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Topic 1. PM MODI LAUNCHES HYDROGEN-POWERED FERRY: FEATURES, SIGNIFICANCE

Important for the subject: Science and technology

Prime Minister Narendra Modi Wednesday virtually launched **India's first indigenously developed hydrogen fuel cell ferry.**

- Built at a cost of Rs 18 crore, the ferry will be handed over to the Inland Waterways Authority of India by the CSL after rigorous trials.
- The **Ministry of Ports, Shipping and Waterways met 75 per cent of the project cost.**
- The **'Harit Nauka' (green boat) initiative of the Ministry of Ports, Shipping and Waterways envisages a green transition of inland vessels.**
- In line with this, the ferry can be replicated in other parts of the country for urban mobility. It is also a boost to the National Green Hydrogen Mission.

What are the special features of the vessel?

- The Hydrogen fuel cell vessel is a 24-meter-long catamaran, which can carry 50 people in its air-conditioned passenger area.
- The accommodation area has been constructed with high-quality fiberglass reinforced plastic, similar to metro train coaches.
- **Hydrogen fuel cell vessels do not use conventional batteries as the primary storage house of electrical energy.**
- The **vessels run on hydrogen fuel, which is stored in cylinders.**
- This boat has five hydrogen cylinders that can carry 40 kg of hydrogen and support eight hours of operations.
- The vessel is also fitted with a 3-kW solar panel.
- The hydrogen fuel cell-powered vessel has zero emission, zero noise and is energy-efficient, which makes it more environment-friendly.
- Since there are no moving parts, the ferry requires less maintenance than combustion vessels.

How do hydrogen fuel cells work?

- A hydrogen fuel cell generates electricity by utilizing the chemical energy contained in hydrogen.
- It releases only pure water, not discharging pollutants.

Hydrogen is loaded into cells.

- The energy within the **hydrogen is converted into electricity and heat, which is then used to power the vessel's propulsion mechanism.**
- In the fuel cell, the **hydrogen reacts with the oxygen in the air to produce electricity.**
- Unlike batteries, hydrogen fuel cells do not require recharging.
- Provided uninterrupted supply of fuel and oxygen, these cells would work continuously.

What type of cells have been used in the vessel?

- This vessel uses a **50-kW PEM (proton-exchange membrane) fuel cell, with Lithium-Ion Phosphate batteries.**
- The advantage is that the cells can quickly change their output depending upon the power demand.
- PEM fuel cells are popular in automotive applications because they operate at a lower temperature, and are lighter and more compact.

How was it developed?

- India has now **indigenously developed hydrogen fuel cells and their related systems.**
- The vessel has been built completely by the CSL, which also developed the vessel automation system and power management system.
- The **hydrogen fuel cell system was developed by KPIT Technologies, Pune, in collaboration with the Council of Scientific and Industrial Research Labs, under the Union Ministry of Science and Technology.**

What is the Harit Nauka initiative?

- In **January 2024, the shipping ministry unveiled the Harit Nauka** guidelines for inland vessels.
- As per the guidelines, **all states have to make efforts to use green fuels for 50 per cent of inland waterways-based passenger fleets in the next one decade, and 100 per cent by 2045.**
- This is to **reduce greenhouse gas emissions** as per the **Maritime Amrit Kaal Vision 2047.**

Topic 2. WHY ASML'S NEW CHIP-MAKING MACHINE IS A SCIENTIFIC MARVEL

Important for the subject: Science and technology

Semiconductor lithography:

Computers operate by encoding data into **bits**, represented by **0s and 1s**, through **semiconductors**. These **small devices store data and execute calculations**, enabling **computing functions**.

- The widespread availability of powerful computers is largely due to **semiconductor lithography**, a technique for **crafting detailed circuits with high precision**.
- This process is **automated** by **highly expensive machines**, costing between **Rs 800 crore** and **Rs 1,600 crore**.

High NA EUV machine:

- **ASML**, a company based in the **Netherlands**, has a **monopoly** in this field, producing these machines for a market valued at **\$125 billion**, making it **Europe's most valuable tech company**.
- In February, **ASML** introduced its "**High NA EUV**" machine, priced at **\$350 million** each and comparable in size to a **double-decker bus**.
- This machine, utilizing **extreme ultraviolet (EUV) photolithography**, represents a **leap in semiconductor manufacturing technology**. It enables the **creation of semiconductors by transferring the circuit design of a transistor onto a silicon wafer coated with a light-sensitive substance**.
- Exposing this to **light solidifies the design**, allowing for the addition of wiring to complete the transistor. This innovation puts **ASML in direct competition with Intel** in the race to supply **advanced semiconductors for future computers and smartphones**.

What is the Rayleigh scattering criterion?

- The **Rayleigh scattering criterion** is a principle in physics that **dictates the minimum feature size** that can be **accurately imprinted onto a silicon wafer** during the **semiconductor manufacturing process**.
- This **criterion** establishes that the **size of the feature is directly proportional to the wavelength of the light used** and **inversely proportional to the lens aperture that directs the light onto the wafer**.
- The **proportionality to the wavelength** includes a variable factor '**k**', which can reach up to **0.25** and is influenced by factors such as the **operating temperature** and the **chemical properties of the photoresist used**.

- The aperture represents the capacity to collect and focus light on the wafer, meaning a larger aperture allows for smaller features.
- To achieve finer details on **wafers**, engineers have historically focused on **utilizing light with shorter wavelengths**.
- For instance, chip manufacturers transitioned from using light with a wavelength of **436 nanometers (nm)** about forty years ago to employing **extreme-ultraviolet (EUV) light** with a **wavelength of 13.5 nm** in **modern equipment**.
- Before the adoption of EUV technology, the industry utilized **deep ultraviolet (UV) light** with a **193 nm wavelength** to etch complex patterns onto wafers.

How is EUV light produced?

- The production of **extreme ultraviolet (EUV) light**, critical for **manufacturing advanced semiconductor chips**, involves a **highly sophisticated process**.
- To fabricate smaller and more powerful chips by cramming more transistors onto them, the **semiconductor industry**, including **ASML**, employs a method to generate **13.5-nm wavelength light**.
- This method starts with propelling a **50-micrometer-wide droplet of liquid tin** through the machine at a **speed of nearly 300 km/hr**.
- A laser then **strikes the droplet**, flattening it into a pancake shape. While still in **motion**, a second, more **intense laser beam** hits the **tin**, ionizing it into a **high-temperature gas, 40 times hotter than the Sun's surface**, which emits the desired **EUV light**.
- This complex process, occurring **50,000 times per second**, requires shooting **50,000 tin droplets** and applying **twice as many laser pulses to generate EUV light** of adequate intensity for **semiconductor lithography**.
- Moreover, the entire operation is conducted in a **vacuum** to prevent absorption by air or any other substances, which could reduce the efficiency of **EUV light production**.

Precision and value of machine:

- The precision of the machine is **extraordinarily high**. The **mirrors**, produced by **Zeiss**, are the **smoothest surfaces ever made**, with imperfections so minor that, when scaled, the **largest deviation** would be just **1 mm high** if the **mirror's surface** were as large as **Uttar Pradesh**.
- To **maintain this precision in directing light to the silicon wafer**, the **wafer stage floats on a magnetic field to eliminate friction** and is adjusted with extreme accuracy—up to **50 picometers —20,000 times per second**.
- This level of adjustment is critical for achieving the **minuscule feature sizes** required on **modern chips**, and the machine accomplishes this with an acceleration surpassing that

of F1 cars or fighter jets.

- The “**High NA EUV**” machine represents a **series of technological achievements** that significantly advance the field of computing, playing a crucial role in the development of future technologies such as **AI, robotics, intelligent vehicles, high-quality digital communication, and space exploration.**
- **Semiconductor chips**, which these machines help create, are central to powering these innovations by performing the vast number of calculations they require.
- The **continuous miniaturization and enhancement of these chips**, in line with **Moore’s law**, have progressed from the **first integrated circuit** with just **four transistors** to **modern chips** with over **19 billion.**
- Additionally, these **lithography machines** have strategic importance, exemplified by **ASML’s restrictions on selling its advanced machines to certain countries**, highlighting the **geopolitical implications of semiconductor technology.**
- These machines not only drive technological progress but also **create high-skilled jobs and bolster national technological sovereignty.**

Topic 3. WHY IS ISRO BUILDING A SECOND ROCKET LAUNCHPORT IN TAMIL NADU’S KULASEKARAPATTINAM?

Important for the subject: Science and technology

Prime Minister Narendra Modi laid the foundation stone of the **second rocket launchport of the Indian Space Research Organisation (ISRO) at Kulasekarapattinam** on February 28.

- Situated at a geographically advantageous location in **coastal Tamil Nadu’s Thoothukudi district**, the facility costs **Rs 986 crore.**
- It will be extensively and exclusively used for commercial, on-demand, and small satellite launches in the future.

Why does India need a new launchport?

- With the Union government’s recent policy announcing the opening of the **space sector to private players**, a **sharp rise in the number of commercial launches** is certain.
- To ensure that **ISRO’s first launchport, the Satish Dhawan Space Centre (SDSC) SHAR** in Sriharikota, is not overburdened with a high number of launches, the space agency has decided to build another facility.
- While SHAR will be **only used for launching bigger and heavy-lift-off missions**, the **Kulasekarapattinam launchport** will be used to launch smaller payloads.
- SHAR will also be available for India’s **big ticket missions to the Moon, Venus, and**

much touted human-flight mission, the Gaganyaan.

- Private players could develop **space-qualified sub-systems, build satellites, and even launch vehicles using the new launchport.**
- It will also facilitate dedicated launch infrastructure for all the on-demand commercial launches.

Why is the new ISRO launchport located in Tamil Nadu?

- Geographically, scientifically, and strategically, the Kulasekarapattinam launchport provides a natural advantage to ISRO's future launches pertaining to the Small Satellite Launch Vehicle (SSLV).
- Allowing a **direct southward and smaller launch trajectory for the light weight SSLVs carrying less fuel, the Kulasekarapattinam facility will boost ISRO's attempts to enhance payload capacities.**
- Currently, the **trajectory followed by all launches from SHAR** are longer as they follow a path which requires the vehicle to skirt eastwards around Sri Lanka before taking the actual southward flight.
- This **consumes additional fuel.**
- However, the same would not be required for future launches from Kulasekarapattinam, which is geographically located several kilometers to the west of Colombo, thereby allowing a straight southward flight and simultaneously saving the already limited fuel available onboard SSLV.
- Notably, both the launch ports are located in **Southern India, near the equator.**
- For a launch site close to equator the magnitude of the velocity imparted due to **Earth's rotation is about 450 m/s**, which can lead to substantial increase in the payload for a given launch vehicle.

Geostationary satellites must necessarily be in the equatorial plane.

- So, for such satellites, the closer the launch site is to the equator the better it is.

What are SSLVs and what are they used for?

- SSLV is the **new small satellite launch vehicle developed by ISRO** to cater for the launch of small satellites.
- It has a **three-stage launch vehicle, having a lift-off weight of about 120 tonnes and is 34 meters in length and 2 meters in diameter.**
- SSLV is **designed with a three-stage solid propulsion and a liquid propulsion stage, which is the terminal stage.**
- The SSLV missions are useful to **launch small-sized satellites weighing anywhere**

between 10 to 500kg into the Low Earth Orbit.

- Going by their **size and weight**, these are typically referred to as **mini, micro or nano satellites**.
- They are **low on cost** and **intended satellite insertion into orbits takes a shorter flight time**. SSLV are best suited for **commercial and on-demand launches**.
- Previously, satellite projects built by college students and private players involved in the space sector have benefitted from SSLV missions.

How has India's SSLV journey been so far?

- SSLV is a relatively **new development by ISRO**, which is expanding its launch capabilities.
- The **first SSLV mission SSLV-D1** i.e. carrying two satellites, including EOS-02 and AzaadiSat, in August 2022, was a failure.
- Despite a **text-book launch, perfect lift-off and smooth transitioning into subsequent stages**, the insertion of the two satellites after their separation took place into a 356 km circular orbit instead of the intended elliptical orbit.
- Six months later, in its second attempt with the **SSLV-D2 in February 2023, ISRO tasted success**.
- The rocket inserted three satellites onboard into the intended 450 km circular orbit following a 15 minute flight. Both these launches were from SHAR.

What are the features of SHAR?

- SHAR is situated along the east coast of Andhra Pradesh and is located 80 km off Chennai. It currently provides launch infrastructure to all ISRO missions.
- It is equipped with a solid propellant processing setup, static testing, and launch vehicle integration facilities, telemetry services — tracking and command network to oversee the launch — and a mission control center.
- SHAR has two launch complexes that are routinely used to launch the Polar Satellite Launch Vehicle (PSLV), the Geosynchronous Space Launch Vehicles (GSLV) and the Geosynchronous Satellite Launch Vehicle Mk-III, now renamed as LVM3.
- The maiden launch from the First Launch Pad, built in the early 1990s, was in September 1993. Operational since 2005, the Second Launch Pad saw its maiden launch in May 2005.

Topic 4. WHY ANTHROPIC CALLS THE NEW CLAUDE 3 ITS ‘MOST INTELLIGENT’ AI MODEL YET

Important for the subject: Science and technology

	Claude 3 Opus	Claude 3 Sonnet	Claude 3 Haiku	GPT-4	GPT-3.5	Gemini 1.0 Ultra	Gemini 1.0 Pro
Undergraduate level knowledge MMLU	86.8% 3-shot	79.0% 3-shot	75.2% 3-shot	86.4% 3-shot	70.0% 3-shot	83.7% 3-shot	71.8% 3-shot
Graduate level reasoning GPQA, Diamond	50.4% 0-shot CoT	40.4% 0-shot CoT	33.3% 0-shot CoT	35.7% 0-shot CoT	28.1% 0-shot CoT	—	—
Grade school math GSM8K	95.0% 0-shot CoT	92.3% 0-shot CoT	88.9% 0-shot CoT	92.0% 3-shot CoT	57.1% 3-shot	94.4% Majority	86.5% Majority
Math problem-solving MATH	60.1% 0-shot CoT	43.1% 0-shot CoT	38.9% 0-shot CoT	52.9% 3-shot	34.1% 3-shot	53.2% 3-shot	32.6% 3-shot
Multilingual math MGSM	90.7% 0-shot	83.5% 0-shot	75.1% 0-shot	74.5% 3-shot	—	79.0% 3-shot	63.5% 3-shot
Code HumanEval	84.9% 0-shot	73.0% 0-shot	75.9% 0-shot	67.0% 0-shot	48.1% 0-shot	74.4% 0-shot	67.7% 0-shot
Reasoning over text DROP, F1 score	83.1 3-shot	78.9 3-shot	78.4 3-shot	80.9 3-shot	64.1 3-shot	82.4 Variable shots	74.1 Variable shots
Mixed evaluations BIG-Bench-Hard	85.8% 3-shot CoT	82.9% 3-shot CoT	73.7% 3-shot CoT	83.1% 3-shot CoT	66.6% 3-shot CoT	83.6% 3-shot CoT	75.0% 3-shot CoT
Knowledge Q&A ARC-Challenge	96.4% 25-shot	93.2% 25-shot	89.2% 25-shot	96.3% 25-shot	85.2% 25-shot	—	—
Common Knowledge Hellaswag	95.4% 10-shot	89.0% 10-shot	85.9% 10-shot	95.3% 10-shot	85.5% 10-shot	87.8% 10-shot	84.7% 10-shot

Anthropic was founded by former members of OpenAI, the company behind ChatGPT. It says its new family of AI models is capable of advanced performance, beating the likes of GPT-4 on some parameters.

- The family includes three state-of-the-art AI models in the ascending order of capabilities – **Claude 3 Haiku, Claude 3 Sonnet, and Claude 3 Opus.**
- The company claims that each model offers an increasingly powerful performance, **offering** a balance between intelligence, speed, and cost based on their specific use case.

What is Claude 3?

- Claude is a group of large language models (LLMs) developed by Anthropic.**
- The chatbot is capable of handling text, voice messages, and documents.
- The chatbot is capable of generating **faster, contextual responses compared to its peers.**
- Claude 3 Opus is the most powerful model, Claude 3 Sonnet is the middle model that is capable and price competitive, and Claude 3 Haiku is relevant for any use case that requires instant responses.

- Claude Sonnet powers the **Claude.ai chatbot for free** at present and users only need an email sign-in.
- **Opus is only available through Anthropic's web** chat interface and if a user is subscribed to the Claude Pro service on the, Anthropic website. It is available for \$20 a month.
- All new models come with a 2,00,000-token window, signifying possibly better performance, accuracy and the capacity to input more information in a user prompt.

How did Claude 3 perform?

- Based on the comparison of Claude 3 with its peers, it seems the Anthropic may have caught up with Open AI. It had surpassed many AI models with the launch of its GPT-4 Turbo.
- Claude 3 reportedly demonstrates advanced performance across cognitive tasks such as reasoning, expert knowledge, mathematics, and language fluency.
- Despite the lack of consensus over whether LLMs can really “know” or “reason,” the AI research community commonly uses these terms.
- The company says that the Opus model exhibits “near-human levels of comprehension and fluency on complex tasks”.
- While this is a big claim, the scores show that Claude 3 Opus has shown some near-human performance on specific benchmarks. However, this doesn't mean that Opus possesses general intelligence like humans.

Claude 3 vs GPT-4

- **Claude 3 Opus has surpassed GPT-4** on as many as 10 AI benchmarks, which include MMLU (undergraduate level knowledge), Human Eval (Coding), HellaSwag (common knowledge), and GSM8K (grade school math).
- On the benchmark scores, **Claude 3 beats its peers narrowly. For example, in the five-shot MMLU trial, Claude 3 secured 86.8 percent while GPT-4 obtained 86.4 percent.**

Benchmark scores.

- Claude 3 has also shown improvements in terms of analysis, forecasting, content creation, multilingual conversations, code generation, etc.
- Anthropic claimed that the new model family also comes with enhanced vision capabilities, allowing Claude 3 to process photos, charts, and diagrams, much like GPT-4V.

Limitations of Claude 3

- According to those who had early access to the model, Claude 3 performs well in tasks such as answering factual questions and optical character recognition (OCR), meaning the

ability to extract text from images.

- However, **it struggles with complex reasoning and mathematical problems at times.**
- It also exhibited biases in its responses, such as favoring a certain racial group over others. In the past too, other AI models have faced similar problems.
- **Google's AI chatbot Gemini was criticized** after it showed racial bias and historical inaccuracies. It refused to generate images of white individuals and depicted those individuals as people of color.
- **Anthropic has emphasized the safety features of Claude 3, especially its refusal to generate harmful or illegal content.**
- The company was also among the first to bring about Constitutional AI. Developers laid down a set of values that the system must follow so that it undertakes politically and socially responsible actions.
- As of now the Claude 3 is the most expensive model on the market, but Anthropic has plans to release affordable versions soon.
- Based on the early reports, benchmarks, and confidence from the AI community, Claude 3 seems to be a significant step forward in the development of LLMs.

Topic 5. BENGALURU BOMB BLAST: WHAT ARE IMPROVISED EXPLOSIVE DEVICES, OR IEDS?

Important for the subject: Science and technology

	Common uses	Common form	Known IED use
High explosives			
Ammonium nitrate and fuel oil (ANFO)	Mining and blasting ²	Solid	Oklahoma City bombing
Triacetone Triperoxide (TATP)	No common uses; mixed from other materials	Crystalline solid	2005 bombings in London
Semtex, C-4	Primarily military	Plastic solid	Irish Republican Army bombings
Ethylene glycol dinitrate (EGDN)	Component of low-freezing dynamite	Liquid	Millennium Bomber, intended for Los Angeles airport, 1999
Urea nitrate	Fertilizer	Crystalline solid	World Trade Center 1993
Low explosive			
Smokeless powder	Ammunition	Solid	Olympic Park bombings

At least nine people were injured after an explosion at the bustling **Rameshwaram Cafe in Bengaluru's Whitefield** area on March 1, possibly by an **improvised explosive device (IED)**.

- Some notable instances of IEDs being used in the past include the 1993 Mumbai

serial blasts, the 2008 Jaipur blasts, the 2006 Jama Masjid bombings, and the 2013 Bodh Gaya bombings. IEDs have also been commonly used by Maoist insurgents, and Kashmiri militants.

What are IEDs?

- The term “IED” first entered common usage during the United States’ Iraq invasion (beginning in 2003), where such bombs were commonly used against US forces.
- An IED is basically a home-made bomb.
- IEDs can come in many forms, ranging from a small pipe bomb to a sophisticated device capable of causing massive damage and loss of life.
- IEDs can be deployed using a vehicle, carried, placed, or thrown by a person, delivered in a package, or concealed on the roadside.

Components of an IED:

- Each IED comprises a few basic components, which can come in various forms, depending on resources available to the bomb-maker.
- These include an **initiator or a triggering mechanism, (which sets the explosion off), a switch (which arms the explosive), a main charge (which causes the explosion), a power source (since most IEDs contain an electric initiator, they require an electronic power source), and a container.**
- Additionally, IEDs may be packed with additional materials or “enhancements” such as nails, glass, or metal fragments designed to increase the amount of shrapnel released by the explosion — and thus the damage it causes.
- Enhancement may also include hazardous materials such as toxic chemicals, or radioactive circumstances — **an IED packed with, say, depleted Uranium will be colloquially called a “dirty bomb”.**
- Some common materials used to **build IEDs include fertilizers such as ammonium nitrate and urea nitrate, gunpowder, and hydrogen peroxide.**
- The reasons why passengers are not allowed to carry beyond a certain quantity of liquids aboard commercial aircraft is the possibility of creating IEDs on site by mixing some commonly available liquids.

Threat	Threat Description	Explosive Capacity	Building Evacuation Distance	Outdoor Evacuation Distance
	Small Package/letter	1 lb	40 ft	900 ft
	Pipe Bomb	5 lb	70 ft	1,200 ft
	FedEx Package	10 lb	90 ft	1,080 ft
	Vest/Container Bombs	20 lb	110 ft	1,700 ft
	Parcel Package	50 lb	150 ft	1,850 ft
	Compact Car	500 lb	320 ft	1,900 ft
	Full Size Car/Minivan	1,000 lb	400 ft	2,400 ft
	Van/SUV/Pickup Truck	4,000 lb	640 ft	3,800 ft
	Delivery Truck	10,000 lb	860 ft	5,100 ft

Damage caused by IEDs:

- IEDs are not simply used to kill and injure — **they have often, especially in active war zones, been used as distractions.**
- The extent of damage caused by an **IED depends on its size, construction, and placement, and whether it incorporates a high explosive or propellant.**

Typically, IEDs come with a very clear trade-off.

- While smaller bombs are easier to hide, carry, and deploy, they are also generally much less damaging than larger ones, especially ones deployed using vehicles.

Topic 6. AI HAS A BIG AND GROWING CARBON FOOTPRINT, BUT ALGORITHMS CAN HELP

Important for the subject: Science and technology

Artificial intelligence (AI) offers immense potential for solving complex problems, including the **climate crisis**. Yet, its **significant energy consumption** for operating large-scale data centres places it both as a **contributor** to and a **potential solver** of climate issues.

- The **carbon footprint of AI** mainly stems from the **extensive data processing** during its **training and inference phases**, with **training phases**, in particular, being **extremely energy and resource-intensive**.
- Training **GPT-3** (the precursor AI system to the current **ChatGPT**) generated **502 metric tonnes of carbon**, which is **equivalent to driving 112 petrol powered cars for a year**. **GPT-3** further emits **8.4 tonnes of CO₂ annually** due to **inference**.

- **Technological advancements**, such as **spiking neural networks** and **lifelong learning**, offer avenues for **reducing the carbon footprint of AI systems** by **optimizing their efficiency**.
- The **growth of AI's energy demands**, having **increased by a factor of 300,000** since the early **2010s**, underscores the urgency for developing more **sustainable AI technologies**.
- Without standard, accurate methods to measure **AI-related emissions**, current estimates of **AI's environmental impact** might even be underrepresented, suggesting the need for more rigorous evaluations and innovations to align AI development with climate sustainability goals.

Spiking neural networks (SNN):

- **SNNs and Lifelong Learning (L2)** are **emerging technologies** with the potential to significantly **reduce the carbon footprint of Artificial Intelligence (AI)**.
- **SNNs**, in particular, offer an **energy-efficient alternative** to **traditional Artificial Neural Networks (ANNs)**.
- **ANNs** require **substantial computing power, memory, and time** due to their **reliance on decimal numbers** and **precise calculations**, becoming **more energy-intensive** as they grow in complexity.
- In contrast, **SNNs**, like the **human brain**, **operate on intermittent electrical signals** or **spikes**, which **convey information** through the **timing of these spikes** rather than **continuous activity**.
- This **binary, all-or-none mechanism** allows **SNNs** to be up to **280 times more energy-efficient than ANNs**, consuming energy only during a spike and requiring minimal energy otherwise.
- Researchers are developing **learning algorithms for SNNs** to further enhance their **energy efficiency**, potentially enabling them to operate closer to the **brain's efficiency levels**.
- The reduced computational needs of **SNNs** may also allow for **quicker decision-making processes**.
- Given their **energy efficiency**, **SNNs** are considered particularly suitable for applications where **energy resources are limited**, such as **space exploration, defense, and self-driving cars**.

Lifelong Learning:

- **Lifelong Learning (L2)** is a technique **aimed at reducing the energy consumption of Artificial Neural Networks (ANNs)** throughout their operational life.
- Traditionally, **ANNs** tend to **forget previously learned information** upon training for new tasks, necessitating retraining from scratch with each change in their operational

environment. This process significantly contributes to **AI-related carbon emissions**.

- **L2** addresses this issue by employing a set of algorithms that allow AI models to sequentially learn and retain knowledge across multiple tasks, **minimizing or eliminating the need for retraining from scratch**.
- This approach not only reduces energy requirements but also enhances the models' ability to accumulate knowledge over time.
- Beyond **L2**, the **AI** field is exploring additional strategies to **decrease energy demands**, such as **developing smaller AI models** that maintain predictive accuracy comparable to larger counterparts.
- Furthermore, **advancements in quantum computing** are anticipated to revolutionize the training and inference processes for both **ANNs** and **SNNs**.
- By leveraging quantum physics phenomena, **quantum computing** could offer **unprecedented computational speed and efficiency**, potentially enabling the **creation of more energy-efficient AI solutions on a larger scale**.
- Addressing the **energy demands of AI is critical** in the context of **climate change**, underscoring the urgency of finding sustainable advancements in this rapidly evolving technology area.

Topic 7. MEET METHANE SAT, A SATELLITE WHICH WILL 'NAME AND SHAME' METHANE EMITTERS

Important for the subject: Science and technology

MethaneSAT, a satellite designed to **monitor and quantify methane emissions globally**, was launched on a **SpaceX Falcon9 rocket** from **California** on March 4.

- Although **not the first of its kind**, this washing-machine-sized satellite surpasses its predecessors in providing more detailed information and possessing a significantly broader field of view.

Why do we need to track and measure methane emissions?

- **Methane**, a **potent greenhouse gas** and the **second largest contributor to global warming after carbon dioxide** is **responsible for 30% of global heating** since the Industrial Revolution.
- It is **80 times more effective at trapping heat compared to carbon dioxide** over a 20-year period, as per the **United Nations Environment Programme**.
- Additionally, **methane** contributes to the **formation of ground-level ozone**, a harmful gas that can **lead to one million premature deaths annually** according to a **2022 report**.
- The **primary source of human-caused methane emissions**, making up about **40%** of

the total, comes from **fossil fuel operations**.

- **MethaneSAT** aims to address this critical issue by targeting and helping to reduce methane emissions globally.

What is MethanSAT?

- **MethaneSAT** is a **satellite project** initiated by the **Environmental Defense Fund (EDF)**, a **US-based nonprofit environmental advocacy group**, in collaboration with **Harvard University**, the **Smithsonian Astrophysical Observatory**, and the **New Zealand Space Agency**.
- Its **mission** is to orbit the Earth **15 times daily** to specifically monitor **methane emissions** from the **oil and gas sector**.
- The **satellite** will generate **extensive data** detailing the **volume of methane emissions**, their sources, the responsible parties, and the temporal trends of these emissions.
- This initiative **aims** to provide **critical insights** into **methane emission patterns**, facilitating targeted efforts to reduce the **environmental impact** of these **potent greenhouse gases**.

Features of Methane SAT:

- **MethaneSAT** is designed to enhance the **detection and tracking** of **methane emissions**, addressing the limitations faced by existing satellites in measuring and identifying methane sources accurately.
- It is equipped with a **high-resolution infrared sensor** and a **spectrometer**, enabling it to **detect subtle differences in methane concentrations** as **low as three parts per billion**.
- This capability allows **MethaneSAT** to identify smaller methane emission sources that have been challenging to **track with previous technologies**.
- Furthermore, its **wide-camera view** spans approximately **200 km by 200 km**, which aids in the identification of both smaller sources and larger, “**super emitter**” sources of methane emissions.

Significance:

- The **significance of MethaneSAT** lies in its potential to **bridge critical data gaps** highlighted by **discrepancies between actual methane emissions and those reported by national governments**; an **International Energy Agency (IEA) report** suggests that **global methane emissions** are about **70% higher** than national reports indicate.
- The data collected by **MethaneSAT** will be processed using **advanced cloud-computing**

and AI technology developed by Google, a mission partner.

- This processed data will be publicly available through Google's Earth Engine platform, ensuring broad access to the information needed to tackle methane emissions more effectively.

Topic 8. WHAT WILL GAGANYAAN CHANGE FOR INDIA?

Important for the subject: Science and technology

Prime Minister Narendra Modi publicised the final shortlist of candidates to be astronauts on board the **maiden human spaceflight mission– Gaganyaan–** of the **Indian Space Research Organisation (ISRO)**.

About Gaganyaan:

- **Gaganyaan** is an **ISRO mission** aiming to send **Indian astronauts** to **low-Earth orbit** using an **Indian launch vehicle**.
- It is a **demonstration mission** to test technologies essential for **human spaceflight**, showcasing **India's capability** in **producing, qualifying, and utilizing** these technologies.
- **Future goals for ISRO** include **establishing an indigenous space station by 2035** and **landing an Indian on the moon by 2040**.
- **ISRO** plans to integrate these ambitious projects with **future lunar explorations**, starting with a joint mission with **Japan** for **lunar rover landing** and a **mission to return lunar soil samples to Earth**.
- The Indian government has expanded spaceflight and services responsibilities beyond ISRO to **New Space India Ltd. (NSIL)** for **commercialization** and the **Indian National Space Promotion and Authorization Centre (IN-SPACe)** for **authorizing space activities**.
- Additionally, ISRO has established the **Human Space Flight Centre (HSFC)** to coordinate the **Gaganyaan mission**.

Components of Gaganyaan:

- **Gaganyaan's components** include the **Launch Vehicle Mark-3 (LVM-3)**, the **orbital module**, and the **crew**.
- The **LVM-3**, previously known as the **GSLV Mk-III**, is a **three-stage rocket** with **solid-fuel boosters**, **liquid-fuelled Vikas 2 engines**, and an **indigenous cryogenic engine** using **liquid hydrogen and oxygen**.
- The **orbital module**, weighing **8.2 tonnes**, comprises the **crew** and **service modules**. It can support **up to three astronauts for a week** and is **equipped with parachutes**,

an **environmental control and life-support system (ECLSS)**, and a **crew escape system**.

- The **service module** contains the **propulsion system** for **orbital maneuvers** and **re-entry**.
- The **crew**, consisting of **Indian Air Force personnel Prashant Nair, Ajit Krishnan, Angad Pratap, and Shubanshu Shukla**, underwent training in **India** and advanced training in **Russia**.
- The mission will also include a **gynoid** named '**Vyommitra**' equipped with sensors to monitor various conditions and emergencies within the capsule.

How was the mission put together?

- The **Gaganyaan** mission by **ISRO** was assembled following the **Union Cabinet's** approval in **2018**, building on technologies already realized by that time.
- Post-approval, **ISRO** human-rated these technologies to meet human spaceflight standards.
- **Key preparatory experiments** included the **Space Capsule Recovery Experiment (SRE)** in **2007** and the **Crew-module Atmospheric Re-entry Experiment (CARE)** in **2014**, both crucial for testing **module separation, heat shield efficacy, braking systems, and retrieval procedures**.
- Additionally, in **October 2023**, it was revealed that despite initial plans, the **crew module** would need to be procured internationally due to a lack of domestic manufacturing capability, and efforts to source.
- **Environmental Control and Life Support System (ECLSS)** technologies abroad were unsuccessful, leading **ISRO** engineers to develop them internally.
- The mission's components, including **engines and rocket stages**, underwent extensive testing, simulations, and quality control, exemplified by the completion of tests on four **CE-20** engines under flight-like conditions.

What will Gaganyaan achieve?

- **Gaganyaan** aims to establish **India's self-sufficiency in human spaceflight**, enabling the country to **send humans to space** on its own schedule rather than **depending on costly foreign launch services**.
- This initiative is part of broader space sector reforms in India, including the creation of **NSIL** and **IN-SPACe**, the **National Geospatial Policy 2022**, the **Indian Space Policy 2023**, and the **Telecommunications Act 2023**.
- Furthermore, these reforms have encouraged investment in **India's emerging space startups** by allowing **49% to 100% automatic foreign direct investment in space**.

services and spaceflight.

- The **Indian Space Policy** outlines **India's objectives** for its **space program** in the coming decades, positioning the country within the **global 'space race'** that includes scientific, commercial, and exploratory missions beyond Earth.
- **Gaganyaan's development** aligns with these broader efforts, marking **India's presence in outer space** and on the **moon** alongside other nations, emphasizing the importance of a human presence from diverse nationalities in space for extended periods.

Topic 9. AFTER 30 YEARS, INDIA BEGAN TO MAKE PENICILLIN G

Important for the subject: Science and technology



The common antibiotic penicillin will be manufactured in the country for the first time in 30 years.

- Forty greenfield projects under the PLI schemes for manufacturing bulk drugs and medical devices were inaugurated on Saturday.
- This **included 27 greenfield bulk drug projects** and 13 manufacturing plants for medical devices.
- The bulk drug parks will produce active pharma ingredients for commonly used drugs.

About Penicillin:

- **Penicillin is a medication** used to manage and treat a wide range of infections.
- It is in the **beta-lactam antibiotic class of drugs**.
- This activity describes **penicillin's indications, action, and contraindications as a valuable agent in treating infection**.

About Active Pharmaceutical Ingredients:

- These are the **active ingredients** contained in a medicine.

- It is that part of the **medicine that produces the intended therapeutic effects**.
- For example, in a painkiller, **the active ingredient relieves pain**.
- In the OTC drug Crocin, **the API is paracetamol**.
- Only a small amount of the **API is required to produce the effect and so the medicine contains only the required amount of the API**.
- **China is one of the largest producers of Key Starting Material (KSM) and APIs in the world**

About Production Linked Incentive (PLI) Scheme:

- The **scheme expected to give a fillip to the domestic drug manufacturing industry is the PLI Scheme**.
- This scheme aims to promote the domestic manufacturing of, apart from **APIs, drug intermediates and key starting materials (KSMs)**.
- In this scheme, financial incentives will be provided to eligible manufacturers of identified 53 critical bulk drugs on their **incremental sales over the base year (2019-20) for a period of 6 years**.
- The scheme will be implemented through a **Project Management Agency (PMA) to be nominated by the Department of Pharmaceuticals**.

Drugs in news:

- **Atorvastatin:** Reducing Cholesterol
- **Lopinavir:** Treating HIV
- **Acyclovir:** Treating infection such as shingles etc.

Topic 10. CHINESE DUAL-USE CARGO HEADING TO PAKISTAN SEIZED

Important for the subject: Science and technology

Indian security agencies have intercepted a **Pakistan-bound ship from China at Mumbai's Nhava Sheva port**, suspected to be carrying a 'dual-use consignment' for Islamabad's nuclear and ballistic missile programme.

- During its voyage, the **vessel reached Nhava Sheva Port (JNPT) Mumbai** on January 22, 2024 and the consignment was seized by Indian customs officials based on intelligence inputs on possible proliferation concerns by **Pakistan and China**.
- The same was intercepted at **Nhava Sheva Port on March 12, 2022**, under the policy to prevent proliferation activities through Indian ports.

Customs watchlist

- China was attempting to supply an autoclave to Pakistan under the cover of an ‘**industrial dryer**’, which was seized from a **Hong Kong-flagged Chinese ship** named **Dai Cui Yun** which left Jiangyin port on the Yangtze river in **China’s Jiangsu province**, and was headed to **Pakistan’s Port Qasim**.
- The autoclave, which was mis-declared as an ‘**industrial dryer**’, is notified in the **SCOMET (Special Chemicals, Organisms, Materials, Equipment and Technologies)** list and was found concealed in the bottom of the cargo of the ship, as it transited through **Gujarat’s Kandla port**.

U.S. sanctions

- In June 2023, the **U.S. Bureau of Industry and Security (BIS)** sanctioned **three Chinese companies i.e. General Technology Limited (which had supplied the autoclave), Beijing Luo Luo Technology Development, and Changzhou Utek Composite** — for their involvement in supplying missile-related items to Pakistan’s ballistic missile programme.
- These sanctions were imposed as part of the global non-proliferation regime.
- China has also been assisting Pakistan in the construction of civil nuclear power plants, including four 300 MWe nuclear power plants at Chashma, and two 1,000 MWe plants in Karachi.

What are Dual Use Goods?

- Dual-use goods are items that can be used both for civilian and military applications. These types of goods are heavily regulated because they can be classified for civilian use and then transformed for military purposes, or worse, used for terrorism.

Topic 11. TIRED OF SPAM OR FRAUD CALLS? FILE A COMPLAINT ON

Important for the subject: Science and technology

Chakshu platform:

The **Department of Telecommunications (DoT)** has introduced **Chakshu**, an **online platform for telecom users to report suspected fraud or spam callers**, accessible via **sancharsaathi.gov.in/sfc**.

- This **initiative aims** to empower citizens to **report fraudulent communications related to various services** such as **bank accounts, payment wallets, SIM and utility connections, KYC updates, impersonation, and sextortion**.
- Alongside, the **DoT** launched the **Digital Intelligence Platform**, a **secure data-sharing tool for stakeholders** like **Telecom Service Providers, law enforcement, financial institutions, and social media platforms**, among others, to **combat fraud**.
- Furthermore, Communications Minister Ashwini Vaishnaw endorsed the **Caller Name**

Presentation (CNAP) feature, which would **allow users to see the registered name of incoming callers**, despite concerns over **privacy implications**.

- The minister emphasized the **importance of informed consent** and mentioned that **recommendations for CNAP** by the **Telecom Regulatory Authority of India** would undergo thorough review before implementation.

What's Chakshu Portal?

- The **Chakshu portal**, part of the **Sanchar Saathi initiative**, allows citizens to report suspected fraud communications aimed at defrauding telecom service users. Examples include fraudulent communication related to bank accounts, payment wallets, SIM cards, and impersonation as government officials or relatives.

How to Use Chakshu Portal to Report Spam Calls, fraud

- Log in to the '**Sanchar Saathi**' portal at sancharsaathi.gov.in
- Select the 'Chakshu' option under 'Citizen Centric Services.'
- Review the disclaimer and the uses of 'Chakshu,' then click 'continue for reporting.'
- Fill out the form with details such as the medium, category, and timing of the suspected fraud communication.
- Add personal details, verify with OTP, and submit the complaint.

Chakshu Portal: What you can report on Sanchar Saathi Portal

- Check mobile connections issued in their name and report unnecessary or unauthorized connections.
- Report stolen/lost mobile handsets for blocking and tracing.
- Verify the authenticity of mobile handsets when purchasing new or used devices.
- Report incoming international calls displaying Indian telephone numbers as caller ID.
- Check details of licensed wireline Internet Service Providers.
- Furthermore, the Department of Telecom has introduced the DIP, which will facilitate the sharing of information with law enforcement agencies, banks, and other financial institutions to combat fraud.
- The combined efforts of Chakshu and the Digital Intelligence Platform are expected to bolster the detection and prevention of cyber fraud.

Topic 12. THE STATUS OF INDIA'S NUCLEAR PROGRAMME

Important for the subject: Science and technology

On March 4, Prime Minister Narendra Modi witnessed the start of the process of **core-loading the indigenous Prototype Fast Breeder Reactor (PFBR)** at the **Madras Atomic Power Station in Kalpakkam, Tamil Nadu**.

What is PFBR?

- The **Prototype Fast Breeder Reactor (PFBR)** is a significant advancement in **nuclear technology**, designed to **produce more nuclear fuel than it consumes**.
- This reactor marks a **pivotal point in India's nuclear power strategy**, representing the commencement of the **second stage of India's three-stage nuclear power programme**.
- Initially, **India utilized Pressurised Heavy Water Reactors (PHWRs)** and **natural uranium-238 (U-238)** as the **primary fissile material** in the **first stage**, producing **plutonium-239 (Pu-239)** and energy through **nuclear fission processes** involving **U-235** and **heavy water** as a **neutron moderator**.
- In the **second stage**, the **PFBR** will use **Pu-239** along with **U-238** to **generate energy**, **U-233**, and additional **Pu-239**.
- This step is facilitated by **Bharatiya Nabhikiya Vidyut Nigam Ltd. (BHAVINI)**, established by the **Department of Atomic Energy (DAE)** in **2003**.
- The **final stage** involves **combining Pu-239 with thorium-232 (Th-232)** to produce **energy** and **U-233**.
- This strategic progression, conceptualized by **Homi J. Bhabha**, leverages **India's substantial thorium reserves**, aiming to **achieve self-sufficiency in nuclear energy** for the country.

Why was the PFBR delayed?

- The development of the **Prototype Fast Breeder Reactor (PFBR)** in **India** has been fraught with setbacks, including **prolonged delays**, **escalating costs**, and **several broken commitments**, attracting a wide array of critics.
- There were **international sanctions imposed on India** after the **'Smiling Buddha' nuclear test**, necessitating a switch from the **planned enriched uranium** to a **mixed carbide fuel**.
- Additionally, **technical issues** with the **reactor coolant** further contributed to the project's delay, pushing the **commercial operation deadline to October 2022**.

How does PFBR work?

- The **Prototype Fast Breeder Reactor (PFBR)** operates on the **principle of using a**

breeder reactor mechanism, where it **generates more fissile material** (plutonium-239, Pu-239) **than it consumes**.

- In contrast to **Pressurised Heavy Water Reactors (PHWRs)** that utilize **natural or low-enriched uranium-238 (U-238)** and produce **Pu-239** as a **byproduct**, the **PFBR** takes this produced **Pu-239** and **combines it with additional U-238** in a **mixed oxide form**.
- This **mixture** is then **loaded** into the **reactor's core** along with a **breeder blanket**, a layer that interacts with the fission products to create more **Pu-239**.
- A **distinctive feature** of the **PFBR** is its use of **fast neutrons** (hence “**fast**” in the name), which are **not moderated or slowed down**, enabling certain **fission reactions** that contribute to the **breeding process**.
- The reactor uses **liquid sodium** as a **coolant** in **two separate circuits** for **safety and efficiency**.
- The **primary circuit** carries the **coolant** through the **reactor core**, absorbing **heat and radioactivity**, and then **passes the heat** (but not the radioactivity) to a **secondary coolant circuit** through **heat exchangers**.
- This **secondary circuit** then uses the **transferred heat** to **generate electricity**.
- **Challenges in operationalizing the PFBR** have been noted, including the **complex behavior of its systems in practical settings** compared to **theoretical expectations**.
- For instance, the **process of preheating the reactor vessel to 150 degrees Celsius** took significantly longer than anticipated.

What role can SMRs play?

- **Small Modular Reactors (SMRs)** are emerging as a promising **alternative to traditional large-scale nuclear reactors**, especially in the wake of delays experienced with projects like the **Prototype Fast Breeder Reactor (PFBR)**.
- With a **maximum capacity of 300 MW**, **SMRs** require **less land** and incorporate **enhanced safety features**.
- **SMRs** also have the **potential to utilize low-enriched uranium**, which **India** could **import from the U.S.** under the **123 Agreement**.
- Expanding the role of **SMRs in India's energy mix** would necessitate amendments to the **Atomic Energy Act (1962)** and related legislation to enable **private sector involvement** under the **supervision of the Atomic Energy Regulatory Body (AERB)**, ensuring that both **nuclear fuel and waste management** adhere to **international safeguards** as directed by the **Department of Atomic Energy (DAE)**.

Significance and challenges of Phase II:

- **Stage II of India's nuclear power program**, represented by the **Prototype Fast Breeder Reactor (PFBR)** and its envisioned expansion with **four more Fast Breeder Reactors (FBRs)**, each with a **600 MWe capacity**, is aimed at **enhancing the country's nuclear power output**.

Challenges:

- **Renewables**, such as **solar energy**, have become **significantly cheaper**, making **nuclear power less competitive in terms of cost**.
- Public sentiment towards nuclear energy has shifted after the **Fukushima Daiichi disaster in 2011**.
- The **technical and operational complexities** associated with **FBRs**.
- The **use of thorium** in future reactors introduces **complications** due to the **production of various radioactive isotopes**, complicating **waste handling and storage**.

Recommendations:

- The **International Atomic Energy Agency** has recommended establishing an **independent statutory regulator**, leading to the proposal of the **Nuclear Safety Regulatory Authority (NSRA) Bill**.

Topic 13. WHAT IS 'DRY ICE' AT THE CENTRE OF THE GURUGRAM RESTAURANT INCIDENT?

Important for the subject: Science and technology

At a Gurugram restaurant, the diners were mistakenly given “**dry ice**” as a **mouth freshener**, leading to **severe health reactions** including **vomiting blood**.

Dry ice:

- **Dry ice** is the **solid form of carbon dioxide**, recognized by **authoritative bodies** such as the **Food Safety and Standards Authority of India (FSSAI)**, the **United States Food and Drug Administration (FDA)**, and the **Centers for Disease Control and Prevention (CDC)** as a **hazardous substance**.
- **Direct contact with skin or ingestion** can lead to **significant harm** to both **skin and internal organs** due to its **extremely cold temperatures** and the **risk of sublimation** into **carbon dioxide gas**, potentially causing **breathlessness**.

Primary Use:

- Primarily utilized as a **cooling agent for food products**, dry ice is favoured for its **ability to maintain lower temperatures than water ice** and for **leaving no residue**, other than **incidental frost**.
- It finds applications in **preserving frozen foods** where **conventional mechanical cooling is impractical**.

- Additionally, **dry ice is employed in fog machines** for theatrical effects and other applications requiring temporary refrigeration.

Characteristics:

- **Sublimates at 194.7 K** (-78.5°C ; -109.2°F) under **Earth's atmospheric pressure**.
- Can lead to **hypercapnia** if it **outgasses in confined spaces**.

Safe Handling Guidelines:

- **Awareness campaigns** are necessary to educate food business operators and citizens on the proper and **safe handling of dry ice**.
- **FSSAI** warns against **storing dry ice in enclosed spaces** and **underscores the need for well-ventilated areas** to mitigate health risks.
- The **FDA** emphasizes that dry ice should not compromise food safety and advises against its direct consumption or skin contact.
- Establishments using **dry ice** should **implement safety procedures and employee training** to prevent accidental ingestion or contact, according to the FDA.
- The **CDC** recommends using gloves designed for cold temperatures, safety goggles, and working in well-ventilated areas to handle dry ice safely, strictly advising against its consumption.

Topic 14. IN SNAKE GENES, STUDY FINDS THEY EVOLVED 3X FASTER THAN OTHER REPTILES

Important for the subject: Science and technology

In the earth's distant past, many species went through bursts of evolutionary innovation, taking giant leaps and incorporating extraordinary diversity in their population, while others were left behind.

Unexplained bursts of change:

- The enduring mystery in **evolutionary biology** revolves around **why some species experience sudden, significant evolutionary changes**, known as **quantum leaps**.
- While the **Darwinian theory** suggests that **evolution occurs gradually through natural selection**, fossil records indicate a more complex narrative.
- These records reveal not only a **constant rate of transformation** but also instances of **rapid evolution**, leading to **new species' emergence** or the **extinction of existing ones**.
- This **discrepancy** between the **slow, incremental changes** proposed by **Darwin** and the **sudden bursts of evolution** documented in the **fossil record** highlights the

complexity and variability of evolutionary processes on Earth.

A tree of snakes and lizards:

- Approximately **100-150 million years ago**, during the era when **dinosaurs inhabited the Earth**, a significant **evolutionary event** occurred leading to the **transformation of ordinary lizards into snakes**, now considered some of the most highly adapted predators globally.
- This transition involved the **loss of legs**, enabling snakes to navigate various terrains effortlessly.
- Snakes also developed **intricate chemical sensory systems** for **tracking prey**, **flexible jaws** capable of **consuming large animals**, and **diverse methods of attack**, including **venom production**.

Study findings:

- A recent study, published in the journal Science on February 22, conducted by an international team with leading researchers from the University of Michigan, **aimed to decipher the genetic sequence of over 1,018 snake and lizard species**.
- This effort resulted in the creation of the **most extensive and detailed evolutionary tree of snakes and lizards** to date.
- By combining **new genetic data** with **previous studies**, the research uncovered that **snakes have been evolving at a rate nearly three times faster than lizards and other reptiles**.
- This rapid evolution allowed snakes to **exploit new environmental niches** that appeared following the **dinosaurs' extinction**, contributing significantly to their diversification and success across the globe.

A clock in the body's molecule:

- The concept of a **molecular clock** is based on the observation that **DNA and protein sequences** evolve at a relatively **constant rate over time**, regardless of the species.
- This consistency allows scientists to use **genetic variations between two species to estimate the time elapsed since their last common ancestor**, providing insights into the pace of their evolution.
- Essentially, **genetic sequences** act as a **molecular clock**, enabling the determination of '**evolutionary distances**' between **different organisms**.
- This mechanism has revealed not only the **rapid evolution of snakes** but also **similar adaptations in many lizards**, which developed **snake-like features** such as **limb loss and body elongation**.
- The **Australian scincid lizard (Lerista)**, part of the **Squamata clade** (which includes

both lizards and snakes), exemplifies this evolutionary trend.

- **Lerista** shows a remarkable range of **limb configurations** across its more than 75 species, from **full-limbed to completely limbless**, due to at least 10 separate limb-reduction events over millions of years.
- However, despite these adaptations, **snakes have evolved much faster than lizards**, leading to a significant diversification known as the “**singularity of snakes**”.
- This concept is likened to the **Big Bang theory** in cosmology, suggesting that **snakes underwent a series of rapid evolutionary changes** that, although distinct, occurred so closely together in time that they appeared as a single, transformative event in evolutionary history.

Availability of prey:

- The current diversity of snakes, with approximately **4,000 species** thriving in various habitats—including on **land, in trees, underground**, and in **water**—can be attributed to their **adaptability** and **varied hunting strategies and diets**.
- A recent comprehensive study involving the analysis of **stomach contents** from over **60,000 snakes and lizards** revealed that **snakes primarily consume small vertebrates**, demonstrating a **specialization in their dietary preferences**, while **lizards generally eat insects and invertebrates**, indicating a **less specific diet**.
- However, the diversity of snakes cannot be solely explained by the availability of prey. The underlying cause of the evolutionary “**singularity**” that led to the **rapid diversification of snakes remains elusive**.
- A significant aspect of **snake evolution** involves their **unique mode of movement**, facilitated by their **elongated spinal column** and **specialized vertebrae**, which allow for efficient **gliding**.
- Despite having a **similar genetic blueprint to lizards and humans**, snakes possess over **300 vertebrae**, **significantly more than their counterparts**.
- This **morphological distinction** is partly due to variations in the **Sonic hedgehog gene**, a **critical gene in limb development**.
- Previous research has identified **snake-specific changes in a limb-enhancer of this gene**, which is present in **primitive snakes** like **pythons** and **boas** but not in modern snakes.
- Experiments replacing the **limb-enhancer gene** in mice with the **snake-specific version** resulted in **severe limb reduction in the mice**.
- This finding suggests that such evolutionary developments could have occurred multiple times, not just once.
- Understanding these **evolutionary bursts** is crucial for comprehending the **Earth’s**

ecological future.

Topic 15. RESONANCE: A TENDENCY TO MOVE IN STEP

Important for the subject: Science and technology

Resonance:

Resonance occurs when a system **oscillates with greater amplitude** at its natural frequency, the frequency at which it tends to vibrate in the absence of external disturbances.

- This phenomenon, akin to the enhanced vibration of a drum membrane when struck, is **observed both in nature and in man-made systems**.
- An **example of resonance** is when **pushing a swing**; the most effective push aligns with the swing's **existing oscillation frequency**, maximizing the swing's motion. **Resonance** can have both **positive** and **negative effects**.
- It is beneficial in various applications, such as **ensuring the accuracy of quartz watches**, **enhancing musical performances**, **generating laser light**, and **facilitating detailed internal body imaging through MRI scanners**, which rely on **nuclear magnetic resonance**.
- However, **resonance** can also have **undesirable consequences**, such as when the **vibration of a bus's engine at idle causes the vehicle's structure to rattle uncomfortably**.
- A historical instance of resonance's destructive potential occurred on April 12, 1831, with the **collapse of the Broughton Suspension Bridge in England**.
- The **synchronized marching of British soldiers** produced a **periodic force** that **matched the bridge's natural frequency**, leading to its **failure**.
- This incident led to the **practice of soldiers breaking step when crossing bridges to prevent similar accidents**.

Topic 16. SIGNIFICANCE OF LAB-GROWN DIAMONDS IN POWER ELECTRONICS

Important for the subject: Science and technology

Traditional Use: Lab-grown diamonds, apart from being **used in jewellery**, are also **utilized in industries**, particularly for **cutting purposes**.

- **New Application:** A new **application for synthetic diamonds** is **emerging in the field of power electronics**, specifically for **heat dissipation**.

Need for Effective Heat Dissipation:

- **Power Density Increase:** Power electronic components tend to **heat up as their power density increases**.
- **Traditional Cooling:** Copper has traditionally been used to dissipate heat in power electronics. However, **to prevent interference with electricity, a thin layer of insulating material is placed around the copper**.
- **Challenge:** The challenge arises because **good insulators are typically poor conductors of heat**. Therefore, a material is needed that can efficiently conduct heat while maintaining electrical insulation.

Role of Diamond in Heat Dissipation:

- **Ideal Material:** Diamond possesses the qualities needed for this task. It is **electrically insulating but highly thermally conductive**, making it ideal for electronic cooling applications.
- **Heat Conductivity:** The **heat conductivity of diamond is approximately five times that of copper**, making it an excellent choice for dissipating heat in power electronics.

Research and Development:

- **Previous Studies:** In 2022, researchers from China and Israel conducted a study on the **cooling enhancement of a cold plate made of single-crystal diamond (SCD)** with embedded microfluidic channels.
- **Results:** Their findings indicated that the **cold plate made of SCD exhibited significantly enhanced cooling effects**, especially for high applied power densities and flow rates.
- **Fabrication Challenges:** One practical challenge faced in **using diamonds for cooling is how to fabricate extremely thin sheets of diamonds** for integration into electronic components.

Development of Diamond Nanomembranes:

- **Fraunhofer USA Inc, Center Midwest CMW:** Scientists at this center in Michigan have developed nanomembranes made from synthetic diamonds.
- **Thin and Flexible:** These **nanomembranes are thinner than a human hair and are flexible**, making them suitable for integration into electronic components.
- **Cooling Efficiency:** The nanomembranes have the potential to **reduce the local heat load of electronic components**, such as current regulators in electric motors, by a factor of ten.
- **Benefits for Electric Cars:** The use of these nanomembranes can significantly **improve the energy efficiency, service life, and performance of electric cars**.

Dr. Matthias Mühle's Comments:

- **Replacing Intermediate Layers:** Mentions of the **goal of replacing intermediate layers in electronic components with diamond nanomembranes.**
- **Conductive Paths:** Diamonds can be processed into conductive paths, **making them versatile for various applications within electronic components.**
- **Integration:** The flexibility of the nanomembranes allows them to be positioned anywhere on the component, **integrated directly into the cooling circuit, or used alongside copper elements.**
- In summary, the use of lab-grown diamonds, particularly in the form of nanomembranes, shows promising advancements in the field of power electronics. **These developments have the potential to significantly enhance the cooling efficiency and performance of electronic components, particularly in applications such as electric cars.**

About Lab-Grown Diamonds: A Technological Marvel

- Lab-grown diamonds are **created using advanced technology that replicates the geological processes responsible for the formation of natural diamonds.**
- These diamonds are **distinct from diamond simulants** like Moissanite, Cubic Zirconia (CZ), White Sapphire, and YAG, which are **used to mimic the appearance of natural diamonds.**

Production Methods:

High Pressure, High Temperature (HPHT) Method:

Description:

- This method is the most common and cost-effective.
- Involves **Important for the subjecting a “diamond seed” (often graphite) to extreme pressure and temperatures.**

Process:

- Heavy presses generate pressures of up to 730,000 psi.
- Temperatures exceed 1500 degrees Celsius.
- Under these conditions, the **carbon transforms into diamond.**

Outcome:

- Results in the **creation of diamonds from relatively inexpensive carbon sources.**

Chemical Vapor Deposition (CVD) Method:

Description:

- This method **involves the deposition of carbon atoms onto a substrate to form**

diamond.

Process:

- A “diamond seed” substrate is placed in a chamber filled with a carbon-rich gas.
- When heated, carbon atoms adhere to the seed, gradually forming a diamond.

Outcome:

- Produces **high-quality diamonds suitable for various applications.**

Explosive Formation:

Description:

- Also known as detonation nano diamonds.
- Created through explosive processes that **transform carbon materials into diamond.**

Process:

- Controlled **detonations convert carbon into diamond particles.**

Outcome:

- **Yields Nano diamonds with unique properties used in specialized applications.**

Applications of Lab-Grown Diamonds:

Industrial Uses:

- LGDs are **widely employed in industrial settings due to their exceptional hardness** and strength.
- Ideal for **machinery components, cutting tools, and abrasives.**

Electronics:

- Pure synthetic diamonds are utilized as **efficient heat spreaders in electronic devices.**
- Applications include **high-power laser diodes, laser arrays, and high-power transistors.**
- The exceptional **thermal conductivity of diamonds helps dissipate heat effectively.**

Advantages of Lab-Grown Diamonds:

Sustainability:

- Offers a sustainable alternative to mined diamonds, reducing the environmental impact.

Durability:

- Possess the **same hardness and durability as natural diamonds**, suitable for diverse applications.

Precision Engineering:

- The controlled production process ensures consistent quality and purity of LGDs.

Technological Advancements:

- Continual improvements in **production techniques enhance the properties and applications of lab-grown diamonds.**

India's Diamond Industry Scenario:

- **Global Leader:** India leads the world in diamond cutting and polishing, accounting for over 90% of global polished diamond manufacturing.
- **Key Hub:** Surat, Gujarat, is a renowned global center for diamond manufacturing.
- **Market Insights:** The US stands as the largest market for cut and polished diamonds, followed closely by China.
- **Export Contribution:** India contributes 19% of the world's total diamond exports, showcasing its significant role in the global market.

Government Initiatives to Promote LGDs:**Customs Duty Reduction:**

- The Union Budget 2023 **aims to reduce the basic customs duty on seeds used in LGD manufacturing.**
- The duty on seeds for **rough LGDs will be slashed from 5% to nil**, encouraging local production.

Research and Development:

- A five-year **research grant will be awarded to an Indian Institute of Technology (IIT) for LGD-related research and development.**

Creation of Tariff Lines:

- New tariff lines will be **established to aid in identifying various products, including synthetic diamonds.**
- This move aims to **facilitate trade and provide clarity on availing concessional import duty, promoting the growth of LGD industry in India.**
- The emphasis on Laboratory-Grown Diamonds in the Union Budget 2023 **underscores India's commitment to innovation, sustainability, and growth in the diamond industry, aligning with global trends towards environmentally friendly and efficient practices.**

Topic 17. WHY OBESITY, UNDERNUTRITION HIGH IN INDIA: WHAT A LANCET STUDY SAYS

Important for the subject: Science and technology

THE OBESITY MAP					
India			World		
	1990	2022		1990	2022
Men	1.1	26	Men	67	374
Women	2.4	44	Women	128	504
Boys	0.2	7.3	Boys and girls (total)	31	160
Girls	0.2	5.2			

All figures in million

Recently, **Lancet** published a study which says India has become one of the countries with a high “**double burden**”.

- As per the study, India has seen a constant increase in obesity levels both in adults and children over the last 32 years.
- The prevalence of undernutrition has also remained high in the country. The rise in obesity and undernutrition is due to lack of access to affordable and nutritious food for the prominence of undernutrition and obesity.
- According to study though lack of access to food can lead to undernutrition, increased access to processed foods high in fats, salt, and sugar has driven up obesity.
- As in 2022, about 12.5 million children aged between five and 19 in India were overweight.
- In India, the adult obesity rate increased from 1.2 per cent in 1990 to 9.8 per cent in 2022 for women and 0.5 per cent to 5.4 per cent for men.
- The total number of children and adolescents who were affected by obesity in 2022 was nearly 160 million (65 million girls and 94 million boys), compared to 31 million in 1990.

What are the parameters of being obese, underweight?

- According to the World Health Organisation (WHO), obesity is an abnormal or excessive accumulation of fat that poses health risks.
- Adults—anyone over the age of 20years — are considered obese if they have a **body**

mass index (BMI) of 30 kg/m² or more.

- BMI is a person's weight in kilograms divided by the square of height in meters, according to the Centers for Disease Control and Prevention.
- School-aged children and adolescents — anyone between the ages of 5 and 19 years — are considered obese if their BMI is two standard deviations more than the mean.
- Underweight is one of the four broad sub-forms of undernutrition. An adult is considered underweight if their BMI is less **than 18 kg/m²**. Children are considered under weight if their BMI is two standard deviations below the mean.

Why are more women obese than men?

- Women do not have access to or time for physical activities such as walks or gyms.
- They are likely to put the nutrition of the family above theirs.
- They are also likely to have fewer hours of proper sleep

What is the role of socio-economic conditions?

- Obesity is no longer the disease of the rich in India
- Eating junk food is cheaper and easier
- While it is affecting more people, there continues to be a rural-urban divide in obesity.
- NFHS-5 data from last year shows that the prevalence of obesity was 31.7% in urban women and 19% in rural women.
- It was 28.6% among urban men and 18.8% among rural men. Undernutrition persists in remote and rural parts of poorer states.
- Under nutrition is prevalent in the extremely poor populations in states like Bihar, Jharkhand, or Odisha, where people might be eating just one meal a day

What are the impacts?

- The health consequences of obesity are obvious. An increase in obesity, especially in children, is likely to lead to an increase in diseases such as diabetes, hypertension, heart attacks, and strokes. The effect of under nutrition, however, is not so obvious.

Topic 18. UNDERSEA CABLE DISRUPTIONS EXPOSE INDIA'S CRUCIAL TELECOM VULNERABILITY

Important for the subject: Science and Technology

Three critical undersea cables, namely Asia-Africa-Europe-1, Europe India Gateway, and Tata Global Network, which connect India to the global telecom networks, have suffered damages which are speculated to be the result of targeted attacks amidst the ongoing conflict in the Red Sea region.

Submarine Communication Cable:

- These are **strategically placed on the ocean floor**, connecting **land-based stations to facilitate the transmission of telecommunication signals** across vast bodies of water.
- Utilizing **fibre-optic technology**, these cables contain optical fibres that are encased in protective materials designed to withstand the harsh conditions of the marine environment.
- Offering a dependable, cost-effective, and high-capacity solution for internet connectivity, submarine cables present significant advantages over satellite alternatives.

India's undersea cable network:

- **India** boasts a **robust submarine cable network**, with **17 cables** making landfall at **14 different cable landing stations**, predominantly in **Mumbai** and **Chennai**, as part of its ongoing efforts to **bolster undersea connectivity**.
- To **streamline and improve data transmission** while decreasing dependency on **international service providers**, the **Telecom Regulatory Authority of India (TRAI)** has implemented new regulations.
- These classify **Cable Landing Stations (CLS)** into **two categories: Main CLS and CLS Point of Presence**, aimed at enhancing data flow.
- Further, **TRAI** has put forth recommendations to acknowledge the operations of submarine cables as essential services.
- It has suggested changes to legislation and proposed tax exemptions for critical equipment, including exemptions from customs duty and GST.

Notable submarine cable projects include:

- **The MIST Submarine Cable System** establishes links between India and countries like **Myanmar, Thailand, Malaysia, and Singapore**.
- **Reliance Jio Infocomm's India Asia Xpress (IAX)** creates direct connections from India to the **Maldives, Singapore, Sri Lanka, and Thailand**.
- **The India Europe Xpress (IEX)** spans from India to Italy through **Saudi Arabia and Greece**.
- **The SeaMeWe-6 project** connects Singapore to France with stops in India, **Bangladesh, and the Maldives**.
- **The Africa2 Cable** links India to the **UK** through various **African nations**.

Telecom Regulatory Authority of India (TRAI):

- **TRAI** is a **regulatory body** set up by the **Government of India** under **section 3** of

the Telecom Regulatory Authority of India Act, 1997.

- It is the **regulator of the telecommunications sector in India.**
- It consists of a **chairperson** and **not more than two full-time members** and **not more than two part-time members.**
- The **TRAI Act** was amended by an **ordinance**, effective from **24 January 2000**, establishing a **Telecom Disputes Settlement and Appellate Tribunal** to take over the **adjudicatory and dispute functions** from TRAI.

Topic 19. NEWLY PERMITTED COMMODITIES FOR DERIVATIVES TRADING BY MOF

Important for the subject: Economy

Recently, **derivatives trading in 11 additional commodities**, has been allowed by Finance Ministry, based on the recommendation from the Securities and Exchange Board of India (SEBI).

Skimmed Milk Powder

Cement

- **Apple**
- **Bamboo**
- **Timber**
- **Weather**
- **Freight**
- **White Butter**
- **Cashew**
- **Metal Alloys**
- **Manganese**

Key Points:

- **Date of Notification:** The Finance Ministry issued the notification on March 1.
- **Legislation:** These commodities have been added under the Securities Contracts (Regulation) Act, 1956.
- **Total Number of Commodities for Derivatives Trading:** With these additions, the **total number of commodities eligible for derivatives trading now stands at 104.**
- **Immediate Effect:** The changes are implemented immediately upon the issuance of the

notification.

Comments from Industry Experts:

- **Recommendation by CDAC:** The Commodity and Derivatives Advisory Committee (CDAC) of SEBI recommended trading in these 11 commodities. CDAC includes members of the Commodity Participants Association of India (CPAI).
- **Enabling Provision:** While the **notification enables trading in these commodities, it does not mean immediate trading will commence.** Exchanges will study market potential and submit applications to SEBI. SEBI will then assess demand and market prospects before allowing trading.
- **Market Participants' Involvement:** Market participant associations need to be on board before a commodity is approved for trading. **Some physical market participants have reservations about online derivatives trading, citing concerns about price manipulation.**
- **Ban on Some Commodities:** Derivatives trading in **seven key agricultural commodities remains banned until December-end to control inflation.**

Expert Opinion:

- **Price Discovery:** Allowing derivatives in these commodities **will aid in price discovery** for widely traded items.
- **Inflation Concerns:** There are concerns about the impact on inflation, with experts noting that the **government is cautious about derivatives trading's role in price inflation.**
- **Policy Certainty:** Hedgers and investors are **seeking clarity and policy certainty regarding derivatives trading in agriculture commodities.**
- In summary, the recent move to permit derivatives trading in these 11 commodities **aims to enhance market activity, aid in price discovery, and offer new opportunities for investors.**
- However, considerations about **inflation, market demand, and policy certainty remain important factors in the process.**

Exploring Derivatives: A Financial Instrument Overview

- Derivatives are financial instruments **that derive their value from an underlying asset, index, or interest rate.** They serve as contracts whose value is linked to the performance of the underlying entity.

Types of Derivatives:

Forwards and Futures:

Description:

- Contracts that **obligate the buyer to purchase an asset at a predetermined price** on a specified future date.
- Both forwards and futures serve the same purpose, **with slight differences in their nature.**

Key Points:

- Buyers **commit to buy the asset at the agreed-upon price**, irrespective of the market price at maturity.
- Commonly used in **commodities, currencies, and financial markets.**

Options:

Description:

- Offer the **buyer the right, but not the obligation, to buy (call option) or sell (put option) the underlying asset at a specified price.**
- The **buyer can exercise the option on the maturity date** or at any time before the maturity.

Key Points:

- Provides flexibility to investors based on market movements.
- Two types: Call options (for buying) and Put options (for selling).

Swaps:

Description:

- Contracts facilitating the **exchange of cash flows between two parties.**
- Involves swapping fixed cash flows for floating cash flows based on a specified underlying asset.

Common Types:

Interest Rate Swaps:

- Exchange **fixed interest payments for variable (floating) interest payments.**

Commodity Swaps:

- Exchange cash flows based on commodity prices (e.g., oil, gold).

Currency Swaps:

- Exchange cash flows in different currencies, often used to hedge against currency risk.

Benefits and Applications:**Risk Management:**

- Derivatives **enable hedging against adverse price movements**, reducing financial risk.
- Investors use derivatives to protect their portfolios from market volatility.

Speculation:

- Traders utilize **derivatives to speculate on price movements without owning the underlying asset**.
- Offers potential for higher returns but involves higher risk.

Enhanced Portfolio Diversification:

- Derivatives provide **exposure to diverse asset classes** without directly owning them.
- Allows investors to spread risk across different markets and instruments.

Price Discovery:

- Derivative markets **contribute to price discovery by reflecting market sentiments and expectations**.
- Prices of derivatives can indicate future market trends and sentiments.

Considerations and Risks:**Leverage:**

- Derivatives often **involve leveraging, amplifying potential gains or losses**.
- Requires careful risk management and understanding of exposure.

Counterparty Risk:

- Swaps and other derivative contracts involve counterparty risk.
- Parties **must assess the creditworthiness of their counterparties** to mitigate default risks.

Market Volatility:

- Derivative prices can be **highly sensitive to market fluctuations**.
- Requires active monitoring and adjustment of positions.

National Commodities and Derivatives Exchange (NCDEX)

- The National Commodities and Derivatives Exchange (NCDEX) is an **online commodities exchange based in India, specializing in agricultural commodities**. Established in 2003, NCDEX plays a crucial role in **facilitating trading, price discovery, and risk management in the agricultural sector**.

Key Highlights:**Establishment and Legal Structure:**

- Founded on: April 23, 2003.
- Legal Status: NCDEX is a **public limited company incorporated** under the Companies Act, 1956.

Founding Institutions:

- NCDEX was established by a **consortium of prominent financial institutions** in India.
- Leading Founders:
- **ICICI Bank Limited:** One of India's largest private sector banks.
- **National Stock Exchange of India (NSE):** Premier stock exchange in India.
- **National Bank for Agriculture and Rural Development (NABARD):** Financial institution focused on rural and agricultural development.
- **Other Institutions:** Several other financial entities and institutions also participated in the founding of NCDEX.

Nature of Operations:

- NCDEX primarily **deals in agricultural commodities, offering a platform for trading, hedging, and price discovery.**
- The exchange provides a **transparent and efficient marketplace for farmers, traders, and other stakeholders** in the agricultural value chain.

Contracts Offered:

- NCDEX offers a range of futures contracts for various agricultural products.
- Currently, the **exchange lists around 25 contracts for different agricultural commodities.**
- These contracts **allow market participants to hedge against price risks, speculate on price movements, and participate in the agricultural market.**

Role in Agricultural Sector:

- The exchange plays a vital role in the agricultural sector by providing farmers with a platform to sell their produce at transparent prices.
- It enables farmers to **hedge against price fluctuations, reducing the impact of market uncertainties on their incomes.**
- Traders, processors, and other **stakeholders benefit from efficient price discovery and**

risk management tools offered by NCDEX.

About Commodity Derivatives Advisory Committee (CDAC)

- **Mandate:** The Commodity Derivatives Advisory Committee (CDAC) is a **committee constituted by the Securities and Exchange Board of India (SEBI) to review the commodity derivatives segment.**

Objectives:

- **Improving Market Depth:** CDAC aims to **suggest measures to enhance the depth and efficiency of the commodity market in India.**

Recommendations:

- **Opening to Institutional Investors:** CDAC has recommended the phased opening of the commodity derivatives segment to all categories of institutional investors.
- **Calibrated Approach for Overseas Investors:** SEBI is advised to adopt a careful and phased approach before allowing overseas investors into the commodity derivatives market.

Phased Approach:

- Initially, the **recommendation is to open the segment to all categories of domestic institutional investors.**
- In the subsequent phase, **foreign portfolio investors (FPIs), banks, insurance companies, and pension funds should be allowed to participate.**
- **Asset Class Diversification:** CDAC highlights that commodity derivatives **offer a new asset class for investors, which can serve as a hedge against inflation.**
- **Portfolio Diversification:** Investment in commodity derivatives **can benefit investors by providing better portfolio diversification, reducing overall risk exposure.**

Significance:

- **Enhancing Liquidity:** Opening the commodity **derivatives segment to institutional investors** is expected to increase liquidity and depth in the market.
- **Risk Management:** Institutional participation allows for **better risk management as investors** can use commodity derivatives to hedge against price fluctuations.
- **Investor Benefits:** Institutional investors, including foreign entities, **gain access to a new avenue for investment diversification,** potentially improving overall portfolio performance.
- **Market Development:** These recommendations signify a step towards the development of a more robust and mature commodity derivatives market in India.
- **Regulatory Oversight:** SEBI's role in overseeing the phased opening ensures a

structured approach to market expansion, safeguarding investor interests and market integrity.

- The recommendations of the Commodity Derivatives Advisory Committee (CDAC) reflect a **strategic approach towards strengthening the commodity derivatives market in India, fostering investor confidence, and promoting market development** in line with regulatory standards.

Topic 20. REVISED REGULATORY FRAMEWORK FOR BHARAT BILL PAYMENT SYSTEMS (BBPS)

Important for the subject: Economy

Objective:

The Reserve Bank of India (RBI) has introduced a **revised regulatory framework for BBPS to align with developments in the payments landscape.**

- Effective from April 1, 2024, the new framework aims to **streamline bill payment processes, enhance participation, and bolster customer protection.**

Operational Structure:

- BBPS functions on a tiered structure comprising:
- **NPCI Bharat Bill Pay Ltd (NBBL)** as the Central Unit (BBPCU).
- **Bharat Bill Payment Operating Units (BBPOUs).**
- Agent networks of BBPOUs.

Role of NBBL:

- NBBL, a wholly-owned subsidiary of the National Payments Corporation of India (NPCI), serves as the Payment System Provider for BBPS.
- It operates a platform connecting customers and billers, facilitating clearing and settlement activities for transactions routed through the BBPCU.

Responsibilities of NBBL (BBPCU):

- Establish rules, participation criteria, and technical standards for the system.
- **Ensure guaranteed settlement of all transactions via NBBL**, preventing fund flow through any Technology Service Provider (TSP).

Dispute Resolution:

- NBBL must implement a **centralized dispute resolution framework** for end-to-end complaint management.
- **Integrated system for participating entities allows customers and billers** to raise and

resolve disputes as per the framework.

Participation of Entities:

- Banks, non-bank Payment Aggregators (PAs), and authorized BBPOUs can participate as Operating Units.
- **Banks and non-bank PAs do not require separate authorization** for BBPS participation.
- Non-bank BBPOUs **must open an escrow account with a Scheduled Commercial Bank exclusively for BBPS transactions.**

Functioning of Non-bank BBPOUs:

- Non-bank BBPOUs act as Payment Aggregators (PAs) when collecting or settling funds with onboarded billers.
- The BBPOU's payment system is deemed a 'designated payment system' for the maintenance of the escrow account, as per the guidelines.
- The revised regulatory framework for BBPS by RBI aims to enhance efficiency, transparency, and customer protection in bill payment systems.
- It empowers various entities to participate, ensures secure fund management, and establishes a **robust dispute resolution mechanism** for the benefit of customers and billers alike.

NPCI (National Payments Corporation of India):

- NPCI is the umbrella organization for **operating retail payments and settlement systems in India.**
- It is an initiative of the Reserve Bank of India (RBI) and Indian Banks' Association (IBA) under the provisions of the **Payment and Settlement Systems Act, 2007.**
- NPCI plays a crucial role in promoting cashless transactions and digital payments across the country.
- It develops and manages various payment systems like **UPI (Unified Payments Interface), IMPS (Immediate Payment Service), and RuPay.**

BBPS (Bharat Bill Payment System):

- BBPS is a **centralized bill payment system in India** that offers interoperable and accessible bill payment services to customers.
- It enables individuals to **pay their bills online through a single platform.**
- BBPS covers a wide range of billers including **electricity, water, gas, direct-to-home**

(DTH), telecom, and more.

NPCI Bharat Bill Pay Ltd (NBBL):

- NBBL is a wholly-owned subsidiary of NPCI.
- It operates as the **Central Unit (BBPCU) in the BBPS framework.**
- **NBBL acts as the Payment System Provider for BBPS**, providing the platform that connects customers and billers.

BBPOUs (Bharat Bill Payment Operating Units):

- BBPOUs are entities authorized to operate as part of the BBPS.
- They function as **intermediaries between customers and billers**, facilitating the bill payment process.
- BBPOUs are responsible for on boarding billers onto the BBPS platform and handling customer transactions.

BBPCU (Bharat Bill Payment Central Unit):

- BBPCU is the Central Unit of the BBPS system, operated by NBBL.
- It serves as the **core infrastructure for the BBPS, overseeing the entire bill payment process.** BBPCU sets the rules, standards, and guidelines for participation in the BBPS ecosystem.
- The BBPCU **ensures seamless transactions, proper clearing, and settlement of funds between customers and billers.**
- In summary, **NPCI is the overarching organization overseeing payment systems in India, BBPS is the bill payment system, NBBL is the entity managing the BBPS platform as the BBPCU, BBPOUs are the operational units handling transactions, and BBPCU is the central infrastructure ensuring the smooth functioning of the entire BBPS ecosystem.**
- **Unified Presentment Management System (UPMS)** introduced by NPCI Bill Pay Ltd. (NBBL) – NPCI BillPay Ltd. (NBBL), a wholly-owned subsidiary of the National Payments Corporation of India (NPCI), has launched a new functionality known as the Unified Presentment Management System (UPMS).
- **The primary aim of UPMS is to enrich and simplify the process of bill payments in India, offering a more convenient and efficient solution to customers.**

Key Features of UPMS:

- Standing Instructions Setup

- Automated Bill Fetching
- Centralized Infrastructure
- Democratizing Bill Payments
- Opportunity for Fintech and Service Providers
- Real-Time Updates

Topic 21. NBFC-MFIS PROPOSAL TO RAISE HOUSEHOLD INCOME LIMIT FOR MICRO LOANS

Important for the subject: Economy

The NBFC-MFIs (Non-Banking Finance Company – Microfinance Institutions) are urging the Reserve Bank of India (RBI) to **reconsider the criteria for annual household income limits for providing microloans, citing the growing needs of individual borrowers.** Here's an overview of the situation:

Request for Revised Criteria:

Current Income Limit:

- The existing annual household income limit for micro loans stands at ₹3 lakh.

Proposed Increase:

- NBFC-MFIs are requesting an **increase in this limit to approximately ₹5 lakh.**

Previous Revision:

- The last revision to the income limit criteria was in 2022, when it was raised from ₹1.25 lakh in rural areas and ₹2 lakh in urban and semi-urban areas to a uniform ₹3 lakh.

Industry Insights:

Discussion with RBI:

- Regarding the income limit revision.
- Typically, the **RBI does not revise these criteria on an annual basis, but rather every two to three years.**
- After the conclusion of this financial year, **with a review of numbers and alignment with government schemes and inflation, a case can be made to the RBI for a reevaluation.**

Definition of Microfinance Loan:

- As per RBI, a **microfinance loan is a collateral-free loan provided to a household with an annual income of up to ₹3 lakh.**

- The household, in this context, refers to the **individual family unit consisting of the husband, wife, and their unmarried children.**

Loan Size Trends:

- The average microfinance loan size has shown an increase, **reaching ₹47,374 in Q3 FY24, compared to ₹41,123 in the previous year and ₹39,512 in Q3 FY22, based on the latest MFIN data.**

Industry Portfolio:

Growth and Clientele:

- Microfinance operations have added over one crore unique clients in the past financial year.
- The industry witnessed a **robust growth of 24.6% over the previous financial year**, with the total portfolio reaching ₹3,99,442 crore.

Delinquency and Portfolio Health:

- Portfolio delinquency has returned to pre-Covid levels, indicating an improvement in the health of the microfinance portfolio.

Industry Breakdown:

- NBFC-MFIs are the **largest providers of micro credit, holding a loan amount outstanding of ₹1,56,245 crore**, which accounts for 39.1% of the total industry portfolio.
- Banks follow with 13 entities holding a **total loan outstanding of ₹1,33,759 crore, constituting 33.5% of the micro-credit universe.**
- Small Finance Banks have a **total loan amount outstanding of ₹70,449 crore, accounting for 17.6% of the market.**
- NBFCs represent 8.9%, and other MFIs account for 0.8% of the micro-credit universe.
- The push for a revision in the annual household income limit for microloans by NBFC-MFIs **reflects the evolving needs of borrowers and the industry's efforts to align with changing economic dynamics.**
- **Definition of a Microfinance Loan:** The RBI revised the definition of a microfinance loan to indicate a collateral-free loan given to a household **having annual income of up to Rs. 3 lakh. Earlier, the upper limits were Rs.1.2 lakh for rural borrowers and Rs.2 lakh for urban borrowers.**

Topic 22. SEBI ASKS SMALL AND MID-CAP FUNDS TO DISCLOSE MORE ABOUT RISKS TO INVESTORS

Important for the subject: Economy

India's market regulator has asked the country's asset managers to give investors more information about the risks associated with their small and mid-cap funds, according to a fund manager and two people with knowledge of the matter.

- **The Securities & Exchange Board of India (SEBI)** has also been reviewing stress tests conducted by such funds.
- **Small and mid-sized funds** have seen high inflows, causing concern among authorities about how they would hold up in the event of a sharp market selloff.
- Heavy inflows have sent the **Nifty small cap 250 index surging 71 per cent over the past 52 weeks and lifted the Nifty midcap 100 index 64 per cent.**
- That far exceeds the benchmark **Nifty's 28 per cent rise.**
- Mutual funds tend to keep between 1 percent and 5 percent of their assets as cash as a prudent measure to meet outflows, according to public documents.
- There is, however, **no minimum regulatory requirement.**

Definitions of various Caps:

- Small-cap stocks are defined as those with market caps of less than **50 billion rupees .**
- **Mid-cap stocks** are those with market values of between **50 billion and 200 billion rupees.**
- **Large-cap stocks** are usually well-established and dominant companies in their respective industries as their market capitalisation is **over Rs. 20,000 crores(200 Billion rupees).**
- The term **"cap" in large-cap refers to market capitalization.**

Topic 23. RESERVE BANK OF INDIA (RBI) DIRECTIVE ON CARD NETWORKS

Important for the subject: Economy

Directive to Card Issuers:

- RBI has directed card issuers, **including authorised payment system providers, banks, and non-banks.**
- They are **instructed not to enter into agreements or arrangements** with card networks that restrict them from using services of other card networks.

Options for Customers:

- Card issuers must provide eligible customers with the option to choose from multiple card networks at the time of card issuance.
- For existing cardholders, this **choice must be offered at the time of the next card renewal.**

Effective Date:

- These directives will come into effect six months from the date of issue of the circular.

Authorised Card Networks in India:**The currently authorised card networks in India include:**

- American Express Banking Corp.
- Diners Club International Ltd.
- MasterCard Asia/Pacific Pte. Ltd.
- National Payments Corporation of India–RuPay
- Visa Worldwide Pte. Ltd.

Current Practice:

- Typically, authorised card networks form tie-ups with banks/non-banks for issuing credit cards.
- The **choice of network for a customer's card is decided by the card issuer (bank/non-bank) based on their bilateral agreements with card networks.**

RBI's Observation:

- Upon review, RBI observed that **some existing arrangements between card networks and issuers limit customer choice.**
- These arrangements do not promote availability of options for customers.

Fresh Agreements:

- The RBI has asked card issuers and card networks to execute fresh agreements to align with these changes.
- The **directive aims to enhance customer choice and promote competition in the payment system.**

Purpose of the Directive:

- Issued with the interest of the payment system and public interest in mind.
- Aims to ensure customers have the flexibility to choose card networks that best suit their

needs.

- **Promotes a competitive and consumer-friendly environment in the card issuance process.**
- This directive from the RBI seeks to empower customers with more choices in selecting card networks, thereby enhancing competition and efficiency in the payment system.

Card Issuer Companies:

What are Card Issuer Companies?

- Card Issuer Companies are **financial institutions or entities responsible for issuing payment cards to consumers**, including credit cards, debit cards, and prepaid cards.

Why Do Card Issuer Companies Exist?

- They exist to provide consumers with **convenient and secure payment options** for transactions, both online and offline.
- Card issuer companies facilitate the use of credit facilities, offer access to banking services, and enable financial transactions globally.

Who are the Stakeholders Involved?

- **Consumers:** Individuals who use payment cards issued by these companies for purchases, payments, and withdrawals.
- **Banks and Financial Institutions:** Often the entities behind card issuer companies, providing the financial backing and infrastructure.
- **Card Networks (Visa, Mastercard, American Express, etc.):** Companies that provide the network for transactions and card acceptance worldwide.
- **Regulatory Authorities:** Governments and financial regulatory bodies overseeing card issuer operations, ensuring consumer protection and market stability.
- **Merchants and Businesses:** Accepting payments made through cards issued by these companies.

Functions and Roles of Card Issuer Companies:

Issuance of Payment Cards:

- Providing consumers with various types of payment cards, including credit cards, debit cards, and prepaid cards.

Setting Credit Limits:

- Determining the maximum amount of credit a cardholder can borrow for credit cards.

Account Management:

- Managing cardholder accounts, processing transactions, monitoring balances, and generating statements.

Transaction Authorization:

- Approving or declining transactions based on available funds, credit limits, and security checks.

Customer Service and Support:

- Offering assistance for lost or stolen cards, transaction disputes, billing inquiries, and general customer inquiries.

Security Measures:

- Implementing fraud prevention measures, encryption technologies, and security protocols to protect cardholder data.

Fee Structures and Interest Rates:

- Establishing fees, charges, annual fees, interest rates, and penalties associated with card usage.

Compliance with Regulations:

- Adhering to financial regulations, data protection laws, and consumer protection statutes.

Partnerships with Card Networks:

- Collaborating with card networks to enable card acceptance, processing, and interoperability.

Types of Cards Issued by Card Issuer Companies:**Credit Cards:**

- Offer a revolving line of credit, **allowing cardholders to borrow money up to a certain limit**. Payments are made monthly, and interest may apply on unpaid balances.

Debit Cards:

- Linked directly to the cardholder's bank account, debiting funds immediately for purchases or withdrawals.

Prepaid Cards:

- Loaded with a specific amount of funds by the cardholder, used until the balance is depleted.

Co-branded Cards:

- Issued in partnership with a retail brand, airline, or other organizations, offering rewards,

discounts, or benefits specific to that brand.

Secured Cards:

- Backed by a security deposit, often used by individuals looking to build or rebuild credit.

Contactless Cards:

- Utilize near-field communication (NFC) technology for quick and secure tap-and-go payments.

Corporate Cards:

- Issued to employees of companies for business-related expenses, with features for expense tracking and reporting.

Topic 24. INDIA'S GDP GROWTH IN Q3 2023-24

Important for the subject: Economy

GDP Growth Rate:

- Surpassed expectations to rise to a **six-quarter high of 8.4%** in the third quarter (October-December) of 2023-24.
- This exceeded the **5% estimate** for **Q3 by the Reserve Bank of India (RBI)** and other economists.

Impact on Full-Year Estimate:

- Q3 GDP pushed the **full-year estimate to 7.6%** in the second advance estimates.
- Initial estimate was **3%** released in January.

Sectoral Growth:**Improvement in sectors such as:**

- Manufacturing
- Mining
- Construction
- Trade
- Hotels
- Transport
- Communication
- Broadcasting services

- Agriculture sector, however, recorded a **contraction** in Q3.

Divergence in Growth Rates:

- Divergence between **GDP and Gross Value Added (GVA)** growth rates.
- GDP for Q3 was **4%**, while GVA growth was lower at **6.5%**.
- GVA measures national income from the output side, excluding product or indirect taxes.

Reasons Behind Surge in GDP:

- Strong growth in sectors except agriculture.
- Manufacturing grew at **6%**.
- Construction posted **5%** growth.
- Services, such as trade, hotels, transport, communication, grew at **7%**.

Investment Support:

- Rise in **investments** supported GDP growth.
- Revival in **capex cycle** due to:
- Turn in real estate cycle
- Industry utilization back at 2019 levels.

Consumption Expenditure:

- Slowdown in **private final consumption expenditure**.
- FY23 growth levels at a **two-decade low** (excluding pandemic year).
- Q3 private final consumption expenditure rose by **5%** year-on-year.

Growth Revisions:

- Revisions made to growth rates of previous financial years.
- Q3 growth rate revised down to **3%** for October-December 2022-23.

Divergence Between GVA and GDP:

- Sharp rise in **net taxes** and fall in **subsidies**.
- Widening difference to **190 basis points** in Q3.

Government's View:

- Divergence due to **fall in subsidies**.
- **Urea subsidy** 25% lower than the year-ago period.

- **Growth Expectations and Concerns:**
- Expectation for broad-based improvement in **consumption growth** and **private investments**.
- Concerns about **slowing profit growth** and rising **input costs**.
- GDP deflator growth expected to impact real GDP growth in FY25.

Future Outlook:

- Growth momentum expected to **moderate**.
- **Urban demand** could moderate as **wage growth slows**.
- Government **capital expenditure** may slow in Q4.
- India's GDP growth in Q3 2023-24 reflects a **mixed picture with strong performances in certain sectors, a slowdown in consumption, and a divergence between GDP and GVA growth rates**.
- The outlook for future growth hinges on **factors such as consumption demand, private investments, and government spending**.

Understanding GDP and GVA in India's Economic Growth

What is GDP?

- Gross Domestic Product (GDP) measures the **monetary value of all final goods and services produced within a country's borders in a specific time period**.
- It includes **consumption, government spending, investments, and net exports**.

Components of GDP:

- **Private Final Consumption Expenditure (PFCE):** Money spent by individuals on final goods and services.
- **Government Final Consumption Expenditure (GFCE):** Government spending on goods and services.
- **Gross Fixed Capital Expenditure (Gross Investment):** Investments in capital assets to boost productivity.
- **Net Exports (NX):** Difference between exports and imports.

Calculation:

$$\text{GDP} = \text{PFCE} + \text{Gross Investment} + \text{GFCE} + (\text{Exports} - \text{Imports})$$

What is GVA?

- Gross Value Added (GVA) calculates the value of goods and services produced in an

economy, minus the cost of inputs and raw materials.

- It provides insights into the contribution of each sector to the economy.

GVA Calculation:

GVA = Total Output Value – Cost of Intermediary Inputs

Relationship Between GDP and GVA

Derived Relationship:

- GDP is derived from GVA **along with taxes earned by the government and minus subsidies provided.**

GDP = GVA + Taxes – Subsidies

Usage:

- GDP is more **commonly used for analyzing annual economic growth** and for comparisons between countries or over time.
- GVA helps understand the **performance of individual sectors within the economy.**

Recent Indian Economic Growth Data

Q2 FY23 Growth:

- India's **GDP grew by 6.3% and GVA by 5.6%.**
- India maintained its status as the fastest-growing major economy, outpacing China.

Significance of GDP and GVA

Economic Indicators:

- GDP and GVA serve as crucial indicators of an economy's health and performance.
- They reflect **overall economic activity, sector-wise contributions, and growth trends.**
- Government policies and decisions **often rely on GDP and GVA data.**

Conclusion

- Understanding GDP and GVA is essential for comprehending India's economic growth story. The recent growth rates reflect a **positive trajectory, with implications for policy, investment, and sectoral development.**
- **As India aims for sustained growth, these indicators will continue to guide economic strategies and decisions, ensuring a path of prosperity and progress.**

Topic 25. INCLUSION OF INDIAN BONDS IN THE BLOOMBERG EMERGING MARKET (EM) LOCAL CURRENCY GOVERNMENT INDEX

Important for the subject: Economy

The inclusion of Indian bonds in the Bloomberg Emerging Market (EM) Local Currency Government Index and related indices represents a **significant development in India's presence in global financial markets.**

- Bloomberg has announced the **inclusion of Indian Fully Accessible Route (FAR) bonds in its Bloomberg EM indices.**
- This move follows a **similar announcement by JP Morgan Chase & Co last year,** which included Indian government bonds in the **JP Morgan GBI-EM Global index.**

Phased Inclusion:

- The **inclusion of Indian FAR bonds in the Bloomberg EM indices will occur in a phased manner over a ten-month period.**
- It will begin on January 31, 2025, with an **initial weight of 10% of their full market value.**
- The weight of FAR bonds will then increase by increments of 10% every month until October 2025, **when they will be weighted at their full market value in the indices.**

Impact and Significance:

- The inclusion of Indian bonds in these indices reflects **India's growing importance in the global economy.**
- India is expected to **become the third-largest country, after China and South Korea,** in the market cap weighted version of the Bloomberg EM 10% Country Capped Index.
- Using data as of January 31, 2024, **the index would include 34 Indian securities, representing 7.26% of a \$6.18 trillion index on a market value-weighted basis.**

Benefits:

- Inclusion in global indices is expected to **attract significant investments into India.**
- It will **bring dollar inflows into the country, helping to stabilize the financing of India's current account gap.**
- Analysts estimate that the inclusion could attract investments exceeding \$5 billion, in addition to the **expected investment of around \$20 billion from the JP Morgan EM Bond Fund.**

Future Plans:

- Bloomberg indices will **create an ex-India version of the EM Local Currency**

Government Index.

- They can also **create other standard and custom versions of the index**, providing more investment options for investors interested in emerging market bonds.

Overall Impact:

- The inclusion of Indian bonds in global indices **not only boosts India's visibility in international financial markets but also opens up new avenues for investment** in the country's debt market.
- It **signifies confidence in India's economic growth trajectory and policy reforms**, making it an attractive destination for global investors.
- In conclusion, the phased inclusion of Indian bonds in the Bloomberg EM indices is a significant step that is expected to have **positive implications for India's financial markets, economy, and attractiveness to foreign investors**.

About Emerging Markets Bond Index (GBI-EM):

- It is a **benchmark index** for measuring the **total return performance of international government and corporate bonds issued by emerging market countries**. **Emerging market bonds** are debt instruments issued by developing countries, offering higher yields compared to bonds of developed nations.

Inclusion of India's Local Bonds:

- India's local bonds will be **included** in the **Government Bond Index-Emerging Markets (GBI-EM)** of JP Morgan. **Expected to reach the maximum weight of 10%** in the **GBI-EM Global Diversified Index (GBI-EM GD)**.
- **23 Indian Government Bonds (IGBs)** with a combined notional value of **\$330 billion** are **eligible** for inclusion. All bonds are classified as **"fully accessible"** for **non-residents**.

Advantages of Inclusion:

- **Increased demand** for the **Indian rupee**, potentially **buffering** against **depreciation**.
- **Lower borrowing costs** can **fuel** essential **infrastructure projects**.
- **Enhanced liquidity** may **foster** more **efficient trading** conditions.
- **Market Development and Innovation**
- **Par with Other Countries** – India reaches 10% weightage in GBI-EM Global Diversified, aligning with countries like China, Brazil, Indonesia, and Malaysia.

Fully Accessible Route (FAR):

Brief:

- RBI has introduced the **Fully Accessible Route (FAR)** to enable non-residents to invest in specified government bonds.

Key Features:

- Eligible investors can **invest in specified government securities under FAR** without any investment ceilings.
- Operates alongside the existing routes, **namely the Medium Term Framework (MTF) and the Voluntary Retention Route (VRR).**

Benefits:

- Substantially eases access for non-residents to Indian government securities markets.
- Facilitates inclusion in global bond indices, **enhancing the visibility of Indian bonds in international markets.**
- **Encourages stable foreign investment inflows into government bonds**, promoting financial stability.

Voluntary Retention Route (VRR):**Brief:**

- RBI introduced the **Voluntary Retention Route (VRR)** to encourage **Foreign Portfolio Investors (FPIs)** for long-term investments in Indian debt markets.

Key Features:

- Aggregate investment limit: **₹ 40,000 crores for VRR-Govt and ₹ 35,000 crores for VRR-Corp.**
- Minimum retention period of three years, **during which FPIs must maintain a minimum of 75% of the allocated amount in India.**
- Greater operational flexibility in terms of instrument choices and exemptions from certain regulatory requirements for FPIs.

Topic 26. AMIT SHAH INAUGURATES NATIONAL URBAN COOPERATIVE FINANCE AND DEVELOPMENT CORPORATION LIMITED***Important for the subject: Economy***

Event: Union Cooperation Minister Amit Shah inaugurated the **National Urban Cooperative Finance and Development Corporation Limited (NUCFDC).**

- **Purpose:** The umbrella organization aims to **enhance self-regulation and boost the development of Urban Cooperative Banks (UCBs)** in India.

- **Importance:** Mr. Shah emphasized the **need for UCBs to upgrade and adhere to RBI regulations** for sustained competitiveness.
- **Compliance:** The organization will help **prepare small banks for compliance** with the Banking Regulation Act. The **goal is to establish urban cooperative banks in every city, promoting financial inclusion and accessibility.**

Collective Strength:

- **Branches:** 11,000 branches collectively.
- **Banks:** 1,500 member banks.
- **Deposits:** ₹5 lakh crore.
- **Loans:** ₹3.50 lakh crore.

Performance:

- **Net NPAs:** Reduced to 2.10%, reflecting improved asset quality.
- **Conclusion:** The inauguration of the National Urban Cooperative Finance and Development Corporation Limited underlines the **government's commitment to the growth and stability of Urban Cooperative Banks.**
- This umbrella organization aims to **facilitate self-regulation, compliance with banking regulations, and expansion of UCBs across India.**
- With a strong collective presence and improved asset quality, **UCBs are poised for enhanced development and greater financial inclusion under this initiative.**

Cooperative Banks: Overview

- Institutions established on a cooperative basis for banking operations.
- Funded through shares, deposits, and loans extended to members at favorable terms.
- Registered under **Cooperative Societies Acts, operating under Banking Regulations Act and Banking Laws (Cooperative Societies) Act.**

Features:

- **Customer Ownership:** Members are customers and owners, with democratic control.
- **Profit Allocation:** Yearly profits are **allocated to reserves and distributed to members.**
- **Financial Inclusion:** Vital for **providing cheap credit to unbanked rural masses.**

Urban Cooperative Banks (UCBs)

Definition:

- Primary cooperative banks in urban and semi-urban areas.
- Traditionally community-centric, now expanded scope of operations.

Challenges Faced:

- **Financial Sector Trends:** Competition from microfinance, FinTech, NBFCs challenges UCB presence.

Regulatory Challenges:

- Dual regulation eliminated, but issues of money laundering persist.
- Regulatory arbitrage and financial mismanagement concerns.

Decline in Agricultural Lending:

- Share in agricultural lending decreased significantly.

Audit and Government Interference:

- Limited audits and delays.
- Historical patronage by the government.

Limited Coverage:

- Small size restricts resources and operational scope.

Recent Developments**RBI Actions:**

- Revised Supervisory Action Framework (SAF) for UCBs in January 2020.
- Direct supervision of UCBs by RBI via Ordinance in June 2020.

Committee Recommendations:

- Proposed **4-tier structure for UCBs** based on deposit size in 2021.

Ministry of Cooperation:

- **Establishment of dedicated ministry crucial for cooperative movement.**

Future Steps**RBI Interpretation:**

- Ensuring Act provisions do not disrupt UCBs.

Institutional Reforms:

- Transparency in recruitment and robust accounting systems.

Professional Management:

- Encouraging new, young professionals in managerial roles.

NAFCUB's Role:

- Focus on UCB accounting software, common bylaws.
- Strive for symmetrical development of UCBs across towns.

National Urban Cooperative Finance and Development Corporation Limited (NUCFDC)**About:**

- **Umbrella Body:** Established as an **umbrella organization for Urban Cooperative Banks (UCBs)** in India.
- **Mission:** Aligned with the **goal of 'Sahakar se Samriddhi'** (prosperity through cooperatives) to promote self-reliance and economic growth.
- **Objective:** To **modernize and strengthen the Urban Cooperative Banking Sector**.
- **Function as SRO:** NUCFDC will serve as a **Self-Regulatory Organization for the UCB sector**, ensuring compliance and efficient operations.
- **Specialized Functions:** The corporation will **provide specialized functions and services tailored** to the needs of cooperative banks.
- **Facilitate Communication:** It aims to **facilitate communication between UCBs and regulatory bodies**, addressing challenges faced by the sector.
- **Certification:** Registered by the **Reserve Bank of India (RBI)** as a **Non-Banking Finance Company (NBFC) under a Certificate of Registration (CoR)**.

Significance:

- **Promoting Economic Growth:** NUCFDC supports the **urban cooperative banking sector**, indirectly aiding small farmers and weaker sections in expanding their economic activities.
- **Policy Formulation:** Acts as a **bridge between banks and regulators**, assisting state and central governments in making informed policy decisions based on sectoral realities.
- **Financial Assistance:** Aims to **raise capital and utilize it to provide financial support to UCBs**, fostering their growth and development.

Benefits:

- **Technological Advancements:** Introducing new technologies in the **urban Cooperative Banking Sector** to enhance efficiency and coverage.

- **Technology Platform:** Providing a **centralized technology platform** to UCBs, improving service offerings, reducing operational costs, and **addressing technological constraints**.

Conclusion:

- The establishment of the **National Urban Cooperative Finance and Development Corporation Limited** marks a **significant step towards modernizing and strengthening the Urban Cooperative Banking Sector** in India.
- Acting as an umbrella body and SRO, **NUCFDC aims to facilitate growth, promote financial inclusion, and enhance efficiency through technological advancements**.
- By providing specialized services and fostering collaboration between banks and regulators, it aims to contribute to the prosperity and self-reliance of the cooperative banking sector and the economy as a whole.

Topic 27. RBI TASKS NPCI BHARAT BILLPAY LTD. FOR INTEROPERABLE INTERNET BANKING SYSTEM

Important for the subject: Economy

The Reserve Bank of India (RBI) has taken steps to **accelerate the settlement of funds for merchants by directing NPCI Bharat BillPay Ltd. (NBBL) to implement an interoperable system for Internet Banking**.

- RBI emphasizes the benefits **it will bring to various payment transactions such as income tax, insurance premiums, mutual fund payments, and e-commerce**.

Current Scenario and Challenges:

- **Non-Interoperability:** Presently, transactions processed through Payment Aggregators (PAs) lack interoperability.
- This means that **each bank needs to integrate separately** with different PAs of various online merchants. With multiple PAs in the ecosystem, it **becomes challenging for banks to integrate with each one individually**.
- **Delays and Settlement Risks:** The **absence of a standardized payment system and rules** leads to delays in the receipt of payments by merchants and poses settlement risks.

Objective of the Interoperable System:

- **Facilitate Quicker Settlement:** The primary goal of the new interoperable system is to **expedite the settlement of funds for merchants**, enabling faster and smoother transactions.
- **Simplified Transactions:** By creating an interoperable framework, **customers will no**

longer need specific arrangements between the merchant's PA and their bank for payments.

RBI's Approval and Implementation Timeline:

- **Approval to NPCI Bharat BillPay Ltd.:** The RBI has **approved NPCI Bharat BillPay Ltd. to implement the interoperable system for Internet banking transactions.**
- **Expected Launch:** The implementation of this new system is anticipated **within the current calendar year**, promising a more efficient and seamless payment experience.

Benefits for Stakeholders:

Merchants:

- Faster and more reliable settlement of funds.
- Reduced settlement risks and delays in receiving payments.

Banks:

- Simplified integration process with a standardized interoperable system.
- Enhanced efficiency in handling Internet banking transactions.

Customers:

- Seamless payment experience without the need for multiple arrangements.
- Quicker processing of transactions for various services such as insurance, mutual funds, and e-commerce.

Conclusion:

- The RBI's directive to **implement an interoperable Internet banking system through NPCI Bharat BillPay Ltd. marks a significant stride towards streamlining digital payments in India.**

NPCI – National Payments Corporation of India

- **About:** NPCI is an **umbrella organization for operating retail payments and settlement systems in India. It is an initiative of the Reserve Bank of India (RBI) and Indian Banks' Association (IBA).**
- **Role:** NPCI develops and operates payment systems like **Unified Payments Interface (UPI), Immediate Payment Service (IMPS), National Electronic Funds Transfer (NEFT), and more.**

NBBL – NPCI Bharat BillPay Ltd.

- **About:** NBBL is a **subsidiary of NPCI, specifically focused on the Bharat Bill Payment System (BBPS).**

- **Role:** NBBL operates the BBPS, which is a **centralized bill payment system in India that allows users to pay bills and make recurring payments**

BBPS – Bharat Bill Payment System

- **About:** BBPS is a **centralized system in India for payment of bills** and other services.
- **Role:** It provides a **one-stop solution for payment of utility bills**, such as electricity, water, gas, telephone, and more. Users can make these payments through multiple channels, including online platforms, mobile apps, agents, and bank branches

In brief:

- **NPCI** is the overarching organization responsible for retail payments in India.
- **NBBL** is its subsidiary dedicated to operating the **BBPS**, which is a centralized bill payment system allowing users to pay various bills through different channels.

Topic 28. INDIAN START-UPS URGE CCI TO INTERVENE IN GOOGLE APP REMOVAL DISPUTE

Important for the subject: Economy

A group representing Indian start-ups has taken its battle against Google to the **Competition Commission of India (CCI)**, **requesting the regulator to mandate the reinstatement of apps removed by Google for alleged policy violations.**

- This move marks an escalation in the ongoing conflict with the U.S. tech giant within a crucial market.
- **Google's Action:** On a recent Friday, Google acted by removing over 100 Indian apps from its platform, **citing violations of its policies.** Notable apps were among those removed.
- **Policy Violations:** The apps were removed due to non-compliance with Google's policy, which **requires payment of a service fee when in-app payment options** other than Google's are utilized.
- **Antitrust Directive:** This dispute is further fueled by the backdrop of an antitrust directive from 2022. The **directive, aimed at tech giants like Google, prohibits them from taking adverse actions against companies using alternate billing systems.**

Start-ups' Appeal to CCI:

- **Anticompetitive Allegations:** The Alliance of Digital India Foundation (ADIF) urging the CCI to intervene in the matter and labeled Google's app removal as a "brazen move" that is anticompetitive in nature.
- The group believes that **Google's actions are detrimental to the market's competitiveness and requested CCI to instruct Google to reverse its decision,**

emphasizing the **potential “irreparable harm”** that Google’s actions could cause to the entire market.

Google’s Response and Public Criticism:

- **Denial of Wrongdoing:** Google has **denied any wrongdoing** in this matter and refrained from commenting on the letter sent to CCI.
- **Criticism from Indian Companies:** The app removal has garnered criticism from Indian companies, many of which have had **longstanding disagreements with Google over its practices**.

Key Points:

- **Market Impact:** The dispute between Google and Indian start-ups has **wider implications for the Indian app market’s competitiveness and the freedom of companies** to use alternate billing systems.
- **Regulatory Intervention:** ADIF’s appeal to the CCI reflects a **growing demand for regulatory oversight and intervention to ensure fair practices** in the digital ecosystem.
- **Awaiting Response:** Both Google and the CCI have yet to respond to the recent developments, leaving the **fate of the removed apps and the broader market dynamics** in question.

Conclusion:

- The clash between Google and Indian start-ups over app removals **underscores the challenges faced by tech platforms operating in India’s burgeoning digital landscape**.
- With calls for regulatory scrutiny and demands for fair competition growing louder, the outcome of this dispute will be closely watched by stakeholders across the industry

Competition Commission of India

- The Competition Commission of India (CCI) is a **regulatory body established by the Government of India to enforce the Competition Act, 2002**.

Overview:

- **Establishment:** The CCI was constituted in March 2009 as a **statutory body responsible for promoting and sustaining competition in markets, preventing anti-competitive practices, and protecting the interests of consumers**.
- **Repeal of MRTP Act:** It replaced the **Monopolies and Restrictive Trade Practices Act, 1969** (MRTP Act), following the recommendations of the Raghavan Committee.

Composition:

The Commission is composed of:

- One Chairperson
- Six Members
- These members are appointed by the Central Government.
- The **Chairperson and Members are whole-time members** of the Commission.

Competition Act, 2002:

- **Purpose:** The Competition Act, 2002, was enacted to **promote competition, prevent anti-competitive practices, and ensure fair trade practices** in India.

Prohibitions:

- **Anti-Competitive Agreements:** The Act prohibits agreements that significantly affect competition.
- **Abuse of Dominant Position:** It regulates entities that hold a dominant position in a market to prevent abuse of such position.
- **Combinations:** The Act **regulates mergers, acquisitions, and combinations** that may have an adverse impact on competition.

Establishment of CCI and Competition Appellate Tribunal:

- The Act led to the establishment of the Competition Commission of India (CCI) as the primary regulatory authority.
- It also **established the Competition Appellate Tribunal (COMPAT) for hearing appeals against the decisions of the CCI.**

Amendments:

- The Act was amended in 2007 by the Competition (Amendment) Act to further strengthen competition regulations.

Replacement of COMPAT with NCLAT:

- In 2017, the **Government replaced the Competition Appellate Tribunal (COMPAT) with the National Company Law Appellate Tribunal (NCLAT).**
- The Competition Commission of India plays a crucial role in **promoting fair competition, protecting consumer interests, and ensuring a level playing field** for businesses operating in India's markets.

Topic 29. SCRUTINY ON DE MINIMIS TRADE RULE: IMPACT ON ONLINE SHOPPING AND U.S. ECONOMY

Important for the subject: Economy

The **de minimis exception**, a trade rule **allowing duty-free entry of parcels under \$800 per person per day**, is **under intense scrutiny** as it shapes the landscape of online shopping and **raises concerns about its impact on American competitiveness, consumer safety, and trade practices** with non-market economies like China.

Impact of De Minimis Rule:

- **De Minimis Exception:** The de minimis exception allows parcels valued under \$800 to enter the U.S. duty-free per person per day. This **rule has enabled online retailers to offer extremely low prices, making it attractive to American consumers.**

Scrutiny and Concerns:

- **Lawmakers' Concerns:** Lawmakers are now questioning about the **rule facilitating the entry of products made by forced labor, illicit drugs, or unsafe materials** into the U.S.
- **Drug Trafficking Concerns:** A group of 40 lawmakers has raised concerns about the de minimis trade **facilitating the flow of deadly drugs like fentanyl into the U.S.**
- **Legislative Actions:** Lawmakers have introduced legislation to **exclude non-market economies like China from the de minimis rule. The proposed bills aim to make the practice reciprocal, aligning with the U.S.'s trade objectives.**

Defense of the De Minimis Rule:

- **Industry Defense:** The National Foreign Trade Council argues that **restricting its use would lead to increased costs for American consumers and small businesses.**
- **Impact on Consumers:** Critics of changes to the de minimis rule argue that **it could significantly increase the cost of online purchases for consumers.** For example, a \$50 package could double in price if the rule is amended.

Trade Figures and Growth:

- **Surge in De Minimis Packages:** The number of de minimis packages entering the U.S. has skyrocketed, **exceeding 1 billion in 2023, up from 134 million in 2015.**
- **China's Dominance:** China is the largest source of retail packages entering the U.S. under the de minimis rule, **accounting for the majority of the nearly 3 million small parcels entering daily.**
- **E-commerce Growth:** Cross-border e-commerce, including de minimis packages, has seen significant growth. **China's online sales expanded nearly 20% in 2023, reaching**

\$257 billion, with the U.S. being the biggest market.

Potential Impact of Repeal:

- **Financial Impact:** A repeal or amendment of the **de minimis rule** could add \$20 to \$30 to each transaction, making it financially challenging for businesses to maintain their low prices.
- **Trade Dynamics:** Changes to the de minimis rule could have far-reaching implications for the U.S. economy, international trade relations, and the competitiveness of American businesses in the global market.

Conclusion:

- The debate over the de minimis trade rule reflects broader concerns about trade practices, consumer affordability, and the role of online shopping in the modern economy.
- As lawmakers and industry stakeholders navigate this issue, the future of online retail, particularly in relation to non-market economies like China, remains uncertain.
- The outcome of this scrutiny could reshape the landscape of cross-border e-commerce and consumer choices in the years to come.

About De Minimis rule

- The **De Minimis rule**, created in 1938, refers to a threshold below which certain goods or transactions are exempt from certain taxes, duties, regulations, or reporting requirements.
- The term “De Minimis” is Latin for “of minimal concern” or “trifling.”

Origin and Purpose:

- The De Minimis concept was initially introduced in the Tariff Act of 1930 in the United States. It was designed to simplify customs procedures and reduce administrative burdens on low-value imports.
- The rule recognizes that the cost and effort of collecting duties or enforcing regulations on very small transactions or goods may not be worthwhile compared to the revenue or benefit gained.
- It aims to facilitate the flow of small-value shipments across borders while allowing customs agencies to focus their resources on higher-value or riskier imports.
- For example, in the context of international trade, if the value of a shipment falls below the De Minimis threshold, it may not be important for the subject to customs duties or import taxes.

Evolution and Changes:

- Over time, the De Minimis threshold has been adjusted to reflect changing economic conditions, inflation, and trade practices.
- In the United States, the **De Minimis threshold for imports has increased over the years**. For instance:
- The original De Minimis threshold in 1938 was set at \$5.
- It was increased to \$200 in 1994.
- In 2016, it was **further raised to \$800 per person per day for most goods imported into the U.S.**

Implications:

- **Benefits for Consumers:** Higher De Minimis thresholds can benefit consumers by allowing them to import low-cost goods without incurring additional duties or taxes.
- **Simplification of Customs Procedures:** It helps streamline customs procedures, particularly for express shipments and e-commerce transactions.
- **Promotion of Trade:** By reducing barriers to cross-border trade on low-value items, it encourages international commerce and access to global markets.
- **Challenges:** Critics argue that **excessively high De Minimis thresholds may disadvantage domestic producers by allowing cheap imports to flood the market**.
- It can also make it challenging to enforce regulations **related to product safety, intellectual property rights, and environmental standards**.

Conclusion:

- The **De Minimis rule, established in 1938 and subsequently adjusted, plays a significant role in international trade, customs procedures, and consumer access to global markets**.
- While it offers benefits such as simplified customs procedures and lower costs for consumers, it also raises questions about **fair competition, revenue loss for governments, and regulatory enforcement**.
- The **threshold continues to be a Important for the subject of debate and consideration** as trade practices evolve in the modern global economy.

Topic 30. ZSI NAMES A NEWLY DISCOVERED SEA SLUG AFTER PRESIDENT MURMU

Important for the subject: Environment

The **Zoological Survey of India (ZSI)** discovered a new species of head-shield sea slug with a distinctive ruby red spot.

- Found along the **West Bengal (Digha)** and **Odisha (Udaipur)** coasts.
- Named **Melanochlamys droupadi** in honour of the **President of India, Droupadi Murmu**.

Species Characteristics:

- Belongs to the **Melanochlamys** genus, notable for short, blunt, cylindrical body and smooth dorsal surface with two dorsal shields: **anterior cephalic** and **posterior**.

Unique features of Melanochlamys droupadi:

- The maximum length of 7 mm, **Brownish-black** colour with a **ruby red spot** at the **hind end**, **Hermaphroditic**, with a **shell inside the body**, and Typically found **crawling** in the **intertidal zone**, leaving crawl marks on sandy beaches.

Reproduction and Habitat:

- The reproduction period is between November and January.
- Located near **Hospital Ghat, Old Digha**, only 50 meters away from **ZSI's Marine Aquarium Regional Centre**.

Conservation and Study:

- Type specimens are deposited in the **Marine Aquarium and Regional Centre, Digha**, and **Estuarine Biology and Regional Centre, Gopalpur**.
- The species exhibits behaviour like **secreting transparent mucus for protection against sand grains** and **moving beneath smooth sand**, rarely exposing its body.

Distribution and Significance:

- **Melanochlamys** species are generally found in **temperate regions** of the **Indo-Pacific Oceanic realm**, with **three species**, including **Melanochlamys droupadi**, being truly tropical.
- Other **tropical** species include **Melanochlamys papillata** from the **Gulf of Thailand** and **Melanochlamys bengalensis** from the **West Bengal** and **Odisha** coasts.
- Their research highlights the **unique adaptation mechanisms** of **Melanochlamys droupadi**, contributing to the understanding of **marine biodiversity in the region**.

About Sea Slug:

- Sea slug is a common name for some **marine invertebrates** with **varying levels of resemblance to terrestrial slugs**.
- The name “**sea slug**” is often applied to **nudibranchs** and a **paraphyletic set** of other **marine gastropods** without apparent shells.

Topic 31. INDIA’S LEOPARD POPULATION RISES TO 13,874; M.P. ON TOP

Important for the subject: Environment

In the news:

India’s leopard population increased by 8% from 12,852 in 2018 to 13,874 in 2022, as reported by the Environment Ministry.

- The exercise to estimate the **population of leopards in India** is in its **fifth cycle (2022)**.
- The **National Tiger Conservation Authority** and **Wildlife Institute of India**, in collaboration with **state forest departments**, focused on **forested habitats within 18 tiger-range states**, covering **four major tiger conservation landscapes**.
- The **highest leopard count** was in **Madhya Pradesh (3,907)**, followed by significant populations in **Maharashtra (1,985)**, **Karnataka (1,879)**, and **Tamil Nadu (1,070)**.
- However, **Uttarakhand** experienced a **22% decline** in **leopard numbers** due to **poaching** and **human-leopard conflicts**.
- On a positive note, **Arunachal Pradesh**, **Assam**, and **West Bengal** collectively saw a **150% increase** in **leopard numbers**, reaching **349 animals**.
- **Nagarajunasagar Srisailem** in **Andhra Pradesh**, **Panna** and **Satpura** in **Madhya Pradesh** were the **tiger reserves** with the **highest numbers of leopards**.
- The survey, which covered **20 States**, focused on approximately **70%** of the **leopard’s expected habitat**, including **tiger reserves** and **protected forest areas**.
- Unlike **tigers**, **leopards** are **more adaptable**, often found in **villages and cities**, leading to **conflicts with humans** due to their tendency to prey on cattle.

Habitat conservation:

- The report, authored by **Qamar Qureshi** of the **Wildlife Institute of India**, highlights that a **third of India’s leopards reside within protected areas**, emphasizing that **conserving tiger reserves** also benefits **leopard habitats**.
- The study focused on forest regions surveyed in **2018**, showing varied growth rates across different geographical areas:

- a **3.4% annual decline** in the **Shivalik hills** and the **Gangetic plains**, while **Central India** and the **Eastern Ghats**, the **Western Ghats** along with the **hills of the northeast**, and the **Brahmaputra flood plains** experienced **growth rates of 1.5%, 1%, and 1.3% per year**, respectively.
- The report suggests a **stable leopard population** over the last four years but with **minimal growth**, indicating possible impacts from human activities in multiple-use areas.
- Significant findings include a **decline in leopard numbers** in the **Ramnagar forest division (Uttarakhand)** amidst a **sharp increase in tiger populations**.
- Remarkably, **65% of leopards live outside protected areas** in the **Shivalik landscape**, though both **leopard and tiger populations** have **grown in Uttar Pradesh**.
- The notable **increase in leopard numbers** in the **northeastern states** was attributed to a “**sampling artefact**”, pointing out the lack of systematic surveys and fewer cameras in previous years.

Topic 32. INTERNATIONAL BIG CAT ALLIANCE HEADQUARTERS WILL BE IN INDIA; THE CENTRE ALLOCATES RS 150 CRORE

Important for the subject: Environment

The **Indian government** announced the establishment of the **International Big Cat Alliance (IBCA)** on February 29, 2024, following an idea proposed by Prime Minister Narendra Modi in **2019**.

- The **headquarters of IBCA** will be located in **India**.
- The Union Cabinet, led by Prime Minister Modi, approved a **one-time budgetary support of Rs 150 crore for IBCA**.
- This funding is allocated for a **five-year period from 2023-24 to 2027-28**.

Big Cats Overview:

- “**Big Cat**” refers to **large species within the Felidae family**, primarily those in the **Panthera genus**: Tiger (*Panthera tigris*), Lion (*Panthera leo*), Jaguar (*Panthera onca*), Leopard (*Panthera pardus*), Snow Leopard (*Panthera uncia*)
- These species are **capable of roaring**, with the **lion’s roar being the loudest**, audible from 8-10 kilometres away.
- The **snow leopard** was initially classified as **Uncia uncia** but was later reclassified into **Panthera**.
- Although **not part of the Panthera genus**, **Puma (Puma concolor)** and **Cheetah (Acinonyx jubatus)** are commonly included in **big cat listings**.

Big Cats in the Indian Subcontinent:

- Historically, the region has been home to **several big cats: Bengal tiger, Asiatic lion, Indian leopard, Indian/Asiatic cheetah** (declared extinct in 1952), **Snow leopard**.
- In **2022**, the **Government of India** initiated a program to **reintroduce African cheetahs to Kuno National Park in Madhya Pradesh**, aiming to **revive the cheetah population** in the country.

About the International Big Cat Alliance (IBCA)

Formation and Purpose

- The **IBCA** is envisioned as a **coalition involving 96 big cat range countries, non-range countries interested in big cat conservation, conservation partners, scientific organizations, business groups, and corporates**.
- The alliance **aims to establish networks, develop synergies, and create a centralized platform** for sharing successful conservation practices and resources.
- Its **primary goal** is to **arrest the decline in big cat populations and reverse this trend through a multi-faceted approach**.

Strategies and Objectives

- The **IBCA** will focus on knowledge sharing, capacity building, networking, advocacy, financial and resource support, research, technical assistance, education, and awareness.
- It seeks to **mitigate the adverse effects of climate change** and advocate for policy initiatives that **align biodiversity conservation** with local needs, contributing to the **United Nations Sustainable Development Goals**.

Organizational Structure

- The **IBCA's** structure will include an **Assembly of Members**, a **Standing Committee**, and a **Secretariat**, with headquarters based in **India**.
- Its Framework of Agreement is modelled after the **International Solar Alliance**, another initiative proposed by **Prime Minister Modi in 2015**.
- The **statute of the IBCA** will be finalized by an **International Steering Committee**, which includes **national focal points of founding member countries**.
- An **interim head of the IBCA Secretariat** will be appointed by the **Ministry of Environment, Forest and Climate Change (MoEFCC)** until the IBCA appoints its **Director-General** during an Assembly meeting.

Funding and Support

- The Centre plans to seek **contributions** from **bilateral and multilateral agencies, public sector organizations, national and international financial institutions, and donor**

agencies to support the IBCA's initiatives.

Topic 33. TREES IN CORBETT FELL PREY TO GREEDY NEXUS, SAYS SUPREME COURT

Important for the subject: Environment

The Supreme Court criticized the **illegal cutting down of over 6,000 trees** for the construction of buildings under the guise of “eco-tourism” at **Jim Corbett National Park, Uttarakhand**, highlighting it as an example of the **detrimental collaboration** between politicians and officials for commercial benefits at the expense of the environment. This act was particularly condemned as it severely impacted the **Corbett Tiger Reserve, a critical habitat for tigers**.

- The court directed the **Ministry of Environment, Forest and Climate Change** to establish a **specialized committee** to evaluate and provide recommendations on the allowance of **tiger safaris** in the **buffer zones of tiger reserves**.
- The court emphasized **Uttarakhand's obligation to restore the forest fully** and **underscored the intrinsic connection** between **tigers and their forest habitat**, indicating the **critical role of tigers** in **maintaining the ecosystem's health**.
- The **specialized committee** is to include members from the **National Tiger Conservation Authority, Wildlife Institute of India, Central Empowered Committee**, and a **Joint Secretary** from the **Ministry**, focusing on ensuring the protection of tigers and, by extension, the ecosystem surrounding them.

Panel to access damage:

- The appointed panel is tasked with **evaluating the damage to the green cover of the Corbett Reserve**, estimating the **restoration costs**, and identifying the individuals and officials responsible for the damage.

Guidelines for safaris:

- The **Supreme Court** indicated that if the **committee** recommends **permitting tiger safaris** in the **peripheral areas of tiger reserves**, it should also **propose guidelines for their operation, applicable across India**.
- The court emphasized an **eco-centric approach to tiger safaris**, criticizing the **use of tigers from zoos** for these purposes as suggested by the **2019 National Tiger Conservation Authority (NTCA) guidelines**.
- Instead, it referred to the **2016 NTCA guidelines**, which **advocate for using only injured, conflict, or orphaned tigers** unfit for rewilding, sourced from the same landscape as the safari.
- The court **rejected** the idea of **selecting safari animals with the Central Zoo Authority's approval** and **opposed** the creation of a “**Master Plan**” by

the **CZA** for **managing tiger safaris**.

- It stressed **minimizing environmental damage**, suggesting that any resorts should be built to blend with the **natural environment**, **noise levels should be controlled**, and **safaris should be close to animal rescue centres**.
- Existing safaris, like the **Pakhro zone** in **Corbett**, are to remain undisturbed, but the court instructed the Uttarakhand government to set up an animal rescue centre nearby.

Jim Corbett National Park:

- **Jim Corbett National Park** is the **oldest national park** in India and was established in **1936** as **Hailey National Park** to protect the **endangered Bengal tiger**.
- It is located in **Nainital district** and **Pauri Garhwal district** of **Uttarakhand** and was named after **hunter** and **naturalist Jim Corbett**.
- The Park was the first to come under the **Project Tiger initiative**. The Park encompasses the **Patli Dun valley** formed by the **Ramganga river**.
- **Ramganga, Sonanadi, Mandal, Palain** and **Kosi** are the **major rivers** flowing through the **Corbett National Park**.
- The national park is a protected area covered by the **World Wide Fund (WWF)** for **Nature** under their **Terai Arc Landscape Program**.

Topic 34. KERALA GOVERNMENT DECLARES WILDLIFE ATTACKS A STATE-SPECIFIC DISASTER

Important for the subject: Environment

On March 6, the **State Cabinet of Kerala** declared **human-wildlife conflict** a **State-specific disaster**, acknowledging the **rising incidents of deaths, injuries, and property losses** due to **wildlife encroachments from forests**.

- The declaration enables **Kerala State Disaster Management Authority (KSDMA)** to actively engage in mitigating such conflicts.
- A **high-level committee** chaired by **Chief Minister Pinarayi Vijayan** has been established to address the **wildlife threat**, particularly towards **plantation workers and tribal communities**. This committee includes **Forest, Revenue, Local Self-Governments, and SC/ST Welfare Ministers**, along with their department secretaries.
- **District-level committees**, led by the **Minister in charge of the district** and including **District Collectors** and **heads** of various departments like **KSDMA**, will also be formed.
- An **inter-state coordination committee** with **Karnataka** and **Tamil Nadu officials** will oversee forest areas adjoining the **three states**, aiming for a unified approach to managing

human-wildlife conflicts.

Community Involvement:

- **Neighbourhood watch groups** will be created to **enhance vigilance** and provide **early warnings of wildlife presence and movement**.
- **Volunteer groups, wildlife enthusiasts, and environmentalists** have been enlisted to assist in containing human-wildlife conflicts.

Operational and Surveillance Enhancements:

- The **Chief Wildlife Warden** has been appointed as the **nodal officer for conflict prevention**, overseeing a **24/7 control room**. Recruitment of additional **forest watchers** to **improve wildlife monitoring**.
- **Plantation managers** are instructed to clear undergrowth for **better visibility and tracking of wild animals**.
- The **Forest Department** is directed to form **more rapid response teams** equipped with **firearms, surveillance devices, tranquiliser guns**, etc.
- Initiatives to provide **sufficient fodder and water** within **protected reserves** to **deter wildlife from encroaching on human habitats**.

Compensation and Funding:

- Expedited compensation for wildlife attack victims, exempting payments from treasury restrictions.
- **Kerala Infrastructure Investment Fund Board (KIFFB)** is tasked with raising **₹210 crore** for protective measures like fences, moats, and early warning systems near forest boundaries.

Topic 35. RESORTS NEAR TIGER RESERVES HAVE TURNED CHOICE WEDDING DESTINATIONS: SUPREME COURT

Important for the subject: Environment

The **Supreme Court** criticized the **rapid growth of resorts around tiger reserves**, which are increasingly being used as **venues for weddings**, causing **disturbances with loud music** that **disrupts the forest habitat**.

- **Justice B.R. Gavai**, in a judgment regarding the **illegal tree felling in the protected Jim Corbett National Park**, highlighted this issue as part of a broader concern about commercial activities undermining the ecological balance of protected forest areas.
- The Supreme Court has ordered the **formation of an expert committee** by the **Ministry of Environment** to **recommend regulations on the establishment of resorts near**

protected areas.

- This committee is **tasked with determining the acceptable number and types of resorts and specifying restrictions on noise levels within a certain distance from protected forests.**
- Highlighting the **government's role as a trustee of natural resources**, the court emphasized that **these resources should not be converted into private ownership or used for commercial purposes in a way that compromises their aesthetic value and ecological integrity.**
- The **Supreme Court** stated that any **encroachment on natural resources for private, commercial, or any other use should only be permitted** if deemed necessary for the **public good** and in the **public interest**, maintaining a firm stance on protecting the environment and ecosystems of the country.

Laws related to tree felling in India:

- In India, aspects related to trees are covered under the **Indian Forest Act, 1927**
- It is broadly under this Act that each state has laid down rules and regulations against tree felling.

Along with that various states have come up their own laws for the same purpose like-

- Maharashtra (Urban Areas) Preservation of Trees Act 1975
- Delhi Preservation of Trees Act (1994)
- Karnataka Preservation of Trees Act 1976
- West Bengal Trees (Protection and Conservation in Non-Forest Areas) Act, 2006
- Also, various cities like Gurugram, Chennai etc. come up with their own notifications regarding felling of trees

Cutting OF RESERVED TREES and FORESTS:

- Under **Indian Forest Act, 1927, Section 30**– The State Government may, by notification in the Official Gazette,
- declare any trees or class of trees in a protected forest to be reserved from a date fixed by, the notification;
- declare that any portion of such forest specified in the notification shall be closed for such term, not exceeding thirty years, as the State Government thinks fit, and that the rights of private persons, if any, over such portion shall be suspended during such terms

Section 33 Indian Forest Act:

- Penalties for acts in contravention of notification under **section 30**

Any person who-

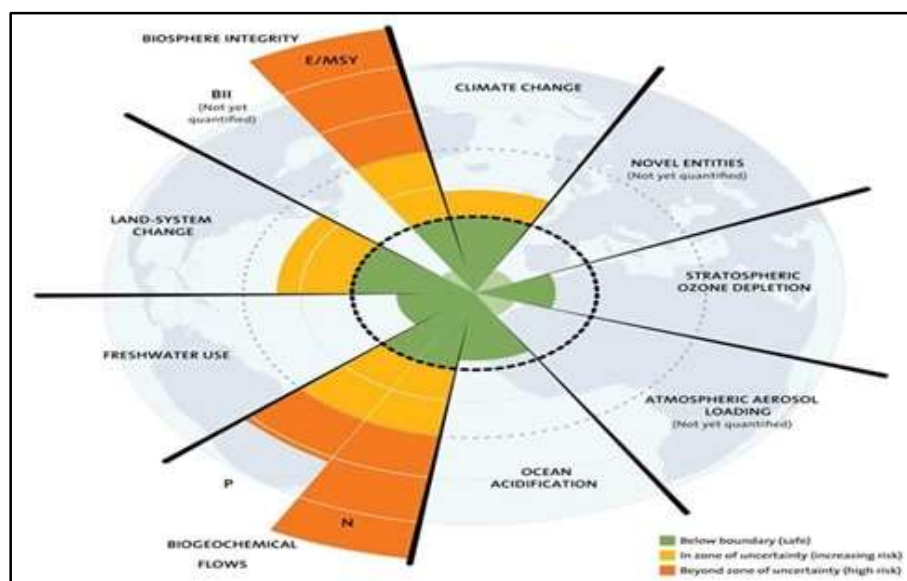
- fells any tree reserved under section 30, or strips off the bark or leaves from, or otherwise damages, any such tree;
- permits cattle to damage any such tree;
- shall be punishable with imprisonment for a term which may extend to six months, or with a fine which may extend to five hundred rupees, or with both.

Is it punishable to cut trees even on my own premises?

- Yes, according to the **Indian Forest Act**, the penalty for cutting down a tree is **Rs.10,000** or **3 months imprisonment**.
- This punishment may extend up to one year under various state acts.
- But in some cases like where a tree is blocking your way, whose branches are spreading to your house or blocking hoardings, you need to take a clearance from the Forest department, before cutting that tree.

Topic 36. PLANETARY BOUNDARY PIONEER JOHAN ROCKSTROM WINS 2024 TYLER PRIZE FOR ENVIRONMENTAL ACHIEVEMENT

Important for the subject: Environment



Why in news?

The 2024 Tyler Prize for environmental achievement will be awarded to Johan Rockstrom for his groundbreaking contributions and pioneering work to the development of the Planetary Boundaries framework, the science for defining the safe operating space for humanity on Earth.

Who is Johan Rockstrom?

- Rockstrom is director of the Potsdam Institute for Climate Impact Research (PIK) and co-chair of the Earth Commission. The framework provides boundaries for world development and a basis for human justice, PIK said in a statement on February 29, 2024.
- The prestigious Tyler Prize is often described as Nobel Prize for environment. Rockstrom will receive the award on May 17, 2024, in a ceremony in Potsdam, Germany.

What is concept of planetary boundary?

- The concept of planetary boundaries was first proposed by a team of international scientists in 2009 to articulate key natural processes that, when kept in balance, support biodiversity.
- The Planetary Boundaries is an international collaboration across multiple Earth system science disciplines.
- The theory establishes defined boundaries for nine Earth systems, emphasising the critical importance of their stability and resilience in preserving life as we understand it.

Nine planetary boundaries beyond which we can't push Earth Systems without putting our societies at risk:

- climate change
- biodiversity loss
- ocean acidification
- ozone depletion
- atmospheric aerosol pollution
- freshwater use
- biogeochemical flows of nitrogen and phosphorus
- land-system change
- Release of novel chemicals.

Humanity already exists outside the safe operating space for at least four of the nine boundaries:

- climate change, biodiversity, land-system change, and biogeochemical flows (nitrogen and phosphorus imbalance).
- The best way to prevent overshoot, researchers say, is to revamp our energy and food systems.
- **The nine planetary boundaries, counter clockwise from top:** climate change, biosphere integrity (functional and genetic), land-system change, freshwater use, biogeochemical flows (nitrogen and phosphorus), ocean acidification, atmospheric

aerosol pollution, stratospheric ozone depletion, and release of novel chemicals (including heavy metals, radioactive materials, plastics, and more).

Topic 37. MATING CALLS INDICATE ENDANGERED HANGULS ARE ON A COMEBACK TRAIL

Important for the subject: Environment

Kashmir's hangul, a critically endangered species of deer known for its shyness and sensitivity, experienced one of its healthiest mating seasons in the previous autumn, indicating a possible increase in population.

- The hangul population could surpass 300 this spring, marking the first time in over 30 years.
- The current male-to-female ratio stands at 19.2 males per 100 females, which is significantly lower than the ideal.

About Hangul:

- Hangul, also known as the Kashmir stag, is a species of deer native to the state of Jammu and Kashmir in India.
- Scientific Name: Hangul is scientifically known as *Cervus hanglu*.
- Hangul primarily inhabits the dense temperate forests of the Kashmir Valley and its surrounding areas. It is found at elevations ranging from 1,700 meters to 3,000 meters above sea level.

Challenges:

- Challenges such as habitat disturbance and human intervention have impacted hanguls, but improved environmental conditions and protective measures, including traffic regulation in Ganderbal for safe hangul movement, are being implemented.
- The Wildlife Department has identified threats such as water scarcity, leading to hanguls venturing into disturbed habitats, increasing the risk of predation.

Conservation efforts:

- During the rutting season in October, the Dachigam National Park, where hanguls reside, was temporarily closed.
- The hangul, recognized as the State animal of Jammu & Kashmir (J&K), has seen its numbers decline sharply since 1947, from around 2,000 to as low as 183 in 2015.
- However, recent efforts have led to a steady increase, with the population estimated at 261 in 2021.
- To support hangul conservation, 10 sites have been earmarked for protection, and

a captive-breeding facility has been established at **Shikargah Tral**.

Topic 38. OVER 24,000 BIRDS FROM 66 SPECIES RECORDED DURING TAMIRABHARANI WATERBIRD COUNT

Important for the subject: Environment

The **Tamirabharani Waterbird Count 2024** organised recently has recorded over **24,000 birds** in the **irrigation tanks** getting water from the **perennial river**.

World Wildlife Day on March 3.

- **ATREE's Agasthyamalai Community Conservation Centre (ACCC)** initiated the citizen-centric bird monitoring program, the **Tamirabharani Waterbird Count**, in **2011**.
- The **14th** edition of the **Tamirabharani Waterbird Count** is co-organized by **ATREE's ACCC**, **Pearl City Nature Trust**, **Thoothukudi**, **Nellai Nature Club Trust**, **Tirunelveli**, and **Pushpalata Educational Centre**, **Tirunelveli**.

40 out of 100 are identified as migratory birds.

- **Sighted birds: Black-tailed Godwit, Egret species** (Cattle Egret, Little Egret, Medium Egret and Large Egret), **Migratory duck species** (Northern Pintail, Bar-headed Geese, and Eurasian Wigeon), **Cormorant species** (Little Cormorant, Indian Shag, and Oriental Darter), **Spot-billed Duck**, **Common Coot**
- **Tamirabharani** and its major tributaries, including **Chithar**, **Pachchaiyar**, **Gadana**, and **Ramanathi** serve as crucial water sources for the districts of **Tirunelveli**, **Tenkasi** and **Thoothukudi**.
- Beyond natural disasters, **man-made threats** such as sewage water drainage, improper waste disposal and misuse of tanks for anti-social activities, mostly for consuming liquor, were observed in numerous tanks.
- The **Vaeinthankulam tank**, located in the heart of the city of **Tirunelveli** faces **severe degradation** due to anti-social activities including daytime liquor consumption on the tank bund and using this spot for flesh trade in the dusk.
- The **Veinthankulam restoration project** was initiated under the '**Nellai Neervalam**' in June 2021, and subsequently joined by **Care Earth**.

About the Thamirabarani River:

- Thamirabarani is the **only perennial river** in south India that flows through the districts of **Tirunelveli** and **Thoothukudi** in **Tamil Nadu**.
- **Originating** from the **Pothigai hills of Western Ghats**, the life-giving river dribbles, sprints and gallops for about **128 kilometres** along the southern edge of the country. It originates and ends in the same state (Tamil Nadu).
- The river is deeply connected to the lives, livelihoods and culture of the people in the

state.

- The river supports wildlife such as the **Nilgiri marten, slender loris, lion-tailed macaque, white spotted bush frog, galaxy frog, Sri Lankan Atlas moth and the great hornbill.**

Topic 39. CABINET APPROVES ROYALTY RATES FOR MINING OF 12 CRITICAL AND STRATEGIC MINERALS

Important for the subject: Geography

The Union Cabinet chaired by Prime Minister Shri Narendra Modi approved the amendment of **Second Schedule to the Mines and Minerals (Development and Regulation) Act, 1957 ('MMDR Act')** for specifying rate of royalty in respect of **12 critical and strategic minerals.**

- These minerals include **Beryllium, Cadmium, Cobalt, Gallium, Indium, Rhenium, Selenium, Tantalum, Tellurium, Titanium, Tungsten and Vanadium.**
- This completes the exercise of the rationalization of royalty rates for **all 24 critical and strategic minerals.**
- It may be noted that the Government had notified the royalty rate of **4 critical minerals, viz., Glaucanite, Potash, Molybdenum and Platinum Group of Minerals on 15th March, 2022 and of 3 critical minerals, viz., Lithium, Niobium and Rare Earth Elements on 12th October, 2023.**

About The Mines and Minerals (Development and Regulation) Amendment Act, 2023:

- The **Mines and Minerals (Development and Regulation) Amendment Act, 2023**, which came into force from 17th August, 2023, **had listed 24 critical and strategic minerals in Part D of the First Schedule of the MMDR Act.**
- The amendment provided that **mining lease and composite licence of these 24 minerals shall be auctioned by the Central Government.**
- The **Second Schedule of the MMDR Act provides royalty rates for various minerals.**

Item No. 55 of the Second Schedule:

- Item No. 55 of the Second Schedule provides that royalty rate for the minerals whose royalty rate is not specifically provided therein **shall be 12% of the Average Sale Price (ASP).**
- If the royalty rate for these is not specifically provided, then their **default royalty rate would be 12% of ASP**, which is considerably high as compared to other critical and strategic minerals.
- This royalty rate of **12% is not comparable with other mineral producing countries.**

About Critical Minerals:

- Critical minerals refer to **mineral resources, both primary and processed, which are essential inputs in the production process of an economy**, and whose supplies are likely to be disrupted due to the risks of non-availability or unaffordable price spikes.
- To tackle such supply risks, **major global economies periodically evaluate which minerals are critical for their jurisdiction through a quantitative assessment**.
- Critical minerals have become essential for economic development and national security in the country.
- Critical minerals such as **Cadmium, Cobalt, Gallium, Indium, Selenium and Vanadium** and have uses in batteries, semiconductors, solar panels, etc.
- These minerals have gained significance in view of India's commitment towards energy transition and **achieving net-zero emission by 2070**.

Topic 40. ABOUT INDIA'S FIRST UNDER-RIVER METRO TUNNEL

Important for the subject: Geography

It is a part of **Kolkata Metro's East-West Corridor**. It passes under the **Hooghly River** and forms part of section from **Howrah Maidan to Esplanade**.

- The stretch also has the deepest metro station in the country, the Howrah Maidan station, at 32 metres below ground level.

River Hooghly:

- The Hooghly River, also known as the **Bhagirathi-Hoogly** and **Kati-Ganga Rivers**. It is a distributary or arm of the Ganges River.
- It is formed in **Murshidabad**, where the Ganga splits into two parts, while the part flowing through Bangladesh is called the Padma.
- The Hooghly River is silted up above Kolkata, and the river flows to the west and south to the estuary of Rupnarayan and then south and southwest to enter the Bay of Bengal through a 32-kilometer-wide estuary.
- **Haldi, Ajay, Damodar and Rupnarayan** are the rivers that feed the lower reaches of the Hooghly.
- The important cities near the Hoogli River are **Jiaganj, Azimganj, Murshidabad, and Baharampur**

Topic 41. STAR DUNES

Important for the subject: Geography

Scientist unveiled the first in depth study of star dune, revealing the internal structure of these geological features and showing how long it took for one of them to form

What are star dunes?

- Star dunes – or pyramid dunes – are named after their distinctive shapes and reach hundreds of metres in height.
- Star dunes make up just under 10% of the dunes in Earth's deserts. These are the tallest ones, surpassing other types such as crescent-shaped barchan dunes and straight and lengthy linear dunes.
- These are formed in areas with complex wind regimes, where winds blowing from different directions and net sand accumulation, points within the desert where big piles of sand can be blown around to form giant dunes.

Geographical distribution:

- They are found in Africa, Asia and North America and also have been spotted on Mars and on Saturn's large moon Titan.
- Earth's largest star dunes are found in the Badain Jaran desert in western China.
- Namib Sand Sea in Namibia, large sand seas in Algeria such as the Grand Erg Oriental and Grand Erg Occidental, and Rub' al Khali in Saudi Arabia.
- In North America, Great Sand Dunes National Park in Colorado contains a series of them.

Recent study about Star dunes

- The research team from the UK have estimated the age of star dune of Lala Lallia in Morocco, for the first time.
- The scientists used a technique called luminescence dating to work out the age of the star dune. The method calculates when the grains of sand were last exposed to daylight.

Types of dunes

- **Barchans:** – crescent-shaped sand dune produced by the action of wind predominately from one direction.
- One of the most common types of dunes, it occurs in sandy deserts all over the world.
- Barchans are convex facing the wind, with the horns of the crescent pointing downwind

and marking the lateral advancement of the sand.

- These dunes are markedly asymmetrical in cross section, with a gentle slope facing toward the wind and a much steeper slope, known as the slip face, facing away from the wind.

Parabolic

- Parabolic dunes – also called U-shaped, blowout, or hairpin dunes – tend to form where vegetation covers the sand. Winds may erode a section, pushing the sediment leeward. The vegetation will hold back the arms of the dune, so that the dune points in the leeward direction.
- The animation below gives a basic overview of how they form. They are most common in coastal deserts. Sometimes, parabolic dunes can come from transverse or barchan dunes, given that the dunes stay static enough for vegetation to grow on them.

Star

- Star dunes are a rare, interesting dune structure, that pepper landscapes in sandy deserts. They form when alternating and multiple wind directions pile sand in a location, and forms a peak, with many arms extending from the center (Fun Facts...).
- Star dunes make up 8.5% of all the dunes on the planet, and they often form in large groups in a dune field (Star Dunes). Many of these fascinating dunes can be seen in the Sahara desert, especially in the Grand Erg Oriental, a “sand sea” of dunes.

Barchan

- Barchan dunes are crescent or half-moon shaped, and are thus also called crescentic dunes. They form where conditions are ideal. They require a flat landscape, winds from only one direction, and limited sand.
- However, these exact conditions are rare, and so is this type of dune, although they are found in all types of deserts. Barchan dunes point against the wind. Their faces are steep, but their trailing sides are not. They will often join up with other barchans to form barchanoid ridges.

Longitudinal

- Also called linear dunes, longitudinal dunes look like large, parallel needle-esque features

on the landscape. They are straight, and long, unlike the typical dune that people imagine.

- This dune type forms when sand is not in excess, and when wind blows in one constant direction. Over an extended period of time the dunes will migrate in the direction the wind is blowing.

Topic 42. 2023-24 EL NINO AMONG FIVE STRONGEST ON RECORD, WILL CONTINUE FUELLING HEAT IN 2024: WMO

Important for the subject: Geography

The prevailing El Nino conditions fuelled record temperatures and extreme events the world over, with 2023 being the warmest on record

- As per **World Meteorological Organisation 2023-24 El Nino** has peaked as **one of the five strongest** on record and will continue to impact global climate in the coming months despite a weakening trend.
- The UN agency also said above-normal temperatures are predicted over almost all land areas between March and May.
- The prevailing El Nino conditions fuelled record temperatures and extreme events the world over, with 2023 being the warmest on record.
- According to the **European Union's Copernicus Climate Change Service**, the global mean temperature breached the **5-degree Celsius** threshold for an entire year for the first time in January.
- A permanent breach of the 1.5-degree Celsius limit, specified in the Paris Agreement, however, refers to long-term warming over many years.
- In its latest update, the World Meteorological Organisation (WMO) said there is about a 60% chance of El Nino persisting during March-May and an 80% likelihood of neutral conditions (neither El Nino nor La Nina) during April to June.
- There is a chance of La Nina developing later in the year but those odds are currently uncertain, it said.
- Scientists closely tracking the development in India have said La Nina conditions setting in by June-August could mean monsoon rains would be better this year than in 2023.
- Every month since June 2023 has set a new monthly temperature record — and 2023 was, by far, the warmest year on record.
- El Nino has contributed to these record temperatures but heat-trapping greenhouse gases are unequivocally the main culprit.
- “Ocean surface temperatures in the equatorial Pacific clearly reflect El Nino. But sea-

surface temperatures in other parts of the globe have been persistently and unusually high for the past 10 months.

- The January 2024 sea-surface temperature was by far the highest on record for January. This is worrying and cannot be explained by El Nino alone.
- The current El Nino event, which developed in **June 2023**, was at its strongest between **November and January**.
- It displayed a peak value of about 2.0 degrees Celsius above the 1991 to 2020 average sea-surface temperature for the eastern and central tropical Pacific Ocean.
- This made it **one of the five strongest El Nino events ever**, though it was weaker than the 1997-98 and 2015-2016 events.
- El Nino is mainly a **seasonal climate phenomenon** with climate impacts on **seasonal climate averages** but can make **extreme weather** and climate-events more likely in certain regions.
- The WMO said the seasonal forecasts are found to be more accurate during El Nino and La Nina events, particularly in the tropics, and this emphasises the pivotal role of early warnings to support decision-making and enhance preparedness and anticipatory action.
- El Nino events have a major impact on societies and economies. Accurate seasonal forecasts from the WMO community helped countries prepare in advance to try to limit the damage in climate sensitive sectors like agriculture, water resources and health.

What is El Nino?

- It is a periodic warming of the ocean surface in the central and eastern tropical Pacific Ocean — occurs every two to seven years on an average, and typically lasts nine to 12 months.
- It is associated with increased rainfall in the Horn of Africa and the southern US, and unusually dry and warm conditions in Southeast Asia, Australia and southern Africa.

Topic 43. OFFSHORE MINERAL BLOCKS FOR AUCTION

Important for the subject: Geography

Shortlisted Blocks:

The Mines Ministry has shortlisted around **10 offshore mineral blocks** for potential auction.

Location:

- Blocks are located on **both the east coast and west coast of India**.

Minerals:

Expected minerals include:

- **Construction sand**
- **Lime mud**
- **Others**

Number of Identified Blocks:

- Ministry has identified **35 offshore mineral blocks** so far.
- Potential auctions would mark the **first offshore mining activities** in India.

Exclusive Economic Zone (EEZ):

- Some blocks are in the **Exclusive Economic Zone** of India, beyond the territorial waters (12 nautical miles).
- Target minerals: **Lime mud and polymetallic nodules.**

Consultations:

- Inter-ministerial discussions underway **with Ministries like Defence for necessary No-Objection Certificates (NOCs).**
- Aim to avoid any overlapping with existing projects.

Timeline:

- Auctions likely to occur by **June-July 2024.**

Mineral Usage:**Lime mud primarily imported, used in:**

- **Steel**
- **Paint**
- **Pharma**
- **Glass industries**
- **Marine sand deposits** (used in construction) reported off the coast of Kerala.

Auction Rules:

- Discussion on rules:
- Auction for **production in-lease** can be made at **G3 level of exploration** for silica sand and lime mud.

Offshore Mining Stages:

Four stages of exploration:

- Reconnaissance (G4)
- Preliminary exploration (G3)
- General exploration (G2)
- Detailed exploration (G1)

Deep-sea Mining:

- **Offshore mining** or **deep-sea mining** involves retrieving mineral deposits from **ocean depths below 200 metres**.

Process:

- Submersible crafts with **suction pipes** creep across the seabed, stirring up metallic objects.
- **Poly-metallic nodules** sorted, unwanted sediment flushed back into the sea.

Demand:

- **Growing demand** for metals like those in nodules for:
- Wind turbines
- Solar panels
- Batteries
- Smartphones
- Essential for **clean-energy technologies**.

Standard Operating Procedures:

- Centre is developing **SOPs** for private sector bidders winning exploration rights.
- Offshore mineral auctions mark a significant step in India's mining sector, **potentially unlocking valuable resources and catering to the demand for essential minerals in various industries**.

Offshore Areas Mineral (Development and Regulation) Amendment Bill, 2023: Salient Features**Introduction of Auction Regime**

- **Purpose:** Major reform in allocating operating rights in offshore areas.
- **Method:** Operating rights granted through auction via competitive bidding.

Types of Operating Rights

Production Lease:

- Granting to private sector through auction.
- **Duration fixed at 50 years, aligning with MMDR Act.**
- **Renewal provision removed.**

Composite License:

- Two-stage operating right for exploration and production.
- Private sector granted through auction.

Operating Rights for PSUs

- Mineral-bearing areas reserved by Central Government.
- PSUs exclusively granted operating rights for atomic minerals.

Area Acquisition Limit**Maximum Area:**

- Restricted to 45 minutes latitude by 45 minutes longitude.
- Applies to any mineral or prescribed group of associated minerals.

Non-Lapsable Offshore Areas Mineral Trust**Purpose:****Ensure funds for:**

- Mitigation of adverse impacts.
- Disaster relief.
- Interest and benefits for affected parties.

Funding:

- Additional levy on mineral production, up to one third of royalty.
- Rate to be prescribed by Central Government.

Management:

- Trust to maintain a fund under the Public Account of India.

Ease of Business Measures**Transfer of Licenses:**

- Provision for easy transfer of composite license or production lease.

Timelines for Production

Commencement:

- Introduction of timelines for starting production and dispatch.
- Ensures timely utilization of leases.

Revenue Allocation

Royalty and Premiums:

- Revenues from offshore mineral production accrue to Government of India.
- **Significance of Offshore Mineral Resources in India**

Resource Potential:

- Vast mineral resources within Exclusive Economic Zone (EEZ).

GSI Findings:

- Lime mud, construction-grade sand, heavy mineral placers, phosphorite, ferromanganese nodules and crusts.

Economic Growth:

- Utilization essential for India's high-growth economy.

Public-Private Partnership:

- Encouragement of public-private partnerships.
- Private sector brings expertise and technology for exploration.

Conclusion

- The Offshore Areas Mineral (Development and Regulation) Amendment Bill, 2023 introduces crucial reforms in India's offshore mining sector.
- **By adopting an auction regime, granting specific rights to PSUs for atomic minerals, setting area acquisition limits, and establishing a non-lapsable trust, the Bill aims to promote transparency, responsible mining, and economic growth.**
- It aligns with India's vision of harnessing its maritime resources for sustainable development while ensuring benefit for all stakeholders.

Understanding the International Seabed

- The **international seabed**, also known as the Area, refers to the seabed and ocean floor beyond national jurisdiction.
- It covers about **54%** of the world's oceans.

- Recognized under the **United Nations Convention on the Law of the Sea (UNCLOS)** as the “**common heritage of mankind**,” it is to be managed for the benefit of all nations.

The Role of International Seabed Authority (ISA)

- **Establishment:** ISA is an autonomous international organization established under UNCLOS.
- **Mandate:** It **regulates and manages all mineral-related activities** in the international seabed.

Functions:

- Grants licenses and regulates exploration and exploitation activities.
- Ensures activities protect the marine environment.
- Promotes equitable and efficient resource utilization.

Deep Sea Mining:

- **Definition:** Involves extracting mineral deposits and metals from the ocean floor.

Types:

- Mining **polymetallic nodules**.
- Extracting massive seafloor sulphide deposits.
- **Stripping cobalt crusts from rocks.**
- **Materials:** These areas contain minerals vital for technologies such as **batteries, cellphones, and renewable energy.**

Current Regulations on Deep Sea Mining

- Governed by the **United Nations Convention on the Law of the Seas (UNCLOS)**.
- **High Seas:** Areas beyond 200 nautical miles from any nation's coast.
- **Common Heritage:** The seabed and its resources are considered humanity's shared wealth.
- **Management:** Must protect **global interests, support research, and safeguard marine environments.**

Challenges of Offshore Mining

- Environmental Impact
- Deep-Sea Ecosystem
- Technological Challenges

- Regulatory Issues
- Resource Conflicts
- Economic Viability
- Social Impact
- Waste Management
- Accidents and Spills
- Lack of Coordination

Topic 44. WHY INS JATAYU, INDIA'S NEW NAVAL BASE IN LAKSHADWEEP, MATTERS

Important for the subject: Geography



On March 6th, the **Indian Navy** will commission the Naval Detachment Minicoy as **INS Jatayu**, transforming it into an **upgraded naval base** at the **strategic Lakshadweep Islands**

- This development represents a significant step in **enhancing India's security infrastructure in the region.**
- The **Minicoy detachment**, located on the **southernmost atoll of the Lakshadweep**

archipelago, has been **operational since the 1980s**, but its upgrade to **INS Jatayu** marks it as the **country's second naval base** in **Lakshadweep**, following **INS Dweeprakshak** in **Kavaratti**, commissioned in **2012**.

- This event comes shortly after the joint inauguration of an airstrip and a jetty on the **Mauritian island of Agaléga**, showcasing **India's strategic interests in the Indian Ocean**. The prefix **INS** is used for **ships, bases, and detachments** of the **Indian Navy**.

INS Jatayu naval base:

- The **Naval Detachment Minicoy**, currently under the **command of the Naval Officer-in-Charge (Lakshadweep)**, is set to be commissioned as **INS Jatayu**, transforming it into a **full-fledged naval base**.
- This transition involves **enhancing the base's facilities beyond its existing administrative, logistics, and medical capabilities** to include additional infrastructure like an **airfield, housing, and personnel**, Important for the subject to **environmental** and other necessary clearances.
- The **construction efforts**, particularly for a **jetty**, may face challenges due to the **island's fragile ecology**, but plans are underway to develop an **airfield** capable of supporting both **military and civil aircraft operations**.
- The **establishment of INS Jatayu** as an **independent naval unit** with comprehensive infrastructure **aims to bolster the Indian Navy's operational capability** in the **Lakshadweep Islands**, aligning with the **government's strategy for the islands' holistic development**.
- The base is expected to extend the **Navy's operational reach, support anti-piracy and anti-narcotics efforts** in the **western Arabian Sea**, and enhance its role as a first responder in the region.
- The **commissioning of INS Jatayu** and the proposed **airfield** will significantly strengthen the **Navy's presence on the western seaboard**, enabling the **operation of various aircraft**, including **P8I maritime reconnaissance aircraft and fighter jets**.
- This development is particularly pertinent as **India** seeks to **counter Chinese influence** in the **Indian Ocean Region** amidst strained relations with the **Maldives** following the election of a **pro-China president**.

About Lakshadweep Islands:

- **Lakshadweep**, meaning a **hundred thousand islands'** in **Sanskrit and Malayalam**, is an **archipelago** comprising **36 islands**, stretching between **220 km and 440 km** off the **coast of Kochi, India**.
- With **only 11 of these islands being inhabited**, the **total land area of Lakshadweep** is merely **32 square kilometers**.

- The archipelago forms part of a significant **chain of coralline islands** in the **Indian Ocean**, which also includes the **Maldives** to the **south** and the **Chagos archipelago** further **south, across the equator**.
- Due to its **strategic location in the Indian Ocean**, **Lakshadweep** holds immense strategic value for India.
- **Minicoy Island**, in particular, is crucial as it **lies adjacent to vital Sea Lines of Communications (SLOCs)**, including the **Eight Degree Channel** (between Minicoy and the Maldives) and the **Nine Degree Channel** (between Minicoy and the main cluster of Lakshadweep islands), making these islands significantly important but also exposed to risks of marine pollution.

It consists of three major islands.

- **Amindivi Islands** (consisting of six main islands of Amini, Keltan, Chetlat, Kadmat, Bitra and Perumul Par). [don't have to remember all these names]
- **Laccadive Islands** (consisting of five major islands of Androth, Kalpeni, Kavaratti, Pitti and Suheli Par) and **Minicoy Island**. At present these islands are collectively known as Lakshadweep.
- The Lakshadweep Islands are a group of 25 small islands. They are widely scattered about 200-500 km south-west of the Kerala coast.
- Amindivi Islands are the northern most while the Minicoy island is the southernmost. All are tiny islands of **coral origin** {Atoll} and, they are **surrounded by fringing reefs**.
- The largest and the most advanced is Lakshadweep Islands the Minicoy island with an area of 4.53 sq km.
- Most of the islands have low elevation and do not rise more than five metre above sea level (Extremely Vulnerable to sea level change).
- Their topography is flat and relief features such as hills, streams, valleys, etc. are absent.

Topic 45. FOURTH MASS CORAL BLEACHING

Important for the subject: Geography

According to the U.S. NOAA, the world is on the verge of a **fourth mass coral bleaching event** which could see wide swathes of tropical reefs die, including parts of **Australia's Great Barrier Reef**.

Coral reef

- But corals are quite sensitive to warming water. They host a microscopic symbiotic alga called **zooxanthella** that **photosynthesizes** just like plants, providing food to the coral. When the surrounding waters get too warm for too long, the zooxanthellae leave the

coral, and the coral can turn pale or white – a process known as bleaching.

- If corals stay bleached, they can become energetically compromised and ultimately die.
- When corals die or their growth slows, these beautiful, complex reef habitats start disappearing and can eventually erode to sand.

Importance of coral reefs:

- Coral reefs are **hot spots of biodiversity**. They are often referred to as the rainforests of the sea because they are home to the highest concentrations of species in the ocean.
- Healthy reefs are vibrant ecosystems that **support fish and fisheries**, which in turn support economies and food for millions of people.
- Additionally, they provide billions of dollars in economic activity every year through tourism, particularly in places like the Florida Keys, where people go to scuba dive, snorkel, fish and experience the natural beauty of coral reefs.
- If that isn't enough, reefs also protect shorelines, beaches and billions of dollars in coastal infrastructure by buffering wave energy, particularly during storms and hurricanes.

What is Coral Bleaching?

- When corals face stress by changes in conditions such as temperature, light, or nutrients, they **expel the symbiotic algae zooxanthellae** living in their tissues, causing them to turn completely white. This phenomenon is called **coral bleaching**.
- The **pale white colour** is of the translucent tissues of calcium carbonate which are visible due to the loss of pigment producing zooxanthellae.
- Bleached corals can survive depending on the levels of bleaching and the recovery of sea temperatures to normal levels.
- If heat-pollutions subside in time, over a few weeks, the zooxanthellae can come back to the corals and restart the partnership but severe bleaching and prolonged stress in the external environment can lead to coral death.
- Over the last couple of decades, climate change and increased global warming owing to rising carbon emissions and other greenhouse gases have made seas warmer than usual.
- Coral bleaching has occurred in the Caribbean, Indian, and Pacific oceans on a regular basis.

Mass Coral Bleaching:

- To officially declare a global mass bleaching event, widespread bleaching must be observed in three major ocean basins: the **Atlantic, Pacific, and Indian Oceans**. According to Manzello, “technically we’re already there” in 2024, pending final confirmation from Indian Ocean scientists.

Previous Mass Coral Bleaching

- **First Mass Bleaching:** It occurred in 1998 when the El Niño weather pattern caused sea surfaces in the Pacific Ocean to heat up; this event caused 8% of the world's coral to die.
- **Second Mass Bleaching:** This event took place in 2002. In the past decade, however, mass bleaching occurrences have become more closely spaced in time, with the longest and most damaging bleaching event taking place from 2014 to 2017.
- **Third Mass Bleaching:** The event that took place between 2014-17 affected reefs in Guam in the Western Pacific region, the North, South-Pacific, and the Indian Ocean.

What are the Findings of the National Oceanic and Atmospheric Administration (NOAA)?

- The world is on the verge of a fourth mass coral bleaching event (after 1998, 2010 and 2014).
- Preliminary results suggest that about 15% of the world's reefs saw large coral die-offs in this event.
- This year is turning out to be even worse. For example, following the Northern Hemisphere summer last year, the Caribbean registered its worst coral bleaching on record.
- Coral bleaching is often tied to the naturally occurring **El Nino climate phenomenon which leads to warmer ocean waters.**
- The world also just registered (as a result of climate change) its first 12-month period with an average temperature over 1.5 degrees Celsius (2.7 degrees Fahrenheit) above pre industrial levels.
- A rise of 1.5C is believed to be the tipping point for mass coral die-offs, with scientists estimating that 90% of the world's corals could be lost.

Initiatives to Protect Corals

International Coral Reef Initiative

- **Global Coral Reef Monitoring Network (GCRMN)**
- **Global Coral Reef Alliance (GCRA)**

The Global Coral Reef R&D Accelerator Platform

- Similarly, the Ministry of Environment and Forests and Climate Change (MoEF&CC), India has included the **studies on coral reefs under the Coastal Zone Studies (CZS).**
- In India, the Zoological Survey of India (ZSI), with help from Gujarat's Forest department, is **attempting a process to restore coral reefs using "biorock" or mineral**

accretion technology.

- **National Coastal Mission Programme**, to protect and sustain coral reefs in the country.

Topic 46. INDIGENOUS GREENLAND WOMEN SUE DENMARK OVER FORCED CONTRACEPTION

Important for the subject: Geography

In **Greenland**, **143 Indigenous Inuit women** have filed a **lawsuit** against **Denmark**, demanding compensation of nearly **43 million kroner (\$6.3 million)** for being **forcibly fitted with intrauterine contraceptive devices (IUDs)** during the **1960s and 70s**.

- These women, some of whom were teenagers at the time, allege that **Danish health authorities** violated their **human rights** by **inserting these devices without their awareness or consent, aiming to curb population growth** in **Greenland** amidst **improving living conditions and healthcare**.
- Although **Greenland** transitioned from a **Danish colony** to a province in **1953**, the matter has prompted a joint investigation by the **governments of Denmark and Greenland**, with findings expected next year.

About Intrauterine Contraceptive Devices (ICD):

- An **IUD** is a **small T-shaped plastic and copper device** that's put into one's **womb (uterus)** by a doctor or nurse.
- It releases **copper** to stop one **getting pregnant**, and **protects against pregnancy for between 5 and 10 years**. It's sometimes called a **"coil"** or **"copper coil"**.

Uses, advantages and disadvantages:

- When inserted correctly, IUDs are more than **99% effective**.
- An **IUD works** as soon as it's put in and **lasts for 5 to 10 years**, depending on the type.
- It can be put in at any time during one's **menstrual cycle**, as long as **one is not pregnant**.
- It can be **taken out at any time** by a specially trained doctor or nurse. **It's then possible to get pregnant straight away**.
- There's a **small risk of getting an infection** after it's been fitted.
- There's a small risk that one's body may push out the IUD or it may move.
- It **may not be suitable** if one has had previous pelvic infections.
- It **does not protect against sexually transmitted infections (STIs)**.

About Greenland:

- **Greenland** is a **North American autonomous territory** of the **Kingdom of Denmark**.

- It is the **larger of two autonomous territories** within the Kingdom, the other being the **Faroe Islands**; the citizens of both territories are **full citizens of Denmark**.
- As **Greenland** is one of the **Overseas Countries and Territories of the European Union**, citizens of **Greenland** are **European Union citizens**.
- The **capital and largest city of Greenland** is **Nuuk**.
- **Greenland** lies between the **Arctic and Atlantic oceans**, east of the **Canadian Arctic Archipelago**.
- It is the **world's largest island**, and is the location of the **northernmost area of the world** – **Kaffeklubben Island** off the **northern coast** is the **world's northernmost undisputed point of land**, and **Cape Morris Jesup** on the **mainland** was thought to be so until the **1960s**.

Topic 47. NATIONAL DAM PANEL TO EXAMINE KALESHWARAM PROJECT ON MARCH 6

Important for the subject: Geography

The **National Dam Safety Authority (NDSA)** has established an **expert committee** to investigate the **Kaleshwaram Lift Irrigation Project (KLIP)** following concerns over the **sinking of piers** at the **Medigadda barrage**.

- This inspection is scheduled due to issues at the **Medigadda barrage, Sundilla and Annaram barrages**.
- The **NDSA's five-member committee**, led by **J. Chandrasekhar Iyer**, a former chairman of the **Central Water Commission (CWC)**, will conduct a comprehensive review.

Madigadda barrage:

- The **Lakshmi Barrage**, also known as the **Medigadda Barrage** is the starting point of the **Kaleshwaram Project** which envisages the construction of **three barrages** between **Yellampally & Medigadda**.
- Its **objective** is to utilize **Godavari** water for drinking and irrigation. The Barrage/Project site is located at **Medigadda Village**, Mahadevpur Mandal, Jayashankar Bhupalpally district in **Telangana State, India**.

Kaleshwaram lift- irrigation project:

- It is a **multi-purpose irrigation project** on the **Godavari River** in **Kaleshwaram, Bhupalpally, Telangana**.
- The project starts at the confluence point of the **Pranahita River** and **Godavari River**.
- Originally called the **Pranahita-Chevella project** in erstwhile **Andhra Pradesh**, it was

redesigned, extended and renamed as the **Kaleshwaram project** in **Telangana** in **2014**.

Need of the project:

- It would bring **drinking water and irrigation** to the **backward areas of Telangana**.
- It will also help to restore the **groundwater level** to its original state by the way of shifting from the usage of groundwater for irrigation to the usage of surface water.
- The project will also support **Mission Kakatiya** and **Mission Bhagiratha** schemes designed to provide drinking water to many villages and improve the capacities of tanks.

National Dam Safety Authority (NDSA):

- The **Dam Safety Act 2021** was introduced in response to dam failures caused by deficient surveillance and maintenance.
- It establishes **key responsibilities** and requires the formation of national and state-level bodies for its implementation.

The Act outlines the following provisions:

- **National Committee on Dam Safety:** Responsible for overseeing dam safety policies and regulations.
- **National Dam Safety Authority:** Tasked with implementing and resolving state-level disputes.
- **Chairman of the Central Water Commission (CWC):** Heads dam safety protocols at the national level.
- **State Committee on Dam Safety (SCDS) and State Dam Safety Organisation (SDSO):** To be established at the state level.

Topic 48. EXPERTS REPORT NICARAGUAN ‘SYSTEMATIC HUMAN RIGHTS VIOLATIONS’ TO UN COUNCIL

Important for the subject: International Relations



Nicaragua has jailed hundreds of real and perceived opponents since then and shuttered more than 3,500 religious and other NGOs, often also seizing their assets.

- **Managua** views the 2018 protests as part of an attempted coup promoted by Washington, and claims they were funded by NGOs.
- In a report presented to the **UN's Human Rights Council (HRC) in Geneva**, said that the President, Vice President and other high-level officials should be held accountable.

About Nicaragua:

- Nicaragua, officially the **Republic of Nicaragua**, is the **largest country in Central America**.
- The country is bordered by **Honduras to the north, the Caribbean to the east, Costa Rica to the south, and the Pacific Ocean to the west**.
- Managua is the **country's capital and largest city**. As of 2015, it was estimated to be the **third largest city in Central America**.

About the United Nations Human Rights Council (UNHRC):

- The **UNHRC describes itself as an inter-governmental body within the UN system** responsible for strengthening the promotion and protection of human rights around the globe.
- It addresses situations of **human rights violations and makes recommendations on them**.
- The UNHRC has the **ability to discuss all thematic human rights issues and situations that require its attention throughout the year**.
- The UNHRC replaced the **former United Nations Commission on Human Rights (UNCHR)**.

UNHCR's headquarters is located in Geneva.

- The organization employs over 10,966 staff in more than 130 countries, including the Republic of Korea.

Topic 49. INDIA AND SOUTH AFRICA BLOCK ATTEMPT TO INCLUDE 'INVESTMENT FACILITATION FOR DEVELOPMENT' AGREEMENT AT WTO MEET

Important for the subject: International Relations

Opposition to **Investment facilitation for development (IFD) Agreement** at **WTO's 13th Ministerial Conference**.

- The **13th Ministerial Conference (MC13)** of the **World Trade Organization**

(WTO) took place in **Abu Dhabi**, starting on February 26 and concluding on February 29.

Investment Facilitation for Development (IFD) Agreement:

- The **IFD Initiative** was initiated in the spring of **2017** by **developing and least-developed WTO members**.
- Its goal is to **create a global agreement to enhance the investment and business climate, facilitating easier investment, daily business operations, and expansion for investors across all economic sectors**.
- The agreement is **plurilateral**, based on the **most-favoured-nation principle**, and is **open for all WTO members** to join. **Plurilateral agreements are binding only on the WTO members that accept them**.
- Over **120 countries supported the IFD agreement**, aiming to integrate it into the **WTO to improve the investment and business climate**.
- The agreement, advocated by a **China-led group**, sought to be made **binding through Annexure-4 of the WTO**.

Opposition by India and South Africa

- **India and South Africa** formally **opposed the IFD agreement's consideration** at MC13, labelling it a **non-trade issue outside the WTO's framework**.
- **India** argued that **investment-related issues do not fall under the WTO's jurisdiction**, emphasizing that the **Marrakesh Agreement** requires **explicit consensus** for adopting **new plurilateral agreements**.

Consensus and Attempts to Persuade

- **South Korea**, a co-sponsor, acknowledged the need for consensus to incorporate the **IFD agreement**.
- **Civil society organizations** reported efforts by the **WTO Secretariat** to persuade opponents to withdraw their objections.
- **WTO Director-General Ngozi Okonjo-Iweala** mentioned the **IFD agreement** as a potential **"deliverable."**

India's Stance on Development Issues

- **India** emphasized the **importance of addressing issues relevant to developing countries**, insisting that new issues should not be considered unless previous decisions and mandates were fulfilled.
- **India** defended the principles of **'Special and Differential Treatment'**, asserting they are **fundamental to the WTO's objectives and not exceptions to its rules**.

Topic 50. 2023 WAS DEADLIEST YEAR FOR MIGRANTS IN A DECADE: UN

Important for the subject: International Relations



As per the UN's International Organization for Migration the 2023 death count represents a tragic increase of 20 percent compared to 2022, highlighting the urgent need for action to prevent further loss of life.

- At least 8,565 people died on migration routes worldwide in 2023, making it the deadliest year since records began a decade ago

Why increase?

- The IOM said that because safe and regular migration pathways remain limited, hundreds of thousands of people attempt to migrate every year via irregular routes in unsafe conditions.

The most unsafe migration route

- The **Mediterranean Sea**, where many migrants try to reach southern Europe from northern Africa, continues to be the deadliest route for migrants, with at least 3,129 deaths and disappearances registered last year.
- It is the highest number of deaths on the Mediterranean migration routes since 2017. In one incident alone an overcrowded trawler, the Adriana, sank off the coast of Greece in on June 14 last year, with the loss of more than 600 lives.

- Unprecedented numbers of migrant deaths were recorded last year across Africa (1,866) and Asia (2,138).
- In Africa, most of the deaths occurred in the Sahara Desert and the sea route to **Spain's Canary Islands**.
- In Asia, hundreds of deaths of Afghan and Rohingya refugees were recorded last year.
- Slightly more than half of the total migrant deaths in 2023 came as a result of drowning, with nine percent caused by vehicle accidents, and seven percent in violence

International Organization for Migration

- IOM is an **intergovernmental organization** that provides services and advice concerning migration to governments and migrants, including refugees, internally displaced persons and migrant workers.
- IOM was **established in 1951** as Intergovernmental Committee for European Migration (ICEM) to help resettle people displaced by World War II.
- It was granted **Permanent Observer status to UN General Assembly in 1992**. Cooperation agreement between IOM and the UN was signed in 1996.
- **World Migration Report is published every year by International Organization for Migration (IOM) of the UN.**
- IOM works in **four broad areas of migration management**:
- Migration and development, Facilitating migration, Regulating migration and Forced migration.
- It has **166 member states**, a further 8 states holding observer status and offices in over 100 countries.

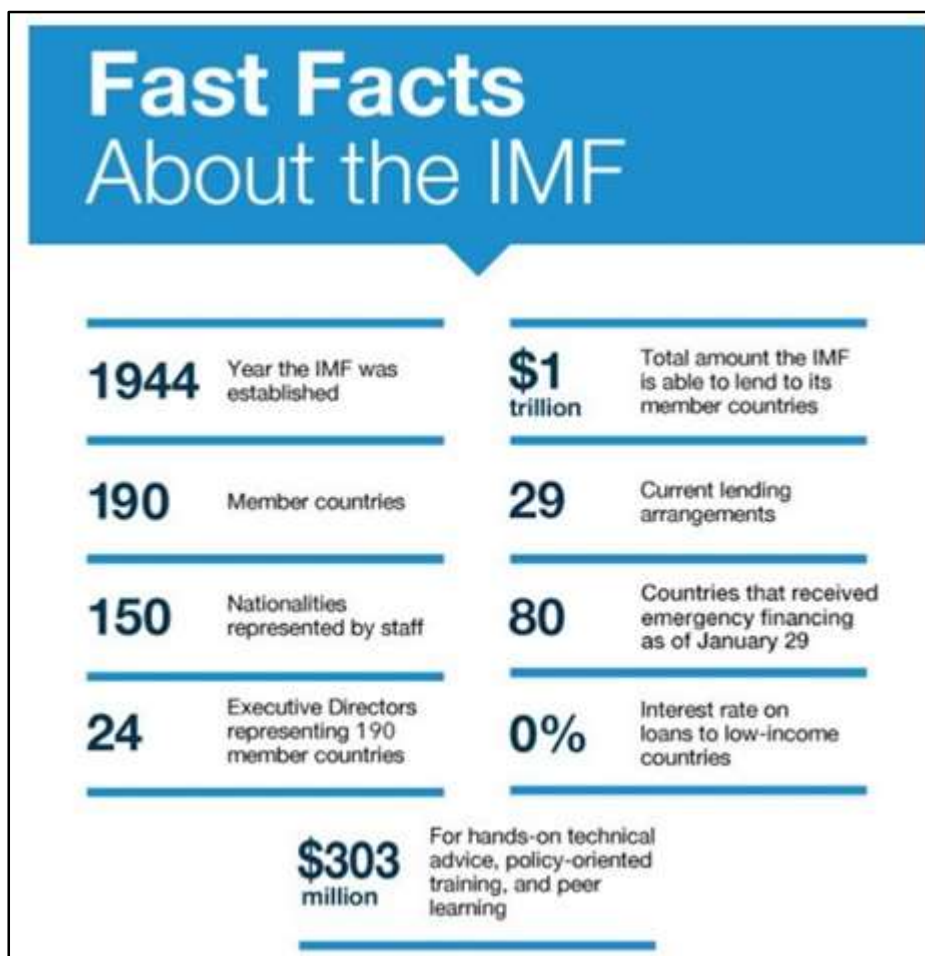
India is a member of IOM.

Missing Migrants Project

- **Missing Migrants Project** records since 2014 people who die in the process of migration towards an international destination, regardless of their legal status.
- As collecting information is challenging, all figures remain undercounts. The locations in most cases are approximate. Each number represents a person, as well as the family and community that they leave behind.

Topic 51. ENSURE PAKISTAN DOES NOT DIVERT LOANS TO FOOT DEFENCE BILLS: INDIA TO IMF

Important for the subject: International Relations



India stresses the need for stringent monitoring during a recent review of the IMF's ₹3 billion loan to Pakistan; new PM Shehbaz Sharif seeking additional funding support from the IMF.

- The Stand-by Arrangement (SBA) provides short-term financial assistance to countries facing balance of payments problems.
- Historically, it has been the IMF lending instrument most used by advanced and emerging market countries. Through the years, the SBA has been upgraded to be more flexible and responsive to countries' needs.
- The International Monetary Fund, or IMF, promotes international financial stability and monetary cooperation.
- It also facilitates international trade, promotes employment and sustainable economic growth, and helps to reduce global poverty.

- The IMF is governed by and accountable to its 190 member countries.

Primary aims:

- Promote international monetary cooperation; Facilitate the expansion and balanced growth of international trade; Promote exchange stability;
- Assist in the establishment of a multilateral system of payments; and Make resources available (with adequate safeguards) to members experiencing balance-of-payments difficulties.
- **Financial assistance:** Providing loans to member countries that are experiencing actual or potential balance-of-payments problems is a core responsibility of the IMF.
- **Surveillance:** In order to maintain stability and prevent crises in the international monetary system, the IMF monitors member country policies as well as national, regional, and global economic and financial developments through a formal system known as surveillance.
- **SDRs:** The IMF issues an international reserve asset known as Special Drawing Rights, or SDRs, that can supplement the official reserves of member countries participating in the SDR Department (currently all members of the IMF).
- **Resources:** Member quotas are the primary source of IMF financial resources. A member's quota broadly reflects its size and position in the world economy. The IMF regularly conducts general reviews of quotas.
- **IMF Members:** Any other state, whether or not a member of the UN, may become a member of the IMF in accordance with IMF Articles of Agreement and terms prescribed by the Board of Governors.
- Membership in the IMF is a prerequisite to membership in the IBRD.

Governance and organization:

- The IMF is accountable to its member country governments.
- At the top of its organizational structure is the **Board of Governors**, consisting of one governor and one alternate governor from each member country, usually the top officials from the central bank or finance ministry.

The Board of Governors meets once a year at the IMF–World Bank Annual Meetings.

- Twenty-four of the governors serve on the International Monetary and Financial Committee, or IMFC, which advises the IMF's Executive Board on the supervision and management of the international monetary and financial system.
- The day-to-day work of the IMF is overseen by its 24-member **Executive Board**, which represents the entire membership and supported by IMF staff.
- The **Managing Director** is the head of the IMF staff and Chair of the Executive Board

and is assisted by four **Deputy Managing Directors**.

- First Deputy Managing Director is the second top post in IMF next to the Managing Director.
- The First Deputy Managing Director in the IMF takes lead on conducting surveillance, flagship publications and oversee researches
- The IMF's **various lending instruments are tailored to different types of balance of payments** need as well as the specific circumstances of its diverse membership
- **General Resources Account**-All IMF members are eligible to access the Fund's resources in the General Resources Account (GRA) on non-concessional terms.
- Funds for PRGT lending are obtained through bilateral loan agreements at market interest rates. Subsidy resources make up the difference between the market rates received by lenders and the concessional rates paid by LIC borrowers.
- **Poverty Reduction and Growth Trust**-concessional financial support (currently at zero interest rates) available through the Poverty Reduction and Growth Trust
- **Stand-By Arrangements (SBAs)**- in case of emerging and advanced market economies in crises, the bulk of IMF assistance has been provided through Stand-By Arrangements to address short-term or potential balance of payments problems.
- **Standby Credit Facility (SCF)** -Financing for LICs with actual or potential short-term balance of payments and adjustment needs caused by domestic or external shocks, or policy slippages—can also be used on a precautionary basis during times of increased risk and uncertainty.
- **The Extended Fund Facility (EFF)** -Fund's main tool for medium-term support to emerging and advanced countries facing protracted balance of payments problems
- **Extended Credit Facility (ECF)** for low-income countries are the Fund's main tools for medium-term support to countries facing protracted balance of payments problems
- **Flexible Credit Line (FCL) or the Precautionary and Liquidity Line (PLL)**-To help prevent or mitigate crises and boost market confidence during periods of heightened risks, members with already strong policies can use the Flexible Credit Line (FCL) or the Precautionary and Liquidity Line (PLL).
- **The Rapid Financing Instrument (RFI)** –for emerging and advanced countries provide rapid assistance to countries with urgent balance of payments needs, including from commodity price shocks, natural disasters, and domestic fragilities.
- **Rapid Credit Facility (RCF)**-Rapid financial support as a single up-front payout for low-income countries facing urgent balance of payments needs—possible repeated disbursements over a (limited) period in case of recurring or ongoing balance of payments

needs.

- **Catastrophe Containment and Relief Trust**—In February 2015, the IMF repurposed the Post-Catastrophe Debt Relief Trust, into the Catastrophe Containment and Relief Trust.
- Under the new trust the IMF can join international debt relief efforts for poor countries hit by the most catastrophic of natural disasters. It can also assist countries battling public health disasters—such as infectious disease epidemics—with grants for debt service relief.

Topic 52. HAITIAN CRISIS

Important for the subject: International Relations

Doctors Without Borders (MSF) announced Wednesday it was boosting its presence in the Haitian capital following a surge in casualties linked to the worsening violence engulfing **Port-au-Prince**.

- Armed groups have mounted a coordinated effort to oust Prime Minister Ariel Henry — who was supposed to step down last month — with Port-au-Prince’s airport, prisons, police stations and other strategic targets coming under attack.
- **The gang leader behind the violence blighting the Haitian capital has warned there will be a “civil war” if Haiti’s prime minister, Ariel Henry, does not step down.**
- **Jimmy “Barbecue” Chérizier** made the threat as members of his gang tried to seize the capital’s airport to stop Mr Henry from returning from abroad.

Haiti:

- **Population:** 11.5 million (estimate)
- **Area:** 27,800 sq km (slightly smaller than Belgium, about the same size as the state of Maryland in the US)
- **Location:** Caribbean country sharing a border with the Dominican Republic
- **Languages:** French, Haitian Creole

How will the development of Agaléga help Mauritius?

- The new jetty and airstrip will enable a larger and more credible government presence on the islands, and the stationing or **forward deployment of ships of the Mauritius Coast Guard.**
- It will be possible to better monitor and police the vast **Exclusive Economic Zone (EEZ) that extends 200 nautical miles outward from these islands.**

What is in it for India?

- The joint development of Agaléga underscores India's commitment to the vision of **Security And Growth for All in the Region (SAGAR)**, and its willingness to assist smaller maritime nations in building capacity and developing capability.
- It will indicate to other maritime neighbors that India is a **benign and friendly country that respects the sovereignty of independent nations.**
- India would like to emerge as the preferred development and security partner in the Indian Ocean Region.

About Agalega Islands:

- **Agaléga is a group of two islands** with a total area of 26 sq km and a native population of about 300 people.
- It lies approximately 650 nautical miles (1,050 km) **north of Mauritius, and belongs to the island nation.**
- **Agaléga is a dependency of Mauritius** which consists of two outer islands located in the Indian Ocean, about 1,050 km (650 mi) north of Mauritius Island.
- Agalega is explicitly defined by the **Constitution of Mauritius, part of the Sovereignty of Mauritius**, together with the following islands **Rodrigues, Tromelin, Cargados Carajos (Saint Brandon), Chagos Archipelago, Diego Garcia and other islands included in the State of Mauritius.**

Topic 54. RAJYA SABHA MEMBER, TEAM MEET REBEL ARAKAN ARMY INSIDE MYANMAR, DISCOVER POOR CONDITION OF KALADAN PROJECT ON MYANMAR SIDE

Important for the subject: International Relations



An **Indian delegation**, led by **Rajya Sabha member K. Vanlalvena**, engaged in talks with the **Arakan Army within Myanmar**, weeks after the **rebel group captured a crucial township** near the **Indian border**.

- The meeting **aimed** to discuss the status of the **Kaladan Multi-Modal Transit Transport Project**, a **\$484 million connectivity initiative** designed to enhance **overland and water connectivity** between **India and Southeast Asia**.

Key Discussions:

- The dialogue with the **Arakan Army** focused on **two main issues**: the **refugee problem** affecting the region and the **progress of the Kaladan project**.
- **Security and Autonomy Concerns:**
- The situation indicates a loss of control by the **Burmese military** in the area, highlighting the influence of various rebel groups over approximately forty per cent of Myanmar's territory.

Strategic Implications:

- The **Kaladan project** is strategically important for connecting **India's northeastern region to Southeast Asia**, potentially enhancing commercial prospects through the **port of Sittwe**.
- The engagement with the **Arakan Army**, a **non-state actor** with growing influence, raises questions about the future legal status of the Kaladan project amid Myanmar's complex political landscape.

About Kaladan Multi-Modal Transit Transport Project:

- **Kaladan Project** would link **India and Myanmar** via the **Bay of Bengal**.
- It was **jointly identified** by **India and Myanmar** to create a **multi-modal mode of transport** for the shipment of cargo from the **eastern ports of India to Myanmar** as well as to the **North-Eastern part of India** through **Myanmar**.
- It is being constructed by **India** under the **Grant in Aid Scheme**.
- Once completed, it will link **Kolkata** with the **Sittwe seaport** in **Rakhine state** in **Myanmar**, primarily over the **Bay of Bengal** – covering over 500 km.

The project envisaged four important stages:

- Kolkata to Sittwe waterway;
- Sittwe to Paletwa inland (River Kaladan) waterway;
- Paletwa to India-Myanmar border post in Myanmar;

- Finally, linking the road to Lawngtlai in Mizoram as part of the project's last leg;

Benefits:

- The project is expected to contribute to the economic development of the North-Eastern States of India.
- It also provides a strategic link to the North-East, thereby reducing pressure on the Siliguri Corridor.

Places in news:

- **Paletwa township-** a part of Myanmar (border to India) currently controlled by the Arakan Army.
- **Port of Sittwe-** A port of Myanmar and a part of the **Kaladan Project**.

Topic 55. GLOBAL RESOURCES OUTLOOK 2024

Important for the subject: International Relations

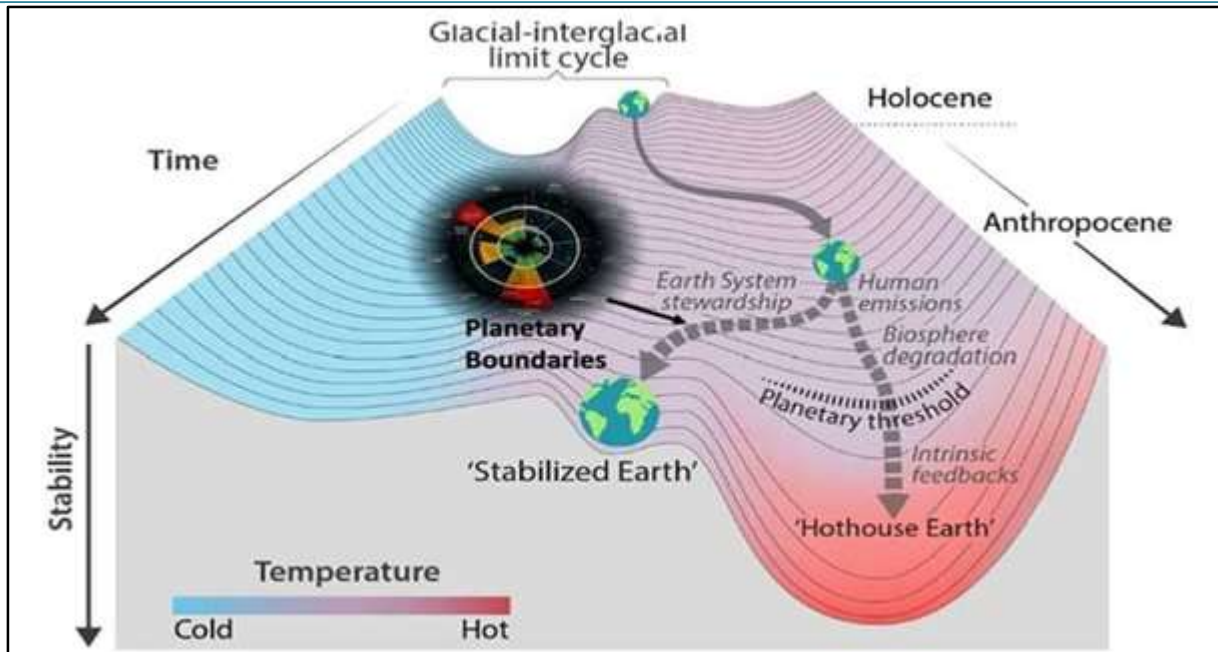
Global Resources Outlook 2024, released on final day of assembly, reveals shocking statistics

What is Global Resources Outlook?

- It is a flagship report of International Resource Panel

What is International Resource Panel (IRP)?

- The International Resource Panel (IRP) was launched by the United Nations Environment Programme (UNEP) in 2007 to build and share the knowledge needed to improve our use of resources worldwide.
- The International Resource Panel is a scientific panel of experts that aims to help nations use natural resources sustainably without compromising economic growth and human needs.
- It provides independent scientific assessments and expert advice on a variety of areas, including:
- The volume of selected raw material reserves and how efficiently these resources are being used the lifecycle-long environmental impacts of products and services created and consumed around the globe options to meet human and economic needs with fewer or cleaner resources.
- The Secretariat of the IRP is hosted by the **United Nations Environment Programme (UN Environment) through its office in Paris, France**.



- **Earth Trajectories:** Think of the Earth's climate taking different trajectories through time — pathways weaving between different climate states.
- Different paths through all the possible climates can be influenced by distinct tipping points.
- Self-reinforcing feedback processes can lock the planet into a particular trajectory for centuries or millennia.
- There is no evidence that modern societies can exist, let alone thrive, in conditions substantially different from the Holocene.

Topic 56. RAJYA SABHA POLLS BJP GAINS IN U.P., HIMACHAL PRADESH AMID CROSS-VOTING

Important for the subject: Polity

Rajya Sabha polls in Uttar Pradesh and Himachal Pradesh went down to the wire, with heavy cross-voting by Samajwadi Party (SP) and Congress MLAs respectively, and the BJP walking away with two extra seats than its Assembly strength permitted.

- The June 1998 Rajya Sabha elections in Maharashtra witnessed cross-voting that resulted in the loss of a Congress party candidate

Legal Provisions:

- As per **Article 80 of the Constitution**, representatives of each State to the Rajya Sabha are elected indirectly by the elected members of their Legislative Assembly.
- In order to rein in the MLAs from such cross-voting, an amendment to

the **Representation of the People Act, 1951** was carried out in 2003.

- **Section 59 of the Act** was amended to provide that the voting in elections to Rajya Sabha shall be through an open ballot.

What does the Tenth Schedule state?

- **The 52nd constitutional amendment** introduced the ‘**anti-defection**’ law through the **Tenth Schedule in 1985**.
- This Schedule provides that a member of a House of Parliament or State legislature who voluntarily gives up the membership of their political party or votes against the instructions of their party in a House are liable for disqualification from such House.
- This instruction with respect to voting is issued by the ‘**whip**’ of a party.
- However, the elections to **Rajya Sabha are not treated as a proceeding within the Legislative Assembly**.
- The Election Commission, drawing reference to Supreme Court judgments, had issued a clarification in July 2017.
- It specified that the provisions of the **Tenth Schedule, with respect to voting against the instruction of the party, will not be applicable for a Rajya Sabha election**.
- Furthermore, political parties cannot issue any ‘whip’ to its members for such elections.

What is Cross Voting:

- Cross voting in Rajya Sabha polls **refers to the phenomenon where a legislator**, typically a member of a legislative assembly (MLA), votes for a candidate who does not belong to the political party or alliance to which the legislator is affiliated.
- **Rajya Sabha, the upper house of the Parliament of India, is not directly elected by the public** but by the elected members of the State Legislative Assemblies.
- In Rajya Sabha elections, **each state’s MLAs cast their votes to elect representatives to the Rajya Sabha**.
- The number of seats allocated to a state is determined by its population.
- **Cross voting occurs when a legislator** goes against the party’s designated candidate and votes for a candidate from another political party or an independent candidate.

Reasons for Cross Voting:

- **Conscience Voting:** Legislators may choose to vote according to their individual conscience, beliefs, or evaluation of the candidate’s qualifications, rather than strictly adhering to party lines.
- **Political Alliances and Rivalries:** Complex political dynamics, alliances, or rivalries

within a state or among political parties can lead to instances of cross voting.

- **Personal Agendas:** Legislators may have personal or local issues that influence their voting decisions, leading them to support candidates or parties that align with their specific concerns.
- **Internal Party Conflicts:** Internal conflicts within a political party, dissatisfaction with party decisions, or disagreements with leadership can motivate legislators to cross vote.

Topic 57. WHY THE SUPREME COURT OVERTURNED ITS 2018 DECISION, WHICH SET A TIME LIMIT ON COURTS' STAY ORDERS

Important for the subject: Polity

The court held that an SC bench from 2018 did not have the power to set a six-month time limit for vacating stay order.

What is the Stay Order?

- A stay order is a temporary measure to halt or defer the use of a property or land until a verdict is reached.
- It serves as a protective action taken by the court or legal authorities in India to secure the rights of a citizen.
- This action may lead to the suspension of an entire case or the suspension of specific proceedings within an ongoing case.
- In certain instances, a judge may issue a stay order without formal prompting from the opposing party, emphasizing its importance in critical developments.

Nature of Stay Order:

- Stay orders can be classified into two types: '**stay of proceedings**' and '**stay of execution**.'
- A stay of proceedings is issued when **parallel proceedings may impact each other**.
- On the other hand, a stay of execution involves a complete halt to the enforcement of a judgment, typically in cases where innocence is asserted, leading to a pardon.
- Stay orders can be **conditional or absolute**.

When a stay order is granted?

- The procedure for obtaining a stay order from the High Court is the same as for any lower Court.
- Every Court has inherent authority to stay proceedings in any action where the plaintiff is in default or has disobeyed any lawful order of the Court.

- Any other Court may issue a precept to the High Court, which is then ‘competent to execute such decree to attach any property belonging to the judgment-debtor and specified in the precept’.

What the 2018 bench ruled in the Asian Resurfacing case?

- In 2018, a three-judge bench comprising Justices Adarsh Goel, Navin Sinha and Rohinton Nariman were deciding a batch of cases involving the Prevention of Corruption Act.
- These batches of cases had one aspect in common, that the respective High Courts had granted a stay at some stage of trial.
- Stay orders are passed for a court to temporarily halt a judicial proceeding, to secure the rights of a citizen.
- Grant of stay invariably delays the trial, irrespective of which side benefits from it.
- To address the big problem plaguing the criminal justice system, of undue delays in trials, the SC held that interim orders of stay at the High Court and Civil Court level will be only valid for six months.
- At the end of this period, they will automatically be rescinded or “vacated”.

What was the impact of the 2018 ruling?

This ruling led to the various questions as follows:

- First, whether the SC, under Article 142 of the Constitution (which allows the Supreme Court to pass any order to secure “complete justice”) can order automatic vacation of all interim orders of the HC of staying proceedings of Civil and Criminal cases on the expiry of a certain period?
- Second, whether the SC, under Article 142 of the Constitution, can direct the HCs to decide pending cases in which interim orders of stay of proceedings have been granted on a day-to-day basis and within a fixed period?

On what grounds has the 2018 ruling been undone?

- The five-judge bench held that constitutional courts should refrain from laying down precise timelines for deciding cases, highlighting the discretion that should be afforded to lower courts which are more aware of “grassroots issues”.
- The SC also pointed out that courts often have different patterns when it comes to their pending caseload, and so the concerned court is best placed to decide which cases to prioritize.
- The court also held that the bench in Asian Resurfacing did not have the power to set a six-month time limit for vacating stay orders. The bench in Asian Resurfacing had invoked Article 142.
- The court held that automatically vacating a stay order after six months would in fact

“defeat justice” by nullifying interim orders that had been lawfully passed without hearing the parties.

- The court said that the six-month time limit would amount to court-created legislation, which is impermissible.
- Only the legislature has the power to decide if a category of cases should be decided within a specific amount of time.

About Article 226(3):

- Justice Manoj Misra in his separate opinion drew attention to Article 226(3) of the Constitution, which already provides a two-week time limit for High Courts to consider an application for the vacation of an interim order.
- If the application is not disposed of within those two weeks, Article 226(3) provides that the interim order will be vacated.
- It is pointed out that this essentially provides a process for automatically vacating a stay order, so long as an application is filed in the first place.

Topic 58. SORT OUT DIFFERENCES ON FINANCIAL ISSUES, SC TELLS KERALA AND CENTRE

Important for the subject: Polity

The Supreme Court Wednesday asked the Centre and Kerala government, which have been sparring over the state’s borrowing limit, to hold further discussions to sort out their differences.

- A two-judge bench **presided by Justice Surya Kant** stated that the fiscal management of the states is an issue with which the Union must be concerned because ultimately it has its own impact on the nation’s economy.
- Justice Surya Kant said the Centre is free to impose every other condition that it may feel appropriate to give sanction to borrow an additional Rs 13,608 crore “except the condition to withdraw the suit”

Article in news:

- **Article 293 of the Constitution:** The executive power of a State extends to borrowing within the territory of India upon the security of the Consolidated Fund of the State.
- **Article 293(3) of the Constitution:** State cannot raise a loan without the consent of the Government of India if any part of a previous loan from the central government remains outstanding.
- **Article 131 of the Constitution:** The Supreme Court has exclusive and original jurisdiction in matters of law between states or between states and the Union.

Topic 59. CENTRAL CONSUMER PROTECTION AUTHORITY (CCPA) **ADVISORY ON ENDORSING ILLEGAL BETTING**

Important for the subject: Polity

Advisory to Celebrities and Social Media Influencers:

CCPA has asked celebrities and social media influencers to refrain from endorsing or promoting illegal betting and gambling activities.

- Stringent action will be taken against those found promoting such activities.

Concern Over Betting Platforms' Use of Celebrities:

- The advisory notes that **betting platforms are employing celebrities and influencers to endorse and promote betting activities.**

Legal Implications for Promotion:

- Engaging in promoting or advertising online gambling and betting, being illegal in most states, makes one equally liable for participating in illegal activities.
- Celebrities and influencers are advised to refrain from endorsing and promoting illegal betting and gambling activities.

Past Advisories by Information & Broadcasting Ministry:

- The **Information & Broadcasting Ministry** has issued advisories in the **past** cautioning publishers and digital platforms against carrying ads promoting betting or gambling.

Prohibition of Betting and Gambling:

- Betting and gambling are prohibited under the **Public Gaming Act 1867** and are **considered illegal in most regions of India.**
- Advertisement or promotion of online betting platforms and apps promotes an activity predominantly banned.

Persistence of Online Betting Platforms:

- Despite legal prohibitions, **online betting platforms and apps continue to advertise betting and gambling, sometimes under the guise of gaming.**

Financial and Socio-economic Implications:

- Endorsements of such activities have significant financial and socio-economic implications, especially for the youth.

Guidelines for Prevention of Misleading Advertisements:

- The CCPA mentions the Guidelines for **Prevention of Misleading Advertisements and**

Endorsements for Misleading Advertisements, 2022.

- These guidelines categorically prohibit advertisements of products or services prohibited under any prevailing law.

Stringent Measures for Violations:

- Any violation of the guidelines will **lead to stringent measures as per the Consumer Protection Act, 2019.**
- Measures will be initiated against **manufacturers, advertisers, publishers, intermediaries, social media platforms, endorsers, and other relevant stakeholders involved in promoting illegal betting and gambling.**

Central Consumer Protection Authority (CCPA):**Establishment:**

- Established in 2020 based on the provisions of the **Consumer Protection Act, 2019.**
- Nodal Ministry: The **Ministry of Consumer Affairs.**

Composition:

- The CCPA is headed by a Chief Commissioner.
- It consists of **two other Commissioners as members:**
- One Commissioner deals with matters relating to goods.
- The other Commissioner handles cases related to services.
- Additionally, the CCPA has an Investigation Wing headed by a Director General.

Powers and Responsibilities:

- Objective: The primary objective is to **promote, protect, and enforce the rights of consumers as a class.**

Empowered:

- **Conduct Investigations:** Into violations of consumer rights and institute complaints /prosecutions.
- **Order Recall:** Of unsafe goods and services from the market.
- **Discontinue Unfair Practices:** Such as misleading advertisements and unfair trade practices.
- **Impose Penalties:** On manufacturers, endorsers, publishers, or entities involved in misleading advertisements.

District Collectors' Powers:

District Collectors also have the power to investigate complaints of:

- Violations of consumer rights.
- Unfair trade practices.
- False or misleading advertisements.

Objective:

- The main objective of the CCPA is to **promote, protect, and enforce the rights of consumers as a class.**

Enforcement Actions:

The CCPA is empowered to:

- Conduct investigations into violations of consumer rights.
- Institute complaints or prosecutions against offenders.
- Order the recall of unsafe goods and services.
- Discontinue unfair trade practices and misleading advertisements.
- Impose penalties on manufacturers, endorsers, publishers, or entities involved in misleading advertisements.

Consumer Protection Focus:

- The primary focus of the CCPA is on **ensuring consumer protection** and upholding their rights.
- It aims to create a fair and transparent marketplace for consumers.

Regulatory Body:

- The CCPA acts as a **regulatory body overseeing consumer protection laws and regulations.** It plays a vital role in enforcing consumer rights and ensuring compliance by businesses.
- By enforcing consumer rights, **ensuring market integrity, and fostering consumer awareness, the CCPA contributes significantly to a fair and transparent consumer environment in India.**

Topic 60. MINIMUM AGE TO CAST POSTAL BALLOTS HIKED TO 85 YEARS

Important for the subject: Polity



The government on Friday, in consultation with the Election Commission, amended the Conduct of Election Rules, 1961, to raise the minimum age for senior citizens eligible for voting by postal ballot, to 85 years from 80 years.

Recent Changes:

- According to the electoral roll published on February 8, of the 96.88 crore electors in the country, 1.85 crore were above the age of 80.
- The rules enable postal ballot voting for a “**notified class of electors**”, which includes essential services workers, persons with disabilities, Covid-19-infected or suspected cases and senior citizens.
- In Section 27(A) (e), senior citizens had been defined as those above 80 years.
- In the conduct of Elections Rules-1961, in rule 27A, in clause (e), for the words and figures—above 80 years, the words and figures —above 85 years shall be substituted.

About Postal Ballot:

- A restricted set of voters can exercise postal voting.
- Through this facility, a voter can cast her vote remotely by recording her preference on the ballot paper and sending it back to the election officer before counting.
- Members of the armed forces like the Army, Navy and Air Force, members of the armed police force of a state (serving outside the state), government employees posted outside India and their spouses are entitled to vote only by post.

- In other words, they can't vote in person. Voters under **preventive detention can also vote only by post.**
- Special voters such as the **President of India, Vice President, Governors, Union Cabinet ministers, Speaker of the House and government officers on poll duty have the option to vote by post. But they have to apply through a prescribed form to avail this facility.**
- The **Returning Officer is supposed to print ballot papers within 24 hours** of the last date of nomination withdrawal and dispatch them within a day.
- This is done so that the ballot papers reach the concerned voter well before the polling date and she has enough time to send it back before the counting day.
- **Postal ballot papers for members of the Armed Forces** are sent through their record offices.
- For members of the **armed police force of a state (serving outside the state), government employees posted outside India and their spouses, the ballot paper can be sent through post or electronically.**
- For remaining categories ballot papers can be delivered personally or through post.
- The postal ballot facility had been extended to **persons with disability, absentee voters who are working in essential services and senior citizens (above 80 years) for the first time in 2019, after an amendment to the Conduct of Elections Rules on the recommendation of the ECI.**
- Those who opt for the facility are visited at home by poll officials, who facilitate the filling up of the postal ballots. The whole procedure is done after informing the political parties and under videography.
- During the Covid-19 pandemic, the facility was extended to those infected or suspected to be infected with the coronavirus, starting with the Bihar Assembly elections in 2020.
- However, the ECI eventually decided not to extend the facility to those above 65 years.
- On August 23, 2023, the **Law Ministry again amended the rule to take the eligibility back to 80 years from 65 years.**

Topic 61. MASK NAMES OF THOSE ACQUITTED IN CRIMINAL CASES FROM DIGITAL RECORDS, HC TELLS MEDIA

Important for the subject: Polity

The **Karnataka High Court**, through Justice **M. Nagaprasanna**, advised the media to proactively remove or anonymize the **names of individuals acquitted in criminal cases from their digital archives to avoid forcing these individuals to seek legal remedies for**

name removal.

- This suggestion was made alongside a **directive** to the **High Court's registry** to **anonymize the personal details** of a **27-year-old** who was exonerated in a **criminal case**, emphasizing the **individual's right to dignity**.
- The court highlighted that **once a person is acquitted, discharged, or has their criminal proceedings quashed**, allowing their association with the crime to persist online contradicts the **essence of life protected under Article 21 of the Indian Constitution**.
- The court's stance **aims** to facilitate a form of **digital forgetting**, aligning with human tendencies to forget, invoking the **right to privacy principles** established in the **K.S. Puttaswamy case** by the apex court.

'Right of Erasure':

- The **Karnataka High Court** referenced the recently **notified Personal Data Protection Act**, effective from **August 11, 2023**, highlighting its recognition of the **"right of erasure" of personal data**.
- This move aligns with global legal trends towards the **rights to be forgotten, correction, and erasure of personal data**.
- The court cited a **2018 UK judgment (NT1 Vs Google LLC)** that underscored the **right of individuals**, even those acquitted or discharged by competent courts, to **live with dignity**, challenging **Google's resistance to delisting such individuals**.
- Additionally, the **High Court** referred to a **Supreme Court directive** to anonymize the names in a case regarding **sexual offenses** and a **2023 Delhi High Court order directing media platforms to remove the name of an accused** whose criminal case was quashed following a settlement.
- These references demonstrate a **growing legal consensus on the importance of protecting individuals' dignity and privacy post-acquittal**.

K S Puttaswamy case and Right to Privacy:

- In **August 2017**, a **nine-judge bench** of the **Supreme Court** in **Justice K. S. Puttaswamy (Retd) Vs Union of India** **unanimously held** that **Indians have a constitutionally protected fundamental right to privacy** that is an **intrinsic part of life and liberty under Article 21**.
- It held that **privacy is a natural right** that inheres in all natural persons and that the **right may be restricted only by state action that passes each of the three tests**:
- First, such state action must have a legislative mandate;
- Second, it must be pursuing a legitimate state purpose;

- Third, it must be proportionate i.e., such state action — both in its nature and extent, must be necessary in a democratic society and the action ought to be the least intrusive of the available alternatives to accomplish the ends.

Topic 62. IMMUNITY WON'T PROTECT LEGISLATORS TAKING BRIBES TO VOTE IN PARLIAMENT FROM CRIMINAL PROSECUTION: SUPREME COURT

Important for the subject: Polity

The **Supreme Court of India**, led by a **seven-judge Bench**, delivered a **unanimous decision** stating that **parliamentary privilege or immunity does not shield legislators from criminal prosecution for bribery** related to **voting or speaking in Parliament or State Legislative Assemblies**.

Historical Overruling:

- This ruling overturns a **1998 Supreme Court decision** (the **JMM bribery case judgment**) that previously **granted lawmakers immunity from corruption prosecution** if their **bribed actions** were executed as part of their legislative functions.

Chief Justice of India's Observations:

- The **Chief Justice** emphasized that **privileges and immunities** should not be used to **evade the general law**, highlighting that **corruption undermines the essence of Indian parliamentary democracy**.
- He clarified that the **act of bribery is considered complete once the corruption money is accepted**, irrespective of the **legislator's subsequent actions within the House**.

Implications for Parliamentary Immunity:

- The Court **rejected** the notion that **reducing parliamentary immunity** would **unjustly expose opposition members to a criminal investigation**, arguing instead that **bribed lawmakers compromise the constitution's aspirational and deliberative ideals**, thereby weakening democracy.

Criteria for Immunity:

- The judgment specified that **parliamentary immunity** could only be **invoked to preserve the dignity and authority of the legislative body** or in the **exercise of a legislator's rights to free speech and protest**.
- Any claim for immunity that does not meet these criteria would not be accepted.
- The Court recognized that **criminal courts and legislative houses have concurrent jurisdiction over bribery allegations**, stating that **one does not negate the jurisdiction of the other**.

Background of the Appeal:

- The ruling came in response to an appeal by **JMM leader Sita Soren**, accused of

accepting a **bribe** during the **2012 Rajya Sabha elections**.

- The case revisited the controversial **JMM bribery scandal of 1993** involving **payments to MPs**, including **Sita Soren's relatives**, to secure their votes during a **no-confidence motion** against the then government.
- **Reaffirmation of Rule of Law:** Chief Justice Chandrachud concluded that **granting MPs immunity from bribery prosecution would undermine parliamentary democracy and contravene the rule of law**, firmly positioning the **judiciary against corruption within legislative bodies**.

Parliamentary Privileges:

- Parliamentary privileges are **special rights, immunities and exemptions** enjoyed by the **two Houses of Parliament**, their **committees** and **their members**.
- These privileges are defined in **Article 105** of the **Indian Constitution**.
- Under these privileges, the **members of Parliament** are **exempted from any civil liability (but not criminal liability)** for any statement made or act done in the course of their duties.
- The privileges are **claimed only when the person is a member of the house**. As soon as s/he ends up being a member, the privileges are said to be called off.
- **Parliament has not made any special law to exhaustively codify all the privileges**. They are rather based on **five sources**:
 - Constitutional provisions
 - Various laws made by Parliament
 - Rules of both the Houses
 - Parliamentary conventions
 - Judicial interpretations

Privileges:

Freedom of Speech in Parliament:

- The freedom of speech and expression guaranteed to a citizen under Article 19(2) is different from the freedom of speech and expression provided to a member of the parliament.
- It has been guaranteed under Article 105(1) of the Indian constitution. But the freedom is Important for the subject to rules and orders which regulate the proceedings of the parliament.

Limitations:

- Freedom of speech should be in accordance with the constitutional provisions and Important for the subject to rules and procedures of the parliament, as stated under **Article 118** of the Constitution.
- Under **Article 121** of the Constitution, the members of the parliament are restricted from discussing the conduct of the **judges of the Supreme Court and the High Court**.

Freedom from Arrest:

- The members enjoy **freedom from arrest** in any civil case **40 days before and after** the adjournment of the house and also when the house is in session.
- No member can be arrested from the **limits of the parliament without the permission of the house** to which s/he belongs so that there is no hindrance in performing their duties.
- If the detention of any members of the parliament is made, the chairman or the speaker should be informed by the concerned authority, of the reason for the arrest.
- But a member can be arrested outside the limits of the house on criminal charges against him under the **Preventive Detention Act, the Essential Services Maintenance Act (ESMA), the National Security Act (NSA)**, or any such act.

Right to Prohibit the Publication of Proceedings:

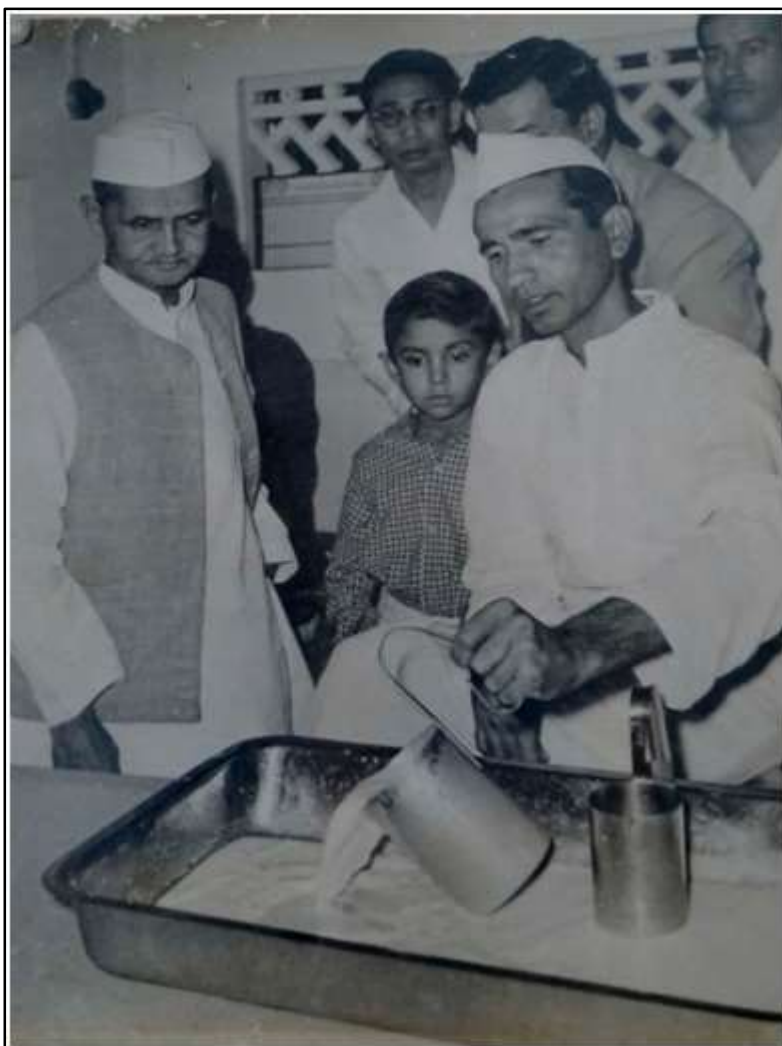
- **Article 105(2)** of the Constitution, no person shall be held liable for publishing any reports, discussions etc. of the house under the authority of the member of the house.
- For paramount and national importance, it is essential that the proceedings should be communicated to the public to aware them of what is going on in the parliament.

Right to Exclude Strangers:

- The members of the house have the power and right to exclude strangers who are not members of the house from the proceedings. This right is very essential for securing free and fair discussion in the house.

Topic 63. UNION CODE 0001: HOW A VILLAGE SEEDED INDIA'S WHITE REVOLUTION

Important for the subject: History



Amul, the renowned dairy cooperative, recently celebrated its **golden jubilee**, marking **fifty years** of transformative impact in India's dairy industry.

- On October 31, 1964, the birthday of Sardar Vallabhbhai Patel, then Prime Minister Lal Bahadur Shastri inaugurated a 50-tonne-per-day cattle feed plant of the **Kaira District Co-operative Milk Producers' Union**, better known as Amul.
- It laid the basis for the **Operation Flood** programme that helped turn India into the world's largest milk producer by 1998.
- Feed factory was opened in Kanjari, about 8 km from the cooperative's dairy in Anand.
- Amul's top five DCSs ranked by average milk procurement in 2022-23 were **Badharpura (18,609 LPD)**, **Undel (17,429 LPD)**, **Bedva (12,173 LPD)**, **Motipura**

(10,430 LPD) and Borsad (9,769 LPD). They are all much bigger than Ajarpura.

The start of a revolution:

- The National Dairy Development Board was established in **September 1965**, with **Shastri appointing Kurien as the chairman** of this organization having the mandate to replicate the “Anand Pattern”.
- It laid the basis for the **Operation Flood programme** that helped turn India into the world’s largest milk producer by 1998.
- **Ajarpura not only seeded the White Revolution**, it was the first Amul dairy cooperative society (DCS) to be registered on August 7, 1947, with a union code of “0001”.

About White Revolution:

- In 1970, India set in motion the ‘White Revolution’, the world’s biggest dairy development program, led by Dr. Verghese Kurien. ‘Operation Flood’.
- White Revolution or Operation Flood, launched on 13 January 1970, was the world’s largest dairy development program and a landmark project of **India’s National Dairy Development Board (NDDB)**.
- It transformed India from a **milk-deficient nation into the world’s largest milk producer, surpassing the United States in 1998 with about 22.29 percent of global output in 2018.**
- Within 30 years, it doubled the **milk available per person in India and made dairy farming India’s largest self-sustainable rural employment generator.**

Topic 64. GI RECOGNITION FOR NARASAPUR CROCHET LACE CRAFT REVIVES HOPES OF STRUGGLING ARTISAN

Important for the subject: History

The **Narasapur crochet lace craft** from the **Godavari region of Andhra Pradesh** has been awarded the **Geographical Indications (GI) tag**, revitalizing this **traditional craft**.

- Conferred by the **Department of Promotion of Industry and Internal Trade (DPIIT)** under the **Ministry of Commerce and Industry**.
- The craft is centralized around **key trading hubs** such as **Narsapur and Palacole in West Godavari district** and **Razole and Amalapuram in the Konaseema region**.
- It supports nearly 15,000 women artisans who specialize in producing **lace-based garments, home furnishings, and accessories**.
- **Alankriti Lace Park in Narasapur town** is run by the **state government**.

Tracing the origin:

- The **Narasapur** **crochet lace craft**, which dates back to **1844**, was introduced to **local women in the Godavari region** by **Macrae and his wife**, associated with a **Christian missionary** in **Dummugudem** (now in Telangana), **Scotland**.
- They facilitated the sale of these products both in **India** and **overseas**. Despite challenges like the **Indian famine of 1899** and the **Great Depression of 1929**, the craft thrived, involving over 2,000 women by the early 1900s.

History of Narasapur:

- The existence of Narsapur dates back to **1173 AD**. **Dutch people** landed in Narsapur in **1626**. Narsapur was used as a **port by the Dutch** and ships and boats were built here.
- It was noted for its **ship-building activity** and some of the **Europeans** also were customers at this place; small boats are still built in Narsapur.
- In the **16th century**, **Portuguese** established their own **factory** which remained as a trading centre for a few years.
- In the **18th century**, Narsapur became an important trading port. From this port, **teak** was **exported** to other regions. The ports at **Kakinada** and **Narsapuram** became famous for **manufacturing ships**.

At present there is no port handling at Narsapur.

- According to **Alexander Hamilton's A New Account of the East Indies (1727)**:
- "Next to **Matchulipatam (Machilipatnam)** is **Narsipore**, where the **English** had a **Factory for long Cloth**, for the Use of their **Factory of Matchulipatam**, when they manufactured **Chintz** there.
- It also affords good **Teak Timber** for **building**, and has a fine deep River, but a dangerous Bar, which makes it little frequented."
- The **trade of the town** has **steadily declined** since the **abolition of the company's factory in 1827**.

A highly ornate, silver-colored metal boat, likely a ceremonial vessel, featuring intricate carvings and a central structure resembling a temple or shrine. The boat is displayed on a dark surface, possibly a stage or exhibition platform. The central structure has multiple tiers and a domed roof, with a small figure on top. The boat's hull is decorated with complex patterns and carvings. The background is dark, and the lighting highlights the metallic sheen and intricate details of the boat.

Ambaji White Marble:

- Ambaji Superior White Marble is an Indian marble stone of pure white Color with light grey veins. This rock is quarried in **marble mines of Gujrat (India)**.
- It is formed when limestone is re-crystallised under the earth's crust due to intense pressure and heat.



Tripura Risa Textile:

- The traditional Tripuri female attire comprises three parts — **risa, rignai and rikutu**.
- Risa is a handwoven cloth used as a female upper garment, and also as headgear, a stole, or a present to express respect.
- As an upper garment, it is wrapped around the torso twice.



Hyderabad Lac Bangles:

- The lac bangles of Hyderabad have been registered with the **Registrar of Geographical Indications, Chennai**.



- This is the **second GI tag for a Hyderabad product after haleem.**

Majuli Mask of Assam:

- Majuli mask of Assam are made in different variety and sizes as they are mainly divided into different categories — ‘**Mukha bhaona**’ face mask covers the face, ‘**Lotokoi**’ hanging mask which is bigger in size extends to the chest and, ‘**Cho Mukha**’ huge mask is a head and body mask.



Assam Majuli Manuscript Paintings:

- **Assam Majuli Manuscript Paintings** illustrated numerous stories and chapters taken from the great **Hindu epics Ramayana, Mahabharata** and above all Important for the subjects from the Bhagavata Purana.



About GI tags:

- It is an insignia on products having a unique geographical origin and evolution over centuries with regard to its special quality or reputed attributes.
- It is a mark of authenticity and ensures that registered authorized users or at least those residing inside the geographic territory are allowed to use the popular product names.
- **GI tag in India is governed by Geographical Indications of Goods (Registration & Protection) Act, 1999. It is issued by the Geographical Indications Registry (Chennai).**
- GI is a tag on products that have a specific geographical origin and possess certain qualities due to that origin and are safeguarded by **legalities such as by the World Intellectual Property Organisation.**
- The registration of a geographical indication is valid for a period of 10 years
- It can be renewed from time to time for a further period of 10 years each.

Topic 66. CERTIFICATION OF RAILWAY STATIONS AS EAT RIGHT STATIONS BY FSSAI

Important for the subject: Schemes

Objective:

The Food Safety and Standards Authority of India (FSSAI) has certified **nearly 150 railway stations across India as Eat Right Stations.**

- This initiative is part of the **Eat Right movement, aiming to ensure safe, hygienic, and nutritious food options in various settings.**

Significance:

- Marks a significant milestone in advancing the Eat Right India movement.
- **Provides safe, hygienic, and nutritious food choices** for millions of passengers across India's extensive railway network.

Accredited Stations:

- **Railway Stations:** New Delhi, Varanasi, Kolkata, Ujjain, Ayodhya Cantt, Hyderabad, Chandigarh, Kozhikode, Guwahati, Visakhapatnam, Bhubaneswar, Vadodra, Mysuru City, Bhopal, Anand Vihar Terminal (Delhi), and Puratchi Thalaivar Dr MG Ramachandran Central Railway Station (Chennai).
- **Metro Stations:** Noida Sector 51, Esplanade (Kolkata), IIT Kanpur, Botanical Garden (Noida), and Noida Electronic City Metro Station.

Achieving Food Safety:

- Certification signifies **adherence to food safety standards, promoting healthier food choices.**
- Enhances the **overall dining experience for passengers** and commuters.

Public Health Impact:

- Promotes public health by offering food options that meet safety and nutritional standards.
- Encourages a **culture of healthy eating and well-being among travelers and commuters.**

Eat Right Station' certification

- The **'Eat Right Station' certification** awarded by the **Food Safety and Standards Authority of India (FSSAI)** signifies railway stations that excel in providing safe and wholesome food options to passengers.
- **Certification Purpose:** Recognizes railway stations that **maintain high standards of food safety** and hygiene for passengers.

Certification Process:

- Conducted by an FSSAI-empanelled third-party audit agency. Stations are rated on a scale from 1 to 5 based on food safety, hygiene, and quality.
- Upon conclusion of the audit, **stations meeting the benchmarks receive the 'Eat Right Station' certificate.**
- Examples include **Anand Vihar Terminal Railway Station (Delhi), Chhatrapati Shivaji Terminus (Mumbai), Mumbai Central Railway Station (Mumbai),**

Vadodara Railway Station, and Chandigarh Railway Station.

What is the ‘Eat Right Movement’?

- **Initiative:** Led by FSSAI to revamp India’s food system for safe, healthy, and sustainable food practices.
- **Tagline:** ‘Sahi Bhojan, Behtar Jeevan’ (Right Food, Better Life).
- **Alignment:** Aligned with National Health Policy 2017, focusing on **preventive healthcare and key programs like Ayushman Bharat, POSHAN Abhiyaan, Anaemia Mukh Bharat, and Swachh Bharat Mission.**

Approach:

- Regulatory measures.
- Capacity building initiatives.
- Collaborations for effective food safety.
- Empowerment programs for informed choices.

About FSSAI:

Autonomous Body:

- Operates under the **Ministry of Health and Family Welfare**, Government of India.

Establishment:

- Formed **under the Food Safety and Standards Act, 2006, replacing previous food-related regulations.**

Objective:

- Sets science-based standards for food articles.
- Regulates food manufacture, storage, distribution, sale, and import to ensure safe consumption.
- The ‘**Eat Right Station**’ certification and the broader ‘**Eat Right Movement**’ by FSSAI are pivotal in promoting safe, healthy, and sustainable food practices across India’s railway stations and beyond.

India’s Stance on E-Comm Moratorium at WTO

- India has emphasized the **need for a “re-examination” of the implications of the moratorium on customs duties on electronic transmissions**, especially concerning developing countries and the Least Developed Countries (LDCs).
- This discussion took place at the **working session on the work program on e-**

commerce during the 13th WTO Ministerial Conference (MC13) in Abu Dhabi.

Background:

- The **moratorium on customs duties on electronic transmissions** was decided by WTO members in 1998.
- This moratorium has been **periodically extended at successive ministerial conferences**.
- The **current discussion revolves around whether to extend this moratorium**

India's Position:

Revenue Loss Concerns:

- India has expressed concerns about the **substantial revenue loss that developing nations face due to this moratorium**.
- There has been **no consensus on the scope of coverage** of the moratorium.

Technological Advancements:

- India highlighted the ongoing digital revolution and the emergence of technologies like additive manufacturing, 3D printing, data analytics, artificial intelligence, and the Internet of Things.
- There is a **need to re-examine the implications of the moratorium in light of these technological advancements**.

Scope of Moratorium:

- India and South Africa pointed out that if the moratorium's scope includes **"transmission" only, it might be feasible to impose duties on content**.
- However, if the **scope extends to digitized and digitizable goods**, it could have significant implications.
- A joint submission mentioned items such as **cinematograph films, books, newspapers, video games, computer software, and more**.
- The list could **expand further as the digital economy evolves**.

Revenue Impact:

- According to a 2017 study by UNCTAD, **developing countries face an estimated annual revenue loss of \$10 billion due to the moratorium**.
- For India, the **estimated loss could be over \$500 million annually** (based on 2017 figures).

Global Perspectives:

- Developed countries such as the **US, Australia, the EU, and Japan** are advocating for **an extension of the moratorium.**

India's Suggestions:

- India emphasized the **need for developing countries to enhance their domestic physical and digital infrastructure.**
- Creating supportive policy frameworks and regulatory environments is crucial.
- **Developing digital capabilities is also essential for participating in the evolving digital economy.**
- India's stance **reflects its concerns about revenue losses for developing nations, the evolving digital landscape, and the need for a comprehensive re-examination** of the moratorium's implications.