran, Morocco, the Philippines and Türkiye

- **Rankings** - _Switzerland tops_ with a score of 67.5 for the 14th consecutive year, followed by Sweden and the US respectively.

- **India** – It secured the _39th position_.

- It is a slight _improvement of one rank_ from last year when the country was placed at the 40th rank with a score of 38.1 in 2023.

- **India's improvement** – In Infrastructure and Creative Outputs indicators.

Global Innovation Index (GII)
GII – It captures the innovation ecosystem performance of economies and tracks the most recent global innovation trends.   **Released by** – World Intellectual Property Organisation (WIPO)   **7 indicators**   - Institutions   - Human Capital and Research   - Infrastructure   - Market Sophistication   - Business Sophistication   - Knowledge and Technology Outputs   - Creative Outputs

- It continued to top the charts as the _best innovation economy_ in the Central and Southern Asian region.

- It performs well in key indicators such as

  - **1st** – In ICT (Information and Communication Technology) services exports

  - **6th** – In venture capital received

  - **7th** – In intangible asset intensity

  - **8th** – In unicorn companies

- **India's lagging** – Worsened in indicators like Human Capital & Research, Market Sophistication, and Business Sophistication.

Top three innovation economies by region

Latin America and the Caribbean	Sub-Saharan Africa*	Northern Africa and Western Asia†	South East Asia, East Asia, and Oceania
1 Brazil	1 South Africa	1 Israel	1 Singapore
2 Chile	2 Botswana	2 United Arab Emirates	2 Republic of Korea
3 Mexico	3 Senegal	3 Türkiye	3 China

Northern America	Europe	Central and Southern Asia
1 United States	1 Switzerland	1 India
2 Canada	2 Sweden	2 Iran (Islamic Republic of)
	3 United Kingdom	3 Kazakhstan

Top three innovation economies by income group

High-income	Upper middle-income	Lower middle-income	Low-income^
1 Switzerland	1 China	1 India	1 Rwanda
2 Sweden	2 Malaysia	2 Viet Nam	2 Togo
3 United States	3 Türkiye ☆	3 Philippines ☆	3 Uganda ☆

11. OTHERS

11.1 Ramon Magsaysay Award 2024

Japanese filmmaker Hayao Miyazaki has won the 2024 Ramon Magsaysay Award.

- **Ramon Magsaysay Award** – It is Asia's premier prize and highest honor that recognizes greatness of spirit shown in selfless service to the peoples of Asia regardless of race, gender, or religion.

- Recipients – To outstanding ***individuals and organizations*** whose selfless service has offered solutions to some of the most intractable problems of human development.

- It is also known as the ***"Nobel Prize of Asia."***

- **Ramon Magsaysay** – 7th Philippine President whose ideals inspired the Award's creation.

- **Award Instituted In** – 1957.

- **Announcement** - Recipients of the Award are announced annually on ***August 31st***.

- **Award Presentation** - The Award medallion and certificate are presented in a formal ceremony ***in Manila, Philippines, every November*** of the same year.

- **Categories** - Award was given in six categories annually.

Government Service	To recognize outstanding service in the public interest in any branch of government, including the executive, judicial, legislative, or military.
Public Service	To recognize outstanding service for the public good by a private citizen.
Community Leadership	To recognize leadership of a community toward helping the disadvantaged have fuller opportunities and a better life.
Journalism, Literature, and Creative Communication Arts	To recognize effective writing, publishing, or photography or the use of radio, television, cinema, or the performing arts as a power for the public good.
Peace and International Understanding	To recognize effective writing, publishing, or photography or the use of radio, television, cinema, or the performing arts as a power for the public good.
Emergent Leadership	To recognize an individual, forty years of age or younger, for outstanding work on issues of social change in his or her community.
Hayao Miyazaki	

- Hayao Miyazaki is the Japanese filmmaker, considered one of the greatest animators and directors.

- His Major Works - My Neighbour Totoro, Kiki's Delivery Service, World Masterpiece Theater, Future Boy Conan, The Wonderful World of Puss 'n Boots, Castle in the Sky, Spirited Away

- Books written - Starting Point: 1979 to 1996

- Studio Ghibli - He along with director Isao Takahata and producer Toshio Suzuki, founded Studio Ghibli in 1985.

- Themes - Pacifism, Environmentalism.

- Miyazaki's work was heavily steeped in the changing lives of Japanese people post-World War II.

11.2 Emmy Awards

The 76th Primetime Emmy Awards, 2024 took place recently at the Peacock Theater in downtown Los Angeles, California.

- It is the most renowned accolades given to ***television and emerging media performances.***

- Unlike Oscars and Golden Globe awards, they *aren't given for films*.

- **Established in -** I1948 and the 1st ceremony took place in 1949.

- A total of 6 awards were presented, such as the Most Outstanding Television Personality and Most Popular Television Program.

- **Categories**

    o **Primetime Emmy Awards** – It honours television shows produced only in America and aired during primetime, International Emmy Awards are for international shows.

    o **Daytime Emmy Awards** – It is given to American shows aired during late-morning and afternoon.

    o **Regional Emmy Awards** – It is for regional television markets, including state-to-state programming, local news and locally produced shows.

- Apart from those mentioned above the Emmys are also given in the following categories - daytime, sports, news and documentary, technology and engineering.

- **Given by**

    o Television Academy, administers the Primetime Emmy Awards.

    o National Academy of Television Arts & Sciences, oversees daytime, sports, news and documentary categories.

    o International Academy of Television Arts & Sciences, responsible for International Emmys.

- Each organisation maintains its own membership of television professionals who vote and decide who will get the award.

11.3   Periyar

Periyar's 146th birth anniversary celebrated recently in chennai.

- Erode Venkatappa Ramasamy, also known as "Periyar," is an Indian social activist and politician born on September 17, 1879.

    o **Parents -** Venkatappa Nayakar and Chinnathayee.

- He is known as the *'Father of the Dravidian movement'* as well as Pagutharivu Pagalavan.

- **INC –** He joined the Indian National Congress (INC) in 1919, but resigned in 1925 when he felt that the party was only serving the interests of Brahmins.

- He was arrested during the ***non-cooperation movement*** in 1920.

- **Social Justice** – He promoted the principles of rationalism, self-respect, women's rights and eradication of caste and thus started ***Self Respect Movement***.

- In 1921, he courted imprisonment for picketing toddy shops in Erode and during the anti-liquor campaign, he cut down 100 trees in his own farm.

- He opposed discrimination against non-Brahmins by Brahmins in cultural and religious matters.

- **Vaikom Satyagraha -** He led the famous Vaikom Sathya Graha in 1924, where the people of down trodden community were prohibited to enter into the temple.

- Finally the Travancore government allowed the people to enter into the temple, hence he was given the title of 'Vaikom Hero'.

- **Foreign tours** – From 1929 to 1932, he toured of British Malaya, Europe, and USSR which influenced him.

- **Political movements** – In 1939, he became the head of the Justice Party and in 1944, he changed its name to Dravidar Kazhagam.

- **Newspapers & Journals**

    o **Tamil magazine** - Kudi Arasu, Puratchi, Pagutharivu, Viduthalai

    o **English magazine** - Revolt

> *Tamil Nadu celebrates Periyar's birth anniversary as **'Social Justice Day'** since 2021 whereas the World Day of Social Justice is 20th Feb.*

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