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Topic 1. TWO EXPERIMENTS CONDUCTED BY ISRO PAVED WAY FOR GAGANYAAN TEST MISSION

Important for the subject: Science and Technology

In the news: Test Vehicle Abort Mission (TV-D1) flight was successfully tested by **ISRO**.

The Gaganyaan mission, which aims to place humans in space, had its first test flight completed by the Indian Space Research Organisation (ISRO) to demonstrate a crew escape system. The flight was delayed twice due to inclement weather, and on Saturday, it was temporarily postponed just five seconds before the scheduled lift-off due to a glitch in the system.

What is the Gaganyaan Mission?

- The Gaganyaan Mission is a project headed by the Indian Space Research Organisation (ISRO). Three Indian astronauts—one of them a woman—are to spend three days in space as part of this mission.
- For five to seven days, the astronauts will orbit the Earth at a height of 300 to 400 kilometers.
- India will become the fourth country to launch a manned space mission as a result of the program.

The Gaganyaan Mission seeks to:

- Construct a spacecraft that can support human habitation
- Show that humans are capable of space travel.
- Emergency Landing in Indian sea waters
- The mission will take place in 2025.
- ISRO carried out a test flight for the Gaganyaan Mission on October 21, 2023.

Components of Gaganyaan Rocket: GSLV Mk-III

Crew Module

- A crew module and service module.
- The crew members will be selected by the IAF and ISR.
- Crew will perform micro-gravity and other scientific experiments for a week.

Crew Module Atmospheric Re-entry technology – CAR

- Satellites that are launched for communication or remote sensing are meant to remain in space.
- However, a manned spacecraft needs to come back. While reentering Earth's atmosphere,

the spacecraft needs to withstand very high temperatures created due to friction.

- A prior critical experiment was carried out in 2014 along with GSLV MK-III when the CARE (Crew Module Atmospheric Re-entry Experiment) capsule successfully demonstrated that it could survive atmospheric re-entry.

Crew Escape System – PAT

- The Crew Escape System is an emergency accident avoidance measure.
- In July 2018, ISRO completed the first successful flight ‘pad abort test’ or Crew Escape System.
- Environmental Control & Life Support System ECLSS
- ECLSS will Maintain steady cabin pressure and air composition
- Remove carbon dioxide and other harmful gases
- Control temperature and humidity
- Manage parameters like fire detection and suppression.

Vyommitra

- ISRO’s humanoid robot that will test-flight Gangayaan.
- It is a Gynoid (female humanoid).
- Vyom Mitra was built by ISRO’s Inertial Systems Unit, Thiruvananthapuram.

What is the Test Vehicle Abort Mission 1 (TV-D1)?

- The Indian Space Research Organization (ISRO) carried out the Test Vehicle Abort Mission 1 (TV-D1) test mission to confirm the Crew Escape System’s (CES) operation. This test’s main goal was to mimic an abort scenario during a space launch and show that the crew escape system can securely remove the crew module from the launch vehicle in an emergency.

What are the characteristics of Test Vehicle Abort Mission 1?

- **Objective:** TV-D1’s main goal was to evaluate the effectiveness of the Crew Escape System (CES). The CES is a vital safety element intended to protect astronauts in the case of a space launch emergency, such as a malfunctioning or failed rocket.
- **Abort Simulation:** TV-D1 acted out an abort scenario in which the crew escape system was put to the test in a controlled environment to make sure it could successfully extract the crew module from the launch vehicle and bring it back to Earth without incident.
- **Emergency Scenarios:** It’s possible that the system experienced a variety of emergencies during the test, such as an engine failure or other anomalies that would have needed the crew to safely evacuate the launch vehicle.
- **Validation:** TV-D1’s accomplishment indicated that the crew escape system—a crucial part of the Gaganyaan program, which aims to launch humans into space—could function as planned.
- **Data Gathering:** The test gathered important information about how the crew escape system operates, such as the order of operations, timing, and safety precautions in place.



- **Human Spaceflight Preparation:** As part of the Gaganyaan program, TV-D1 was a major step toward preparing for upcoming human space missions. It contributes to the astronauts' safety and security during their space travels.

What does the success of the mission signify for the ISRO

- **Validation of the Crew Escape System:** TV-D1's main objective was to test and confirm the Crew Escape System's (CES) operation. The mission's accomplishment suggests that the Crew Escape System (CES) can fulfil its vital responsibility of protecting astronauts in the event of an emergency by rapidly severing the crew module from the launch vehicle. This is a major advancement in the safety of human spaceflight.
- **Milestone for Gaganyaan:** TV-D1 was a significant milestone in the Gaganyaan program, which aspires to launch humans into space. This test flight's accomplishment shows that ISRO is making real headway in creating the equipment and technologies required for upcoming human spaceflights.
- **Capability Demonstration:** The successful completion of TV-D1 by ISRO demonstrates the technical prowess and knowledge of the organization in organizing, carrying out, and resolving irregularities during a challenging space mission. It proves that ISRO is prepared to manage manned space flights shortly.
- **International Recognition:** ISRO's standing in the space exploration industry is enhanced by the successful crew escape mechanism test. It suggests that ISRO is a dependable and capable collaborator for space cooperation.
- **Safety Assurance:** TV-D1's accomplishments are a big step toward guaranteeing the safety of astronauts taking part in the next human space missions. The effectiveness of the CES in real-world settings is crucial to mission safety, and its accomplishment increases trust in the Gaganyaan program's safety protocols.

Topic 2. HOW BAT GENOMES PROVIDE INSIGHTS INTO IMMUNITY AND CANCER

Important for the subject: Science and technology

Bats, by many measures, are truly remarkable organisms. Their lives are notably extended, and **they enjoy a unique defense against a range of diseases, including cancer.**

About Bats

- **Significant Population:** Bats constitute a substantial part of the mammal world, making up 20% of all mammal species globally. The planet is home to over 1,400 bat species, each exhibiting its own unique characteristics.
- **Diverse Characteristics:** Bats exhibit a wide range of sizes, from the tiny 2-gram bumblebee bat to the formidable flying foxes, boasting a 1.5-meter wingspan and weighing up to 1.6 kg.

- **Ecological Importance:** Bats play pivotal roles in maintaining ecological balance by contributing to essential processes such as pollination and insect population control.

Bats as Virus Reservoirs

- **Notorious Reputation:** Bats have come under scrutiny primarily due to their role as hosts for various deadly viruses, including coronaviruses, Nipah, Ebola, Marburg virus, and Hendra virus.
- **COVID-19 Spotlight:** The COVID-19 pandemic has thrust bats into the spotlight, raising concerns about their potential impact on human health.
- **Natural Pathogen Hosts:** Bats are unique in their ability to harbour numerous pathogens without falling victim to infections, sparking scientific interest in understanding the source of their resistance.

Unlocking Bat Genomes

- **Genomic Exploration:** Scientists have embarked on comprehensive studies of bat genomes, revealing invaluable insights into their distinctive biology.
- **Compact Genomes:** Bats boast relatively small genomes, typically consisting of around 2 billion bases, making them ideal Important for the subjects for genomic research.
- **Metagenomic Sequencing:** The ambitious Bat1K global genome consortium is currently undertaking the task of sequencing genomes of all bat species worldwide, promising further revelations about their genetic makeup.

Immune Insights from Bat Genomes

- **Crucial Immune Genes:** The immune-related genes of bats have been a major focus of research, with these creatures exhibiting unique genomic features.
- **Reduced Immune Genes:** Bats possess a smaller percentage of immune-related genes, approximately 2.7-3.5% compared to humans, who have around 7%.
- **Positive Selection:** Certain immune genes in bats have undergone positive selection, equipping them to control the spread of viruses while mitigating the inflammatory responses that often prove detrimental to humans.

Long-Read Sequencing and Deeper Insight

- **Sequencing Advancements:** Long-read sequencing technologies have revolutionized our ability to assemble complete genomes quickly and accurately.
- **Immune Response Alterations:** Recent research employing long-read technology has revealed significant changes in genes responsible for immune responses in bats.
- **Interferon Dynamics:** There has been a shift in the relative proportions of interferon-alpha (IFN- α) and interferon-omega (IFN- ω) in bats, impacting their immune properties.
- **Tumor Suppression and Longevity:** Genes linked to tumor suppression and DNA repair in bats exhibit signs of positive selection, contributing to their extended lifespans and reduced cancer risk.

Future Prospect



- **Emerging Zoonotic Threats:** The ongoing processes of deforestation, ecological degradation, and heightened human-animal interactions are anticipated to result in more frequent zoonotic disease outbreaks.
- **Genomic Tools:** Advanced genome sequencing techniques hold the promise of aiding in the management of these outbreaks while preserving ecological balance, providing insights without disrupting the delicate equilibrium of nature.

Topic 3. FLUORESCENCE: MAKING ANIMALS GLOW

Important for the subject: Science and technology

A recent study reported that the bodies of animals belonging to all the known mammalian orders fluoresced in some way. Some 107 species also had fur that fluoresced.

Fluorescence

- When an object absorbs some light of higher energy (like blue color) and releases it at lower energy (like red color). It usually happens when an electron absorbs a photon, or a particle of light, jumps to a higher energy level, before releasing that energy and jumping back down.
- In this process, the electron's spin must not change. If its spin changes, the process is called phosphorescence.
- Fluorescence has many applications. The fluorescent lamp uses an electric discharge to bombard a material with UV light. The material absorbs it and re-emits it as visible light. More curiously, scientists have been finding that the bodies of many mammals also fluoresce.

What is the Purple Economy

Key Points:

- The Purple Economy, also sometimes referred to as the **care economy**, obtains its name from the **color** adopted by many **feminist movements**.
- It represents a new vision of economics that recognizes the **importance of care work, empowerment and autonomy of women** to the functioning of the economies, wellbeing of societies and life sustainability.
- Care work consists of two overlapping activities and can be paid or unpaid: direct, personal, and relational care activities, such as feeding a baby or nursing an ill partner; and indirect care activities or domestic work, such as cooking and cleaning.
- The bulk of care work worldwide is provided by **unpaid carers, mostly women and girls. Paid care work is also predominantly carried out by women**, often those from socially disadvantaged groups, including migrants.
- Being mostly in the service sector, **care work is often associated with significant wage**

penalties and poor working conditions.

How does the purple economy aims to address the problem?

- The Purple Economy aims to overcome the fragility of the care economy at the national and international levels and **address the multiple and intersecting inequalities** created by the **disproportionate reliance on women's unpaid and underpaid labour**, and **under-investment** in the care sector.
- Purple Economy calls for the **internalisation of the costs of care**. The movement argues for making **transitions to sustainable care arrangements** along with environmental sustainability.
- Public investments in the care sector should be seen as a source of decent and quintessentially green jobs.
- Women benefit from job and entrepreneurship opportunities created in **other, less feminised green sectors**, such as energy or transport.

International instruments and goals related to gender equality

- Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) was signed by governments in 1979, entered into force in 1981, and at present has 189 state parties. CEDAW is the first legally binding instrument that takes a comprehensive approach to prohibiting discrimination against women in all domains of economic, social, and political life, and it is considered a significant achievement.
- The Beijing Declaration and Platform for Action, signed by 189 governments in 1995, is the first international legal instrument to incorporate a detailed action plan that sets out strategies to ensure equality and full human rights for women in 12 areas of concern: poverty, education and training, health, violence against women, armed conflict, the economy, power and decision-making, institutional mechanisms for the advancement of women, human rights, the media, the environment, and the girl-child.
- MDG3, the Millennium Development Goal that specifically focused on gender equality, was Important for the subject to some criticism for its narrow (mainly social) interpretation of gender equality and women's empowerment, and for its limited attention to the impact of economic factors on women's well-being.
- SDG5, the Sustainable Development Goal that succeeded MDG3, has a broader approach to gender equality. SDG5 aims to achieve gender equality and empower all women and girls. It includes nine sub-targets.

Topic 4. GLOBAL EXPERTS DISCUSS CHALLENGES, POSSIBILITIES AROUND ANTIBIOTICS BECOMING A GLOBAL PUBLIC GOOD

Important for the subject: Science and Technology

The Antibiotic Webinars series:

Conducted by: Delhi-based think tank **Centre for Science and Environment (CSE)**

- **Objective:** To discuss the challenges and possibilities around antibiotics or any aspect of antimicrobial resistance becoming a global public good.

Outcome of the webinar:

- There is a **need for critical reforms to stimulate the antibiotic innovation ecosystem** for a **sustainable and equitable antibiotic access**.
- To explore the possibility of considering antibiotics as a **‘global public good’** so that they are treated differently from other drugs in terms of resource and development and access.

Global public good (GPG):

- A global public good is understood as being **non-rival** (if one person consumes it, this does not reduce its availability to others) and **non-excludable** (no one can be denied access).

Common goods:

- As per the **World Health Organization**, **‘common goods for health’** are public goods or have large social externalities and thus will not arise through market forces alone. Therefore, they require both public financing and public action.

Global functions:

- It captures the broad array of activities **critical** in preparing for and responding to **transnational challenges**. These include **supplying global public goods, managing cross border externalities** (such as AMR response) and **exercising leadership**.

Financial models that can be used for antibiotics:

- **Pull incentives** like **subscription models** and **prize models** (such as a **“milestone prize”** during clinical development or an end-stage prize / market exclusivity reward for a product when it comes to market).
- **Push incentives** like Global Antibiotic Research & Development Partnership (GARD-P).

Concern over labeling antibiotics as global public goods:

- Issue of patents and copyright
- Increasing Antimicrobial Resistance (AMR)
- Increased wastage of antibiotics
- **‘Tragedy of the commons’** (if anything is free people will tend to overuse it) and **‘free rider problem’** (those who benefit from resources, do not pay for them or under-pay.)

Topic 5. CARL SAGAN DETECTED LIFE ON EARTH 30 YEARS AGO — HERE'S HOW HIS EXPERIMENT IS HELPING US SEARCH FOR ALIEN SPECIES TODAY

Important for the subject: Science and Technology

In **1993** a group of scientists led by **Carl Sagan** found **evidence for life on Earth** using data from instruments on board the **Nasa Galileo robotic spacecraft**.

Galileo spacecraft:

- **NASA's Viking spacecraft**, launched in the **1970s**, was **aimed to detect life on Mars**. **Galileo** launched in **October 1989** on a **six-year flight to Jupiter**.
- It has a variety of instruments designed to **study the atmosphere and space environment of Jupiter** and its **moons**. These included imaging cameras, spectrometers (which break down light by wavelength) and a radio experiment.

Outcome of Galileo:

- The **near infra-red mapping spectrometer (NIMS)** instrument detected **gaseous water** distributed throughout the **terrestrial atmosphere**, ice at the poles and large expanses of **liquid water "of oceanic dimensions"**.
- It also recorded **temperatures** ranging from **-30°C to +18°C**.

Galileo's plasma wave radio experiment:

- The emission from a given **natural source** occurs **across many frequencies**. **Artificial radio sources**, by contrast, are produced in a **narrow band**.

Signals for detecting life elsewhere:

- A strong case for life elsewhere will likely require a **combination of mutually supporting evidence**, such as **light absorption by photosynthesis-like processes**, **narrowband radio emission**, **modest temperatures and weather** and **chemical traces in the atmosphere** which are hard to explain by non-biological means.

Topic 6. 'IRON BEAM': ISRAEL'S DEADLY LASER TECH CAN BE USED AGAINST HAMAS' MISSILES; HOW IT WORKS

Important for the subject: Science and Technology

Israel's **RAFAEL Advanced Defense Systems** is developing **two High Energy Laser systems: IRON BEAM and LITE BEAM**.

Iron Beam system:

- It is a **100kW class High Energy Laser Weapon System (HELWS)**. It is set to become the **sixth element** of Israel's **integrated missile defense system**, joining **Arrow 2, Arrow 3, David's Sling**, and the **Iron Dome**.
- It utilizes a **fiber laser** to **eliminate airborne threats**, offering a cost-effective and efficient solution.
- It can function as a **stand-alone defense mechanism** or be **integrated** into a broader air defense system.
- Compared to other missile interceptors, it offers **lower costs per shot, unlimited firing capacity, reduced operational expenses**, and **eliminates the risk of interceptor debris falling on protected areas**.
- Its effective range of up to **7 km**, capable of **swiftly neutralizing missiles, UAVs, and mortar shells** within seconds of target engagement.

Lite Beam:

- It is a **7.5kW HEL interceptor** designed for **Counter mini-Unmanned Aerial Vehicles (C-mUAVs)** and ground targets such as **Improvised Explosive Devices (IEDs)** and **Unexploded Ordnances (UXOs)**.
- It can neutralize targets from a distance of a few hundred meters up to 2000 meters.

Topic 7. HOW DO SIM CARDS WORK?

Important for the subject: Science and Technology

In **2021**, there were more than **14 billion cellular devices** in the world even though there were **only seven billion people**.

What is a SIM card?

- 'SIM' stands for '**subscriber identification module**'.
- It is an **integrated circuit**, or a **microchip**, that **identifies the subscriber** on a given network by allotting a number known as **international mobile subscriber identity (IMSI)**.
- A **SIM card** is **mandatory** to connect to any cellular network that follows the **Global System for Mobile Communications (GSM) standard**.
- This relationship is established using a **unique authentication key** — a piece of data that a user needs to '**unlock**' access to the network.
- **Every SIM card stores this data** and it is designed such that the **user can't access it** through their phone. Instead, signals sent by the phone into the network are '**signed**' by the **key**, and the network uses the signature to understand whether the phone's connection is legitimate.
- It is possible to **duplicate a SIM card** by **accessing its key** and storing it in multiple cards.



- SIM cards also store **information** about its own **ID number** (the integrated circuit card identifier), the **IMSI**, the **subscriber's location area identity** (their current location), a **list of preferred networks** (to whom the subscriber can connect when roaming), **emergency numbers**, and – depending on the space available – the **subscriber's contacts** and **SMS messages**.

How does a SIM card work?

- **SIM cards** are designed according to the **ISO/IEC 7816 international standard** maintained by the **International Organisation for Standardisation and the International Electrotechnical Commission**. It applies to **electronic identification cards**, including **smart cards**.
- In this standard, the card itself consists of the **integrated circuit**, which is glued to a silicon substrate on the top side. On the other side of the substrate are **metal contacts**, which form the **gold-coloured side of the SIM card**.
- Wires connect the **integrated circuit** from its bottom side to the metal contacts on the top side, and the contacts interface with the phone's data connectors.
- The metal contacts have a **segmented appearance**. Each segment is called a **pin** and has a **specific purpose**. For example, **pin 1** collects the **operating voltage** that gives it the power to operate. **Pin 3** is to **access the SIM's clock** and **pin 5** is the **grounding**. **Pin 7** transmits data in and out of the SIM.
- These **pin-wise roles** are specified by the **ISO/IEC 7816-2 standard**; others, numbered 1 through 15, specify various **functions of a SIM card** and **how they are to be implemented**, from their "**transmission protocols**" to "**cryptographic information applications**".
- On the **network side**, the **SIM** helps a phone establish its place within a **cellular network**. When a subscriber dials a recipient's number, the phone sends data via the network – signed by the **key on the SIM card** – to a telephone exchange.
- If the recipient is connected to the same exchange, the network establishes their identity and the call is routed to them. If the recipient is '**located**' elsewhere, a computer connected to the network routes the call there according to the most optimum route.

How have SIM cards changed?

- **In 1960s**: West German engineer **Helmut Gröttrup** first had the idea to **stick an integrated circuit in a plastic panel** the size of a credit card.
- The **European Telecommunications Standards Institute (ETSI)** prepared the **GSM Technical Specification 11.11** regarding the SIM card.
- After developing the **11.11 standard**, **ETSI** transferred some of its responsibilities to an **international consortium of seven organizations** called **3GPP** (the **Telecommunications Standards Development Society in India** is one).
- **3GPP** subsequently developed the standards for the **third (3G)**, **fourth (4G)**, and **fifth generation (5G)** of networks.

- Until **2G networks**, the term ‘**SIM card**’ denoted **both the hardware and the corresponding software**. With **3G networks**, ‘**SIM**’ became **only the software**; the hardware was called the **Universal Integrated Circuit Card (UICC)**. With **5G**, it is being called the **Universal SIM (USIM)**.

What is an eSIM?

- SIM cards shrank from **SIM** to **micro SIM** to **nano SIM**. to the **eSIM**, with specifications defined by the **GSM Association**.
- In the **eSIM paradigm**, the **SIM software** is loaded on to a **UICC** that is **permanently installed in the mobile equipment in the factory itself**, that it can’t be removed (This is called the **eUICC**).
- Users using mobile equipment with this capability don’t have to physically replace their SIM cards when they join or switch networks. Instead, the **network operator simply has to reprogram the eSIM**, which can also be **done remotely**.

An eSIM has two immediate advantages:

- **Environmentally friendlier**: its reprogrammability means no need for more plastic and metal for a new SIM.
- If a **malicious person gains access to your phone**, they won’t be able to separately access the **SIM application** nor be able to duplicate it.

There are at least two disadvantages:

- In some countries, including the U.S., **eSIMs can be programmed by subscribers themselves**.
- An **eSIM can in theory allow network operators to track subscribers’ data**, including inside apps on the device, especially in the absence of data privacy laws.

3GPP:

- Established in **December 1998**.
- The **3rd Generation Partnership Project (3GPP)** is an umbrella term for a number of standards organizations which develop protocols for mobile telecommunications. Its best known work is the development and maintenance of:
 - **GSM** and related **2G** and **2.5G standards**, including **GPRS** and **EDGE**
 - **UMTS** and related **3G standards**, including **HSPA** and **HSPA+LTE** and related **4G standards**, including **LTE Advanced** and **LTE Advanced Pro** **5G NR** and related **5G standards**, including **5G-Advanced**
- An evolved **IP Multimedia Subsystem (IMS)** developed in an access independent manner **3GPP** is a **consortium with seven national or regional telecommunication standards organizations (One of them is India)** as **primary members** and a variety of other organizations as associate members.
- The **3GPP** organizes its work into **three different streams**: Radio Access Networks, Services and Systems Aspects, and Core Network and Terminals.

Topic 8. A RARE FORM OF LIGHTNING

Important for the subject: Science and Technology



Ball lightning:

Also called **globe lightning**, it is one of the most rare and mysterious forms of lightning usually associated with **thunderstorms**.

It's a **ball of luminosity** that usually occurs near the impact point of a flash and moves horizontally at a speed of a **few centimeters per second**. These balls are said to be **plasmas**.

- **Plasma** is a completely **ionized state of matter**, at high temperature, in which positive and negative ions freely move about.
- It can **penetrate closed windows**, is usually accompanied by a **hissing sound**, and has a **lifetime of several seconds**. The color is quite variable and the ball often ends with an explosion. Though it is not usually destructive.
- It occurs at times of intense electrical activity in the atmosphere.
- It has not been produced in the laboratories by the scientists.

Topic 9. FOOD LABELS TO HAVE QR CODE TO HELP THE VISUALLY DISABLED

Important for the subject : Science and Technology

The Food Safety and Standards Authority of India (FSSAI) has recommended the use of **quick response (QR) codes on food products** for accessibility by persons with visual disabilities, stating that this would ensure access to safe food for all, including those with special needs.

More About News:

- The **FSSAI under its Food Safety and Standards (Labelling and Display) Regulations, 2020** has comprehensively outlined the information to be included on the labels of food products.
- This includes **product name, shelf life, nutrition facts, vegetarian/nonvegetarian logos, ingredient lists**, allergen warnings, and other product specific labeling requirements.
- The information is aimed at **empowering consumers** to make informed choices when selecting food products.
- The **Rights of Persons with Disabilities Act, 2016** recognises the rights and needs of individuals with disabilities, which emphasize accessibility and the promotion of health for persons with disabilities.

Food Safety and Standards Authority of India

- It is a **statutory body** established under the Food Safety and Standards Act, 2006 (FSS Act). FSS Act, of 2006 consolidated various acts & orders that had earlier **handled food-related issues in various Ministries and Departments**.

Nodal ministry: Ministry of Health & Family Welfare.

What are QR codes?

- A QR code is a type of barcode that can be read easily by a digital device and which stores information as a series of pixels in a square-shaped grid. QR codes are frequently used to track information about products in a supply chain and – because many smartphones have built-in QR readers – they are often used in marketing and advertising campaigns. More recently, they have played a key role in helping to trace coronavirus exposure and slow the spread of the virus.
- The first QR code system was invented in 1994 by the Japanese company Denso Wave, a Toyota subsidiary. They needed a more accurate way to track vehicles and parts during the manufacturing process. To achieve this, they developed a type of barcode that could encode kanji, kana, and alphanumeric characters.
- Standard barcodes can only be read in one direction – top to bottom. That means they can only store a small amount of information, usually in an alphanumeric format. But a QR code is read in two directions – top to bottom and right to left. This allows it to house significantly more data.
- The data stored in a QR code can include website URLs, phone numbers, or up to 4,000 characters of text. QR codes can also be used to:
 - Link directly to download an app on the Apple App Store or Google Play. Authenticate online accounts and verify login details.
 - Access Wi-Fi by storing encryption details such as SSID, password, and encryption type.

Send and receive payment information.

- And much more – a company in the UK called QR Memories even creates QR codes for use on gravestones, allowing people to scan the code to read more about that deceased person's life (if they have an obituary or news story relating to them online).

Topic 10. WHAT SEPARATES CLASSICAL AND QUANTUM CHAOS?***Important for the subject: Science and Technology*****Chaos in Weather Forecasting**

Randomness in the Atmosphere: Earth's atmosphere, a laboratory of randomness, constantly changes in terms of pressure, density, gas flow rates, and temperature, making the paths of gas molecules unpredictable.

The Butterfly Effect: The "butterfly effect" illustrates the idea that a butterfly's wings flapping in one place can trigger a storm elsewhere, emphasizing the sensitivity of chaotic systems to initial conditions.

Deterministic Chaos: Chaotic systems, like a pinball machine, follow deterministic physical laws but exhibit seemingly unpredictable behaviour. The term "deterministic chaos" implies that precise knowledge of the present is required for accurate future predictions.

Chaos and the Lyapunov Time

- **Diverse Applications:** Chaos theory finds applications in various fields, from fluid dynamics and human heartbeat irregularities to voting patterns and planetary dynamics.
- **Sensitivity to Initial Conditions:** Chaotic systems are highly sensitive to their initial conditions, often leading to seemingly random behavior.
- **Lyapunov Time:** The predictability of a chaotic system depends on factors such as the accuracy of its initial state knowledge and the Lyapunov time, which varies from milliseconds for electrical circuits to millions of years for the inner solar system.

What is Quantum Chaos?

- **Quantum Mechanics vs. Chaos:** Quantum mechanics, while probabilistic, differs from chaos theory. Subatomic particles lack point-like locations, making it impossible to precisely determine their positions.
- **Perturbation Theory:** Quantum physics addresses mild disturbances in atomic systems using perturbation theory. Chaos, however, requires a distinct approach, leading to the field of quantum chaos.
- **The Rydberg Atom:** The Rydberg atom bridges classical and quantum domains. When an atom's energy levels become nearly continuous due to high excitation, it exhibits classical behavior.

- **Spectrum Signatures:** Chaos in a Rydberg atom manifests in the spectrum of its energy levels, with irregularities that contrast with the randomness of non-chaotic quantum systems.

Significance of studying Quantum Chaos

- **Discrete Energy Steps:** Quantum systems feature discrete energy levels, in contrast to classical systems with continuous energy. The Rydberg atom offers a link between these realms.
- **Regularities in Chaos:** Chaotic quantum systems surprisingly display strong regularities in the distribution of energy levels, an area ripe for exploration.
- **Expanding Horizons:** Quantum chaos is a burgeoning field of research with implications in thermalization, quantum information, and black hole quantum mechanics, presenting exciting challenges and opportunities.

Topic 11. CENTER TO INTRODUCE DNA AND FACE MATCHING SYSTEMS AT POLICE STATIONS ACROSS COUNTRY

Important for the subject : Science and Technology

More than a year after the **Criminal Procedure Identification Act** was passed by Parliament, the Centre is all set to roll out “**DNA and face matching**” systems at 1,300 police stations across the country.

Criminal Procedure Identification Act 2023:

- In April 2022, the Indian Parliament passed the Criminal Procedure Identification Act (CrPI), granting police and **Central investigating agencies the authority to collect, store, and analyze physical and biological samples, including retina and iris scans of arrested individuals.**

Integration with NAFIS

- The **National Automated Fingerprint Identification System (NAFIS), managed by the NCRB**, has been integrated into the CrPI Act’s implementation. NAFIS includes fingerprint data for over 1 crore people, including accused and convicts, and is available at around 1,300 police stations across the country.

Facial recognition system

- A **facial recognition system**, which is often used to verify individuals through ID verification services, works by identifying and measuring facial features from a given image. It may match a human face from a digital image or a video frame against a

database of faces.

- The purpose of **facial recognition software is to help increase safety and security in various situations**. The police in India are using it more frequently for identifying purposes and in criminal investigations.
- A **few examples** were the police departments of India using facial recognition technology systems are:
- **TSCOP and Crime and Criminal Tracking Network & Systems (CCTNS) in Telangana, Punjab Artificial Intelligence System (PAIS) in Punjab**, Trinetra in Uttar Pradesh, Police Artificial Intelligence System in Uttarakhand, Automated Facial Recognition System (AFRS) in Delhi, and **Automated Multimodal Biometric Identification System (AMBIS)**.
- The Delhi police used a facial recognition system for over 100 of the 1,818 arrests they made during the riots against the Citizen Amendment Act in December 2019.
- Thousands of Indian citizens came out to protest this new law that is believed to be discriminatory towards Muslims and other marginalized communities.
- In another situation, the police used facial recognition technology along with **CCTV footage** to arrest over 200 protesters who were protesting an agriculture reform that favored corporations over farmers at Delhi's Red Fort.

The advantages of using technology in law enforcement in India:

- Technology helps in increasing the **productivity and efficiency of Law Enforcement Agencies**. A strong partnership between police and technology would facilitate quick criminal investigations, greatly reduce crime, and help to uphold law and order.
- **Technological assistance** helps the police to reduce the burden of daily manual tasks.
- **Big Data can be quite useful in identifying crime trends and hotspots**. The smartphone apps are connected to centralized databases and give the investigating officer real-time access to data on missing individuals, vehicles, bodies, and criminal histories very quickly.
- **Reduce Malpractices**: The use of technology like body-worn cameras will reduce the scope of malpractices by the officers on duty.
- **Technology helps in bridging** the gap between the public and the police. The digital services provided by police may help the public to make use of these services from the comfort of their house.
- For example, in **Punjab Police's SAANJH**, people can submit their concerns online using the State public grievance redressal portal for the state police. The main goal of this portal is to allow citizens to file complaints online, track their progress, and receive reports in a timely manner while sitting at home.

The challenges of using technology in law enforcement in India:

- The **lack of proper data security legislation** may result in data breaches and the subsequent use of this data for terrorism and other illegal acts.
- The **unequal distribution of infrastructure across India's rural and urban**

environments makes widespread adoption of technology difficult. Remote places might not have adequate internet penetration to access the technology made available to the public by law enforcement authorities.

- The **failure of present police reforms** to teach the effects of technology and incorporate it into crime investigation.
- **Budget constraints are a problem** at many police stations around the nation, making the deployment of new equipment financially impractical.
- **Due to a lack of adequate training and access to this technology**, the Indian law enforcement authorities are unable to keep up with the rapid developments in technology, which has resulted in a large technological gap.
- **Many agencies lack the necessary mobile or software tools** to enhance interagency collaboration or maintain officers in the community.

Topic 12. CONTOURS OF JOINT THEATRE COMMANDS READY

Important for the subject: Science and Technology

The Armed Forces have narrowed down the **final contours of the integrated theatre commands**

The **Armed Forces** in India have made significant progress in **defining integrated theatre commands**, which aim to **combine Army, Navy, and Air Force resources**.

- These theatre commands are **awaiting government approval** and may involve a **national defense committee**, potentially led by the **Defense Minister**.
- They aim to **enhance jointness among** the services and may result in the **appointment of a Vice CDS and a Deputy CDS**.
- **Three theatre commands focused on Pakistan, China, and maritime threats** are in the works, with the possibility of a **fourth command for tri-service agencies in the future**. The **structure is nearly final**, but **human resource matters are still under discussion**.
- The **HQIDS is expected to come under the CDS**, and existing **tri-service agencies are also being considered for integration** into theatre commands.
- The **focus is on promoting jointness in intelligence, logistics, training, and infrastructure**, among other areas. This represents a **significant military reform** and has been in discussion for **three years**.
- The specific service leadership for **each theatre command is yet to be determined**, and previous **air defense command plans** faced objections from the **IAF**.

Some facts about theatre commands and India:

- The **Kargil Review Committee**, the **Naresh Chandra Committee** and the **Group of Ministers** had called for structural changes in higher defence management.
- It was the **Shekatkar committee**, which had **recommended the creation of the post of Chief of Defence Staff (CDS) and theatre commands**.

- The Inter-Services Organisation (Command, Control and Discipline) Bill, 2023, a key prerequisite for theatre commands, got parliamentary approval in August 2023.
- At present, India has 17 single service commands and only two tri-service commands.

The 17 single service commands are divided as:

- Army – 7 commands; Airforce – 7 commands; Navy – 3 commands. The two tri-service commands are: Andaman and Nicobar Command (ANC), and The Strategic Force Command (Handles the nuclear weapons).

Topic 13. INDIA WON'T MEET UN TARGETS TO REDUCE PREMATURE MORTALITY FROM MAJOR NON-COMMUNICABLE DISEASES: ICMR-NCDIR

Important for the subject: Science and Technology

India will likely miss reaching targets set by the World Health Organization (WHO) and the United Nations-mandated Sustainable Development Goals (SDG) to reduce premature deaths from four major Non-Communicable Diseases (NCD), according to an analysis by the Indian Council of Medical Research (ICMR).

The assessment was conducted by the ICMR's National Centre for Disease Informatics and Research (NCDIR) in Bengaluru.

- **Method used for assessment:** The publicly available data from the census for population and the Sample Registration System (SRS) for cause of death by 5-year-age groups were extracted. Age-standardized premature mortality rates, unconditional probability of dying, and annual percent change (APC) were computed.
- The WHO has defined the unconditional probability of dying (UPoD) from the four NCDs between the ages of 30 and 69 as the progress indicator for monitoring the reduction in premature mortality.
- Four of 10 NCD deaths are premature and occur before the age of 70. The majority of these premature deaths occur in low- and middle-income countries, resulting in productivity loss and economic impact.

Findings of the assessment:

- UPoD was higher among males, particularly around the age of 44, owing to risk factors such as tobacco use and alcohol consumption, physical inactivity, overweight/obesity, inappropriate diet (including high salt intake), and high systolic blood pressure.
- NCDs account for 66 per cent of all deaths in India, of which 22 per cent were premature deaths in 2019.
- The premature mortality rate for four major non-communicable diseases (NCD) namely cancer, cardiovascular disease (CVD), chronic respiratory diseases (CRD), and diabetes, is projected to decrease by 13.9 percent from 2010 to 2025 in India.

- WHO target is a **25 per cent reduction in premature mortality rate** of these NCDs.

SDG target: Reduce it to a **third** from **2015 to 2030**.

- The target of **25 per cent (WHO)** and **33 per cent (SDG)** could possibly be reached by **2039** and **2053** in **India**.
- **Lower and middle-income countries** are reducing NCDs at a higher rate at **25.1 per cent**.
- Other countries' previous reduction rates include **Moldova (25 percent)**, **Peru (23.2 percent among women)**, **China (38.7 per cent)**, and **Sweden (26.6 per cent)**.

Surveillance programme for NCDs in India:

- National Program for Non communicable Diseases, the National Tobacco Control Program, the Eat Right India movement, the National Health Policy of 2017, and the National multi-sectoral action plan for prevention and control of Common NCDs 2017-2022.

Topic 14. NIPAH VIRUS ANTIBODY IN BAT

Important for the subject: Science and Technology

Kerala will intensify the disease surveillance activities and maintain vigil against Nipah as Nipah virus antibodies have been detected in bats in Wayanad as well in Indian Council of Medical Research's bat surveillance studies.

About Nipah virus (NiV):

- It is a **zoonotic virus** (it is transmitted from animals to humans).
- The organism which causes Nipah Virus encephalitis is an **RNA or Ribonucleic acid virus** of the family Paramyxoviridae, genus Henipavirus, and is **closely related to Hendra virus**.
- Hendra virus (HeV) infection is a **rare emerging zoonosis** that causes severe and often fatal disease in both infected horses and humans. It **first broke out in Malaysia and Singapore** in 1998 and 1999.
- It **first appeared in domestic pigs** and has been found among several species of domestic animals including dogs, cats, goats, horses and sheep.

Transmission:

- The disease spreads through **fruit bats or 'flying foxes,'** of the genus **Pteropus**, who are natural reservoir hosts of the Nipah and Hendra viruses.
- The **virus is present in bat urine and potentially, bat faeces, saliva, and birthing fluids**.

Symptoms:

- The human infection presents as an encephalitic syndrome **marked by fever, headache, drowsiness, disorientation, mental confusion, coma, and potentially death.**

Prevention:

- Currently, there are **no vaccines** for both humans and animals. Intensive supportive care is given to humans infected by Nipah virus.

Topic 15. THE NEW MADE-IN-INDIA EV CHARGING STANDARD FOR BIKES AND SCOOTERS: HERE'S WHY IT MATTERS***Important for the subject: Science and Technology***

The **Bureau of Indian Standards (BIS)** has approved an **indigenously developed AC and DC combined charging connector standard {ISI7017 (Part 2 / Sec 7): 2023}** for light electric vehicles (LEVs) such as scooters, bikes, and rickshaws.

About the new standard- ISI7017 (Part 2 / Sec 7): 2023:

- Developed by: **NITI Aayog, the Department of Science and Technology**, electric two-wheeler maker **Ather Energy**, and various other government and industry stakeholders.
- It is the **first in the world** that combines **alternating current (AC) and direct current (DC) for LEVs. Combined AC and DC charging standards for electric four-wheelers are already in use** around the world.

Why is a national standard needed for India?

- EV makers in India are **not mandated** to follow a **specific standard** for charging connectors, thus **different automakers use different charging connectors** for their vehicles.
- **Example: Ola's proprietary Hyperchargers** are designed for charging **Ola Electric scooters only. Ather Energy's open source charging standard** is used by its own scooters and by Hero Vida V1 e-scooters.
- Too many charging standards for EVs makes it **difficult for public charging stations** to cater to each individual type, thus adding to **range anxiety** — the fear that the vehicle would run out of charge, and there will be nowhere to recharge it.
- Even now the new standard **does not mandate EV makers to use a uniform standard** that can help address range anxiety and promote faster adoption of EVs.

What is the situation in other countries around the world?

- **CHINA: World's largest electric car market** in terms of both sales and vehicles on the road, uses a **national standard for EV charging connectors** that is called **GB/T**.

- **UNITED STATES:** The US does not have a national standard as of now.
- **EUROPE:** In Europe, CCS is the predominant **charging connector standard**, and is also a **European Union (EU) requirement** for **EV charging networks**.
- **JAPAN:** Charging standard is called **CHAdEMO**, a charging standard developed in **2010**.

Topic 16. UNMASKING INDIA'S OSTEOPOROSIS CARE CRISIS

Important for the subject: Science and Technology

Only a small percentage of people in India receive care for their **osteoporosis** – a **condition characterized by weakening of bones**.

Osteoporosis or weakening of bones:

Osteoporosis day: 20 October

Theme: Build better bones

- **Osteoporosis** is a **bone disease** that develops when **bone mineral density** and **bone mass decreases**, or when the **quality or structure of bone changes**. This can lead to a **decrease in bone strength** that can **increase the risk of broken bones (fractures)**.
- It **causes** long-term pain, changes in posture and increases chances of fractures and nerve injury.
- These symptoms **negatively impact the quality of life** and **increase disability** and **financial burden** on the family.
- Data shows that at least **46 million women in India** currently live with **post-menopausal osteoporosis**, which is only one type of osteoporosis.

Other causes of Osteoporosis:

- Women who had surgeries to remove their uterus, people who used steroid medication for a long time, and Old age.
- A **2019 study** also revealed that **India was the highest contributor** to **osteoporosis fracture-related deaths/disabilities** worldwide.
- **Endocrinologist:** Doctors/practitioners having knowledge about bone conditions. Most of the **Indian population** does not have access to **DEXA** or the **bone mineral density scan** – the **gold standard test for osteoporosis**.
- A study found that in **India**, there are **only 0.26 DEXA machines per million of the population**.

Singh index to diagnose osteoporosis:

- It is a score that requires only an X-ray of the patient's pelvis to diagnose osteoporosis.

Topic 17. AUTOMATED PERMANENT ACADEMIC ACCOUNT REGISTRY (APAAR ID)

Important for the subject: Science and Technology

Recently, several state governments requested schools to seek parental consent for the creation of a new student identity card.

What is APAAR ID:

- **APAAR**, which stands for **Automated Permanent Academic Account Registry**.
- It is **envisioned as a special ID system for all students in India**, starting from childhood.
- Under the initiative, **each student would get a lifelong APAAR ID**, making it easy for **the learners, schools, and governments to track academic progress** from pre-primary education to higher education.
- APAAR would also serve as a gateway to **Digilocker**

What is the goal behind the APAAR ID for students:

- The goal behind introducing APAAR is to **make education hassle-free and reduce the need for students to carry physical documents**.
- This initiative was **launched as part of the National Education Policy 2020** by the Education Ministry.
- APAAR also **aims to reduce fraud and duplicate educational certificates** by providing a **single, trusted reference for educational institutions**.
- Only **first party sources** that issue certificates will be **allowed to deposit credits** into the system, ensuring authenticity.

How will the APAAR ID work:

- Every individual will have a **unique APAAR ID**, which will be **linked to the Academic Bank Credit (ABC)** which is a **digital storehouse that contains information** of the credits earned by students throughout their learning journey.
- With the APAAR ID, **students would be able to store all their certificates and credits**, whether they **come from formal education or informal learning**.
- When a **student completes a course or achieves something**, it is **digitally certified and securely stored in his/her account** by authorised institutions.
- If the **student changes schools**, whether **within the state or to another state**, all related **data in the ABC gets transferred to the new school just by sharing the APAAR ID**.

What do students have to do to get their single ID created:

- To **sign up for APAAR**, students will have to **provide basic information** such as **name, age, date of birth, gender, and a photograph**.
- This information will be **verified using their Aadhar number**. Students will **need to sign a consent form**, and they can **choose to either accept or decline sharing their Aadhar number** and demographic information with the Ministry of Education for creating the APAAR ID.
- **For minors, parents will have to sign** the consent form, allowing the Ministry to use the student's **Aadhar number for authentication with UIDAI**.
- **Registration for creating APAAR ID is voluntary**, not mandatory.

Topic 18. HOW MUCH SALT SHOULD YOU TAKE EVERY DAY?***Important for the subject: Science and Technology***

Our bodies need salt. Salt also adds taste to our food. However, too much salt in your diet may lead to high blood pressure.

The **World Health Organization recommends 5 grams of salt in your diet every day**. But the world average is 10.8 grams.

A recent report, a part of the national noncommunicable disease monitoring survey, states that **Indian men consume 8.9 grams, and Indian women take in 7.1 grams of salt on a daily basis**.

What is the Need for Limiting Salt Intake?

- Excessive salt intake can have **dangerous consequences such as Hypertension, heart disease, and stroke**.
- Reducing sodium intake is important because it is strongly correlated with **lower blood pressure, which can lead to a decrease in Cardiovascular Diseases**.
- Cardiovascular disease is the leading cause of mortality worldwide and is responsible for a significant economic impact on low- and middle-income countries (LMICs) such as India.
- Cardiovascular disease and hypertension are significant challenges in India due to several factors, including rising mortality rates, higher prevalence in men, particularly in southern states, and a large pre-hypertensive population.
- The 2020 Report on Medical Certification of the Cause of Death shows that circulatory system diseases account for 32.1% of all documented deaths in India, with hypertension being a major risk factor.
- The World Economic Forum projects that the Indian economy alone faces losses surpassing USD 2 trillion between 2012 and 2030 because of cardiovascular disease.

What are the Related Initiatives?

Eat Right India Campaign:

- It was launched by the Food Safety and Standards Authority of India (FSSAI), aiming to transform the Indian food system and ensure that everyone has access to safe, nutritious, and sustainable food.

Aaj Se Thoda Kam Campaign:

- FSSAI has initiated the ‘Aaj Se Thoda Kam’ social media campaign. Despite these efforts, the average sodium consumption of Indians remains alarmingly high. Studies have found that the typical daily intake of sodium in India is around 11 grams, which is much higher than the recommended intake of 5 grams per day.

Why is Salt Consumption Important?

- Salt as a Sodium chloride is an essential nutrient that plays several important roles in the body.
- Sodium is an **electrolyte that helps to regulate the balance of fluids in the body and aids in the transmission of nerve impulses and muscle contractions.**
- Salt consumption is important for maintaining proper bodily function, but excessive intake can have negative health consequences, **making it important to consume salt in moderation.**

How can the Related Challenges be Addressed?

- India needs a comprehensive national strategy to reduce salt consumption, with a multi-pronged approach that engages consumers, industry, and the government. Collaboration between state and union governments is essential to combat hypertension caused by excessive sodium intake.
- Reducing sodium consumption has been identified as a highly cost-effective strategy to prevent Non Communicable Diseases (NCDs), which are responsible for the majority of deaths worldwide.
- A report suggests that implementing policies to reduce sodium consumption could save an estimated seven million lives globally by 2030.
- The sodium reduction policy is crucial to achieving the **Sustainable Development Goal (SDG) of reducing deaths from NCDs.**

Topic 19. WILL QR CODES IMPROVE ACCESS TO FOOD LABELS?

Important for the subject: Science and Technology

The Food Safety and Standards Authority of India (FSSAI) has recommended the inclusion of a QR (quick response) code on food products for accessibility by visually impaired

individuals stating that this will ensure access to safe food for all.

Why is the move important?

- The move is vital as India is one of the largest markets of packaged foods in the world and is currently witnessing a growing burden of non-communicable diseases (NCDs) which have seen an abrupt rise globally since the last two decades.
- According to the World Health Organization. Besides other factors, this trend is attributed to aggressively marketed, cheaper, and more easily available prepackaged foods which is finding a growing preference among consumers.
- **Every consumer has the right to know** exactly what he is paying for and if he is getting what he is promised and advertised.

What information will the QR codes provide?

- The FSSAI has advised that these new QR codes should encompass **comprehensive details about the product**, including, but not limited to, ingredients, nutritional information, allergens, manufacturing date, best before/expiry/use by date, allergen warning, and contact information for customer enquiries.
- It adds that the inclusion of a QR code for the accessibility of information does not replace or negate the requirement to provide mandatory information on the product label, as prescribed by relevant regulations.
- The latest advisory caters to two important regulations the FSSAI's Food Safety and Standards (Labeling and Display) Regulations, 2020 which outlines the information to be included on labels of food products and the **Rights of Persons with Disabilities Act, 2016** which recognises the rights of individuals with disabilities and emphasizes accessibility of health for persons with disabilities.

How did the QR code come into being?

- A QR code is a type of two dimensional matrix barcode, invented in 1994, by the Japanese company Denso Wave for labeling automobile parts.
- According to market experts, for the food manufacturers, using QR codes on food products can help improve their brand image, customer loyalty, and operational efficiency.
- On the importance of accurate and accessible food labels, a recently published paper titled, 'Food literacy & food labelling laws a legal analysis of India's food policy', noted that aggressively marketed, cheaper and more easily available prepackaged foods, often considered as foods high in fat, salt, and sugar, is finding a growing preference amongst consumers in India.
- To prevent or control further widespread of NCDs, the FSSAI has issued numerous food and packaging laws and acts to control their manufacture, storage, distribution, sale, and import so that a safe and wholesome food is available to consumers.
- The front of pack labeling (FOPL), proposed by FSSAI in 2019, is a key strategy to alert

and educate consumers in making an informed choice.

- Food industry experts also note that consumers now consider food packaging equally important as a product.
- The increase in smartphone usage by consumers indicate that QR codes are emerging as one of the most promising technologies to enhance the information provided to consumers and influence their buying behaviour.

Topic 20. EARTH-LIKE TECTONIC PLATES ON ANCIENT VENUS MAY EXPLAIN ITS CARBON DIOXIDE- & NITROGEN-RICH ATMOSPHERE

Important for the subject: Science and Technology

Venus, often referred to as **Earth's sister planet**, may have experienced tectonic activity about 4.5 billion to 3.5 billion years ago, according to a new study.

Venus planet:

- **Venus and Earth** are about the **same size, mass, density and volume**. Still, Venus is the least understood of the terrestrial planets.
- It appears in Earth's sky always close to the Sun, as either a "**morning star**" or an "**evening star**".
- It is the **third brightest object** in Earth's sky after the **Moon** and the **Sun**. It has a **weak induced magnetosphere** and an especially **thick carbon dioxide atmosphere**, which creates, together with its **global sulfuric acid cloud cover**, an **extreme greenhouse effect**.
- This results at the surface in a mean temperature of **737 K (464 °C; 867 °F)** and a **crushing pressure of 92 times that of Earth's at sea level**, turning the **air into a supercritical fluid**.

Study findings:

- The **planet's atmospheric composition** is mainly composed of **carbon dioxide (96.5 per cent)** and **nitrogen (less than 3.5 per cent)**. **Plate tectonics** may have been instrumental in creating its **carbon dioxide- and nitrogen-rich atmosphere on Venus**.
- The new findings suggest that **ancient Venus** may have been **home to microbial life**. That means **Earth** and **Venus** may have been even more alike than thought.

Outcome from new findings:

- We very likely had **two planets** at the same time in the same solar system operating in a **plate tectonic regime**.
- **Plate tectonics** would have likely **ended on Venus** after it **lost water** and its atmosphere got too hot and thick. This process may have **dried up the necessary ingredients that make tectonic movements possible**.
- **Only early plate tectonics** could explain **Venus' current atmosphere and surface**

pressure. This **early tectonic movement** would have been **happening on Earth and Venus simultaneously**.

- **Venus** may have **transitioned from limited tectonic movement** early in its history to the **stagnant lid model** that exists today. A **stagnant lid** means its **surface** has only a **single plate** with **minimal amounts of movement** to release gases into the atmosphere.
- We might have **planets that transition in and out of habitability** rather than just being continuously habitable.
- **DAVINCI** is **National Aeronautics and Space Administration's (NASA)** upcoming mission to **Venus**.
- **Shukrayaan-1** will be **India's mission on Venus**

Plate tectonics theory (PTT):

- Suggested by **McKenzie and Parker** in **1957** and propounded in **1967** by **Morgan**.
- Both **conventional current theory** and **seafloor spreading theory** paved the way for the theory of plate tectonics.
- It explains the **movement of the Earth's lithospheric plates**, which make up the Earth's outermost shell.
- It describes how **Earth's thin outer shell is broken into big pieces** called **tectonic plates**, which float on the planet's mantle. **Plate tectonics** gave rise to **oceans, continents and mountains**, along with playing a critical role in nourishing life on Earth.

PTT is based on 4 general geomorphological assumptions:

- The **slab or zone of the lithosphere** is divided into several vertical columns geomorphologically known as **plates** drifting kinematically over a semi-molten asthenosphere called a **tectonic**.
- The **surface area of a continental plate** is also **extended over the oceanic lithosphere**. Thus, there is **no complete segregation between the continental and the oceanic lithosphere**.
- The **movement or tectonics of the respective plates** depends on the **direction and the impulse action of the thermal Convection currents**. Consequently, the plates are **converging** and also **divergent** away from each other.
- The **process of convergence and divergence** further **creates a new crust over the Earth's surface** and also disintegrates the crust apart. The rate of formation and disintegration of the crust has acquired a profile of equilibrium by which the surface area of the earth remains constant.

Topic 21. RBI OPENS UP ITS DATED SECURITIES TO HELP RUSSIA PARK ITS RUPEE SURPLUS

Important for the subject: Economy

In News: Countries accumulating surplus in INR to be able to invest in G Secs through

Rupee Accounts.

With RBI's amendment in **FEMA Regulations 2019**, countries holding Rupee accounts in India can directly invest that money in Government dated securities and thus earn interest and invest in India at the same time.

- The move is seen emerging from **Russia's rising Rupee balance** after **India paid for Russian crude oil in Rupees**, because of the US led sanctions.
- This move aims to benefit **22 countries having bilateral trade settlements in INR** (Indian Rupee) with India.

Why was this move required?

- **International Trade Settlement in rupees**, initiated in July last year, aims to promote the growth of global trade with emphasis on exports from India and to support the increasing interest of the global trading community in INR.
- This is likely to increase the Rupee balance with participating countries. Russia can get some comfort over its mounting surplus rupee problem as it, along with 21 other countries, can now invest in **dated Government Securities and Treasury Bills** through a rupee account.
- Reserve Bank of India has notified the amendment in Foreign Exchange Management (Debt Instruments) Regulations, 2019.
- The notification also said the amount of consideration for the purchase of dated Government Securities / treasury bills by persons resident outside India shall be paid out of funds held in their rupee account.
- Also, the **sale/maturity proceeds** (net of taxes, as applicable) of instruments held by persons resident outside India who maintain a rupee account **shall be credited to the said rupee account**.

Was there no such arrangement earlier?

- The new system will be apart from options to invest through the **Foreign Portfolio Investor (FPI) route** and **Special Rupee Vostro Account (SRVA)**.

Dated security vs Treasury Bills

- Dated Government Securities means an instrument with a maturity period exceeding one year which carries a certain interest rate.
- Treasury Bills are also government securities but with a maturity period of less than one year which do not carry any interest. Such bills are issued at discount and payable at face value.

Topic 22. NEW REPORT CALLS FOR GLOBAL MINIMUM TAX ON BILLIONAIRES

Important for the subject: Economy

Report titled ‘**Global Tax Evasion Report**’ prepared by the **EU Tax Observatory**, a research laboratory established in 2021 with expertise in international tax issues has called for a **global minimum tax on billionaires’ wealth**.

- The report studies tax avoidance in view of the rising income and wealth inequality, high public debt in the post-COVID-19 context, and the significant need for government revenue to address climate change and fund essential services like healthcare, education, and infrastructure.
- The report **investigates the effects of international reforms adopted over the past 10 years**, such as the **automatic international exchange of bank information**, and the **international agreement on a global minimum tax for MNCs**, among other issues.
- The **automatic exchange of information was introduced in 2017** to fight offshore tax evasion by wealthy individuals. Countries exchanged information on the deposits of non-residents to foreign tax authorities as part of the **common reporting standard**.
- In 2021, a group of 136 countries, including India agreed to an OECD proposal to set a **minimum global tax rate of 15% for MNCs** and sought to make it harder for them to avoid taxation.

Key findings of the report:

- Firstly, **offshore tax evasion by wealthy individuals has decreased** over the past decade, the report says, attributing it to the automatic exchange of bank information.
- But it also highlights that offshore tax evasion still happens due to **non-compliance by offshore financial institutions** and limitations in the automatic exchange of bank information.
- Not all assets are Important for the subject to the automatic exchange of bank information, allowing individuals to **exploit these gaps, especially in the realm of real estate**.
- Report finds a considerable amount of **profit shifting to tax havens**, with no apparent impact of policies so far.
- **US multinationals** are responsible for around **40% of this profit shifting**, with **Continental European countries being the most affected** by this evasion.
- It finds that **global billionaires** have **effective tax rates equivalent to 0% to 0.5%** of their wealth due to the frequent use of shell companies to avoid income taxation.
- The report highlights the emergence of new forms of aggressive tax competition that negatively affect government revenues.
- Over the past 15 years, many countries have introduced preferential tax regimes aimed at

attracting specific socio-economic groups perceived as particularly mobile.

Recommendation:

- Governments should put a global minimum tax on billionaires, which could raise **\$250 billion annually**.
- If levied, the sum would be equivalent to only 2% of the nearly \$13 trillion in wealth owned by the 2,700 billionaires globally.

Topic 23. RBI ALLOWS RETAIL INVESTORS TO SUBSCRIBE TO FLOATING RATE SAVINGS BONDS VIA ITS PORTAL

Important for the subject: Economy

RBI allows retail investors to subscribe to Floating Rate Savings Bonds via its portal. RBI has made the move to expand the basket of investments available to retail investors.

Already retail investors are allowed to invest in central government securities, treasury bills, state government securities, and sovereign gold bonds through the **Retail Direct Portal**.

What are Floating Rate Savings Bonds?

- FRSB 2020 (T) are **interest-bearing, taxable, non-tradeable bonds**, issued by the central government, which are repayable on the expiration of **seven years** from the date of issue. RBI officially pays **35 basis points above the NSC rate**, offering an 8.05% interest rate.
- The interest on the bonds will be payable at **half-yearly intervals** on Jan 1st and July 1st every year. There is **no option to pay interest on a cumulative basis**.

About RBI-Retail Direct Scheme:

- RBI-Retail Direct Scheme was started in 2021. Under the scheme, individual investors are permitted to open a **Retail Direct Gilt account** with the Reserve Bank of India, using an online portal, through which investments in government Securities can be made in primary and secondary markets

What is Gilt account?

- Gilt Account means an account opened and maintained for holding Government securities.
- Instead of money, the account is debited or credited with treasury bills or government securities.

Topic 24. RBI LIKELY TO HAVE ROLLED OVER A PART OF \$5-BILLION FOREX SWAP TO BOOST LIQUIDITY

Important for the subject: Economy

RBI may have rolled over a portion of its \$5-billion **foreign exchange swap** that was due for maturity in Oct 2023.

Tool likely used is an **ultra-short term swap** whose maturity would augment system liquidity amid tax outflows and currency leakage in the festive season.

Why did RBI use the \$5 billion swap?

- On April 28, 2022, the RBI concluded a **sell-buy foreign exchange swap** under which banks **bought US Dollars from the central bank and simultaneously agreed to sell the same amount of dollars at the end of the swap period.**
- By carrying out the swap, the RBI had drained the banking system of rupee liquidity, which at the time was at a massive surplus of around ₹5 trillion due to central bank cash infusions during the Covid crisis.
- The maturity of the swap, which was due on October 23, **would have released around ₹40,000 crore into the banking system** as purchases of dollars by the RBI inject rupee liquidity into the banking system.

What is a Dollar–Rupee Swap auction?

- It's a forex tool whereby the central bank uses its currency to buy another currency or vice versa.
- In a Dollar–Rupee buy/sell swap, the central bank buys dollars (US dollars or USD) from banks in exchange for Indian Rupees (INR) and immediately gets into an opposite deal with banks promising to sell dollars at a later date.
- In a dollar–rupee sell/buy swap it sells USD in exchange for INR and promises to buy dollar from banks after some years.

Why do Central Banks engage in it?

- Forex swaps help in liquidity management. It also, in a limited way, helps in keeping the currency rates in check. A dollar–rupee buy/sell swap injects INR into the banking system while sucking out the dollars, and the reverse happens in a sell/buy swap.

Topic 25. NATIONAL SINGLE WINDOW SYSTEM TO START COMPANIES, LLPS

Important for the subject : Economy

In News: Company incorporation now available under the centre's single-window approval system. Companies and limited liability partnerships (LLPs) can now be incorporated using

the central government's **National Single Window System (NSWS)** which offers various central and state approvals in one place.

- The ministry said that its system has been integrated with the NSWS for the incorporation of companies and LLPs. This service can now be availed from both the NSWS portal and the MCA21 portal.
- The move is part of the government drive to bring various regulatory services under a single platform for ease of doing business.
- In the **MCA21 portal**, the ministry offers various services like getting a permanent account number (PAN), bank account and GST registration while applying for incorporation of a business in one go.
- The ministry is also in the process of offering adjudication of a host of compliance defaults and other lapses which have been decriminalised, entirely virtually in a new IT module, which will be added to the **MCA21 portal**.
- The trend is to cut down the physical interface between the authorities and the business community and to manage approvals and adjudication virtually, which will also introduce more objectivity in decision-making.

What is the National Single Window system?

- NSWS allows **securing government approvals without having to go to individual ministries or to states**.
- This portal also offers live tracking of application status, quick response to queries and document security.
- It hosts applications for approvals from 31 central government departments and 22 state governments, according to information available from the portal.

Topic 26. HOUSEHOLD INVESTMENTS ON PHYSICAL ASSETS ON THE RISE

Important for the subject: Economy

Households optimistic about future earnings prospects according to the Ministry of Finance's **Monthly Economic Review (MER)**.

With Net household financial savings dropping to a multi-decade low of 5.1% of the gross domestic product (GDP) in 2022-23, the MER finds possible explanations for this change.

- According to the Finance Ministry, household investment in physical assets grew much faster in FY22, compared to the pre-pandemic decade (FY12 to FY20) in response to **release of pent-up demand**.
- This is seen in the steady double-digit growth in housing loans since May 2021 till the present. A **low-interest rate regime** in the last two years might be behind the **sharp fall in household savings in India and an increase in liabilities**.
- Households are making a **smart investment choice** by **acquiring physical assets**, taking

advantage of **larger credit availability from banks** and after a long period of elevated returns in financial assets.

- Given that the **real estate sector** has a vast network of **forward and backward linkages** (such as cement and steel, among others, besides various services), the increase in housing demand is inducing broad-based growth and job creation.
- Acquisition of physical assets has been **financed by a rise in financial liabilities** of households by 5.8% of GDP compared with 3.8% in FY22.
- The housing sector recorded consistent double-digit expansion (13.8 per cent in August), while vehicle loan growth strengthened to 20.6 per cent. Credit card loans maintained high growth (30 per cent in August).
- Of the total **gross fixed capital formation (GFCF or fixed investment)**, households held the **highest share of 40.4 per cent in FY22**, acquired majorly through ownership of **residential properties**, followed by the **private corporate sector at 34.9 per cent**, and the **public sector at 24.7 per cent**.
- Thus the report finds that the data indicates **confidence of households in their future employment and income prospects** for increased demand for housing and vehicle loans.
- This view is further supported by the **Future Expectations Index** of the Consumer Confidence Survey of RBI, which has hit a four-year high in the latest survey round.

India's Household Financial Saving Debate

- The recent data on household financial savings has given rise to two viewpoints on economic outlook. The reduction in the net financial assets rate is primarily due to a rise in financial liabilities.
- There can be many interpretations of this rise. An optimistic interpretation of this rise in the borrowings of household sector which also includes non-corporate businesses is that this sector is buoyant and has borrowed more.
- The other view holds that such a transition is typically seen in times of high inflation, as monetary assets can't always keep up with the value appreciation delivered by physical assets during such times.
- And with low financial savings it may be difficult to manage both private sector growth and manage fiscal deficit.
- The transferable savings ratio of the economy has come down and this will affect the borrowing programme of the government and corporate sector.

Household Financial Savings

- These household financial assets include bank deposits, cash and equity investments, after deducting debt servicing and consumption.
- India's government relies on these savings to fund its capital investments in physical assets like infrastructure, machinery, and equipment.

Topic 27. AHEAD OF DIWALI WARNING ISSUED ON ILLEGAL IMPORT OF FIRECRACKERS

Important for the subject: Economy

The Petroleum and Explosives Safety Organisation (PESO) has warned against the import of foreign-made fireworks illegally using false declarations.

Fireworks have been declared as a **restricted item** under **Indian Trade Classification (Harmonised System)** — **ITC (HS)** with respect to imports.

- To date, no licence for the import of fireworks has been granted for possession and/or sale under the **Explosives Rules, 2008, by PESO**.
- Possession and sale of fireworks of foreign origin in India is illegal and punishable under law.

Petroleum and Explosives Safety Organization (PESO)

- Earlier known as Department of Explosives, has been serving the nation as a nodal agency for regulating safety of hazardous substances such as explosives, compressed gases and petroleum.
- PESO works under the Department for the Promotion of Industry and Internal Trade under Ministry of Commerce and Industry, to administer Explosives Act 1884, Explosive Substance Act, Petroleum (Production) Act 1934, Inflammable substance Act 1952 and Environment Protection Act 1986.
- Further it is responsible towards control of import, export, transport, storage and usage of explosive materials, flammable materials, pressure vessels, cryogenic vessels etc.

Indian Trade Classification (Harmonised System) — ITC (HS)

- HS codes come from the Harmonised System of Nomenclature (HSN), which is a globally agreed system for categorising and coding product types.
- HS codes show the type of product and what it's made from – which can be used by governments around the world to levy the correct import taxes.
- In India, ITC-HS codes are used. ITC stands for Indian Trade Classification. While many countries use a 6 digit HS code, the ITC-HS codes contain the 6 digit HS code, plus 2 additional digits. This results in an 8 digit code which gives more detailed information about the product.
- Any changes or formulation or addition of new codes in ITC-HS Codes are carried out by DGFT (Directorate General of Foreign Trade). Commodity description, weeding out of defunct codes, addition of new codes, change of product description etc., are taken up periodically as a part of the ongoing process towards perfection.

Harmonized System (HS)

- The Harmonized Commodity Description and Coding System, also known as the Harmonized System (HS) of tariff nomenclature is an internationally standardized system of names and numbers to classify traded products.
- It came into effect in 1988 and has since been developed and maintained by the World Customs Organization (WCO) (formerly the Customs Co-operation Council), an independent intergovernmental organization based in Brussels, Belgium, with over 200 member countries.

Topic 28. INDIA TO OUTPACE JAPAN TO BECOME SECOND LARGEST ECONOMY IN ASIA BY 2030

Important for the subject: Economy

India to outpace Japan as second-largest economy in Asia by 2030

India is on a remarkable economic journey, with its **Gross Domestic Product projected to reach USD 7.3 trillion by 2030** as per **S&P Global Market Intelligence**.

- This would make **India the second-largest economy in the Asia-Pacific region, surpassing Japan and Germany**.
- As of 2022, India had **already surpassed the UK and France** to become the **world's fifth-largest economy**.
- India's rapid economic growth is expected to continue, attracting multinational companies across various sectors, from manufacturing to services.
- In 2023, India's GDP showed **strong growth, expanding at a rate of 7.8% year-on-year**.

Foreign direct investment (FDI) has been increasing, driven by India's promising long-term outlook, youthful demographics, and rising urban incomes.

- A **growing middle class** and the **ongoing digital transformation** are pivotal in driving consumer spending and making India an attractive investment destination.
- The future looks bright, with **India's expanding internet access and e-commerce growth** drawing global tech giants and enhancing its economic prospects further

Topic 29. NEARLY HALF A MILLION INDIANS MIGRATED TO OECD COUNTRIES IN 2021: REPORT

Important for the subject: Economy



The 'International Migration Outlook 2023' is released.

Colombia introduced a bill to recognise climate-induced displacement, the first of its kind in Latin America.

Details of the report:

- Report released by: Organisation for Economic Co-operation and Development (OECD).
- India saw the highest migration flows to OECD countries in 2021 and 2022. Though the number of new migrants from India has dropped by 15% compared to 2019.
- India replaced China as the main country of origin of new migrants to OECD countries in 2020. In 2021, for the second consecutive year, India, with 0.41 million new migrants, was the top country of origin.
- China at second (0.23 million new migrants) followed by Romania (200,000 new migrants).
- 0.13 million Indian citizens acquired the nationality of an OECD country in 2021.
- In terms of workers, migration flows from India (+172 per cent), Uzbekistan (+122 per cent) and Turkey (+240 per cent) rose sharply.

OECD:

- Founded in 1961
- Member: 38 countries.
- It is a forum whose member countries describe themselves as committed to democracy and the market economy, providing a platform to compare policy experiences, seek answers to common problems, identify good practices, and coordinate domestic and international policies of its members.
- The majority of OECD Members are high-income economies ranked as “very high” in the Human Development Index, and are regarded as developed countries.
- Their collective population is 1.38 billion.

- As of 2017, OECD Member countries collectively comprised 62.2% of global nominal GDP (US\$49.6 trillion) and 42.8% of global GDP (Int\$54.2 trillion) at purchasing power parity.
- The OECD is an official United Nations observer.

Topic 30. DESPITE HIGHER TAXATION, INDIA NOW SECOND LARGEST CRYPTO MARKET

Important for the subject: Economy

In News: India remains among the top in crypto market adoption as per global report.

Even with **30 per cent tax** on gains and **TDS (Tax Deducted at Source)** at the rate of **1 per cent**, India remains among the top crypto markets in the world, a 2023 global report on crypto by Chainalysis says.

- **Chainalysis**, a US-based blockchain data platform has come out with its report '**The 2023 Geography of Cryptocurrency Report**'.
- According to the report **India leads the world in grassroots adaptation** as measured by **Global Crypto Adoption Index**.
- India has also become the **second largest crypto market** in the world (**US is no. 1**) by raw estimated transaction volume, beating out several wealthier nations. The report pegged transactions in India at over \$260 billion.

Crypto taxation in India:

- Indian Tax Administration uses the term '**Virtual Digital Asset (VDA)**' for cryptocurrency and NFT.
- Effective from April 1, 2022, **any income from transfer** of VDAs is taxable at the rate of **30 per cent (plus surcharge and cess)**.
- The government also introduced **TDS on VDA**, with effect from July 1, 2022. Rate would be **1 per cent** and would be deducted by any individual/HUF while buying any VDA.

Challenges to Indian crypto industry:

- Uneven implementation of TDS is making it more difficult for home-grown Indian exchanges to compete.
- To escape the high taxation Indian users are moving towards international exchanges.
- Hence it is recommended that local rules like TDS **should be strictly enforced for all exchanges operating in a given country**.
- Doing otherwise can create an environment of **regulatory arbitrage** that hurts the country's native crypto industry.
- India should align with the **IMF and FSB recommended roadmap** that was adopted

during G-20.

G-20 / IMF-FSB Crypto Roadmap

- Finance Ministers and Central Bank Governors (FMCBGs) of G20 nations under India's Presidency adopted the roadmap for crypto regulation as proposed by International Monetary Fund (IMF) and Financial Stability Board (FSB) in a synthesis paper.
- The roadmap is not in favour of a blanket ban on crypto-assets, while it vouches for a comprehensive regulatory and supervisory oversight as a better option.
- Regulation should address macroeconomic and financial stability risks.
- It also pitched for using norms for money laundering to check the use of crypto assets for criminal and terrorist misuse.
- Accordingly jurisdictions should implement the Financial Action Task Force (FATF) anti-money laundering and counter-terrorist financing (AML/CFT) standards that apply to virtual assets and virtual asset service providers.

Regulatory arbitrage

- Regulatory arbitrage is a corporate practice of utilizing more favorable laws in one jurisdiction to circumvent less favorable regulation elsewhere.
- This practice is often legal as it takes advantage of existing loopholes; however, it is often considered unethical.

Topic 31. US WITHDRAWS PROPOSAL ON DIGITAL TRADE AT THE WTO JOINT STATEMENT INITIATIVE (JSI) ON E-COMMERCE

Important for the subject: Economy

In News: US withdraws its proposal on digital trade at the WTO giving boost to India's position on regulating Big Tech.

The US has decided to **withdraw its proposal** on **digital trade** at the WTO to retain the policy space **for regulating big-tech firms**.

- The US proposal on e-commerce rules, has been withdrawn at the WTO's **Joint Statement Initiative (JSI) on e-commerce** meeting.
- The US is reportedly reviewing its approach to trade rules in sensitive areas such as data and source code to balance the right to regulate in the public interest and the need to address anticompetitive behavior in the digital economy.
- The US' change in position on the matter is likely to be a dampener for on-going efforts of the JSI to highlight the need for global rules on e-commerce at the **WTO 13th Ministerial Conference (MC13) in February 2024**.

What was the US e-commerce rule proposal?

- The proposal was made in 2019 by the Trump regime. The proposal called for **free cross-border data transfers without data localisation requirements** and restricting mandatory software source code disclosure.

What will be the impact of the change?

- As the US holds a dominant digital position through its MNCs, the decision to withdraw the digital trade proposal will lead to a worldwide reassessment of national e-commerce policies.
- This will potentially reshape the future of digital trade agreements.

Indian position:

- The new US stand on digital trade syncs with India's approach on the Important for the subject.
- India **had refused to be part of the JSI on e-commerce** over concerns that such rules **may strengthen the dominance of large e-commerce companies** and go against smaller local companies.
- With China and India being major data generators and China already safeguarding its data, India believes in maintaining flexibility in data-sharing with domestic companies rather than international tech giants
- This is an opportunity for India to rethink its strategy of negotiating provisions on digital trade in its FTAs.

Joint Statement Initiative (JSI) on e-commerce

- The Joint Statement Initiative (JSI) on Electronic Commerce, launched at the World Trade Organization's (WTO) 11th Ministerial Conference in December 2017 by a group of 71 WTO members.
- It aims to achieve e-commerce outcomes that build on existing WTO agreements and frameworks with the participation of as many WTO Members as possible.
- The major members of the plurilateral grouping of a include many developed nations such as the EU, Switzerland, Australia, New Zealand, Japan, Korea, and Canada.

Topic 32. SELLING ORGANIC PRODUCE IN INDIA

Important for the subject: Economy

Organic farming is being practiced by about 3.7 million growers worldwide, with India accounting for 1.6 million.

The **Agriculture Corridor under the Namami Gange project** has covered 1.23 lakh hectares for organic farming.

- Producers in India can register for organic certification in **two ways** — **third-party certification** and the **Participatory Guarantee System (PGS)**.

- In terms of market development, there is a dedicated ‘**Jaivik Kheti**’ portal with a registration of about 6.09 lakh farmers.
- APEDA launched the **Trace Net** as an internet based electronic service offered by to the stakeholders for facilitating process certification for export of organic products.
- In 2022, the US **terminated India’s organic recognition agreement** due to **anti-dumping countermeasures for soyabeans**.

How to push organic growth:

- Scale and quality are vital for commercialisation of organic produce. Contract farming, perhaps, can be a way towards this.
- In contrast to conventional farming, organic farming often yields less, but the **price premium compensates for the deficit**, ensuring its profitability. This makes certification and marketing important.

Third-party certification and the Participatory Guarantee System (PGS).

- In terms of market development, there is a dedicated ‘Jaivik Kheti’ portal
- there is evidence of low awareness regarding traceability norms among growers registered in the TraceNet scheme of APEDA

National Programme for Organic Production

- NPOP launched during 2001 was the first such quality assurance initiative by the Government of India under Ministry of Commerce and Industry.
- The NPOP not only provided the institutional framework for accreditation of certification agencies and operationalization of certification programme through its accredited certification bodies but also ensures that the system effectively works and is monitored on regular basis.
- During 2004 the NPOP was brought under the ambit of Foreign Trade Development and Regulation (FTDR) Act wherein it was mandated that no organic products can be exported unless they are certified under NPOP.

Participatory Guarantee System

- To make the certification system affordable and accessible without the need for third party certification agencies a farmer group centric certification system was also launched by the Ministry of Agriculture and Farmers Welfare under PGS-India programme for local and domestic market.
- Both the programmes (NPOP and PGS-India) are independent of each other and products certified under one system cannot be processed or labeled under another system.
- While NPOP certified products can be traded in export and in the domestic market including imports, PGS-India certified products can be traded only in the domestic market.

Topic 33. RBI RAISES DATA UPDATION BAR FOR BANKS, CREDIT INFO FIRMS

Important for the subject: Economy

RBI comes out with **Framework for compensation to customers for delayed updating/rectification of credit information.**

Credit institutions (CIs) and **credit information companies (CICs)** will have to compensate complainants at the rate of **₹ • 100 per day** in case their complaint regarding **delayed updating or rectification of credit information** is not resolved within **30 days** from the date of the initializing of the complaint, according to the RBI.

- RBI released a circular on “**Framework for compensation to customers for delayed updating/ rectification of credit information**”.

Provisions:

- **Compensation** to be provided by the CIs (such as banks) or CICs to the complainant for delayed resolution beyond 30 days of filing the complaint should be **apportioned proportionately among the CIs or CICs concerned.**
- The compensation amount shall be credited to the bank account of the complainant within **five working days of the resolution** of the complaint.
- The complainant can approach the RBI Ombudsman under the **Reserve Bank Integrated Ombudsman Scheme, 2021**, in case of wrongful denial of compensation by CIs or CICs.
- In cases of wrongful denial of compensation which are yet to be covered under the Reserve Bank Integrated Ombudsman Scheme, 2021, the complainant can approach the **Consumer Education and Protection Cell (CEPC)**
- The **Credit Information Companies (Regulation) Act, 2005 (CICRA, 2005)** and **Credit Information Companies Rules, 2006** provide the CI and the CIC, collectively, with an **overall limit of 30 days** to resolve or dispose of the Complaint.
- **CI would get 21 days**, and **CICs** would effectively get the remainder of **nine days** for complete resolution of the complaint.

Credit institutions (CIs) and credit information companies (CICs)

- Credit Institutions are the banks and other finance/non finance companies that are in the business of lending credit.
- The Credit Information Company collects financial information about all the individuals and forms a credit report based on their financial history.
- This credit report plays a very important role as it helps banks and other financial institutions determine the creditworthiness of an individual applying for a loan or credit card with them

Reserve Bank Integrated Ombudsman Scheme, 2021

- Reserve Bank of India (RBI) integrated its three erstwhile Ombudsman Schemes viz. (i)

the Banking Ombudsman Scheme, 2006, (ii) the Ombudsman Scheme for Non-Banking Financial Companies, 2018, and (iii) the Ombudsman Scheme for Digital Transactions, 2019, into one Scheme – ‘The Reserve Bank – Integrated Ombudsman Scheme, 2021 (the Scheme / RB-IOS, 2021)’ with effect from November 12, 2021.

- The Scheme simplifies the grievance redress process at RBI by enabling the customers of Regulated Entities (REs) like banks, Non-Banking Financial Companies (NBFCs), Payment System Participants (PSPs) and Credit Information Companies to register their complaints at one centralised reference point.
- The objective of the Scheme is to resolve the customer grievances involving ‘deficiency in service’ on part of REs in a speedy, cost-effective and satisfactory manner.
- RB-IOS, 2021 covers all commercial banks, Non-Banking Financial Companies (NBFCs), Payment System Participants, most Primary (Urban) Cooperative Banks, and Credit Information Companies.

Alternate Grievance Redress (AGR) Framework

- The AGR Framework of RBI comprises RBI Ombudsman (RBIOs), Consumer Education and Protection Cells (CEPCs) and CEPD.
- The RBIOs function under the framework of RB-IOS, 2021.
- The CEPCs take up complaints against REs not falling under the ambit of RB-IOS, 2021.
- CEPD provides assistance to the Appellate Authority (AA) under the RB-IOS and processes the appeal cases.

Consumer Education and Protection Cell (CEPC)

- Customer protection, one of the developmental roles of RBI, is undertaken through the Consumer Education and Protection Department (CEPD).
- It functions from Regional Offices of the RBI.

Topic 34. TEJ NOW EXTREMELY SEVERE CYCLONE OVER THE ARABIAN SEA; YELLOW ALERT ISSUED FOR EIGHT DISTRICTS IN KERALA

Important for the subject: Geography

In the news: The very severe cyclone, **Tej**, that formed over the **Arabian Sea** intensified into an **extremely severe cyclone**.

About Tej cyclone:

- The **cyclone**, which is moving **north-westwards**, is likely to cross the **Yemen coast** close to **Al Ghaidah** as a **very severe cyclonic storm** with wind speed of **125-135 kmph** gusting to **150 kmph**.
- Regions impacted: **Socotra and Al Ghaidah (Yemen), Salalah (Oman)** in the **Arabian sea region**.
- **Impact in India:** **Kerala** is likely to receive isolated heavy rainfall triggered by the

weather systems over the **Arabian Sea** and the **Bay of Bengal**.

How are Cyclones Classified?

- **Cyclones** are classified on the basis of **wind speed** by the **Indian Meteorological Department (IMD)**:
- **Depression:** Wind speeds of between **31–49 km/h**
- **Deep Depression:** Between **50-61 km/h**
- **Cyclonic Storm:** Between **62–88 km/h**
- **Severe Cyclonic Storm:** Between **89-117 Km/h**
- **Very Severe Cyclonic Storm:** Between **118-166 Km/h**
- **Extremely Severe Cyclonic Storm:** Between **166-221 Km/h**
- **Super Cyclonic Storm:** Above **222 Km/h**

Colour- Coded Weather Warning

- Issued by the **IMD**.
- **Objective** is to **alert people ahead of severe or hazardous weather** which has the potential to cause damage, widespread disruption or danger to life.
- Warnings are updated **daily**.

The **IMD** uses **4 colour codes**:

- **Green (All is well):** No advisory is issued.
- **Yellow (Be Aware):** Yellow indicates severely bad weather spanning across several days. It also suggests that the weather could change for the worse, causing disruption in day-to-day activities.
- **Orange/Amber (Be prepared):** The orange alert is issued as a warning of extremely bad weather with the potential of disruption in commute with road and rail closures, and interruption of power supply.
- **Red (Take Action):** When the extremely bad weather conditions are certainly going to disrupt travel and power and have significant risk to life, the red alert is issued.
- These alerts are **universal in nature** and are also **issued during floods**, depending on the amount of water rising above land/in a river as a result of torrential rainfall.

Topic 35. SENSITIVE ECOSYSTEM IN CAUVERY'S BIRTHPLACE CRIES FOR ATTENTION AMID DEFICIT RAINFALL

Important for the subject: Geography

In the news: Deficit rainfall and drought led to **reduced storage** in **Karnataka's Cauvery basin** reservoirs.

Kodagu- Place of origin of Cauvery river:

- **Kodagu**, which is the **main catchment area** as well as **place of origin of the Cauvery river**, is under stress due to the sensitive ecosystem.
- Located in the **Western Ghats region of Karnataka**.
- The **Krishnaraja Sagar (KRS) reservoir** is located downstream the **cauvery river**.

Rainfed cultivation of paddy in Kodagu:

- There is an **age-old practice of cultivating paddy** in the valleys with the help of **rainwater**.
- These **paddy fields** act like **small ponds** or a **micro reservoir system** that **sustains the ecosystem of Kodagu** and the **Cauvery river**.
- Now, the farmers are **shunning paddy** mainly because it is **not remunerative**. The **high labour cost, commercialisation of crops** and **man-animal conflict** near the **Nagarahole National Park** are also forcing them to shun paddy cultivation.
- The government is reviving **rain-fed paddy cultivation** by providing an **incentive of ₹10,000 an acre**.

Implication of rainfall deficit at Kodagu:

- Drinking water needs of towns and cities in the basin, including Bengaluru will be impacted.
- Inter-State sharing of Cauvery water may be hampered.
- Deficit in storage of reservoirs.
- Decline in **rain-fed paddy cultivation in Kodagu**.

Cauvery river:

- Flows through Tamilnadu and Karnataka state.
Originate at **Talakaveri** in the **Brahmagiri range** in the **Western Ghats, Kodagu district** of the state of **Karnataka**.
- It reaches the sea in **Poompuhar, in Mayiladuthurai district**. It is the **third largest river** – after **Godavari** and **Krishna** – in **southern India**, and the **largest** in the state of **Tamil Nadu**.
- In ancient Tamil literature it was also called **Ponni river**.

Tributaries:

- **Left-** Harangi, Hemavati, Shimsha, Arkavati, Sarabanga, Thirumanimuthar
- **Right-** Lakshmana Tirtha, Kabini, Bhavani, Noyyal, Amaravati, Moyar

Topic 36. MONTHS AFTER COMMUNITY ADDED TO ST LIST, HIMACHAL ASKS DELHI TO DEFINE HATTEES

Important for the subject: Geography

There is confusion in the **Tribal Development Department (TDDD)** about who

the “**Hattees**” actually are and whether people already classified as **Scheduled Castes** should be included as members of this community.

TDD noted that while the Bill introduced in Parliament **excluded Scheduled Castes (SC)**, the entry added to the **ST list** just says “**Hattee of Trans-Giri area of Sirmour District**”.

- Few months ago, **Hattee community** of **Himachal Pradesh’s Trans-Giri area (Sirmaur district)** was included in the **Scheduled Tribes (ST) list** of the **State**. The only other **ST** in the region are the **Gujjars**.
- According to past observations of the **Office of the Registrar-General of India (RGI)**, people who are referred to as **Hattees** in the region also include those from communities such as **Koli, Badhai, Lohar, Dhaki, Dom, Chamar**, which are already designated as **SCs**.

Hatti Tribe (Himachal Pradesh):

- The **Hattis** are a close-knit community who got their name from their **tradition of selling homegrown vegetables, crops, meat and wool etc.** at small markets called ‘**haat**’ in towns.
- The **Hattee community** has been demanding their inclusion in the **ST list** since **1967** because they share **ethnic ties with the people of the Jaunsar-Bawar region**, who were declared as **ST** in **Uttarakhand**.
- Their demand for tribal status gained strength because of **resolutions** passed at various **maha Khumblis** over the years.
- Earlier in **2017**, **Registrar General of India (RGI)** has rejected the proposal of **hattees** to be included in the **ST list** based on information that “**Hattee**” was a term used to refer to the **inhabitants of Trans-Giri area** and that this included people from “**upper status social groups**” like the **Khash-Khanet (Rajput)** and **Bhat (Brahmin)** castes and people from **Scheduled Caste communities**.

What is the Process of Inclusion in the ST List?

- The process to include tribes in the **ST list** begins with the **recommendation from the respective State governments**, which are then sent to the **Tribal Affairs Ministry**, which reviews and sends them to the **Registrar General of India for approval**. This is followed by the **National Commission for Scheduled Tribes** approval before the list is sent to the **Cabinet for a final decision**

Benefits in the Inclusion in the ST List:

- Some of the **major benefits** include post-matric scholarship, overseas scholarship and the national fellowship, besides education, concessional loans from the National Scheduled Tribes Finance and Development Corporation, and hostels for students.
- In addition, they will also be entitled to benefits of reservation in services and admission to educational institutions as per the government policy.

Topic 37. CYCLONE HAMOON: DEEP DEPRESSION IN BAY OF BENGAL MAY INTENSIFY INTO CYCLONIC STORM ON OCTOBER 23, SAYS IMD

Important for the subject :Geography



Cyclone Hamoon:

It is a cyclone in the **Bay of Bengal** region. The system will move nearly **north-northeastward** and cross the **Bangladesh** coast between **Khepupara** and **Chattogram**.

Areas affected: Paradip (Odisha), Digha (West Bengal), Manipur, Mizoram, Tripura, south Assam, Meghalaya and Khepupara (Bangladesh).

Classification of cyclonic disturbance:

Classification	Sustained maximum wind speed (1 knot= 1.86 kmph)
1. Depression	17-27 knots
2. Deep depression	28-33 knots
3. Cyclonic storm	34-37 knots

Conditions Favorable for Tropical Cyclone Formation:

- Large sea surface with temperature higher than 27°C.
- Presence of the Coriolis force enough to create a cyclonic vortex.
- Small variations in the vertical wind speed.
- A pre-existing weak low-pressure area or low-level-cyclonic circulation.
- Upper divergence above the sea level system.

Topic 38. AS KEN-BETWA PROJECT BARRELS AHEAD, NEW RESEARCH FINDS RIVER INTERLINKING COULD WORSEN DROUGHT

Important for the subject: Geography

The **Ministry of Environment, Forest and Climate Change** awarded the final forest clearance to the Ken-Betwa river interlinking. **National Water Development Authority** is overlooking river interlinking in India.

- Research study done by **IIT Bombay**. New evidence suggests **large scale river interlinking** could have unintended consequences on **rainfall patterns**.
- River interlinking could change groundwater levels, introduce alien invasive species and reduce sediment deposits downstream.
- **10 percent** of the **Panna Tiger Reserve** stands to be submerged due to the **Ken- Betwa river interlinking project**. Moving vast amounts of water could impact the **atmospheric feedback loops** that regulate **evapotranspiration** and **precipitation**. It can lead to a deficit in rainfall by up to **12 percent**.

River- interlinking project:

- **National River Linking Project** was **first** proposed in **1980**, with the **aim** of transferring water from “**surplus**” river basins to “**water-deficit**” ones to improve irrigation along drought prone tracts.
- Of the **30 basins** identified for interlinking, **16** are in **peninsular India** and **14** in the **Himalayan region**. Together, these projects would transport **174 billion cubic meters** of water each year through a network of canals.

Impact of river- interlinking”

- The cooling resulting from the evaporation can cause fluctuations in temperature across different land regions, changing **wind patterns, moisture transport** and **rainfall**.
- When soil moisture is changed in one basin, it can cause changes in neighboring basins by affecting evapotranspiration, cooling and precipitation.
- **Reduced rainfall:** The **highest median reductions in rainfall** in September were found to be in **Odisha** (12 percent), **Andhra Pradesh** (10 percent), **Rajasthan** and **Gujarat** (9 percent). **Parts of central India** in the **core monsoon zone** also show a **decline in rainfall** of **8 percent**, along with **declines in the western Himalayan foothills** in **Uttarakhand** and **east-central India** (6.4 percent).
- It can **decrease silt deposition** in the **Ganga** and **Brahmaputra deltas** by **30 percent**.

Topic 39. WEAKENING OF TEJ IN ARABIAN SEA MIGHT HAVE STRENGTHENED HAMOON IN BAY OF BENGAL: IMD EXPERT

Important for the subject: Geography

Two cyclonic storms ‘Tej’ and ‘Hamoon’ have developed over Arabian Sea and Bay of Bengal simultaneously.

The weakening of Cyclone Tej in the Arabian Sea might have strengthened its counterpart Cyclone Hamoon across Peninsular India in the Bay of Bengal.

- Previously in 2018, Cyclones Luban and Titli formed over the Arabian Sea and Bay of Bengal respectively.
- In a twin cyclonic system often one gets stronger. In this case, Tej was the stronger one. But as it has already made landfall, shifted and is gradually weakening. Now Hamoon is set to become a ‘very severe cyclonic storm’, maybe due to the sea surface temperature of the region where it is now located is more than the earlier position.
- As a system moves away from the coast; the influx of warm air gets reduced. Consequently, the system gets stronger.

The FUJIWHARA effect:

- Identified by SakuheiFujiwhara, a Japanese meteorologist.
- The FUJIWHARA effect is any interaction between tropical storms formed around the same time in the same ocean region with their centres or eyes at a distance of less than 1,400 km, with intensity that could vary between a depression (wind speed under 63 km per hour) and a super typhoon (wind speed over 209 km per hour).
- The interaction could lead to changes in the track and intensity of either or both storm systems. In rare cases, the two systems could merge, especially when they are of similar size and intensity, to form a bigger storm.

There are five different ways in which the Fujiwhara effect can take place:

- The first is elastic interaction in which only the direction of motion of the storms changes and is the most common case.
- These are also the cases that are difficult to assess and need closer examination. The second is partial straining out in which a part of the smaller storm is lost to the atmosphere.
- The third is complete straining out in which the smaller storm is completely lost to the atmosphere. The straining out does not happen for storms of equal strength.
- The fourth type is a partial merger in which the smaller storm merges into the bigger one. The fifth is a complete merger which takes place between two storms of similar strength.

Topic 40. SOIL DEGRADATION IN INDIA SPELLS DOOM FOR MILLIONS

Important for the subject: Geography

India is facing **massive degradation of soil** and if not corrected, it could **impact food security and livelihoods of millions**.

India, with just **2.4% of the world's land area**, has **18%** of the **world's population** to feed.

- Most states are affected by **soil degradation**. The worst are **Punjab, Haryana, Gujarat, Maharashtra, Andhra Pradesh** and **Telangana**. Restoring damaged soil takes decades.
- Measures like sustainable agriculture, scientific disposal of wastes, reforestation, and strict implementation of pollution laws are likely solutions.

According to the **National Bureau of Soil Survey and Land Use Planning**:

- **146.8 million hectares**, around **30%** of the **soil in India** is degraded.
- Of this, around **29%** is **lost to the sea**, **61%** is transferred from one place to another, and **10%** is deposited in reservoirs.

Positive viewpoint:

- Despite **large-scale soil degradation**, **food production** has **increased** due to **technological inputs**, and now **India** is the **second largest producer** of **farm produce**.

How does soil get degraded?

- Overuse of chemical pesticides and fertilisers
- Excess fertilisers increased nitrate in the soil
- Collapse of water table due to excessive farming
- Untreated sewage and industrial waste
- **Other causes include:** mining, deforestation, overgrazing, monoculture farming, excessive tillage

Soil degradation can be reduced by:

- Improving groundwater levels, regenerating water, making changes in cropping and land use patterns, and involving communities in the conservation and management of soil, Long-term and balanced use of fertiliser.
- Integrated watershed management with the help of check dams, terracing of land, and contour farming as it will decrease runoff, cutting down on crops that need lots of water, building bunds to stop runoff soil during monsoons, and minimum use of pesticides and chemical fertilisers.
- Use of **AI** to **detect crop pests** through thermal imaging, AI-powered early warning system for crop pests, spreading awareness about the **soil testing laboratories** in India

Soil health card scheme:

- Launched by: **Department of Agriculture, cooperation and farmer's welfare.**
- **Theme:** "Swasth Dharaa. Khet Haraa." – Healthy Earth. Green Farm.
- It is used to **assess the current status of soil health** and, when used over time, to **determine changes in soil health** that are affected by **land management**.
- It displays **soil health indicators** and **associated descriptive terms**. The indicators are typically based on farmers' practical experience and knowledge of local natural resources.
- The card **lists soil health indicators** that can be assessed without the aid of technical or laboratory equipment.
- It will contain the **status of a farm soil** with respect to **12 parameters**, namely **N,P,K** (Macro-nutrients); **S** (Secondary- nutrient); **Zn, Fe, Cu, Mn, Bo** (Micro – nutrients); and **pH, EC, OC** (Physical parameters). Based on this, the **SHC** will also indicate **fertilizer recommendations** and **soil amendment** required for the farm.

Key features:

- The government is planning to cover as many as **all farmers** under the scheme.
- The scheme will cover **all the parts of the country**.
- In the form of soil card, the farmers will get a report. and this report will contain **all the details about the soil of their particular farm**.
- A farm will get the soil card **once every 3 years**.

Other initiatives of government for soil conservation:

- **Watershed Development Project in Shifting Cultivation Areas (WDPSCA)**
- The scheme was implemented from the year **1995-96** It is a **100% Central assistance** through the **Ministry of Agriculture & Co-operation**, Government of India.
- **One of the objectives is:** Mitigate ill effects of shifting cultivation by introducing appropriate land use as per land capacity and improved technologies.
- During 2012-13, Government of India did not release any funds for the scheme.

Accelerated Irrigation Benefits Programme (AIBP)

- Central assistance scheme sponsored by the Ministry of Water Resources
- **Aim:** To increase the area under irrigation thereby increasing the productivity of the area and improving the socio-economic condition of the people.

Soil & Water Conservation Scheme under RIDF

- Rural Infrastructure Development Fund (RIDF)- NABARD loan- from **2000-2001**.
- **Objective:** To enhance the **productivity of agriculture** and its allied activities and in small river valleys, thereby improving the **socio-economic set up of the people in the rural areas**.
- The scheme also envisages to **promote sustainable development** through **conservation**

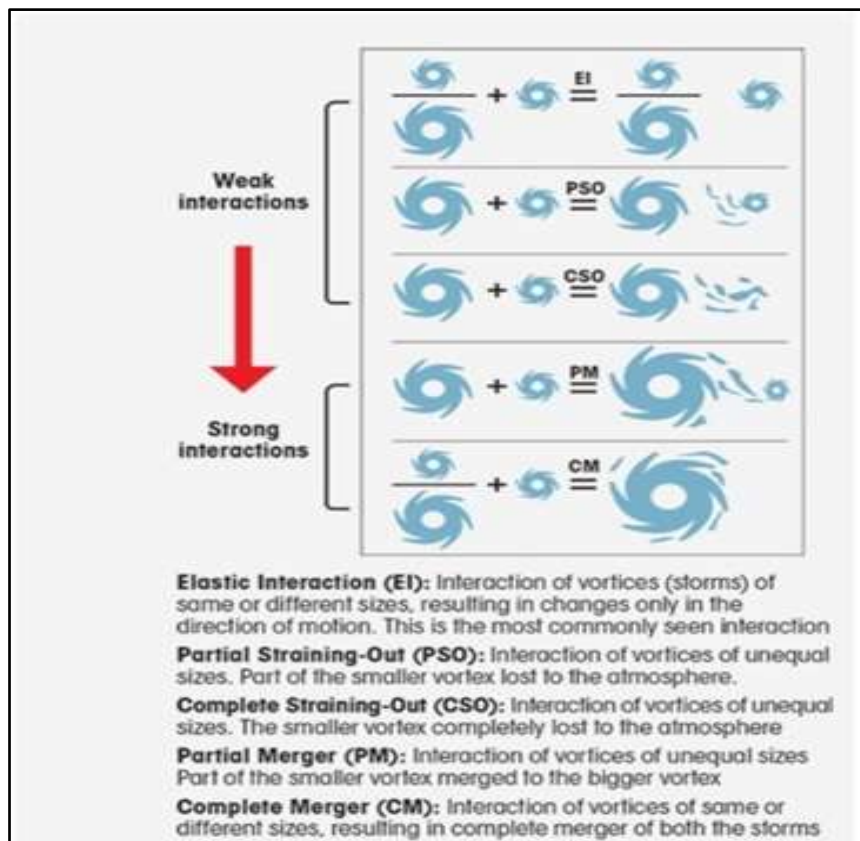
and management of soil and water.

Rashtriya Krishi Vigyan Yojana (RKVY)

- Implemented by the **Department of Agriculture**.
- Focus area is the development of **Rainfed Farming Systems** in and outside watershed areas as also **integrated development of watershed areas, wastelands, river valleys** and for activities relating to **enhancement of crop production and popularization of micro-irrigation systems**.
- The **thrust area** is to **protect the loss of topsoil, improving soil fertility, enhancing crop production, land and water productivity of watershed areas** comprising wastelands, river valleys and the ecosystem as a whole.
- **Development of Nano-urea and nano-DAP by IFFCO** to reduce the use of conventional fertilizers in the agricultural field.

Topic 41. WHY MUMBAI IS WITNESSING MORE POOR AIR QUALITY DAYS

Important for the subject: Geography



Like **Delhi**, **Mumbai** is also witnessing the **longest spell of poor air quality** since the past two years.

Mumbai is considered to be **immune to air pollution** due to its **coastal location**. **Strong sea**

breezes would **blow dust** and other **suspended particles** away, keeping the city's air relatively clean.

But, recently the **air quality index (AQI)** in some parts of **Mumbai** went beyond **300 (very poor)**.

Wind patterns:

- Winds usually alternate between **moving from the sea towards the land**, and **moving from the land towards the sea**. This cycle repeats every three to four days during winter.
- When the wind is directed towards the sea, the dust particles get swept away. This acts as a **natural cleansing mechanism**. Sometimes, when the cycle gets temporarily disrupted for some reason, it has an **impact on the city's air quality**.
- **Climatic events** like **La-Nina** disrupted these cycles last year.
- **La Nina** is a condition in which the sea surface temperatures in the eastern Pacific Ocean become cooler than normal. This large-scale phenomenon influences weather events across the world, and has a wide variety of impacts.

Cause of pollution this year:

- Winds in Mumbai were **relatively calmer** as the **monsoon retreated** from the city. The city's temperature soared to a four-year high for October. That created a **big temperature gradient** between the city and the nearby hilly regions in the **Sahyadri ranges**.
- As a result, **winds from these areas began moving towards Mumbai**, picking up **dust** from the **major construction projects** being carried out in **Navi Mumbai** and surrounding areas.
- **Unfavorable local weather conditions** are **certainly not the cause** of bad air quality in Mumbai. The problem is the **increasing number of sources of pollutants**.

System of Air Quality and Weather Forecasting And Research (SAFAR):

- Initiative of: **Ministry of Earth Science, Govt. of India**.
- Operated by: **Indian Institute of Tropical Meteorology, Pune**
- **SAFAR** envisages a **research based management system** where strategies of **air pollution mitigation** go hand in hand with a nation's economic development to target a win-win scenario.

Air Quality Index of SAFAR:

- There are **six AQI categories**, namely **Good + Satisfactory, Moderately polluted, Poor, Very Poor, and Severe**. Each of these categories is decided based on **ambient concentration values of air pollutants** and their likely health impacts (known as health breakpoints).
- AQ sub-index and health breakpoints are evolved for eight pollutants (**PM10, PM2.5, NO2, SO2, CO, O3, NH3, and Pb**) for which **short-term** (upto 24-hours)
- National Ambient Air Quality Standards are prescribed.

Topic 42. HOW A HYDROPOWER PROJECT THREATENS THE WILDLIFE OF ARUNACHAL PRADESH

Important for the subject: Geography

In 2012, 1,750-megawatt Lower Demwe hydroelectric project in Arunachal Pradesh received wildlife clearance.

Lower Demwe hydroelectric project:

- **Location:** Lohit district, Arunachal Pradesh, India.
- The dam is proposed in an **eco-sensitive zone** on the **Lohit river**, 50 metres from the **Kamlang Wildlife Sanctuary**.
- It will **directly impact** the **Ganges river dolphin**, **critically endangered bird species**, the **Bengal florican**, and the **white-bellied heron**, Assam roofed turtle, tigers, elephants and also impact **Parshuram Kund**, a Hindu pilgrimage site.
- The **white-bellied heron** is known to be **extremely vulnerable** to the **loss and degradation** of its preferred habitat (**free-flowing natural river courses**), and **hydroelectric projects** are causing **direct mortality** of birds through **power lines**.
- The project will **submerge a 4-km stretch** of the **Lang river**, a **left-bank tributary** of the **Lohit river**.
- The **established protocol is to conduct assessments before construction** and seek **mitigation of adverse impacts only as a last resort**.

Dams: Doing major harm but a manageable problem?

- **Dam construction** is one of the **oldest, most preferred tools to manage freshwater for various uses**. The practice reached a **peak internationally in the 1960s and '70s**, but in recent years dam construction has faced increasing global criticism as the hefty environmental price paid for their benefits piles up.
- Damming the rivers is the **largest single anthropogenic alteration** of the freshwater cycle.
- There are close to **60,000 large dams & 16 million small dams**, storing about a **sixth of the globe's total annual river flow** to the oceans.
- The **flows of most major waterways** have been impacted by dams globally. **Only 37% of rivers longer than 1,000 km (620 mi) remain free-flowing**, and **just 23% flow uninterrupted to the sea**. **Natural flows** will be altered for **93% of river volume worldwide by 2030**, if all planned and ongoing hydropower construction goes ahead.
- This **global fragmentation of rivers** has led to **severe impacts**. Dams have contributed to an **84% average decline in freshwater wildlife population sizes since 1970**.
- More than a quarter of Earth's land-to-ocean sediment flux is trapped behind dams. **Dams also impact Earth's climate** in complex ways via **modification of the carbon cycle**.
- But dams are needed for **energy, agriculture and drinking water**, and are an inevitable



part of our future.

- **Impact of dams:** decline of freshwater species, dams block the migration of fish and other aquatic species, separating them from breeding grounds and reducing population sizes, Migratory fish populations have **fallen by 76% since 1970**, decline in fishery activities, downstream water temperatures change, natural ebb and flow of the hydrological cycle is altered, reduced flow of **phosphorous, nitrogen and silicon** trapped behind dams, impact on deltas (Mekong Delta in Vietnam, the world's third-largest delta).
- **Species threatened by dam construction are: Migratory fishes like- sturgeon, salmon, hilsa and gilded catfish**, Amazon's giant catfish, Irrawaddy dolphins, beluga sturgeon, Mekong giant catfish, the **Chinese paddlefish (already extinct)**.

Dams, deforestation and climate change:

- Cheap, government-subsidized hydropower attracts **energy-intensive, ecologically destructive industries**, such as **bauxite mining and aluminum smelting and industrial gold mining**.
- **Tropical hydroelectric plants and their reservoirs can emit two to three times more greenhouse gasses than natural gas, oil, or coal plants**, due to **deforestation and potent methane emissions**.

Penobscot River Restoration Project:

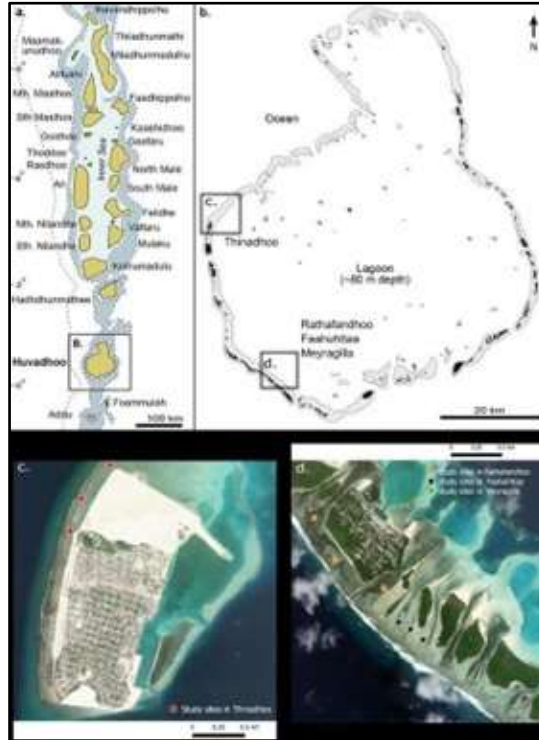
- This effort to revive **New England's second-largest river system** entailed the **removal of two dams and construction of a stream-like bypass channel** around a third.

Kruger National Park:

- Formed in **1911 in South Africa**, it is **one of the largest protected areas in Africa**.
- **Issues faced by the park:** Overgrazing, veld degradation and erosion, Siltation behind the dams due to catchment basins and stagnant waters that are nurturing cyanobacteria and poisoning the animals that drank the water.

Topic 43. CM STALIN ASKS CENTRE TO SECURE RELEASE OF 12 T.N. FISHERMEN DETAINED BY MALDIVIAN COAST GUARD

Important for the subject: Geography



The fishermen had ventured into the sea from the **Tharuvaikulam fish landing centre** in **Thoothukudi** in a **mechanized fishing boat**, bearing the registration number **IND-TN-12-MM-6376**, were apprehended by the **Coast Guard** near **Thinadhoo Island**.

Thinadhoo (Huvadhu Atoll):

Thinadhoo City is the capital of **Gaafu Dhaalu region** in the **atoll of Huvadhu, Maldives**.

Atoll:

- It is a **ring-shaped island**, including a **coral rim** that **encircles a lagoon**.
- **60 Atolls** are located in **warm tropical** or **subtropical parts** of the oceans and seas where corals can develop.

Deep sea fishing in India:

- **Fishing** at least **100 feet deep** in waters far from the shore is known as **deepsea fishing**, also known as **large game** or **offshore fishing**.
- Fishing operations in the open ocean, beyond the continental margin, are referred to as **deep-sea fishing**.
- The country's **Blue Revolution** goal to fully utilize fishing resources within the **200**

nautical mile exclusive economic zone has included deep sea fishing as a key component (EEZ).

Types of deep sea fishing:

- **Trolling:** A technique in which a lure or bait is drawn through the water behind a moving boat. The lure is designed to attract fish to bite.
- **Bottom fishing:** A technique in which the bait is dropped to the bottom of the sea. The trick can be left on the bottom or lifted slightly off the bottom to attract fish.
- **Jigging:** is a technique in which a weighted lure is dropped to the bottom of the sea and lifted and lowered to attract fish.
- **Drifting:** This is a technique in which the boat is allowed to drift along with the current while bait is deployed. The bait can be on the surface or suspended at a depth to attract fish. **Chumming:** This is a technique in which fish bait is scattered over the water to attract fish.
- **Deep dropping:** This is a technique in which the bait is dropped to the bottom of the sea, usually in depths of several hundred meters, to catch deep-sea species

Potential of deep sea fishing in India:

- The potential of **tuna fishery (a form of deep sea fishing)** in the **Indian Ocean**, was estimated by **Indian Ocean Tuna Commission (IOTC)** with the **maximum sustainable yield (MSY)** for **Yellowfin tuna** at **3.44 lakh tonnes** and have reported that for sustainable production the exploitation shall not exceed 3 lakh tonnes.
- The **non-conventional deep sea resources** available in our waters also provide ample scope for exploitation. The **deep sea shrimps** like **Metapenaeopsis andamanensis**, **Aristeus alcocki**, **Pleasonkins spinipes** etc., **deep sea oceanic squids** and **deep sea fishes** like **Myctophids (Lantern fish)** also provide great scope for exploitation.

Government steps:

- **Department of fisheries, GoI** has come up with a **draft national fisheries policy** which empowers the **Coastal State Governments / Union Territories** through delegation of powers to grant **Marine Fishing Licenses** for the **EEZ** and **high seas**.
- It also encourages and empowers **small scale fishers and fisher groups** for undertaking **resource specific deep sea fishing** for harnessing untapped potential of high value resources like **tuna and tuna like species, myctophids** and **oceanic squids** in a sustainable manner within the **EEZ** and **High Seas**, in compliance with international agreements / arrangements.
- Further, for effective utilization of the **deep sea fishery resources**, steps to **support fishing vessels** with additional capacity to undertake extended voyages by infusion of modern technology and capacity building is also being initiated.
- **Introduction of modern electronic equipment** such as **GPS, Fish Finder** and other **communication devices** have paved the way for **multi day fishing** and **triggered the pace for deep sea fishing**.

Challenges in deep sea fishing:

- Overfishing, **Bycatch** (the accidental capture of non-target species during deep-sea fishing), **Habitat destruction, Illegal, unreported, and unregulated fishing (IUUF)**, expensive and logistically difficult, fishermen enter the EEZ of another country for deep sea fishing and get caught by coastal guards.

Topic 44. COTTON CURSE: TIRED OF LOSSES, FARMERS GIVING UP COTTON ON A LARGE SCALE***Important for the subject: Geography***

Cotton farmers in the northern cotton zone have experienced the **worst pink bollworm attack** on their crops in two decades this year.

Pest attacks on cotton crops have occurred on a regular basis in recent years. Farmers are being forced to **switch to other crops** due to continued losses and uncertainty. Farmers are experimenting with **horticulture** and **paddy** as an alternative to cotton farming.

- **Paddy cultivation** requires **less labor** and has **reduced risks of infestation** than that of cotton.
- **Paddy fetches** have an **MSP of Rs 3,200** while the **MSP for cotton is Rs 6,235 per quintal**.
- As per the **state agriculture department**, the **cotton cultivation area** has **decreased** from **421,000 hectares** in **2014-15** to **248,900 hectares** in **2022-23**, and the **production of cotton** has **halved** from **1,347 bales** to **444 bales** in the period. Whereas **paddy cultivation** has **increased** from **2,895,000 hectares** to **3,167,800 hectares** for the same timeframe.
- Cotton is one of the most important fiber and cash crop of India and plays a dominant role in the industrial and agricultural economy of the country. It provides the basic raw material (cotton fibre) to cotton textile industry. Cotton in India provides direct livelihood to 6 million farmers and about 40 -50 million people are employed in cotton trade and its processing.
- In India, there are ten major cotton growing states which are divided into three zones, viz. north zone, central zone and south zone.
- North zone consists of Punjab, Haryana, and Rajasthan.
- Central zone includes Madhya Pradesh, Maharashtra and Gujarat.
- South zone comprises Andhra Pradesh, Telangana, Karnataka and Tamil Nadu.
- Besides these ten States, cotton cultivation has gained momentum in the Eastern State of Orissa. Cotton is also cultivated in small areas of non-traditional States such as Uttar Pradesh, West Bengal & Tripura

Climate & Soil Requirement

- Cotton, a semi-xerophyte, is grown in tropical & sub tropical conditions. A minimum temperature of 15°C is required for better germination at field conditions. The optimum

temperature for vegetative growth is 21-27°C & it can tolerate temperature to the extent of 43°C but temperature below 21°C is detrimental to the crop. Warm days of cool nights with large diurnal variations during the period of fruiting are conducive to good boll & fibre development.

- Cotton is grown on a variety of soils ranging from well drained deep alluvial soils in the north to black clayey soils of varying depth in central region and in black and mixed black and red soils in south zone. Cotton is semi-tolerant to salinity and sensitive to water logging and thus prefers well drained soils.

Crop Season

- Cotton is a Kharif crop in the major parts of the country

Pink Bollworm:

- It is an **insect** known for being a pest in cotton farming.
- It is **native to Asia**, but has become an **invasive species** in most of the world's cotton-growing regions.
- In parts of **India**, the **pink bollworm** is now **resistant to first generation transgenic Bt cotton (Bollgard cotton)** that expresses a **single Bt gene (Cry1Ac)**. **Monsanto** has admitted that this variety is **ineffective against the pink bollworm pest** in parts of **Gujarat, India**.

Bollgard-I and Bollgard-II:

- **Bollgard- I and Bollgard- II** help in developing **genetically modified crop plants**. **Bollgard cotton** provides **in-built protection for cotton** against **destructive Bollworm infestations**, and contains an insecticidal protein from a naturally occurring soil microorganism, **Bacillus thuringiensis (Bt)**.
- **Bollgard Bt cotton** (single-gene technology) is **India's first biotech crop technology** approved for commercialization in India in **2002**.
- **Bollgard II technology** contains a **superior double-gene technology** – **Cry1Ac and Cry 2Ab** which provides protection against **bollworms and Spodoptera caterpillars**.

Topic 45. STUDIES PROVIDE MORE INSIGHT INTO THE INTERNAL STRUCTURE OF MARS

Important for the subject: Geography

Mars's **liquid iron core** is likely to be surrounded by a **fully molten silicate layer**, according to a pair of studies published in Nature.

About the study:

- The **InSight Mars Lander** of **NASA** used an instrument called the **Seismic Experiment**

for **Interior Structure (SEIS)** to record **seismic waves** passing through **Mars's interior**. Data from three years of quakes in Mars, including two seismic events caused by meteorite impacts, were used for the study.

Study findings:

- Its core is smaller and denser than previously proposed.
- **Presence of a large but low-density core**, composed of **liquid iron** and **lighter elements** such as **sulphur, carbon, oxygen** and **hydrogen**.
- The core has a **higher proportion of lighter elements** than is feasible according to **estimates of the abundances of these elements** early in **Mars's formation history**.
- The **liquid iron-nickel core** of Mars is surrounded by an **approximately 150 km-thick layer of near-molten silicate rock**, the top of which was previously misinterpreted as the **surface of the core**. This **decrease in core radius** implies a **higher density** than estimated in the earlier **InSight study**.
- The **molten state of this layer** suggests that **its temperature must be at least 2,000 Kelvin**. This could be a sign that **Mars had a turbulent interior following its formation**, rather than a calmer one that more gently transported and shed heat to interplanetary space.

InSight Mars lander:

- The **Interior Exploration using Seismic Investigations, Geodesy and Heat Transport (InSight) mission** was a **robotic lander** designed to study the **deep interior of the planet Mars**.
- It was manufactured by **Lockheed Martin Space**, was managed by NASA's **Jet Propulsion Laboratory (JPL)**, and two of its three scientific instruments were built by **European agencies**.
- The **mission launched on 5 May 2018** aboard an **Atlas V-401 launch vehicle** and successfully landed at **Elysium Planitia** on Mars. **InSight was active on Mars for 1440 sols** (1480 days; 4 years, 19 days).
- **InSight's objectives** were to place a **seismometer**, called **Seismic Experiment for Interior Structure (SEIS)**, on the surface of **Mars** to measure seismic activity and provide accurate **3D models** of the planet's interior; and measure **internal heat transfer** using a **heat probe** called **HP3** to study **Mars' early geological evolution**.
- This was intended to provide a new understanding of how the Solar System's terrestrial planets – **Mercury, Venus, Earth, Mars** – and **Earth's Moon** formed and evolved.

Topic 46. IITM PUNE DEMONSTRATES CLOUD SEEDING CAN PRODUCE RAINFALL

Important for the subject : Geography



A cloud seeding experiment was carried out in Solapur city, and in return it was able to achieve 18% relative enhancement in rainfall.

About Cloud Aerosol Interaction and Precipitation Enhancement Experiment (CAIPEEX phase-4):

- It was a scientific investigation conducted in Solapur city during the summer monsoon period of 2018 and 2019 by IITM Pune.
- Solapur city (in Maharashtra) falls on the leeward side of the Western Ghats and hence gets low rainfall — 384 mm and 422 mm of total rainfall during the period June to September 2018 and 2019, respectively.
- Enhancement in rainfall is approximately 8.67mm as a result of the experiment.
- The primary objective was to investigate the efficacy of hygroscopic seeding in deep convective clouds and to develop a cloud seeding protocol.

Study findings:

- Cloud seeding is an effective strategy for enhancing rainfall in a region under suitable conditions.
- Selection of clouds is based on:** Liquid water content in the cloud, the vertical motion in the cloud, which is an indicator of the growth of the cloud.
- Calcium chloride flare** was used for seeding the clouds.
- The seeding was done at the base of the warm convective clouds and at a time when the clouds were in their growing stage so that the seed particles could enter the clouds with minimum dispersion.

- The **convective cloud bases** are found at **500-1,500 metres altitude** during the **summer monsoon** period and around **2,000 metres** or more altitude during the **monsoon break periods**, which depends on the moisture content in the lower atmosphere.

Major finding: Not all cumulus clouds produce rainfall when cloud seeding is done.

- The **approximate cost of producing water** through cloud seeding was **18 paisa per litre**. The cost will drop by more than 50% if we use indigenous seeding aircraft.
- **Cloud seeding alone cannot mitigate droughts** but can help **produce 18% more rainfall** and partially address water requirements.
- The study has helped **develop a high-resolution numerical model** that can help stakeholders to **identify target locations, clouds that can be seeded, and a suitable seeding strategy** to enhance rainfall in an area.

Cloud seeding:

- It is a **type of weather modification** that **aims** to change the amount or type of precipitation that falls from clouds by dispersing substances into the air that serve as cloud condensation or ice nuclei, which alter the microphysical processes within the cloud.
- Its effectiveness is debated; some studies have suggested that it is difficult to show clearly that cloud seeding has a very large effect.
- The usual **objective** is to **increase precipitation** (rain or snow), either for its own sake or to prevent precipitation from occurring in days afterward.

Chemicals used for cloud seeding:

- The **most common chemicals** used for cloud seeding include **silver iodide, potassium iodide** and **dry ice (solid carbon dioxide)**. **Liquid propane**, which expands into a gas, has also been used.
- This can produce **ice crystals** at **higher temperatures** than **silver iodide**. In the **CAIPEEX** experiment, **Calcium chloride flare** is used.

Concerns:

- Some **chemicals are potentially harmful** to the **natural environment** and the plants which depend on the contaminated rain to produce food. It is a **very expensive process**.
- It could have many **dire consequences** to the environment if not well regulated. Dry areas are not usually well-positioned to handle certain weather conditions, and thus, may become easily flooded and cause more harm to the already struggling environment.
- For cloud seeding to be successful, certain **uncontrollable conditions** have to be met. for example: Clouds have to be present, not just any cloud but clouds capable of producing rain. The atmospheric conditions must also suit the process as certain conditions could lead to an unwarranted result like the rain falling in a different location or not falling at all.

Topic 47. CONSUMER BODY ISSUES NOTICES TO IAS COACHING CENTRES FOR 'MISLEADING' ADS

Important for the subject: Polity

Consumer body issues notices to IAS coaching centres for 'misleading' ads

The **Central Consumer Protection Authority (CCPA)** has issued notices to **20 IAS coaching institutes** in India for issuing “**misleading**” advertisements targeting civil services aspirants.

The CCPA is taking **action under Section 2(28) of the Consumer Protection Act, 2019**, which defines “**misleading advertisement.**”

- These institutes are accused of **making false claims or exaggerations** in their advertisements.
- One example provided by the CCPA is an **institute claiming credit for 682 out of 933 selected candidates in the UPSC examination in 2022**. However, it was clarified that most of these candidates had **only availed mock interviews and tests**, and this was not clearly disclosed by the institute.
- The coaching industry in India generates significant revenue, approximately **Rs 58,088 crore**.
- The CCPA has imposed **penalties on four of the 20 coaching institutes**, with **two having paid and two approaching the court**.
- Proper disclosure by coaching institutes is seen as essential to prevent consumer deception.

What is the Section 2(28) of the Consumer Protection Act, 2019

- The Section 2(28) of the Consumer Protection Act, 2019 defines “**misleading advertisement**” in relation to any product or service which— **falsely describes such product** or service;
- gives a **false guarantee to**, or is likely to **mislead the consumers** as to the nature, substance, **quantity or quality of such product** or service;
- **conveys an implied representation** which, if made by the manufacturer or seller or service provider thereof, would constitute an unfair trade practice; **deliberately conceals** important information.

What is the Central Consumer Protection Authority (CCPA):

- Central Consumer Protection Authority is a **regulatory body** established in **2020 based on the provisions of the Consumer Protection Act, 2019** and works under the **administrative control of the Ministry of Consumer Affairs**.

- It is headquartered in New Delhi

What are the Objective of Central Consumer Protection Authority:

- To **promote, protect and enforce** the rights of consumers as a class.
- To conduct **investigations into violation of consumer rights** and institute complaints.
- To **order the recall of unsafe goods and services,discontinuation of unfair trade practices and misleading advertisements.**
- To **impose penalties on manufacturers, endorsers and publishers** of misleading advertisements.

What is the composition of Central Consumer Protection Authority

- The Central Consumer Protection Authority consists of **following members** appointed by the Central Government.

Chief Commissioner

- **Two Commissioners.** One commissioner each for goods and services.
- An **Investigation Wing** headed by a **Director General.**
- **District Collectors** too, have the power to investigate complaints of violations of consumer rights, unfair trade practices, and false or misleading advertisements.

What are the power and functions of Central Consumer Protection Authority(CCPA)

- CCPA can **investigate matters** relating to **violations of consumer rights** or unfair trade **practices suo motu,**
- **Section 20 of the Act** gives powers to the CCPA to **order recall of hazardous goods.**
- CCPA has the **power to impose a penalty up to Rs 10 lakh,** with **imprisonment up to two years,** on the **manufacturer or endorser of false and misleading advertisements.** The **penalty may go up to Rs 50 lakh,** with **imprisonment up to five years,** for every **subsequent offence** committed by the same manufacturer or endorser.
- CCPA has the **power to ban the endorser of a false or misleading advertisement** from making endorsement of any products or services in the future, **for a period that may extend to one year.** The **ban may extend up to three years in every subsequent violation of the Act.**

Topic 48. HOW ARE SYMBOLS ALLOTTED TO POLITICAL PARTIES IN INDIA

Important for the subject: Polity

The Supreme Court refused to **entertain a petition** filed by the **ruling Bharat Rashtra Samiti (BRS)** party in Telangana, challenging the allotment of election symbols to two other parties.

More about the news:

- The Supreme Court has **refused to entertain** a petition filed by the **ruling Bharat Rashtra Samiti (BRS) party** in Telangana, challenging the **allotment of election symbols to two other parties**.
- BRS argued that the symbols allotted to two political parties **looked similar to BRS's** symbol of a car. This might **confuse the voters** during elections, it said.
- However, the SC declined the petition, saying **voters were intelligent enough to differentiate between the symbols**.

Who allots election symbols to political parties in India:

- The Election Commission of India (ECI) is **responsible for the allotment of symbols** in elections.
- This allotment is **regulated by The Election Symbols (Reservation and Allotment) Order, 1968**, aimed at specifying, reserving, and allocating symbols for recognized political parties.
- Symbols can be **either reserved (exclusive to recognized parties) or 'free' (available for unrecognized registered parties)**.

Unrecognized parties can choose from free, non-exclusive symbols.

- These symbols can **become free again for others to choose in subsequent elections**.

Recognized national and state parties receive exclusive symbols.

- The EC **publishes lists of parties and their symbols** in the Gazette of India. In the latest notifications, there are **six national parties, 26 state parties, and 2,597 registered unrecognized parties**.

How did symbols like clock, lotus, hen, etc. enter the EC's list:

- The Election Commission of India (ECI) **used to have symbols sketched by MS Sethi**, who retired in September 1992.
- Sethi and a team of ECI officials **brainstormed to create symbols** based on everyday objects that the common man could relate to.
- Many well-known political party symbols, like **the bicycle, elephant, and broom, were conceived in these sessions**.
- Less common objects, including a **pair of glasses, a nail cutter, and a necktie**, were also suggested.
- In the **late 1990s, the ECI compiled a list of 100 sketches** to create the "free" symbols. As of January 2023, the list **includes objects like a bowl of noodles and a mobile charger**.

Do political parties get to state their preferences:

- The **1968 order empowers the Election Commission** to manage the **specification, reservation, choice, and allocation of symbols for parliamentary and assembly elections, aiming to recognize political parties.**
- **Unregistered parties** are required to **submit ten preferred symbols** from the list of free symbols provided by the commission.
- Parties can **propose three new symbols with names and designs, which the Commission may consider for common allocation** if they meet certain criteria.
- **Proposed symbols should not resemble existing reserved or free symbols, have religious or communal connotations, or depict birds or animals.**
- When a **recognized political party splits**, the **Election Commission decides on symbol allocation.** For example, the Congress party initially had a pair of bulls as its symbol in 1952, which eventually changed to the hand symbol following party divisions.
- Recently, the **EC allowed one faction of the Shiv Sena** to keep its traditional bow and arrow symbol, **while another faction received a flaming torch.** The **requested symbols of trident and mace were rejected due to religious connotations**, and the ‘rising sun’ was not granted because it was already the election symbol of the DMK.

Topic 49. TELANGANA’S LAW UNDER SCANNER

Important for the subject: Polity

Telangana stringent preventive detention law is under the spotlight. Telangana **stringent preventive detention** law is under the spotlight. In at least **three separate instances**, the **Supreme Court** has **red-flagged** the Telangana government’s use of the law.

The latest was in a ruling on September 4, where the **court underlined that the pernicious trend prevalent** in the state of Telangana has not escaped the Court’s attention

What is preventive detention:

- Preventive detention is the **state’s authority to detain a person based on suspicion, without trial or conviction**, for up to a year with the possibility of extension.
- This **differs from pre-trial detention**, where a person awaits trial for a specific crime. In India, the **Constitution permits preventive detention under Part III**, which deals with fundamental rights, even though **it emphasizes individual liberty.**
- Despite its inclusion in the fundamental rights section, the **Constitution contains provisions, notably under Article 22**, that allow the state to suspend these rights for preventive detention.
- This sets **India apart from countries like Britain, the United States, and Canada**, where preventive detention is typically considered a wartime measure.

Under what laws can the state order preventive detention:

- Preventive detention is **permitted under various central and state legislations** in India.

At the central level, examples include the **National Security Act and the Conservation of Foreign Exchange and Prevention of Smuggling Activities Act, 1974 (COFEPOSA)**.

- In addition to central laws, as many as **25 states** also have **preventive detention** legislations, like the **Telangana law, which is called The Telangana Prevention of Dangerous Activities of Bootleggers, Dacoits, Drug-Offenders, Goondas, Immoral Traffic Offenders, Land-Grabbers, Spurious Seed Offenders, Insecticide Offenders, Fertiliser Offenders, Food Adulteration Offenders, Fake Document Offenders, Scheduled Commodities Offenders, Forest Offenders, Gaming Offenders, Sexual Offenders, Explosive Substances Offenders, Arms Offenders, Cyber Crime Offenders and White Collar or Financial Offenders Act, (PD Act), 1986**.
- These are **expansive laws** specifically addressed to local law and order issues. Other examples are the **Tamil Nadu Prevention of Dangerous Activities of Bootleggers, Drug Offenders, Forest Offenders, Goondas, Immoral Trafficking Offenders and Slum Grabbers Act, 1982; the Gujarat Prevention of Antisocial Activities Act, 1985; the Bihar Control of Crimes Act, 1981, etc.**
- These state laws are **designed to address local law and order issues** and are quite expansive in their scope and also have **similar acts focused on combating antisocial activities and maintaining public order**.
- These laws **allow authorities to detain individuals** on preventive grounds to **manage and prevent potential threats** or criminal activities.

What are the powers of the state:

- **Article 22** of the Indian Constitution **provides protections** against **arrest and detention**, but it has an **important exception** specified in **Article 22(3) (b)**, which **excludes these protections** when an individual is **detained under a law related to preventive detention**.
- The operational procedures for preventive detention are explained within this legal framework.
- First, **the state, often represented by the district magistrate, can issue a detention order when it is deemed necessary** to maintain “**public order**.” This authority can also be **delegated to the police**.
- If the **detention extends beyond three months**, **Article 22(4)** requires the **approval of an Advisory Board**, typically **consisting of retired judges and bureaucrats**.
- Importantly, **detainees are not typically granted legal representation** before these Boards.
- If the **Board affirms the detention**, the **detainee has the right to challenge the order in court**.
- Additionally, **Article 22(5)** mandates that the state **must promptly communicate the grounds for detention to the detainee** and provide them with the earliest opportunity to present their case against the order. This **communication must be in a language that the**

detainee understands.

- However, **Article 22(6)** does somewhat **diminish these safeguards** by **permitting the state not to disclose facts** it deems against the public interest.
- In summary, **Article 22 balances individual rights with the need to maintain public order** by **outlining protections** and procedures for preventive detention in India.

How do courts assess the detention orders:

- In cases of **preventive detention**, the Constitution places **significant weight on the state's "Important for the subjective satisfaction"** when **ordering a detention, limiting the grounds for judicial review.**
- The court's assessment primarily centers on the state's **Important for the subjective judgment rather than the constitutional rights.** This means the **court cannot independently verify the accuracy of the facts** cited as reasons for detention.
- **Judicial review** is thus **confined to ensuring the Advisory Board's due diligence, consideration of all relevant facts, and the absence of any clear misconduct** by the state.
- Due to these limitations, **courts often invalidate detention orders** based on technical issues, **such as delays in Advisory Board decisions** or problems related to the timely communication of grounds in a language understandable to the detainee.

What is the history of Preventive Detention Laws in India:

- The history of preventive detention laws dates back to the **Bengal Regulation Act, 1818** under which **people could be detained** on mere suspicion which was applicable to the three Presidencies, that is, **Calcutta, Bombay and Madras** during the British era.
- Later the '**Black law**' commonly called the **Rowlatt Act** was introduced in the year **1919** which ensured **indefinite detention on mere suspicion without formal trial** and judicial review.
- Under **Entry 9 of List I (Union List)**, the Constitution of India provides the **Parliament with the exclusive power** to enact a law for **preventive detention for the reasons connected with defence, foreign affairs, or security of India.**
- On the other hand, under **Entry 3 of List III (Concurrent List)**, both **Parliament and State Legislature** have powers to **enact such laws** for the reasons related to maintenance of public order or maintenance of supplies or services essential to the community.
- Subsequently, the **Parliament has enacted several laws** in this respect – **Preventive Detention Act, 1950.**

The National Security Act, Section 13, 1980

- **The Conservation of Foreign Exchange and Prevention of Smuggling Activities Act, 1974. The Prevention of Black-marketing and Maintenance of Supplies of Essential Commodities Act, Section 13, 1980.**
- **The Prevention of Illicit Traffic in Narcotic Drugs and Psychotropic Substances Act, Section 10, 1988.**

Topic 50. SC USES RARE POWER TO HELP MAN FIGHTING FOR POSTAL JOB FOR 28 YEARS

Important for the subject: Polity

The Supreme Court has used its extraordinary constitutional power to do complete justice for a 50 year old man who fought for nearly three decades against the postal department's refusal to give him a job despite his name figuring high on the merit list.

Article 142 of the Constitution

- Article 142 provides a unique power to the Supreme Court, to do “**complete justice**” between the parties, where, at times, the law or statute may not provide a remedy.
- In those situations, the Court can extend itself to put an end to a dispute in a manner that would fit the facts of the case.

Earlier Instances

- SC has defined its scope and extent through its judgments over time.
- **Prem Chand Garg case (1962):** SC held that an order to do complete justice between the parties “must not only be consistent with the fundamental rights guaranteed by the Constitution, but it cannot even be inconsistent with the substantive provisions of the relevant statutory laws,” referring to laws made by Parliament.
- **Union Carbide Corporation vs Union of India Case (1991):** The SC in 1991 ordered UCC to pay \$470 million in compensation for the victims of the tragedy, placing itself in a position above the Parliamentary laws.
- **Siddiq v. Mahant Suresh Das:** Popularly known as the Ayodhya dispute, the Supreme Court had exercised the powers mentioned under **Article 142** of the Constitution.

Significance of Article 142

- **Prevents Injustice:** It provides a special and extraordinary power to the Supreme Court to do complete justice to the litigants who have suffered traversed illegality or injustice in the proceedings.
- **Uphold citizen's rights:** Article 142 has been invoked for the purpose of protecting rights of the different sections of the population.
- **Check on Government:** Works as a system of checks and balances with the Government or Legislature.

Criticism of Article 142

- The sweeping nature of these powers has **invited the criticism that they are arbitrary**



and ambiguous.

- **Ambiguity:** The Supreme Court tried to explain the phrase ‘complete justice’ but it is still blurred. The judgments passed by the Apex Court have created a lot of confusion and there is no clarity on invoking Article 142.
- **Against Separation of powers:** The power has been criticized on grounds of the separation of powers doctrine, which says that the judiciary should not venture into areas of lawmaking and that it would invite the possibility of judicial overreach.
- **Promotes Judicial Overreach:** In some judgments, it is mentioned that it could be used when the law of statutes is silent. However, by analyzing judgments on the use of Article 142 it seems like it is used to fill the lacuna of the law.
- **Negative impact on the economy:** The judgment on the ban on the sale of liquor near national and state highways has affected many hotels, bars, restaurants and liquor shops which resulted in the unemployment of lakhs of people.

Way Ahead & Conclusion

- The Apex Court could make a strict guideline that justifies the use of Article 142 and **promotes judicial restraint.**
- The SC can, in every such case, ensure that it would be a “complete justice” for the society without affecting the rights of citizens.
- The Drafting Committee of the Indian Constitution was mindful of the wide-reaching nature of the powers and reserved it only for exceptional situations.

Topic 51. WHAT HAPPENS NOW IN MAHUA MOITRA CASH-FOR-QUERY CASE

Important for the subject: Polity

How serious is Nishikant Dubey’s accusation:

An MP asking questions in return for consideration is a serious issue that can **undermine the integrity of the parliamentary process.**

If this is established, the matter should be **referred to the Privileges Committee**, which may **recommend that the MP be expelled from the House.** This issue is **relevant to all countries with a parliamentary system** of government.

For **serious matters**, there is either the **Privileges Committee** or a **special committee** appointed by the **House for that particular purpose**

Was an MP previously accused of granting access to Parliament website to others:

- **No.** This system has come into existence recently.
- As per the **rules of Lok Sabha**, a **Member has to submit a question** in a **particular form signed** by him or her with their **identity number.**
- The question **can be delivered by someone on the Member’s behalf**, but it **has to be**

signed by the Member.

- The **signature is verified** and the question is then processed.

Is there a rule that specifically bars Members from giving their Parliament login and password to a third person:

- There is **no such rule** yet because the **practice of online submission of questions** is recent.
- The rule **should have been amended** when online submissions were allowed.

What will happen once the Committee starts its proceedings:

- The Committee will **call the persons who are involved, the stakeholders** i.e the **person who made the complaint, the people who made statements, filed affidavits** and take their evidence.
- After that, the **Committee will certainly call the Member against whom** the complaint has been made.
- He/She has the **right to cross-examine the complainant**.
- He/She can also **seek the permission of the Speaker to appear through an advocate**, who can **cross-examine the other side**.

What's the potential duration for the Committee's decision and the maximum recommended punishment

- The time a Committee takes depends on the **complexity of the case**.
- In the normal course, **two months' time** can be given, and the Committee can **seek an extension if needed**.
- Moreover, the Ethics Committee can **only recommend suspension**.
- The Ethics Committee **does not have the mandate to refer** the matter to an **investigative agency like the CBI or police**.

Some facts about Ethics Committee:

- Each of the **two Houses of Parliament** has an ethics committee. They deal with the members'
- Besides **overseeing the moral and ethical conduct** of members, ethics committee also **prepares a Code of Conduct** for members, which are amended from time to time.
- The **ethics committee in Lok Sabha has 15 members while in Rajya Sabha has 10 members**.
- The **members of the Ethics Committee** are appointed by the Speaker for a **period of one year**.

What is the history of Ethics Committees:

- A **Presiding Officers' Conference** held in **Delhi in 1996** first mooted the idea of ethics panels for the two Houses.
- Then Vice President **K R Narayanan** constituted the **Ethics Committee of the Upper**

House on March 4, 1997, and it was inaugurated that May to oversee the moral and ethical conduct of members and examine cases of misconduct referred to it.

- The Rules applicable to the Committee of Privileges also apply to the ethics panel.
- In the case of Lok Sabha, a study group of the House Committee of Privileges, after visiting Australia, the UK, and the US in 1997 to look into practices pertaining to the conduct and ethics of legislators, recommended the constitution of an Ethics Committee, but it could not be taken up by Lok Sabha.
- The Committee of Privileges finally recommended the constitution of an Ethics Committee during the 13th Lok Sabha.
- The late Speaker, G M C Balayogi, constituted an ad hoc Ethics Committee in 2000, which became a permanent part of the House only in 2015.

Who can file complaint:

- Any person may make a complaint to the Committee regarding alleged unethical behavior or breach of Code of Conduct by a member or alleged incorrect information of a member's interests.
- The Committee may also take up matters suo moto.

What is the punishment that the committee can give:

- Where it has been found that a member has indulged in unethical behaviour or there is other misconduct or a member has contravened the rules, the Committee may recommend imposition of one or more of the sanctions.
- This may include censure, reprimand, suspension from the House for a specific period or any other sanction determined by the Committee.

Topic 52. SC TO JUDGES TO FOLLOW ROSTER, TAKING UNASSIGNED CASES GROSS IMPROPRIETY

Important for the subject: Polity

SC asked Judges to follow roster, taking unassigned cases gross impropriety

The Supreme Court has emphasized the importance of adhering to the roster for assigning cases to judges, stating that judges must follow discipline and should not take up cases unless specifically assigned by the Chief Justice.

- This statement was made during a hearing related to a civil writ petition allowing the clubbing of First Information Reports (FIRs) against some accused.
- The accused had previously filed criminal writ petitions but turned to a civil writ petition to avoid a judge who had not granted interim relief.
- The Supreme Court criticized this as a “gross abuse of the process of law” and described it as “forum hunting.”
- The Court ordered the accused to pay Rs 50,000 to the Rajasthan State Legal

Services Authority as a cost and directed that their conduct be brought to the notice of the relevant court handling petitions to quash the FIRs.

What is the roster system:

- Roster is defined as a **systematic planner to allocate different tasks** to all the members in order to **achieve higher efficiency**.

Topic 53. GOA'S GREEN CESS COMES TO HAUNT METAL, MINING COST

Important for the subject: Polity

Goa and Gujarat are levying 'green cess' on steel manufacturing companies.

What is a 'cess'?

A **cess** is a kind of **add-on tax** the government levies for **collecting purpose-specific funds**.

For instance, the **education cess on income tax** proceeds is used to fund the country's development of primary, secondary, and higher education facilities.

About 'Green Cess':

- A **Green cess** is a form of **tax** levied by the **government** with the purpose of **environment conservation**.
- The **revenue collected** through such **cess** is used to create green energy infrastructure, combating environmental pollution, afforestation and other such purposes which help in conserving the environment.
- The **Ministry of Road Transport and Highways (MoRTH)** had introduced a similar tax called **Green Tax / Eco Tax**.
- **Goa** government has enacted "**The Goa Cess on Products and substances causing pollution (Green Cess) Act 2013**" and levied **Green Cess** on industries using or transportation of **Coal, Coke** and other **similar substances causing pollution**.
- The levy would be **0.5 per cent** of the sale value.

Action from companies:

- Companies are already paying the **cess on coal** and **electricity duty**.
- Several companies had challenged the cess in Bombay high court, but the High Court **upheld the constitutional validity** of the **Green Cess Act**.

Impact of implementing green cess:

- Increase in cost of steel
- Increased import of steel from China
- Can hamper the 'Make in India' plan

Topic 54. WHAT DOES THE SUPREME COURT'S ABORTION VERDICT MEAN FOR REPRODUCTIVE JUSTICE IN INDIA?

Important for the subject: Polity

In the news:

A woman — **26 weeks pregnant, married, with two children, and undergoing postpartum psychosis** — requested **termination** because she was “physically, emotionally, mentally, financially and medically unable to carry, deliver or raise a child. But the **Supreme Court** rejected her plea for **abortion** saying that the Court’s recognition of a woman’s autonomy cannot eclipse the “**rights of the unborn child**”.

Abortion law in India:

- **India’s Medical Termination of Pregnancy Act 1971** allows abortion up to **24 weeks**, post which termination is permitted **only** if a board of doctors attests that continued pregnancy presents a risk to the woman’s life or if there are foetal abnormalities.
- In ‘**X v NCT case 2022**’ Supreme Court declared that ‘**it is the woman alone who has the right over her body**’ and is the ‘**ultimate decision-maker**’ in deciding if she wants an abortion.
- The **court** also said that “continuing with an **unwanted pregnancy** has an **adverse impact** on the **pregnant woman’s mental health** and can be a **ground for abortion**”.
- The Court eventually decided that the **mental health grounds for abortion** did not **extend** beyond **24 weeks** of gestation.
- However in this case, there is a conflict between **foetal right to life** against **women’s right to autonomy**.

The Union Government argued the foetus is “a viable baby with a reasonable chance of survival”. What is the viability theory?

- When the **foetus reaches a point of viability**– where it can exist outside the womb of the woman (with medical support)- the **right to abortion should be curtailed**.
- **Viability** was most famously endorsed by the **U.S. Supreme Court in Roe v Wade in 1973**. In **1992**, the **U.S. Supreme Court replaced the viability standard** with a different test, and in **2022**, the **Court rejected the viability standard completely**.

India’s stance on viable foetus:

- **1971 law:** There is no violation of the right to life in any manner for the abortion.
- **2009:** The SC emphasized ‘**compelling interest**’ to **protect the foetus** which is a form of ‘**potential life**.’
- **2016:** The **Punjab and Haryana High Court** claimed that **once the pregnancy is viable**, the ‘**potential child**’ becomes a part of the determination.

- **2019:** The Calcutta HC said that at an advanced stage of pregnancy, ‘**the right to life of the foetus outweighs the mental trauma**’ suffered by the mother.

Rights of a foetus under Indian law:

- It is not clear under the Indian Constitution.
- A **2016 Bombay High Court** decision relied on **international human rights law** to hold that the **foetus does not have rights till birth**.
- **Any form of recognition of the foetus** will grievously invade **women’s legally recognised rights**.

Topic 55. SC ALLOWS SURROGACY, STRIKES DOWN RULE BANNING USE OF DONOR GAMETES

Important for the subject: Polity

In a landmark decision, the Supreme Court of India has safeguarded a woman’s right to parenthood, particularly in cases of medical conditions, by suspending the enforcement of a law that jeopardized her aspiration to become a mother through surrogacy.

This significant ruling provides protection and empowerment for women facing unique medical challenges on their journey to parenthood.

Case Details

- **Medical Condition:** The woman suffers from the rare **Mayer Rokitansky Kuster Hauser (MRKH) syndrome**. Medical records confirm her condition, which includes “**absent ovaries and absent uterus**,” rendering her unable to produce her own eggs.
- **Hope through Gestational Surrogacy:** She and her husband embarked on the path of gestational surrogacy using a donor’s eggs (a process where one person, who did not provide the egg used in conception, carries a fetus through pregnancy and gives birth to a baby for another person or couple.).

Threatening Amendment

- **No donor gamete use:** A government notification dated March 14 of the current year introduced an amendment to the law, prohibiting the use of donor gametes in surrogacy. It mandated that “**intending couples**” **must employ their own gametes for the surrogacy process**.
- **A Violation of Parenthood Rights:** This amendment was challenged in the Supreme Court, alleging a violation of a woman’s fundamental right to parenthood. The court found that the amendment contradicted the core provisions of the Surrogacy Act, both in form and substance.

Gametes Regulation and ART Act, 2021

- Gametes are reproductive cells. In animals, the male gametes are sperms and female

gamete is the ovum or egg cells.

On March 14, 2023, the Health Ministry published Rules that said:

- A couple undergoing surrogacy must have both gametes from the intending couple and donor gametes are not allowed;
- Single women (widow/divorcee) undergoing surrogacy must use self-eggs and donor sperms to avail surrogacy procedure.
- Section 2(h) of the Assisted Reproductive Technology Regulation Act, 2021 defines a “gamete donor” as a person who provides sperm or oocyte with the objective of enabling an infertile couple or woman to have a child.

Court’s Ruling: Allows Donor’s Gametes

- **Prima Facie Contradiction:** The SC Bench issued a decisive order, stating that the amendment obstructed the intending couple from achieving parenthood through surrogacy and was prima facie contrary to the Surrogacy Act’s intentions.
- **Petitioner’s Argument:** Senior advocate Sanjay Jain, representing the petitioner, argued that the amendment invalidated the possibility of gestational surrogacy, which the Surrogacy Act, 2021, recognized as a valid option for couples facing medical conditions.
- **Rule 14(a) Clarification:** Jain referred to Rule 14(a) of the Surrogacy Rules, emphasizing that it explicitly listed medical or congenital conditions, such as the absence of a uterus, as valid reasons for gestational surrogacy. The rule affirmed that the choice was solely the woman’s.
- **Retrospective Implementation:** The petitioner contended that the amendment could not be applied retrospectively to her case.

Court’s Ruling and Interpretation

- **Woman-Centric Perspective:** The court concurred with Mr. Jain’s argument that gestational surrogacy was “woman-centric.” It recognized that the decision to opt for surrogacy was driven by the woman’s inability to become a mother due to her medical or congenital condition.
- **Validation of Rule 14(a):** The court asserted that the amendment could not contradict Rule 14(a), which explicitly acknowledged medical conditions, including the absence of a uterus, as valid reasons necessitating gestational surrogacy.
- **Genetic Relation Interpretation:** Addressing the government’s contention that the surrogate child must be “genetically related” to the couple, the court clarified that this was related to the husband when Rule 14(a) applied.

Conclusion

- The Supreme Court’s decision not only upholds right to parenthood but also reinforces the significance of gestational surrogacy as a woman-centric solution for individuals facing challenging medical conditions on their path to becoming parents.
- This ruling sets a precedent for protecting the parenthood rights of women across India.

Topic 56. SC BENCH TO HEAR PLEA AGAINST POLL BONDS

Important for the subject : Polity

A five-judge constitution bench of the Supreme Court **presided by Chief Justice of India D Y Chandrachud** will hear petitions challenging the 2018 Electoral Bonds Scheme

More about the news:

- A five-judge constitution bench of the Supreme Court presided by Chief Justice of India D Y Chandrachud will hear petitions challenging the 2018 Electoral Bonds Scheme
- The bench will also comprise Justices Sanjeev Khanna, B R Gavai, J B Pardiwala and Manoj Misra.
- A **batch of petitions** was filed by various parties, including the **NGO Association for Democratic Reforms, CPI(M), Congress leader Jaya Thakur**, and an individual named **Spandan Biswal**.
- On October 16, a **three-judge bench presided by Chief Justice Chandrachud referred the petitions to a Constitution bench** and scheduled the hearing for October 31.
- The decision to refer the case to a Constitution bench was based on the significance of the issue and **Article 145(3) of the Constitution**, which requires **at least five judges to hear cases involving substantial constitutional** questions.
- The electoral bond scheme, introduced in the 2017 Union Budget, **allows for anonymous donations to political parties**. The government claims it is a **step toward electoral reform, ensuring transparency** and accountability.
- The petitioners **argue that the scheme makes political funding less transparent**, as it **allows political parties not to disclose their annual contribution** reports to the Election Commission of India (ECI) or reveal the identities of bond donors.

What was Supreme Court previous judgements:

- In **April 2019**, a **three-judge Supreme Court bench** directed political parties that received donations through electoral bonds to **submit details of the bonds to the ECI**.
- The **Supreme Court had previously dismissed** a request to **halt the sale of new bonds in March 2021**, disputing the claim that the bond scheme provides complete anonymity to donors. The court noted that **it had already ordered certain safeguards in its April 2019 interim order**.
- The court also mentioned that the **Election Commission had received details of contributions made through bonds** as per the April 2019 order.
- The Supreme Court expressed **uncertainty regarding the extent of anonymity in political party financing by corporate houses**, both within India and abroad, under the scheme. The court **questioned whether the allegation of complete anonymity was sustainable at this stage**.

What is Electoral Bond:

- Electoral bonds are **banking instruments** that can be **purchased by any citizen or company** to make donations to political parties, without the donor's identity being disclosed.
- It is **like a promissory note** that can be **bought by any Indian citizen or company incorporated in India** from **select branches of State Bank of India**.

What are the features of Electoral Bonds Scheme:

- A **person being an individual** can buy Electoral Bonds, **either singly or jointly with other individuals**.
- The **bonds are like banknotes** that are **payable to the bearer on demand** and are **interest-free**.
- Only the **Political Parties registered under Section 29A of the Representation of the People Act, 1951** and which secured **not less than one percent of the votes polled in the last General Election** to the House of the People or the Legislative Assembly of the State, shall be **eligible** to receive the Electoral Bonds.

What is the procedure to purchase the electoral bond:

- The **State Bank of India** has been **authorised to issue and encash Electoral Bonds through its 29 Authorized Branches**.
- The **bonds are sold by the SBI in denominations of Rs 1,000, Rs 10,000, Rs 1 lakh, Rs 10 lakh and Rs 1 crore**.
- One can **purchase these bonds only digitally or through cheques**.
- The Electoral Bonds can be **encashed by an eligible Political Party only through a Bank account with the Authorized Bank**.
- The Electoral Bond **deposited by an eligible Political Party** in its account is **credited on the same day**.
- Electoral Bonds shall be **valid for fifteen calendar days** from the **date of issue** and **no payment** is being made to any payee Political Party if the Electoral Bond is deposited **after expiry of the validity period**.

Topic 57. CITIZENS RIGHT TO KNOW IMPORTANT FOR THE SUBJECT TO REASONABLE RESTRICTIONS

Important for the subject: Polity

Centre told Supreme Court on electoral bonds that Citizens right to know is Important for the subjected to reasonable restrictions

Attorney General R Venkataramani has stated that the **citizens' right to know is Important for the subject to reasonable restrictions**, in response to petitions challenging the electoral bonds scheme that will be heard by the Supreme Court.

- Venkataramani argues that **there is no general right to know everything without reasonable restrictions**, and the right to know for the purpose of expression must have **specific ends or purposes**.
- He opposes the **idea that citizens have an unrestricted right to access details of contributions** to political parties, arguing that such a right is overly broad.
- Venkataramani also **mentions previous Supreme Court rulings related to informed choices about electoral candidates** and argues that **they do not establish a right to information** about political party funding **under Article 19(1) (a) of the Constitution**.
- He defends the **confidentiality of the Electoral Bonds Scheme**, emphasizing that it promotes clean money contributions and tax compliance.
- The Attorney General **suggests that the scheme does not infringe upon existing rights** and cannot be **considered repugnant to any constitutional right**.
- He also opposes the **idea of court-driven guidelines on this matter** and suggests that **contributions to political parties are Important for the subjects for political debate** and governance accountability rather than judicial intervention.

What is the issue all about:

- A five-judge constitution bench of the Supreme Court presided by Chief Justice of India D Y Chandrachud will hear petitions challenging the 2018 Electoral Bonds Scheme
- The bench will also comprise Justices Sanjeev Khanna, B R Gavai, J B Pardiwala and Manoj Misra.
- A **batch of petitions** was filed by various parties, including the **NGO Association for Democratic Reforms, CPI(M), Congress leader Jaya Thakur**, and an individual named **Spandan Biswal**.
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- The Supreme Court expressed **uncertainty regarding the extent of anonymity in political party financing by corporate houses**, both within India and abroad, under the scheme. The court **questioned whether the allegation of complete anonymity was sustainable at this stage.**

What has the ECI's stance been

- The Election Commission of India (ECI) expressed **strong objections to amendments in the Representation of the People Act (RPA)** that exempted political parties from disclosing donations received through electoral bonds in May 2017.
- They considered this exemption as a **regressive step** and urged the government to reconsider and modify these amendments.
- Additionally, in **March 2019, the ECI highlighted concerns** about changes in the law that allowed political parties to **accept contributions from foreign companies.**
- They believed this **could lead to unchecked foreign funding** of political parties and the **potential influence of foreign companies** on Indian policies

What are the features of Electoral Bonds Scheme:

- A person being an individual can buy Electoral Bonds, **either singly or jointly with other individuals.**
- The **bonds are like banknotes** that are **payable to the bearer on demand** and are **interest-free.**
- Only the **Political Parties registered under Section 29A of the Representation of the People Act, 1951** and which **secured not less than one percent of the votes polled in the last General Election** to the House of the People or the Legislative Assembly of the State, shall be **eligible** to receive the Electoral Bonds.
- The **Finance Act(s) of 2016 and 2017 amended four separate legislations** to make way for the electoral bonds scheme, including the **Foreign Contribution Regulation Act, 2010; the RPA, 1951; the Income Tax Act, 1961; and the Companies Act, 2013.**

What is the procedure to purchase the electoral bond:

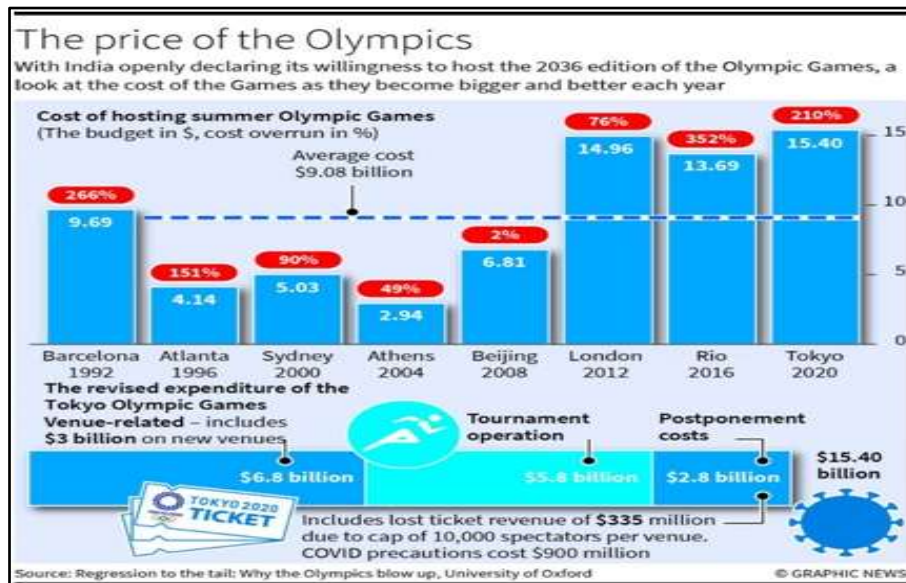
- The **State Bank of India** has been authorized to **issue and encash Electoral Bonds through its 29 Authorized Branches.**
- The **bonds are sold by the SBI in denominations of Rs 1,000, Rs 10,000, Rs 1 lakh, Rs 10 lakh and Rs 1 crore.**
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the same day.

- Electoral Bonds shall be **valid for fifteen calendar days** from the **date of issue** and **no payment** is being made to any payee Political Party if the Electoral Bond is deposited **after expiry of the validity period**.

Topic 58. HOW OLYMPIC CITIES ARE SELECTED

Important for the subject :International Relations



India has declared its intention to **host the Olympic Games**, preferably in **2036**, and **Youth Olympics in 2029** during the opening ceremony of the **141st International Olympic Committee (IOC)** session in Mumbai on October 14.

Only **three Asian countries** have ever hosted the **Olympics** — **China, South Korea and Japan**, with **Japan** hosting the games **twice** in **1964** and **2020**.

How was a host country selected?

Older system:

- Cities, through their respective **national Olympic committees**, would submit a **letter of interest** to the **IOC** to start a multi-year, multi-step evaluation process. Then a series of questionnaires, evaluated by the IOC.
- Second step involves **scrutiny** from the **IOC Evaluation Commission** and a **series of inspections of all venues** before the **final bids** are put to vote at an **IOC session**, ending in a host being decided seven years in advance as per the Olympic Charter. It often leads to excessive spendings from the bidders.

New system of host selection:

- **Thomas Bach** took over as the **IOC president in 2013** and introduced the **Olympic Agenda 2020** that includes the **new process of host city selection**, called the ‘**new norms**’, that was officially adopted during the **2019 IOC session in Lausanne**.

‘New norms’:

- Emphasis on **three main aspects** — **flexibility, sustainability and cost-effectiveness** — with the **motto** being ‘**The Games adapt to the region, the region does not adapt to the Games**’.
- There is now a **two-stage process** — a **continuous dialogue** and a **targeted dialogue** — without any fixed deadlines, to assess, discuss and guide potential hosts.
- **Continuous dialogue:** Unlike the past, the Games can be planned to be held across cities or even in conjunction with another country.
- **Targeted dialogue:** It explores the proposals to host a specific edition of the Olympic Games and brings the IOC’s executive board into the picture for detailed discussions.
- This is where each of the ‘**preferred hosts**’ answer the (Future Host Commission) **FHC’s questions** and **provides guarantees on infrastructure, accommodation, security and public services** among others and makes the **final submission**.
- The **FHC** then prepares an **advisory report** for the **executive board** which has the **power to either recommend a single host or shortlist more than one for elections** by the IOC members.
- In order to **ensure the long-term sustainability of the infrastructure** and to **avoid any public backlash**, hosts are encouraged as far as possible to **use existing and temporary venues**. Any **new venues built must be in line with existing developmental plans** and have a **long-term justification** irrespective of the Games.
- The **focus on using existing and temporary venues** has led to an **80% decrease in the bid budgets** for the **2026 Winter Games** compared to the **2018 and 2022 editions**.

Who are the other potential bidders apart from India for the 2036 Games?

- **Mexico** (spread across the four cities of Mexico City, Guadalajara, Monterrey and Tijuana), **Indonesia** (at the new capital of Nusantara which is still under construction), **Turkey** (Istanbul) and **Poland** (Warsaw). India has not yet decided the cities. Among these, **Mexico** is the only one to have **previously hosted** the Games in **1968**.
- Other potential bidders include **Egypt, Seoul, China, Qatar, Hungary, Italy, Denmark, Canada and Germany**.

Multi-discipline events held in India:

- Regional South Asian Games in 2016, 2010 Common Wealth Games, 2003 Afro-Asian Games, the Asian Games (1951 and 1982) and the 2007 World Military Games.

Topic 59. THE BEDOUIN ARABS IN THE ISRAELI ARMY

Important for the subject: International Relations

Who are the Bedouin Arabs in the Israeli army:

The Bedouins are a **nomadic Muslim Arab people** who live mainly in the **Negev desert** of southern Israel.

They have traditionally been **pastoralists** with no powerful or exclusive national affiliation, who would, until about a century and a half ago, **wander the area between Saudi Arabia and the Sinai** with their livestock.

How did the Bedouins come to join the Israel Defence Forces (IDF):

- Bedouin **transitioned from nomadic to settled** life during **Ottoman rule**.
- They **aided early Jewish settlers** and **provided intelligence in the 1948-49 Arab-Israeli war**. In the 1950s, **many Bedouin were recognized as Israeli citizens**, and settlements were built for them.
- Bedouin **continued to serve in the IDF**, mainly in **scouting roles**.
- **Specialized Bedouin search and rescue units** were created in **2003**.
- A **memorial was inaugurated in 1993** to honor **Bedouin soldiers**, and the **Garden of the Broken Heart** is dedicated to those with unknown burial places.

Is it compulsory for the Bedouin to train with the IDF:

- **No. Army training is compulsory only for the Jewish population** of Israel. However, **many Bedouin youth also volunteer**.

To what extent are the Bedouin integrated in Israeli society:

- Many Bedouin **serve in desert reconnaissance units** come from **northern Israel**, where they have **coexisted with Jewish and Arab communities** since the 1950s.
- Some Bedouin who underwent **army conscription** found it helped them appreciate **Jewish culture**, despite initial language challenges.
- The **Bedouin population** in Israel is around **210,000**, with a significant presence in the **Negev desert**. In 2020, Israel appointed its **first Bedouin ambassador**, and the **first Bedouin high-tech company, Sadel Technologies**, was founded by a Bedouin.
- In **2022**, the Israeli government launched **Operation Negev Shield** to promote **Bedouin community integration through educational programs** and visits by IDF officers to schools in Bedouin communities.

Topic 60. VIENNA CONVENTION ON DIPLOMATIC RELATIONS

Important for the subject: International Relations

What is Vienna Convention on Diplomatic Relations:

The Vienna Convention on Diplomatic Relations was **adopted in 1961** by the **United Nations Conference on Diplomatic Intercourse and Immunities** held in Vienna, Austria.

It came **into force on April 24, 1964** and is nearly **universally ratified**, with **Palau and South Sudan** being the exceptions.

- It provides a **complete framework** for the **establishment, maintenance and termination of diplomatic relations** on a basis of consent between independent sovereign States.
- The Vienna Convention **applies not only to diplomats but also to both military and civilian personnel** from the military departments, who are **present in the country under the authority** of the **chief of the diplomatic mission**.
- It explains the **functions of a diplomatic mission, including representing the State, protecting the State, promoting friendly relations between the sending and receiving State**.
- The **security of any High Commission or Embassy** is the **responsibility of the host nation**. While diplomatic missions can also employ their own security, ultimately, the **host nation is accountable for security**.
- The Convention **codifies the longstanding custom** of diplomatic immunity. Under this, the diplomatic missions are **granted privileges that enable diplomats to perform their functions without fear of coercion or harassment** by the host country.

What is Article 11.1 of the Vienna Convention on Diplomatic Relations:

- It deals with the **size of the diplomatic mission**
- In the **absence of specific agreement** as to the size of the mission, the **receiving State may require that the size of a mission be kept within limits** considered by it to be reasonable and normal, having **regard to circumstances and conditions in the receiving State** and to the needs of the particular mission.

What are the other key provisions of Vienna Convention on Diplomatic Relations:

- As per the Vienna Convention, a “**receiving State**” refers to the **host nation** where a **diplomatic mission** is located.
- **Article 9:** The **host State can prohibit a member** of the **Sending state (persona non grata)** from **entering or remaining in the host State**. The host State can **expel the envoys**. This person could be the **head of mission**, member of the diplomatic staff, or any other member of the mission.
- **Article 22:** It confirms the **inviolability of mission premises**. It **bars the enforcement**

- officers of the host State from searching the premises of the diplomatic mission and seizing its property or documents. **Diplomatic bags may not be opened** or detained.
- The host State has a **special duty to protect the premises** of the diplomatic mission against intrusion, damage, disturbance of the peace or infringement of dignity.
 - **Article 27:** The host State shall **permit and protect free communication** of the mission for official purposes.
 - **Article 29:** Diplomatic members are **not Important for the subject to any form of detention or arrest.**
 - **Article 31:** Diplomats are **exempt from the criminal, civil and administrative jurisdiction of the host State.** It is possible for the **diplomat's home country to waive immunity but this can happen only when the individual has committed a 'serious crime'**.
 - **Article 34:** Sets out the **tax exemption** accorded to **diplomats along with detailed exceptions** in respect of matters unrelated to their official duties or to ordinary life in the receiving State.
 - **Article 36:** Provides for **exemption from customs duties on diplomatic imports** throughout a diplomat's posting.
 - **Article 38:** It bars from **all privileges and immunities**, except for **immunity for their official acts, nationals, and permanent residents of the receiving State.**

India and Vienna Convention on Diplomatic Relations.

- India **acceded to the Vienna Convention on Diplomatic Relations in 1965.**
- India has **enacted the Diplomatic Relations (Vienna Convention) Act, 1972** to give effect to the Vienna Convention.

Topic 61. NUSEIRAT REFUGEE CAMP

Important for the subject : International Relations

Israel attacked the Nuseirat Refugee camp in central Gaza.

Some more details about the -Nuseirat refugee Camp:

- Nuseirat is a Palestinian refugee camp located **five kilometers north-east of Deir al-Balah.** The refugee camp is in the **Deir al-Balah Governorate, Gaza Strip.**
- The Nuseirat camp was **named after the local Nuseirat tribe**, part of the **larger Hanajira confederation**, that historically **dominated the area between Deir al-Balah and Gaza.** Nuseirat camp was **established** in the aftermath of the **1948 War**

What are the some other refugee camps in Gaza Strip:

There are 8 Palestine refugee camps in the Gaza Strip. They are:

1. **Beach camp**
2. **Bureij camp**
3. **Deir El-Balah Camp**
4. **Jabalia Camp**
5. **Khan Younis Camp**
6. **Maghazi camp**
7. **Nuseirat camp**
8. **Rafah camp**

Topic 62. WHY THE ‘WORLD’S MOST GENDER-EQUAL COUNTRY’ IS PROTESTING INEQUALITY

Important for the subject: International Relations

Iceland PM joins women’s strike

Women of Iceland, often called the **world’s most gender-equal country**, went on a **one-day strike** to **protest against gender discrimination**.

The striking women were **joined by the Prime Minister, Katrin Jakobsdóttir**. For 14 years in a row, **Iceland has topped the World Economic Forum’s global gender gap rankings**.

What is the reason for the strike:

- Iceland, a small European island nation with a population of less than 400,000, has made **significant progress** in women’s rights, **including workforce representation and legal support for gender equality**.
- These advancements were **driven, in part, by a nationwide “women’s day off”** observed in **1975**.
- However, despite these gains, **challenges persist in two critical areas: the gender pay gap and gender-based violence**.
- Some professions **still witness women earning 21% less than men, and over 40% of women have experienced gender-based or sexual violence**.
- The strike organizers **aim to draw attention** to the existing gender disparities in Iceland, highlighting that, despite its reputation as an “equality paradise,” there is a pressing need for action to address these issues.

How the strike is playing out:

- Icelandic women are leading a strike called **“Kallarðupettajafnrétti?”** (**You call this equality?**), inspired by the **1975 women’s strike**.
- Women are **refusing all types of work, paid and unpaid**, to address gender-based disparities.

- Sectors like **healthcare and education**, where women are predominant, are affected. The strike calls for **solidarity, including non-binary individuals**, to challenge patriarchy.
- Activists **seek to connect gender-based violence** and the **gender pay gap**, highlighting the **common problem of women being undervalued**. The strike aims to shift societal attitudes and address deep-rooted inequalities.

What is the 1975 strike:

- Women in Iceland organized a full-day strike, in 1975 which **saw almost 90% of working women participating**.
- The strike significantly **impacted various sectors, including schools, theaters, and even the national airline**.
- Men were left to care for their children, leading to creative solutions, like armed with sweets and color pencils.
- This 1975 strike **contributed to Iceland passing a law in 1976 granting equal rights regardless of gender**.

Some facts about Iceland:

- Iceland is an **island country located in the North Atlantic Ocean, between Greenland and Norway**.
- The **capital** of Iceland is **Reykjavik**, which is also the **largest city** in the country. Iceland is also a **world leader in renewable energy**, with over 100% of its electricity coming from hydroelectric and geothermal sources.
- Iceland is a **parliamentary republic**. The **head of state** is the **president, who is elected to a four-year term**.
- The **head of government** is the **prime minister, who is appointed by the president**.
- Iceland has a **unicameral parliament**, the **Althing**, which has **63 seats**. It is home to the **world's largest glacier, Vatnajökull**.
- It is also home to the **world's oldest known geyser, Geysir**. Iceland is the **most sparsely populated country in Europe**.

Topic 63. RUSSIA PASSES LAW TO WITHDRAW FROM RATIFICATION OF NUCLEAR TEST BAN TREATY

Important for the subject: International Relations

Russian parliament's upper house votes to revoke nuclear test ban treaty ratification

Russia's **upper house of parliament voted to revoke the country's ratification of the Comprehensive Nuclear Test Ban Treaty, originally signed in 1996 and ratified in 2000.**

The move aims to align Russia with the U.S., which signed but never ratified the treaty.

- Russian officials also **cited Western support for Ukraine as a reason** for this decision.
- It's important to note that **this withdrawal does not signify an immediate return to nuclear weapons testing**. Russia would only consider such action if the U.S. resumed testing.
- The decision is **seen as a means to pressure Western allies to reconsider their support for Ukraine** amidst escalating tensions **between Russia and the West**.
- Russian officials have **previously alluded to the possibility of using nuclear weapons** in the context of the Ukraine conflict.

What is Comprehensive Nuclear Test Ban Treaty (CTBT):

- The Comprehensive Test Ban Treaty (CTBT) **prohibits nuclear test explosions** worldwide.
- It was **introduced in September 1996, signed by 187 nations, and ratified by 178**. However, for it to **take full effect, 44 specific nations must ratify it, with eight, including India, China, Pakistan, North Korea, Israel, Iran, Egypt, and the United States, yet to do so**.
- The CTBT **establishes a global monitoring network and allows on-site inspections** for compliance.
- Since its introduction, **nuclear testing has become widely discouraged, with even non-ratifying states like India, Israel, and Pakistan** observing moratoriums on nuclear testing. While **Russia ratified the agreement in 2000**, the US is still to do so.

How did CTBT come into Being:

- Between **1945 and 1996, more than 2,000 nuclear tests** were carried out — **1,032 of them by the United States and 715 of them by the Soviet Union**, according to the UN. **Britain carried out 45 tests, France 210 and China 45**.
- The radioactive fallout from those tests **drew criticism from around the globe**. The international community's concern about the effects on health and the environment continued to grow.
- As a result, **several attempts to curb the explosive tests** were made. The **1963 Limited Nuclear Test-Ban Treaty (LTBT)** was one of the **first such attempts**. It **prohibited nuclear testing in the atmosphere, outer space, and underwater, but underground tests were still permitted**.
- A **major breakthrough** only came **after the Cold War** ended around 1990 and the disintegration of the Soviet Union.
- As the geopolitical tensions simmered down, the **UN took advantage of the situation and adopted the CTBT**, which put a **blanket ban on the explosive testing of nuclear weapons**.

Why has India Refused to Sign the CTBT:

- India's interest in a nuclear test ban dates back to Prime Minister Jawaharlal Nehru's

1954 call for a halt in nuclear testing between the U.S. and the Soviet Union. However, this was **thwarted due to verification concerns**.

- India's stance on the Comprehensive Test Ban Treaty (CTBT) is **driven by national security interests, viewing nuclear weapons as a deterrent**.
- **Signing the CTBT**, it believes, **would limit its strategic autonomy and ability to test, while prioritizing equitable global disarmament and national security**.

Topic 64. THE LEGALITY OF USING WHITE PHOSPHORUS

Important for the subject: International Relations

Human Rights Watch recently accused Israel of using white phosphorus munitions in Gaza, raising concerns about the potential risks posed to civilians.

About White Phosphorus:

- It is a **pyrophoric that ignites when exposed to oxygen, producing thick, light smoke alongside an intense 815-degree Celsius heat** (Pyrophoric substances: These are those substances which ignites very quickly i.e., under five minutes when in contact with air).
- It serves as a crucial element in **creating dense smoke screens** during combat, obstructing visibility and providing cover for military maneuvers.

Uses: Used in Incendiary devices like **grenades and artillery shells**.

- **Global Status:** Under the Globally Harmonized System of Classification and Labeling of Chemicals, the internationally agreed-upon system to standardize **chemical hazard** classification and communication, white phosphorus falls under **“Pyrophoric solids, category 1”**, which includes chemicals that **catch fire “spontaneously” when exposed to air**. It is among the most unstable of pyrophoric substances.
- However, ethical concerns come to the forefront when considering the use of white phosphorus in densely populated areas. Its potential to **cause severe burns and prolonged suffering** necessitates a closer examination.
- The **Convention on Certain Conventional Weapons (CCW)** places **restrictions on incendiary weapons** like white phosphorus, aiming to safeguard civilians.

International Humanitarian Law:

- White phosphorus usage falls under the purview of international humanitarian law, which seeks to minimize harm to both civilians and combatants during armed conflicts.
- Central to this body of law are the **principles of distinction and proportionality**. **Distinction mandates the differentiation between combatants and civilians, while proportionality ensures that military actions do not result in excessive harm to civilians in comparison to the military advantage sought**.
- Moreover, international humanitarian law explicitly prohibits indiscriminate attacks that

may disproportionately harm civilians and their property.

Protocol III and Incendiary Weapons:

- **Protocol III under the CCW** provides a specific framework for incendiary weapons. It defines an “incendiary weapon” as an armament primarily designed to set fire to objects or inflict burn injuries on individuals through the action of flame, heat, or a combination thereof, produced by a chemical reaction of a substance delivered on the target.
- This **definition includes an exemption for munitions that may cause unintended incendiary effects**, like illuminants, tracers, smoke, or signaling systems.
- **White phosphorus munitions are primarily intended for producing illuminating and smokescreen effects**, with the incendiary aspects being secondary or unintentional.
- Consequently, they fall within the exceptions outlined in Protocol III’s definition of an “incendiary weapon.”

Way Forward:

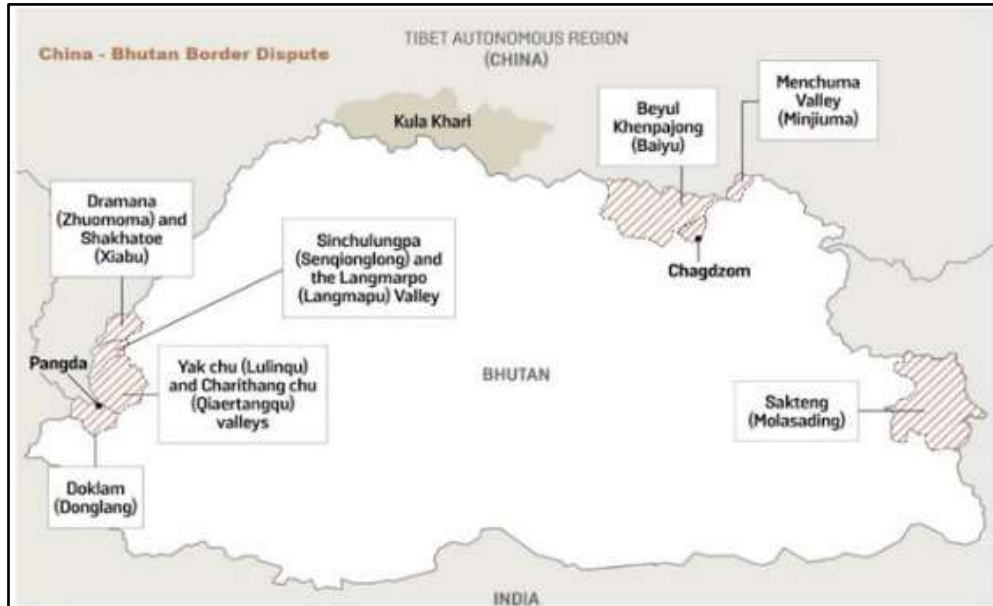
- The legal implications of employing white phosphorus in warfare underscore the importance of upholding international law, treaties, and protocols to reduce harm to both civilians and the environment. Breaches of these legal principles can lead to global condemnation, investigations, and potential prosecution for war crimes.
- **Strengthening Protocol III offers a binding agreement for states, preventing the exploitation of legal ambiguities.** Clearer rules would facilitate enforcement, making violations more easily identifiable.

Conclusion:

- The controversy surrounding white phosphorus munitions highlights the multifaceted nature of armed conflicts, where military necessity often clashes with the imperative to protect civilians and the environment. Resolving this issue requires a concerted effort to reinforce international legal frameworks, ensuring that the use of such substances is well-regulated and in compliance with humanitarian principles. Ultimately, upholding these laws is not just a matter of legal obligation but a moral duty to safeguard human rights and the world we live in.

Topic 65. CHINA BHUTAN BOUNDARY TALKS

Important for the subject: International Relations



China and Bhutan held their **25th round** of boundary talks in Beijing and **signed a Cooperation Agreement on the “Responsibilities and Functions of the Joint Technical Team (JTT) on the Delimitation and Demarcation of the Bhutan-China Boundary.”**

- China and Bhutan held their **25th round of boundary talks** in Beijing and signed a **Cooperation Agreement on the “Responsibilities and Functions of the Joint Technical Team (JTT) on the Delimitation and Demarcation of the Bhutan-China Boundary.”**
- This advances their **3-Step Roadmap initiated in 2021** for border resolution, building on the **positive momentum since their last talks in 2016.**
- The visit of **Bhutan’s Foreign Minister to China** was unprecedented on several levels as **Bhutan and China do not maintain diplomatic relations** and this visit is the **first ever** by a **Bhutanese Foreign Minister**

What is Bhutan-China border dispute:

- China and Bhutan share about **477 kilometers** of border.
- The **dispute over the boundary** can be traced back to **1950** when **China occupied Tibet** and refused to recognise the **dividing line between Tibet and Bhutan.**
- Beijing also **took over the control of eight Bhutanese enclaves** in Tibet during its retaliatory action to the **Tibetan uprising in 1959.**

China claims certain territories from Bhutan:

- In the north – Pasamlung and Jakarlung valleys;
- In the west – Doklam, Dramana, and Shakhatoe, Yak Chu and Charithang Chu, and Sinchulungpa and Langmarpo valleys.
- These places are **pasture-rich and strategically located in the Bhutan-India-China trijunction**, lying close to India’s Siliguri Corridor.
- In 2020, China made new claims on Bhutan’s East in the **Sakteng sanctuary**.
- Surprisingly, there **has been no mention of Eastern Bhutan** in the previous rounds of boundary negotiations held between the two countries.

What is the 3Step Roadmap:

- In 2021, an MoU was **signed between the Bhutanese Foreign Minister and the Chinese Assistant Foreign Minister**.
- The MoU **aimed to establish a 3-step roadmap for delineating the border between Bhutan and China**.
- This is significant because it **marks the first attempt to clearly define the territorial boundaries between the two countries**.

The 3-step roadmap involves:

- First, **reaching an agreement on the border through negotiations**.
- Second, **conducting site visits on the ground to physically inspect and assess the border areas**.
- Third, **formally demarcating the boundary**, thus establishing a clear and recognized border between Bhutan and China.

Topic 66. QATAR HANDS DEATH PENALTY TO 8 EX NAVY MEN

Important for the subject: International Relations

Qatar hands death penalty to 8 former Indian Navy men

Eight former personnel of the Indian Navy have been **sentenced to death** by a court in Qatar in an **alleged case of espionage**.

- The **charges** against these Indian nationals **were not disclosed by Qatari authorities**, but it’s believed **they were working with a private company** in Qatar to **oversee the induction of Italian small stealth submarines**.
- **India expressed shock** and disappointment at the death sentence and is actively exploring all possible legal options to secure their release.
- The **Ministry of External Affairs** in India has stated that it attaches **“high importance” to this case** and will provide consular and legal assistance to the Indian nationals.
- This **case has implications for India’s diplomatic ties with Qatar**, which is a powerful Gulf state with which India has been trying to build friendly relations.

- Efforts are being made to **work with the Qatari establishment** to address the situation due to Qatar's significant role in international diplomacy.
- India's former Ambassador to Doha, **Deepak Mittal, met with the detainees** during their detention, and the **Indian government has been closely monitoring** the situation and providing support.
- India is **following a legal playbook similar to the Enrica Lexie-Italian Marine case**, emphasizing **adherence to international laws and legal procedures**.
- The government is **committed to following due process** in accordance with **international laws and the laws of the country** where the former Navy personnel are being held, to resolve the situation.
- In addition to the GoI's efforts, the **families of the former Navy personnel have also filed a Mercy Plea to the Emir of Qatar**, who is known to **grant pardons during Ramadan and Eid**.

Some facts about Qatar:

- Qatar is a **peninsula in the Middle East**, bordering **Saudi Arabia to the south and the Persian Gulf to the east and north**.
- **The Gulf of Bahrain, an inlet of the Persian Gulf**, separates **Qatar from nearby Bahrain**

Capital: Doha

Official language: Arabic

Currency: Qatari Riyal (QAR)

- It is the **world's largest exporter of liquefied natural gas**
- It **hosted the FIFA World Cup in 2022**.
- **Indians are the largest expatriate community** in Qatar.

Topic 67. APEC SUMMIT

Important for the subject: International Relations

Biden and Xi to meet on the APEC summit sideline in November.

Some facts about APEC:

- APEC is an **inter-governmental forum of 21 member economies** in the **Asia-Pacific region**.
- It was **established in 1989** in response to the growing interdependence of the region's economies.
- APEC's mission is to **“promote trade and economic cooperation among its member economies in order to create greater prosperity for the people of the Asia-Pacific region.”**

- APEC accounts for approximately 60% of global GDP and 47% of global trade.
- Its members include Australia, Brunei Darussalam, Canada, Chile, China, Hong Kong, Indonesia, Japan, Malaysia, Mexico, New Zealand, Papua New Guinea, Peru, the Philippines, Russia, Singapore, South Korea, Taiwan, Thailand, the United States, and Vietnam.
- APEC's work is guided by the APEC Putrajaya Vision 2040, which is for an open, dynamic, resilient and peaceful Asia-Pacific community by 2040.

This will be achieved by pursuing three economic drivers:

- Trade and investment
- Innovation and digitalisation
- Strong, balanced, secure, sustainable and inclusive growth.
- APEC decisions are reached by consensus, and commitments are made on a voluntary basis.
- APEC has three official observers-The Association of Southeast Asian Nations Secretariat, the Pacific Economic Cooperation Council and the Pacific Islands Forum Secretariat
- The 2022 APEC summit was hosted by Thailand in Bangkok. The venue for 2023 APEC summit is San Francisco (U.S.A)

Topic 68. INDIA ABSTAIN ON UN RESOLUTION FOR AN IMMEDIATE HUMANITARIAN TRUCE IN THE ISRAEL-HAMAS CONFLICT

Important for the subject: International Relations

India abstained in a UN General Assembly vote on a resolution that called for an immediate humanitarian truce in the Israel-Hamas conflict. India **abstained from a UN General Assembly** vote on a resolution that called for an **immediate humanitarian truce** in the Israel-Hamas conflict.

- The resolution **did not mention ' Hamas' or 'hostage'** and **passed with 120 votes** in favor and **14 against**.
- The resolution called for an **immediate, durable, and sustained humanitarian truce and unhindered humanitarian access to Gaza**.
- It was **drafted by a group of 22 Arab countries** and had support from various nations, including Bangladesh, Maldives, Pakistan, Russia, and South Africa.
- **Israel, the United States, and a few other countries voted against the resolution.**
- India was part of a **group of 45 countries** that abstained on the resolution titled **"Protection of civilians and upholding legal and humanitarian obligations."**
- **Canada proposed an amendment** to the resolution, naming Hamas and condemning their actions, but it failed to get the necessary support.
- **India voted in favor of Canada's amendment, along with 86 other nations.** India's **abstention in the vote reflected its diplomatic balancing act** in the Israel-

Hamas conflict.

What is Emergency special sessions of UNGA:

- An emergency special session of the United Nations (UN) refers to an **unplanned meeting of the UN General Assembly**. Its purpose is to address pressing issues and provide urgent recommendations on a specific matter.
- The **UN Charter grants the General Assembly the authority to convene an emergency special session**. If the General Assembly is **not in a regular session**, it can assemble for an **emergency special session within twenty-four hours of a request**.
- The process for calling an emergency special session is **outlined in the Rules of Procedure of the General Assembly**. These rules govern the steps and requirements for organizing such sessions

An emergency special session can be initiated in two ways:

- **By the Security Council:** If the Security Council deems it necessary, they can request such a session through a **vote of at least seven of its members**.
- **By Majority of UN Members:** Alternatively, a majority of the United Nations' member states can **also trigger the convening of an emergency special session**.
- Since 1950, only **11 emergency special sessions** of the General Assembly have been held.
- These resolutions passed in the special session are **not legally-binding**. These are **symbolic of the world opinion** on the crisis and carry **political weight** as they represent the will of the entire UN membership.

Some facts about United Nations General Assembly (UNGA):

- It was **established in 1945** under the **Charter of the United Nations** and is headquartered in New York City.
- It is **one of the six principal organs** of the UN and serves as the **main policy-making organ of the Organization**.
- It provides a **unique forum** for multilateral discussion of the full spectrum of international issues covered by the Charter of the United Nations. Each of the **193 Member States** of the United Nations has an equal vote.

Topic 69. BANGLADESH IS BUILDING MEMORIAL TO HONOR INDIAN HEROES OF 1971 WAR

Important for the subject: International Relations

Bangladesh is building memorial to honor Indian heroes of 1971 war

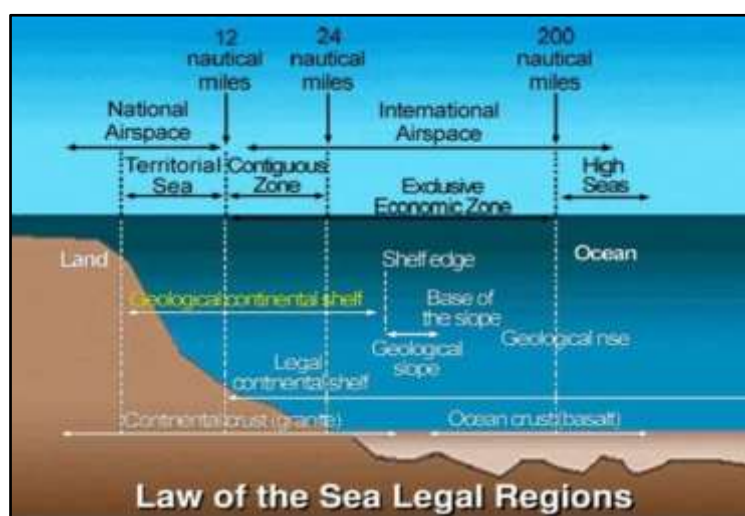
More about the news:



- A memorial is under construction in Ashuganj, Bangladesh, to honor Indian soldiers who participated in the 1971 Liberation War. It is expected to be completed by December.
- The memorial will feature the names of approximately 1,600 Indian soldiers who made the ultimate sacrifice during the war.
- This will be the first memorial in Bangladesh exclusively dedicated to Indian soldiers from the 1971 war.
- The foundation stone for the memorial was laid by Indian Prime Minister Narendra Modi and Bangladeshi Prime Minister Sheikh Hasina in March 2021.
- The purpose of the memorial is to ensure that the names of the Indian soldiers who contributed to Bangladesh's liberation are engraved for all to see, emphasizing their role in the nation's emancipation.
- The memorial's location in Ashuganj, close to the India-Bangladesh border, is significant. It was near this area that Indian forces crossed the Meghna River on their way to Dhaka during the liberation war.
- The project aims to raise awareness of the 1971 Liberation War among the youth and will include facilities for children's recreation on the premises.
- Indian Prime Minister Modi's visit to Bangladesh in March 2021 marked the Golden Jubilee of Bangladesh's independence.
- During the visit, he expressed deep respect for the Indian soldiers who played a crucial role in Bangladesh's liberation and announced India's donation of military equipment used in the war for museums in Bangladesh.

Topic 70. UNITED NATIONS CONVENTION ON THE LAW OF THE SEA (UNCLOS)

Important for the subject : International Relations



In his keynote address at the fourth edition of the Goa Maritime Conclave Rajnath Singh has

laid stress on the rule-based maritime order.

What is the Goa Maritime Conclave (GMC)

- The GMC serves as an **outreach initiative** by the **Indian Navy**, creating a **multinational platform for collaboration** between **maritime security practitioners** and academia to generate practical maritime insights.
- Previously, this **biennial event was conducted in 2017, 2019, and 2021**. The **4th edition of the GMC** is being held from October 29 to 31 under **the** auspices of the Indian Navy and in partnership with the Naval War College in Goa.
- During **GMC-23**, Admiral R Hari Kumar, Chief of the Naval Staff, will be **hosting chiefs of navies, heads of maritime forces, and senior representatives from 12 Indian Ocean littoral countries**. These countries include **Bangladesh, Comoros, Indonesia, Madagascar, Malaysia, Mauritius, Myanmar, Seychelles, Singapore, Sri Lanka, and Thailand**.
- The **theme** for the 2023 GMC is “**Maritime Security in the Indian Ocean Region: Converting Common Maritime Priorities into Collaborative Mitigating Frameworks.**”

What is United Nations Convention on the Law of the Sea (UNCLOS):

- The United Nations Convention on the Law of the Sea (UNCLOS) is a **global treaty that was adopted and signed in 1982**, effectively replacing the four Geneva Conventions from April 1958.
- These conventions covered various aspects, including the territorial sea and the contiguous zone, the continental shelf, the high seas, and issues related to fishing and the preservation of living resources in the high seas.

As per UNCLOS, the sea is divided into 5 parts:

Internal Waters

Territorial sea

Contiguous Zone

Exclusive Economic Zone (EEZ)

High Seas

- The Convention has created **three new institutions** on the international scene:

The International Tribunal for the Law of the Sea

- **The International Seabed Authority**
The Commission on the Limits of the Continental Shelf It is the **only international agreement that lays forth a structure for state authority in maritime areas.**

Topic 71. WHAT ARE DUST SUPPRESSANT

Important for the subject :Environment

Delhi govt to use dust suppressants to combat poor AQI

What are dust suppressant

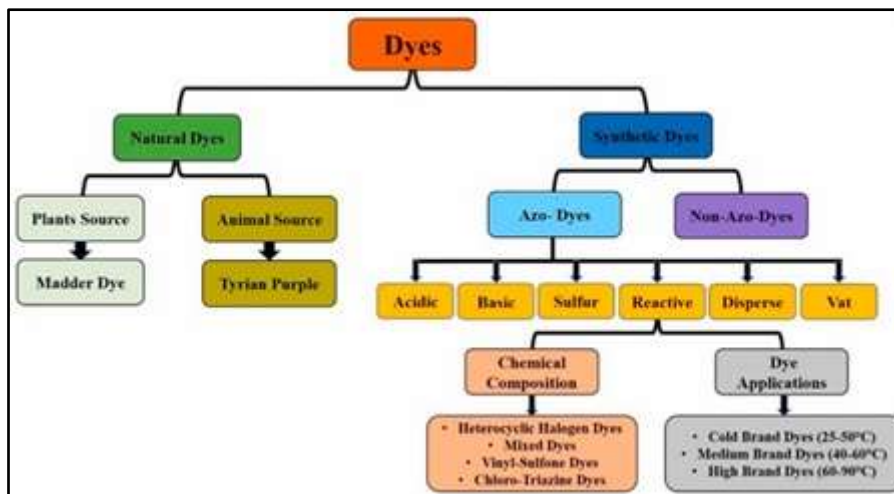
- Dust suppressants may be **salts of calcium or magnesium** that can **absorb moisture**.
- Dust suppressant powder would be **mixed along with water** and sprayed on roads to keep the **dust down for longer**.

Do the dust suppressant works:

- The Central Pollution Control Board (CPCB) **recommended their use in 2019**, citing a study that found a **30% reduction in dust concentration**, including PM10, PM2.5, and PM1, when dust suppressants were used in conjunction with water.
- The Delhi Public Works Department (PWD) advisory in 2019 noted that **dust suppressants mixed with water are more effective than plain water sprinkling**, reducing particulate matter emissions significantly.
- The use of **magnesium chloride as a dust suppressant**, along with **bio-additives**, was found to be particularly effective.
- Both the **CPCB and the Delhi Pollution Control Committee** issued **directives for the use of dust suppressants** in construction and on dusty patches to control dust emissions.

Topic 72. FIXING FASHION’S POLLUTION PROBLEM WITH NATURAL DYES

Important for the subject :Environment





Textile industry in India:

Accounts for **more than two percent** of the **Gross Domestic Product (GDP)** and provides direct employment to **45 million people**.

This **water-intensive industry** is a **polluting one**, as it generates **one-fifth of the world's industrial water pollution**.

Usage of **synthetic dyes** leads to a **substantial production of dye wastewater** that pollutes rivers and streams, impacts soil and water bodies, posing risks to both human and ecological health.

Dyes:

- Dyes are molecules which absorb and reflect light at specific wavelengths to give human eyes the sense of color. There are two major types of dyes: **natural** and **synthetic dyes** (or **coal tar dyes**).

Use of natural dyes:

- **Charaka Handloom Cooperative** in rural **Karnataka** switched from **synthetic dyes** to **natural ones**.
- Extracted from naturally available material such as **roots, berries, pomegranate skin** and **plants** and are **eco-friendly, non-hazardous** and **sustainable**.
- **Adike chogaru**– it is **areca nut, betel nut syrup** used as **natural dye**.

Acacia arabica:

- It is a **flowering tree** in the family **Fabaceae**. Also used for making dye. It is **native to Africa**, the **Middle East** and the **Indian subcontinent**.
- **Vernacular names:** Gum arabic tree, babul, thorn mimosa, Egyptian acacia or thorny acacia.
- It is also considered a '**weed of national significance**' and an **invasive species** of concern in **Australia**, as well as a **noxious weed** by the federal government of the **United States**.

Challenges in natural dyeing:

- High water requirement, limitations in the range of colors it can generate, fabrics it can suit and the scalability.

Topic 73. WHY INDIA IS LAUNCHING A NATIONAL FRAMEWORK FOR CLIMATE SERVICES

Important for the subject: Environment

India is about to launch its **maiden national-level framework** towards providing climate

services and information.

National Framework for Climate Services (NFCS):

- Spearheaded by the **Indian Meteorological Department (IMD)**.
- **Aim:** To bring a seamless working platform for users of climate information and services, and help decide and mitigate climate risks for key sectors — agriculture, energy, disaster management, health and water.
- It is based upon the **Global Framework for Climate Services (GFCS)**.

What will the NFCS do?

- Initially, the NFCS will work in **bridging functioning gaps** between the various agencies who require **climate services**. These include the **hydrological, power, renewable energy, transport, dams and irrigation, health agencies** are **central, state** and other levels.
- Along with the identified sectors of focus, **India** could add other relevant sectors like transport, tourism and other emerging sectors from time to time.

Why is NFCS needed?

- It is needed to have a **complete composite of climatological information** of all the weather parameters, in order to make climate predictions.
- With this **IMD aims to strengthen the observational network on land and the seas, improve the data inflow** and eventually **use it to run weather and climate models** for deriving climate predictions.

Which other countries have launched NFCS?

- Switzerland, China, Germany, the United Kingdom, Benin, Burkina Faso, Cameroon, Cote d'Ivoire, Gambia, Guinea, Madagascar, Moldova, Niger, Senegal, Chad, Togo, Tanzania, Vanuatu and South Africa.

What is GFCS?

- It was announced in **2009** during the **third World Climate Conference** held in **Geneva**. It is a **partnership of governments and organisations at a global level**, for the production and better usage of **climate information and services**.
- It **aims** to facilitate researchers and users of **climate information and services** to join hands in order to make informed and actionable decisions for the long-term betterment.
- This framework, led by **National Meteorological and Hydrological Services (NMHS)** in their **respective nations**, includes **active participation of policymakers, planners, investors and vulnerable communities or sectors**, as they need **climate information and services in a user-friendly format**, so that they can prepare for expected trends and changes in the long run.
- **GFCS** envisages to **generate high-quality data from national and international databases on temperature, rainfall, wind, soil moisture and ocean conditions** and other **vital weather parameters**.

- The **five major components** under GFCS are Observations and Monitoring, Research, Modelling and Prediction, Climate Services Information System, User Interface Platform and Capacity Building. At present, the **priority sectors** where the GFCS focuses upon are **agriculture and food security, energy, health, water and disaster risk reduction**.

Topic 74. SEED WITHOUT BORDERS

Important for the subject: Environment

A two-day workshop on “Seeds Without Borders” was held in **Thimphu, Bhutan**.

Nine countries from Asia and the Pacific signed an **agreement to strengthen the region’s seed sector**.

Seed without Borders (SwB):

- **SwB** is a **regional seed policy agreement** that speeds up the distribution of modern rice varieties across countries in **Asia**, particularly in **South and Southeast Asia**.
- In **2014**, the **International Rice Research Institute (IRRI)** facilitated the agreement signed by **India, Bangladesh and Nepal**.
- Member countries include: **India, Bangladesh, Nepal, Bhutan, Cambodia, Sri Lanka, the Philippines, Vietnam, and Fiji (first pacific nation to join it)**.
- Member countries signed the **Thimpu Protocol of Discussion (2022)** that would help improve the process of implementation of the previous agreements under Seeds Without Borders.
- **Thimphu protocol of Discussion** intends to add **roots, tuber crops, and fruit crops** to the current ones covered by the agreement such as **rice and other cereals, pulses, oil seeds, vegetables, sugarcane and fiber crops**.
- **Donors to the SwB include:** The Australian Centre for International Agricultural Research, Bill and Melinda Gates Foundation, the World Bank, the International Fund for Agricultural Development, Syngenta Foundation, Asian Development Bank (ADB), ADBi, and the SAARC Development Fund.

Topic 75. BRAZZAVILLE SUMMIT OF THE THREE BASINS NEEDS TO FIND WAYS TO PROTECT WORLD’S TROPICAL FORESTS

Important for the subject: Environment

The **Three Basins Threat Report: Fossil Fuel, Mining, and Industrial Expansion Threats to Forests and Communities**, published by **Earth Insight and other non-profits**, documents the challenges that the world’s remaining tropical forest basins face.

Summit of three basins:

- The first Summit of the Three Tropical Forest Basins was held in **Brazzaville in 2011** and resulted in the **Declaration of the Summit of the Three Tropical Forest Basins**, which recognised the need to establish a platform to promote cooperation among the countries of the three basins.
- A **Summit of Three basins** is going to be held at **Brazzaville, Republic of Congo**.
- **Aim:** To **strengthen** South-South governance for **three ecosystems** — **Amazon, Congo, Borneo-Mekong and Southeast Asia**.
- Large parts of tropical forests in these areas remain threatened by fossil fuel, mining and extractive industry expansion.
- These basins are moving towards a **systemic ecosystem breakdown** that affects **global climate stability, biodiversity** and the **livelihoods of millions of indigenous peoples and local communities**.

Threat from oil and gas extraction in these ecosystems:

- In **Indonesia**, half of all **nickel concessions** overlap with natural forests.
- In the **Amazon basin**, nearly **13 percent** of undisturbed tropical forests **overlap with existing or planned oil and gas blocks** and more than **33 percent overlap with active and inactive mining concessions**.
- In the **Congo basin**, more than **39 per cent of undisturbed Tropical Moist Forests** overlap with **oil and gas blocks** and nearly **27 percent** overlap with mining concessions. It is a threat to the **Indigenous pygmy** and other **rare and threatened peoples**.
- In **Southeast Asia**, nearly **20 percent of undisturbed Tropical Moist Forests** are in oil and gas blocks designated for production or exploration.

Topic 76. ACTION INITIATED AGAINST KANNADA FILMSTARS, GODMEN FOR WEARING TIGER CLAW PENDANTS

Important for the subject: Environment

Authorities in **Karnataka** have initiated action against **four Kannada film actors and two self-proclaimed godmen** who have openly flouted the **Wild Life (Protection) Act, 1972** by wearing **tiger claw lockets around their necks**.

Following the directions, the **Principal Chief Conservator of Forest** has passed orders to take action against the violators.

- **Harvesting body parts of a tiger or any wild animal for vanity**, whether from the carcass of the animal or hunting it for wildlife trade, is **treated equally under the law**.
- The **investigating agencies** must trace out the incidences of hunting wildlife for commercial gains, harvesting the body parts of the wild animals, processing them, transporting them, and trading them.

Section 39 of WPA 1972:

- Any person who obtains, by any means, the possession of Government property (including wildlife or any part of it), shall, within forty-eight hours from obtaining such possession, make a report as to the obtaining of such possession to the nearest police station or the authorised officer and shall, if so required, **hand over such property to the officer-in-charge of such police station** or such **authorised officer**, as the case may be.
- No person shall, without the previous permission in writing of the **Chief Wildlife Warden** or the **authorised officer**– acquire or keep in his possession, custody or control, or transfer to any person, whether by way of gift, sale or otherwise, or destroy or damage, such Government property.
- The **imprisonment** can be **three years minimum**, extendable up to **seven years**, and a fine of **Rs 25,000**.
- If body parts like pelts, claws, or, for that matter, even a single strand or hair is harvested from the carcass of an animal or from an animal hunted down for harvesting of body parts, the amount of fine levied is similar.
- The **burden of proof falls on the defendant and not the prosecution**. The defendant has to prove that s/he is not in possession of a wildlife item.

Topic 77. 90% OF PAINT SAMPLES TESTED CONTAIN LEAD ABOVE PERMISSIBLE LIMITS IN INDIA: STUDY

Important for the subject: Environment

51 paints used to paint houses, which are available in the Indian market, analyzed by two research and advocacy groups **Toxics Link** and **International Pollutants Elimination Network (IPEN)**, a network of over 600 non-governmental organizations.

Findings of the research:

- According to the ‘**Regulation of Lead Contents in Household and Decorative Paints Rules, 2016**’, which came into force in **2017**, manufacture, trade, import and export of household and decorative paints containing lead or lead compounds in excess of **90 ppm** is **prohibited in India**.
- **Over 90%** of them contain lead concentrations above the Central government’s **permissible limit of 90 parts per million (ppm)**. **76.4%** of these paints contained **lead more than 111 times the permissible limit**.

What is Lead?

- It is a **naturally occurring toxic metal** found in the **Earth’s crust**.
- **Lead** in the body is distributed to the **brain, liver, kidney and bones**. It is **stored in the teeth and bones**, where it accumulates over time.
- Human exposure is usually assessed through the **measurement of lead in blood**. **Lead in bone is released into blood during pregnancy** and becomes a source of exposure to the developing foetus.

- There is **no level of exposure to lead that is known to be without harmful effects.**

Lead exposure is preventable.

Sources of lead contamination:

- Burning materials containing lead, for example during smelting, recycling, stripping leaded paint and using leaded aviation fuel.
- Ingestion of lead-contaminated dust, water (from leaded pipes) and food (from lead-glazed or lead-soldered containers).

Effect of lead concentration:

- The **toxic effects of lead on children's brains are irreversible and lifelong** and **children aged six years and below** are the most vulnerable to lead poisoning.
- **Lead** can affect different organ systems, including **hematological cells, brain, kidney, gastrointestinal tract and liver.**
- It gets **stored in bone** and can be released gradually from there. It can also be **transferred from a pregnant woman to a foetus.**

Poor market surveillance:

- The **surveillance is poor** and there is an **incentive for the manufacturers** as **pigments used in making paints that contain lead are cheaper** compared to pigments without lead.

Global efforts:

- The **World Health Organisation (WHO)**, along with the **United Nations Environment Programme**, has formed the **Global Alliance to Eliminate Lead Paint**, which has the **aim** of encouraging all countries to have **legally binding laws to control the use of lead in paint.**

International Pollutants Elimination Network (IPEN):

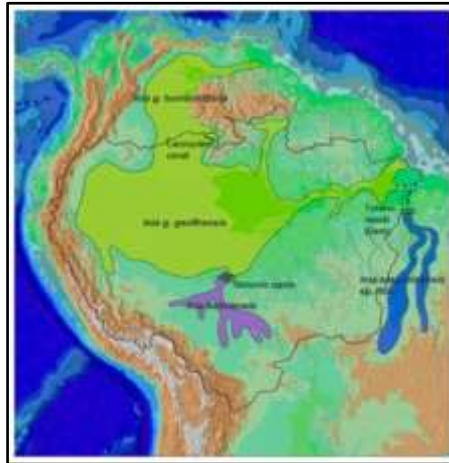
- **IPEN** is a **global network** forging a healthier world where people and the environment are no longer harmed by the production, use, and disposal of toxic chemicals.
- Over **600 public interest NGOs** in more than **120 countries**, largely **low- and middle-income nations**, **comprise IPEN** and work to strengthen global and national chemicals and waste policies, contribute to ground-breaking research, and build a global movement for a toxics-free future.

Objective include:

- Reducing and eliminating the world's most hazardous chemicals.
- Promoting stronger international chemicals standards.
- Halting the spread of toxic metals.
- Building a global toxics-free movement.

Topic 78. CLIMATE CRISIS IS ALREADY AFFECTING THE BRAZILIAN AMAZON

Important for the subject: Environment



The **Amazon rainforest** is home to at least 40,000 plant species, 427 mammals, 1,294 birds, 378 reptiles, 427 amphibians and around 3,000 fish. The latest edition of the **Living Planet Report** reveals an **average drop of 69 per cent** in the **monitored populations of vertebrates** — mammals, birds, amphibians, reptiles and fish — over the last four decades.

Since **1970**, the world has lost a **third of its remaining wetlands**, while **freshwater wildlife populations** have fallen by an **average of 83 per cent**.

- In **Brazil**, the population of **pink dolphins** in the **Mamirauá Sustainable Development Reserve**, in the state of Amazonas, fell by **65 per cent** between 1994 and 2016.
- **Pink dolphins** and **Tucuxis** from the **Lake Tefé region** are declining sharply and the cause of death is **warming of water**.
- **Abnormal warming of the Atlantic Ocean** coupled with **El-Nino**, the region is facing a severe drought.
- Water and thermal stress, nutrient depletion and altered population dynamics directly affect the survival of species.
- **Savannization**: If **20% or 25% of the forest is destroyed**, the forest will enter a process of **savannization** and that would represent the death of the forest.

Amazon river dolphins (or pink dolphins):

- The **Amazon river dolphin** (*Inia geoffrensis*), also known as the **boto**, **bufeo** or **pink river dolphin**, is a species of **toothed whale** which is **native** to and is exclusively of **South America** classified in the family Iniidae.
- **Three subspecies** are currently recognized: **I. g. geoffrensis** (Amazon river dolphin), **I. g. boliviensis** (Bolivian river dolphin) and **I. g. humboldtiana** (Orinoco river dolphin) while position of **Araguaian river dolphin** (*I. araguaiaensis*) within the clade is still

unclear.

- The **three subspecies** are distributed in the **Amazon basin, the upper Madeira River in Bolivia, and the Orinoco basin**, respectively. It is the **largest species of river dolphin**.
- Like other **toothed whales**, they have a **melon**, an organ that is used for **bio sonar**.
- They are **carnivorous** animals.
- IUCN Red list: **Endangered**

Amazon river dolphin range

Topic 79. WORLD ON BRINK OF 6 INTERCONNECTED RISK TIPPING POINTS: UN REPORT

Important for the subject: Environment

World is coming closer to **six interconnected risk tipping points**, according to a new report from the **United Nations University – Institute for Environment and Human Security (UNU-EHS)**.

Risk Tipping Point:

- A **risk tipping point** is the moment at which a given socio-ecological system can no longer buffer risks and provide its expected functions. After this point, the risk of catastrophic impacts to these systems increases substantially.
- The **six risk tipping points** include **extinctions, depleting groundwater, melting mountain glaciers, space debris, unbearable heat and an uninsurable future**.

Mass extinction:

- Extinctions have been part of **Earth's natural process**, but **human activities** such as land-use change, overexploitation, climate change, pollution and introduction of invasive species have **accelerated extinctions**.
- The **disappearance of one species can trigger the extinction of other dependent species**, leading to a ripple effect on the already fragile ecosystem.

Gopher tortoise:

- Facing an **extinction risk**.
- These are known to **dig burrows** that are used by **more than 350 other species**, including the **critically endangered dusky gopher frog**. These frogs help **control insect populations** and **prevent pest outbreaks** in longleaf pine forest ponds.
- If the **gopher tortoise goes extinct**, the **dusky gopher frog will likely follow**, affecting the entire forest ecosystem.

Depleting groundwater:

- Some **21 of 37** world's largest aquifers are depleting faster than they can be replenished. **Aquifers** are essentially a **non-renewable resource**.
- Most of the **groundwater depletion** is due to intense **irrigation activities**.

Melting glaciers:

- The world's glaciers are melting at **double the speed** relative to the past two decades
- Glaciers are projected to lose around **50 per cent of it** (excluding Greenland and Antarctica) by **2100**.

Space debris:

- Out of **34,260** objects orbiting Earth, only around **25 per cent** are working satellites, while the **rest are junk**, such as broken satellites or discarded rocket stages.
- These objects travel over **25,000 kilometres per hour**, the smallest debris can cause significant damage, including collisions between functional satellites.

Unbearable heat and Wet bulb temperature:

- It combines **temperature** and **humidity**.
- **High humidity** hinders the **evaporation of sweat** and **worsens the effects of heat**, causing organ failure and brain damage.

United Nations University – Institute for Environment and Human Security (UNU-EHS):

- The **United Nations University (UNU)** is the **academic arm** of the **United Nations** and acts as a **global think tank**.
- The **mission** of the **Institute for Environment and Human Security (UNU-EHS)** is to carry out cutting edge research on risks and adaptation related to environmental hazards and global change. The **institute's research promotes policies and programmes to reduce these risks**, while taking into account the interplay between environmental and societal factors.
- **Research areas include** climate change adaptation incorporating insurance-related approaches, environmentally induced migration and social vulnerability, ecosystem services and environmental deterioration processes, models and tools to analyse vulnerability and risks linked to natural hazards, with a **focus on urban space and rural-urban interfaces**.

Topic 80. YAVATMAL FARMERS FIGHT LOSING BATTLE AGAINST PESTICIDE POISONING; PIN HOPES ON SWISS COURT HEARING

Important for the subject: Environment

Pesticide ‘Polo’:

Manufactured by the **Swiss agrochemical giant Syngenta.**

Polo’s **active ingredient** is **diafenthiuron**, which has been **banned in Switzerland** and by the **European Union** because of its **harmful effects on health and the environment** but the company exports and distributes it in India.

Health impact includes: Nausea and heavy-head, damage of clear vision, photo-sensitivity, loss of stamina for labour, severe exposure leads to death.

Pesticides in India:

- India is the **2nd largest pesticide manufacturer** in the world. It is the **5th largest exporter** after **China, USA, Germany and France.**
- **Maharashtra** is the top consumer of pesticides in the country. **Maharashtra’s Vidarbha region** (mainly a **cotton** growing region) accounts for **50 percent** of total pesticide use in India.
- Because of several deaths due to pesticides poisoning, Maharashtra has banned products which use **diafenthiuron.**
- **Pesticides** are the **leading cause of poisoning in India**, with **two in every three cases** of poisoning happening because of **pesticide consumption** either intentionally or unintentionally.
- **Pesticides** can enter the human body by **three common ways:** Through the **skin** (contact), the **mouth** (ingestion) and the **lungs** (inhalation).

Pesticide regulation in India:

- The **Pesticides Management Bill** has been introduced to replace the **Insecticides Act of 1968.**
- The **Bill is meant to ensure more effective regulation** of the sector, **minimise risks to human beings, animals, living organisms** other than **pests** and the environment, with an endeavour to **promote pesticides** that are **biological and based on traditional knowledge.**
- There are at least **116 pesticides** that are **banned internationally** but are being **allowed to be used in India** and pose serious health hazards to farmers. In **2020**, the **Centre** came out with a draft order **banning 27 pesticides**, out of the **66.** However, the order has been reversed to **ban only 3 out of 66 pesticides.**
- On **September 29, 2023** the government issued an **order to ban four hazardous**

pesticides — Dicofol, Dinocap, Methomyl and 'Monocrotophos'. The use of pesticide 'carbofuran' has been restricted.

About Central Insecticides Board & Registration Committee (CIBRC):

- It is under the **Directorate of Plant Protection, Quarantine & Storage, Department of Agriculture & Cooperation** and was **set up** by the **Ministry of Agriculture** in the year **1970**.
- **Aim:** To regulate the **import, manufacture, sale, transport, distribution and use of insecticides** with a view to prevent risks to human beings and animals and for other matters connected therewith.
- The **Insecticides Act, 1968** was brought into force in **1971** with the publication of **Insecticides Rules, 1971**.
- The **Central Insecticides Board (CIB)** advises the **Central Government and State Governments** on technical matters arising out of the administration of this Act and to carry out the other functions assigned to the Board by or under these rules. **Major functions are:**
- Advise the Central Government on the manufacture of insecticides under the Industries (Development and Regulation) Act, 1951.
- Specify the uses of the classification of insecticides on the basis of their toxicity as well as their being suitable for aerial application.
- Advise tolerance limits for insecticides residues and establishment of minimum intervals between the application of insecticides and harvest in respect of various commodities.
- Specify the shelf-life of insecticides

Registration of Insecticides / Certificate of Registration

- There is **compulsory registration of the insecticides** at the **Central level** and **license** for their manufacture, formulation and sale are dealt with at the State level.
- Hence for effective enforcement of the Insecticides Act, the following bodies have been constituted at the Central level by the Ministry:

Central Insecticides Board (CIB)

Registration Committee (RC)

- Any person desiring to import or manufacture any insecticide may apply to the **Registration Committee** for the registration of such **insecticide** and there shall be a separate application for each such insecticide to obtain the **Certificate of Registration**.

License to manufacture insecticides

- According to the Insecticides Rules 1971, a license is required to obtain from the concerned State Government office either to manufacture, sell, exhibit for sale or distribute any insecticide/pesticide.

What are the alternatives available to farmers?

- **Integrated Pest Management (IPM) techniques**, which are using **cost-effective**

mechanical methods

Bio-pesticides

- Newer **molecular target-specific low toxicity pesticides**, usage of which is extremely low, and which are a little more expensive
- **Pheromone traps**, which are quite economical, are meant for mating disruption, for suppression of pest population, and mass trapping. Such traps slowly release synthetic attractants which help in the detection of a single species of insect in the fields.
- **Neem-based biopesticides**, which are environment-friendly, is very effective cost-wise and yield-wise. Its bitter taste keeps pests away from plants.
- Moreover, the right kind of seeds and precise irrigation can also help farmers keep the pests away.

Topic 81. ROW OVER TDB'S BAN ON USING TEMPLE FOR MARTIAL ARTS TRAINING

Important for the subject: History

What are the Various Martial Art Forms in India?

Thang Ta – Manipur:

Huyen langlon is an Indian martial art from Manipur.

In the Meitei language, huyen means war while langlon or langlong can mean net, knowledge or art.

Huyen langlon consists of two main components:

- Thang-ta (armed combat)
- Sarit Sarak (unarmed fighting).
- The primary weapons of huyenlanglon are the thang (sword) and ta (spear). Other weapons include the shield and the axe.

Lathi Khela – West Bengal:

- Lathi is a wooden weapon to fight and is an ancient weapon used in martial arts in India.
- Lathi or stick are used in martial arts in the state of Punjab and Bengal.
- Lathi is also popular for its utility in sports specially in the Indian villages.
- A practitioner is known as lathial.

Gatka – Punjab:

- Gatka is a traditional martial art form associated with the Sikh gurus.
- It imbibes sword and sticks fighting skills and self-control.



- Gatka is believed to have originated when the 6th Sikh Guru Hargobind adopted ‘Kirpan’ for self-defense during the Mughal era.
- A style of stick fighting between two or more practitioners, Gatka is a toned-down version of the deadlier Shastar Vidya. The sharp swords of Shastar Vidya have been replaced by wooden sticks (soti) and shields in Gatka.
- It is considered as a battle technique.
- 10th **Guru Gobind Singh** made it compulsory for everyone to use the weapons for self-defense.

Kalaripayattu – Kerala

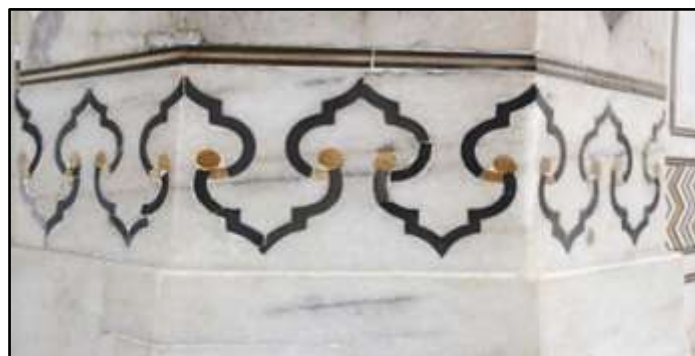
- Kalaripayattu is a martial art based on the ancient knowledge of the human body. It originated in Kerala during the 3rd century BC to the 2nd century AD. It is now practiced in Kerala and in some parts of Tamil Nadu.
- The place where this martial art is practiced is called a ‘Kalari’. It is a Malayalam word that signifies a kind of gymnasium. Kalari literally means ‘threshing floor’ or ‘battlefield’.
- The word Kalari first appears in the Tamil Sangam literature to describe both a battlefield and combat arena. It is considered to be one of the oldest fighting systems in existence.
- It is also considered as the father of modern Kung – Fu.

Mallakhamb- Madhya Pradesh

- Mallakhamb is a traditional sport, originating from the Indian subcontinent, in which a gymnast performs aerial yoga or gymnastic postures and wrestling grips with a vertical stationary or hanging wooden pole, cane, or rope.
- The name Mallakhamb derives from the terms malla, meaning wrestler, and khamb, which means a pole. Literally meaning “wrestling pole”, the term refers to a traditional training implement used by wrestlers.
- Madhya Pradesh and Maharashtra have been the hotspots of this sport.

Topic 82. PROPOSED MOSQUE IN AYODHYA GETS A NEW NAME AND DESIGN

Important for the subject : History



Ayodhya Mosque to be built on five acres of land (as a replacement for the demolished Babri masjid in 1992), as per the 2019 Supreme Court verdict.

The mosque gets a new name and design after objections from the community on its previous ‘contemporary’ style. The new design is prepared by a Pune-based architect, Imran Sheikh.

The new design of the mosque, unlike **the previous blueprint which had no stereotypical domes and arches**, has everything that makes it easily recognisable as a religious structure of the Muslim community. It also has **minarets, a crescent moon**, considered auspicious in Islam, as well as the name of the **Prophet**.

- The name of the mosque, to be spread across over 4,500 square metres, will be **Mohammad Bin Abdullah**.
- Earlier, the name of the mosque was ‘**Masjid-e-Ayodhya**’ with a **zero-carbon-footprint design**.
- The previous blueprint of the mosque had a hospital, community kitchen, library, and a research center dedicated to **Maulvi Ahmadullah Shah, a freedom fighter**, who took part in the **1857 war of independence** against the British.
- In the new design, the giant mosque sits in the middle of a complex full of greenery around.

The SC Verdict of 2019 and its aftermath:

- In November 2019, the Constitution Bench of the Supreme Court permitted the construction of a temple in Ayodhya, at the site where the 16th century Babri Masjid once stood, after being brought down by Hindu fundamentalist groups.
- The top court had asked the government — either the Centre or Uttar Pradesh — to allot a “prominent and suitable” five-acre plot in Ayodhya to the **Sunni Central Waqf Board**, to construct a mosque. “This should be done simultaneously with the transfer of the property to the proposed trust [for the temple],” the order had said.
- The Sunni Central Waqf Board later formed the **Indo Islamic Culture Foundation** to execute the construction of the mosque. The Uttar Pradesh government allotted five acres of land to IICF in Dhannipur, 25 kms from Ayodhya city.

Maulvi Ahmadullah Shah:

- Ahmadullah Shah, born in 1787, more famously known as **Maulavi of Faizabad**, was one of the leading figures of the great Indian revolt of 1857.
- In the Awadh region, Maulavi Ahmadullah Shah was known as the ‘**Lighthouse of Rebellion**’.
- Hailing from a noble warrior family of **Awadh** in Faizabad, he grew up to be a political leader committed to armed revolutionary insurrection against British rule in India.
- During the freedom struggle, Maulavi made Faizabad the center and launched revolts in all of the Awadh region. He made the local mosque Masjid Sarai located in Chowk area of Faizabad his headquarters.

- Maulavi Ahmadullah Shah kept Faizabad free from British rule for almost one year, until his death at the hands of British agents on June 5, 1858.
- According to researcher and historian Ram Shankar Tripathi, “With being a practicing Muslim, he was also the **epitome of religious unity and Ganga-Jamuna culture** of Faizabad.”
- In the revolt of 1857, royalties like Nana Sahib of Kanpur, Kunwar Singh of Arrah fought alongside Maulavi Ahmadullah Shah. During the revolt, the revolutionaries appointed him as chief of 22nd Infantry Regiment that fought in the famous **Battle of Chinhat, in Ismailganj of Lucknow on June 30, 1857.**
- According to another historian Roshan Taqui, “**Maulavi used to bring out revolutionary pamphlets mobilizing the masses to do ‘Jihad’ against the British.**”
- British officers like **George Bruce Malleson and Thomas Seaton** have made mentions about the courage, valour, personal and organisational capabilities of Maulavi Ahmadullah Shah.
- Malleson has repeatedly mentioned Ahmadullah in the **History of Indian Mutiny, a book written in six volumes covering the revolt of 1857.**

Characteristic features of Indo-Islamic form of architecture:

- Buildings in Islamic countries were made of **brick, lime and mortar**. Their style was **arcuate; meaning architecture based on arches, domes and vaults.**
- Muslims under religious injunction avoided the use of human figurines rather they opted for **geometrical patterns (arabesque), floral patterns, inscriptions in various styles, inlay on marble (Pietra dura).**
- **Ornamental, perforated lattice screens with arabesques, star motifs and other geometric designs such as pentagons, hexagons, octagons and circles.**
- Gardens were an integral part of Islamic architecture.

Styles of Islamic architecture in the Indian subcontinent:

Imperial style:

- The style of this period is also called the early Indo-Islamic style. The existing buildings were converted into mosques with the elements of ruins from Hindu temples.
- The palaces were elaborately decorated and embellished with **arches and domes**. Floral patterns and other Hindu motifs were used widely.

Provincial style:

- In this style of architecture which lasted for a period of two-hundred-and-fifty years, they created buildings with the locally available materials, combining the regional styles with the typical Muslim features such as **domes, arches, the minarets and the mihrabs.**
- Initially they constructed on the ruins of Hindu, and Jain temples, and later they derived

their own style in building art.

Mughal style:

- The Mughal style is the style of architecture that flourished in India under the patronage of the Mughal Empire from the mid-16th to the 17th century.
- It is a unique blend of Indo-Islamic and Persian style with **Turkish influences**. The buildings were excellent and remarkably symmetrical in form and uniform in pattern with intricate ornamentation.

Types of Buildings having Islamic Architecture in Indian Subcontinent:

Mosques

- Mosques are the places of congregation where men gather to offer prayers. They are also called “**masjids**” and known as a **place for prostration (sajdah/sujood)**.
- They are basically large columned halls known as hypostyle halls and in some of the mosques, **Madrasahs** are also a part of the same building
- An important element used in the mosque was the “**mihrab**”. **It is the niche in the wall that indicates the direction of Mecca towards which all the Muslims pray.**
- The most visible element of the mosque is the “**minaret**”, **the tower which is either adjacent or attached to the mosque from which the call to prayer is announced.**
- The most important (but inessential) element of Islamic architecture and a part of the mosque is the “**dome**” **which is also known as “qubba” in Muslim architecture**
Calligraphy is also the most visible decorative element in mosques.

Forts

- They were palaces; a place of accommodation on a larger and more comprehensive scale, thus forming **a city within a city**
- They were built for the **purpose of defence** to protect the monarchs and their people from their enemies.
- We can also see the **influences of different regional architecture of Gujarat and Punjab** in the construction of the forts

Tombs

- Among the architectural marvels that were built during the Islamic reign in India, the most wonderful, and beautiful structure was **the tomb of Mumtaz Mahal, the Taj Mahal**, which is an integrated complex of many structures.
- **White domed marble, large gardens, pools with fountains reflecting the light, landscape, and four tall standing minarets surrounding the structure imply a symmetrical and a balanced form.** This proves the **elegance of the Indo-Islamic style** of architecture. It is a perfect example of an architectural accomplishment of the Mughal building art.

Topic 83. DEMOLITION OF THE NATIONAL MUSEUM

Important for the subject : History

The National Museum is set to be demolished and the artefacts will be moved to the North and South Blocks.

North and South Blocks will be emptied to become the **Yug-Yugeen Bharat Indian Museum**.

About the National Museum of India:

Background:

- The blueprint for establishing the National Museum in Delhi was prepared by the **Maurice Gwyer Committee in May 1946**.
- An exhibition was organized in the Rashtrapati Bhawan (President's residence), New Delhi in 1949, which turned out to be a great success. This event proved responsible for the creation of the National Museum.
- State Governments, Museum authorities and private donors, who had participated in the exhibition, were approached for the gift or loan of artefacts, and most of them responded generously.
- **On August 15, 1949, the National Museum, New Delhi, was inaugurated in the Rashtrapati Bhawan by Shri C. Rajagopalachari, the Governor-General of India.**
- The foundation of the present building was laid by **Pandit Jawaharlal Nehru, the Prime Minister of India, on May 12, 1955.**
- The first phase of the National Museum Building was formally inaugurated by Dr. Sarvepalli Radhakrishnan, the Vice President of India, on December 18, 1960.
- The second phase of the building was completed in 1989. While the Museum continued to grow its collection through gifts that were sought painstakingly, artefacts were collected through its Arts Purchase Committee.

Present Status:

- The Museum presently **holds approximately 2,00,000 objects** of diverse nature, both Indian as well as foreign, and its holdings cover a time span of more than five thousand years of Indian cultural heritage.
- The National Museum was initially looked after by the **Director General of Archaeology until 1957**, when the Ministry of Education, Government of India, declared it a separate institution and placed it under its own direct control.
- **At present, the National Museum is under the administrative control of the Ministry of Culture, Government of India.**

Digitalization of National Museum Collections:

- The National Museum has started a special project to digitize its collection of objects in order to make it available for visitors to see online.
- This process involves digitization and storage of museum collections in a collection management system named 'JATAN', a virtual museum builder software that enables creation of digital collection management systems for Indian museums and is deployed in several national museums across India.
- Its objective is to make a digital imprint of all the objects preserved in museums and help researchers, curators and other people interested in the field
- JATAN has been designed and developed by Centre for Development of Smart Computing (C-DAC) Pune.

Topic 84. TEMPLES ALLEGEDLY DESTROYED BY PORTUGUESE IN GOA

Important for the subject : History

Goa Minister for Archives and Archaeology said that an expert committee formed by the archaeology department has collected information of over 1,000 temples that were allegedly destroyed during the Portuguese rule in Goa.

The Committee has recommended the state government to construct a single memorial for all the temples, stating that it is not "feasible" to reconstruct them all.

- The report of the committee, submitted to the government, revealed that most of the sites where temples were destroyed were in Tiswadi, Bardez and Salcete talukas.
- The panel has recommended that the government construct a memorial temple, since it may not be feasible or practical to reconstruct so many temples.
- Recommendation has been made to reconstruct the **Saptakoteshwar temple at Divar island**. The shrine was built on the island during the Kadamba dynasty and **demolished in the 16th Century by the Portuguese**.

Saptakoteshwar Temple:

- Saptakoteshwar used to be one of the major deities of the **Kadamba dynasty** dating back to the **12th century**. The temple was built by the King for his wife Kamaldevi.

History of Saptakoteshwar Temple:

- The original Saptakoteshwar Temple was located in Narve on Divar Island and was built by **Kadambas**. The Kadamba Kingdom was conquered by the Bahmani Sultan Alauddin Hasan Gangu in 1352, which resulted in the destruction of several temples.
- In 1367, King Harihara conquered Hassan Gangu's troops and restored the temple to all

its former glory. However, after 200 years, the temple came under attack once again by the Portuguese conquerors.

- After a war between Shivaji & the Portuguese, **the temple was rebuilt in 1688**. The stone plaque mentioning this order is installed at the entrance gate.

Religious Significance:

- The name **Saptakoteshwar** refers to **Sapt** meaning seven and **Koteshwar** meaning **lord of crores**. The most important festival celebrated in the Temple is **Gokulashtami**, referred to as a day when Lord Shiva incarnated to give boons to the seven sages.
- People also take a dip in the sacred tank named **Panchaganga Tirtha** with a belief that all their sins and illness will be removed. The name Panchaganga Tirtha signifies the meeting point of five holy rivers.

Legend:

- Legend has it that seven holy sages set off to worship Lord Shiva at a place where five holy rivers met the sea. After undergoing penance for seven years, they were blessed with the appearance of Lord Shiva, who agreed to grant all their wishes.

Architectural Features of Saptakoteshwar Temple:

- The Saptakoteshwar Temple is built in the **medieval style** of architecture. There is a **small entrance marked with bells, while the main five pillared hall is decorated with arches**.
- Intricate designs adorn the ceiling while the **Sanctorum wall is composed of plain wood**.
- The temple has a kalash dome mounted on an octagonal drum sloping tiled roofs, and a tall **lamp tower or Deepastambha**.
- The **mandapa of the temple is built in a distinctly European style**, which is quite interesting.

Brahminical laterite and stone caves surround the temple.

- In the area close to the temple, there once existed a **Jain Math, whose ruins are visible even today**.

Kadambas of Goa:

- The **Kadambas of Goa** were a dynasty during the **Late Classical period on the Indian subcontinent, who ruled Goa from the 10th to the 14th century CE**.
- They took over the territories of the Shilaharas and ruled them at first from Chandor, later making Gopakapattana their capital.
- According to the **Talagunda inscription found in Shimoga in Karnataka**, the Kadambas have descended from **Mayurasharma**.
- During the rule of the Kadambas, the name and fame of **Goapuri** reached its zenith.

Goa's religion, culture, trade and arts flourished and **the dynasty built many Shiva temples.**

- They married the royalty of Saurashtra and even local chieftains.
- The kings **patronized the Vedic religion and performed major fire sacrifices (yagna) and Ashvamedha yagna.** They **popularized Hinduism and patronized Jainism.**
- The languages of Kadamba administration were **Sanskrit and Kannada.**
- They **introduced the Kannada language to Goa, where it exercised a profound influence on the local language.**
- The **Nagari, Kadamba, Halekannada and Goykanadi scripts** were very popular.
- It is known from another inscription that Tribhuvanamalla established a **Brahmapuri** at Gopaka.
- Brahmapuris were ancient universities run by Brahmins, where Vedas, astrology, philosophy, medicine, and other Important for the subjects were taught.

Kadambas ruled Goa for more than 400 years, until 1345 CE.

- Goa Government-owned bus service is named after the Kadambas Dynasty and is known as **Kadamba Transport Corporation.** The **royal lion emblem of the Kadambas** is used as a logo on its buses.

Topic 85. ONLY THE GIR INDIGENOUS COW BREED IS BEING PROMOTED UNDER RASHTRIYA GOKUL MISSION; HERE IS WHY

Important for the subject: Schemes

Instead of improving the quality of all the indigenous breeds, as envisioned under the **Rashtriya Gokul Mission scheme**, it has ended up promoting **only one indigenous variety, the Gir cow**, across the country.

Rashtriya Gokul Mission:

- Launched in **2014** by the **Department of Animal Husbandry and Dairying.** It is **India's flagship scheme to improve indigenous cattle breeds.**
- **Two major components:** research and development of high-quality semen to increase the chances of female calf births and the setting up of semen stations to ensure easy access to high-quality semen for livestock rearers across the country.
- **Aim:** Research on a host of **high milk-yielding indigenous bovine varieties** and then depending on the geographical location, the **high-quality semen** will be used to impregnate other indigenous varieties.

Objectives:

- To enhance productivity of bovines and increase milk production in a sustainable manner using advanced technologies.

- To propagate use of high genetic merit bulls for breeding purposes.
- To enhance Artificial insemination coverage through strengthening breeding network and delivery of Artificial insemination services at farmers doorstep.
- To promote indigenous cattle & buffalo rearing and conservation in a scientific and holistic manner.
- **Indigenous Cow varieties:** Sahiwal, thar parkar, Red Sindhi, Gir, Badri cows and Hariana etc.
- **Impact of the programme:** The country witnessed a **70 per cent jump** in the population of **purebred Gir cows** (from 1.38 million to 2.3 million) from **2013 to 2019**.

Funding Pattern:

- All the components of Scheme will be **implemented on 100% grant-in-aid basis except** the components of: **i)** accelerated breed improvement programme under the component subsidy of Rs 5000 per IVF pregnancy will be made available to participating farmers as GoI share; **ii)** promoting sex sorted semen under the component subsidy upto 50% of the cost of sex sorted semen will be made available to participating farmers and **iii)** establishment of breed multiplication farm under the component subsidy upto 50% of the capital cost maximum upto Rs.2.00 crore of the project will be made available to entrepreneur.

Issue arising in the scheme:

- Almost all states are demanding **Gir varieties** for carrying out artificial insemination.

Why is there a high demand for Gir cows only?

- The mission was started in **Chhattisgarh** and **Madhya Pradesh** where **milk production of indigenous bovine varieties** impregnated with **Gir increased by three to four litres a day**. Subsequently, livestock rearers across the country started to demand **only Gir**.
- Being a **native of the west and central parts of India**, **Gir** has the **ability to adapt to the entire central belt and northern and southern stretches**. **Sahiwal**, a **native of Northern India** or **Tharparkar**, from the **Northwest**, does not adapt as well to new environments.
- **Gir** has the **highest milk production** among indigenous varieties at **18-20 litres a day**.
- During **White Revolution**, the country **imported exotic breeds** like **Jersey** to crossbreed with Indian varieties. Though the **country's milk production increased**, it **did not translate into higher income for livestock rearers** as the **crossbred cows were more prone to diseases and required more care**.

Solution:

- Genetically superior cows should be identified and bred from among the indigenous cows.
- Currently, almost **30 percent of all calves** in the country are born through **artificial insemination**. The guidelines of the Mission target **increasing it to 70 per cent**.

Topic 86. INDIA TO PRODUCE ITS OWN “REFERENCE FUELS”

Important for the subject: Schemes

India has marked a **significant milestone in its quest for self-reliance with the commencement of ‘reference’ petrol and diesel production.**

This specialized fuel, crucial for automobile calibration and testing, has been **indigenously developed by the Indian Oil Corporation (IOC)**, reducing the nation’s dependence on costly imports.

Understanding Reference Fuel

- **Octane Number Distinction:** Unlike regular and premium fuels with octane numbers of 87 and 91, reference-grade fuel boasts an impressive octane number of 97. The **octane number measures the ignition quality of petrol or diesel.**
- **Stringent Specifications:** ‘Reference’ petrol and diesel adhere to a host of stringent specifications, encompassing parameters like cetane number, flash point, viscosity, sulphur and water content, hydrogen purity, and acid number, as mandated by government regulations.
- **Emission Testing:** These specialized fuels are indispensable for emission testing of vehicles equipped with spark ignition engines.

Economic Significance

- **Reduced Import Costs:** While imported ‘reference’ fuel costs approximately Rs 800-850 per liter, domestic production slashes the cost to approximately Rs 450 per liter, providing a significant cost advantage.
- **Critical for Auto Industry:** ‘Reference’ fuels, characterized by higher specifications, are vital for calibrating and testing vehicles by automobile manufacturers and agencies such as the International Centre for Automotive Technology (ICAT) and the Automotive Research Association of India.
- **Innovation by IOC:** The Indian Oil Corporation (IOC) has achieved a breakthrough by creating indigenous alternatives, ensuring a dependable supply of reference fuel at a significantly lower cost to support vehicle manufacturers and testing agencies.

Indigenous Technical Prowess and Export Potential

- **Boosting Make in India:** The production of ‘reference’ fuel domestically underscores India’s indigenous technical capabilities, bolstering the Make in India initiative.
- **Export Prospects:** After catering to domestic demand, IOC intends to explore export opportunities for reference fuel

Energy Security Strategy and Environmental Commitment

- **Four-Pronged Energy Security:** The Indian government has adopted a four-pronged energy security strategy to achieve energy independence by 2047. It involves diversifying

energy supplies, expanding exploration and production, leveraging alternate energy sources, and embracing a gas-based economy, green hydrogen, and electric vehicles (EVs).

- **Ethanol Blending:** India has advanced the rollout of petrol blended with 20 percent ethanol to 2025, accelerating its commitment to reduce emissions. The target of 12 percent ethanol blending has been achieved, with plans to reach 20 percent by the end of 2025.

Conclusion

- India's achievement in producing 'reference' fuel domestically is a testament to its technical prowess and commitment to self-reliance.
- This development not only reduces import costs but also bolsters the nation's automotive industry and contributes to environmental sustainability.
- It reflects India's dedication to the Aatmanirbhar Bharat mission, serving as a model for self-sufficiency in specialized sectors.

Topic 87. INDIA'S GREEN HYDROGEN MOVE MAY WORSEN POLLUTION IF STEPS ARE NOT IN PLACE, SAYS STUDY

Important for the subject: Schemes

What is Green Hydrogen?

Hydrogen is a key industrial fuel that has a **variety of applications including the production of ammonia (a key fertilizer), steel, refineries and electricity.**

However, all of the hydrogen manufactured now is the so-called **'black or brown' hydrogen because they are produced from coal.**

- Hydrogen is the most abundant element in the universe. **But pure, or the elemental hydrogen, is very scarce.** It almost always exists in compounds like with oxygen to form H₂O, or water.
- But when electric current is passed through water, it splits it into elemental oxygen and hydrogen through **electrolysis**. And if the electricity used for this process comes from a renewable source like wind or solar then the hydrogen thus produced is referred to as green hydrogen.
- Colors attached to hydrogen indicate the source of electricity used to derive the hydrogen molecule. For instance, if coal is used, it is referred to as brown hydrogen.

What is the National Green Hydrogen Mission?

- It is a program to incentivise the commercial production of green hydrogen and make India a net exporter of the fuel.
- The Mission will facilitate demand creation, production, utilization and export of Green

Hydrogen.

Sub Schemes:

- **Strategic Interventions for Green Hydrogen Transition Programme (SIGHT):** It will fund the domestic manufacturing of electrolyzers and produce green hydrogen.
- **Green Hydrogen Hubs:** States and regions capable of supporting large scale production and/or utilization of hydrogen will be identified and developed as Green Hydrogen Hubs.

Objective:

- Developing green hydrogen production capacity of at least 5 MMT (Million Metric Tonne) per annum, alongside adding renewable energy capacity of about 125 GW (gigawatt) in India by 2030.
- It aims to entail over Rs 8 lakh crore of total investments and is expected to generate six lakh jobs.
- It will also lead to a cumulative reduction in fossil fuel imports by over Rs 1 lakh crore and an abatement of nearly 50 MT of annual greenhouse gas emissions.

Nodal Ministry: Ministry of New and Renewable Energy

- **Significance:** It will help entail the decarbonisation of the industrial, mobility and energy sectors; reducing dependence on imported fossil fuels and feedstock; developing indigenous manufacturing capabilities; creating employment opportunities; and developing new technologies such as efficient fuel cells.

Potential:

- India has a favorable geographic location and abundance of sunlight and wind for the production of green hydrogen.
- Green hydrogen technologies are being promoted in sectors where direct electrification isn't feasible.
- Heavy duty, long-range transport, some industrial sectors and long-term storage in the power sector are some of these sectors.
- The nascent stage of this industry allows for the creation of regional hubs that export high-value green products and engineering, procurement and construction services.

What are the Challenges?

- **In Nascent Stages Globally:** Green hydrogen development is still in the nascent stages globally and while India can take the lead in being a major producer, it doesn't have the necessary infrastructure yet to execute all these intermediary steps.
- **Economic Sustainability:** One of the biggest challenges faced by the industry for using hydrogen commercially is the economic sustainability of extracting green hydrogen. For transportation fuel cells, hydrogen must be cost-competitive with conventional fuels and technologies on a per-mile basis.



How India's move can cause pollution:

- The main concern is that if electrolyzers were run 24×7, they would be expected to operate even at night when no solar power is available.
- Where will the electricity come from? If it comes from India's coal powered grid in general, it will in fact increase carbon emissions, since about 70% of the electricity on the grid is coal generated more in non daylight hours when solar generation is nil. The vast majority of projects have not disclosed their source of electricity.