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Topic 1. ADOPT WHO-STANDARD GOOD MANUFACTURING PRACTICES: GOVT SETS DEADLINE FOR PHARMAS

Important for the subject: Science and technology

Following recent incidents of several countries reporting deaths allegedly linked to “contaminated” **India-manufactured drugs**, the government has **set a deadline** for **mandatory implementation** of the **Good Manufacturing Practices (GMP)** which were revised in **2018**, bringing them on par with **World Health Organisation (WHO)** standards.

- Companies with a turnover of over **Rs 250 crore** will have to **implement the revised GMP within six months**, while **medium and small-scale enterprises** with **turnover of less than Rs 250 crore** will have to implement it **within a year**.
- Those who do not comply with the direction will face suspension of license and or penalty.
- The move comes after a **risk-based inspection of 162 such units** and **14 testing labs found several deficiencies**, including: absence of testing of raw materials before use, absence of quality failure investigation of its products, faulty design of manufacturing and testing areas.
- According to officials, this will lead to **at least 11 specific changes in the manufacturing process on the ground**, including: introduction of a pharmaceutical quality system, quality risk management, product quality review, and validation of equipment.

Introduction of a **GMP-related computerised system**.

- These **computer programmes** will be designed to automatically record all the steps followed and checks done, which will ensure all the processes are followed.
- The companies will also have to **carry out stability studies** as per the climate conditions.
- At present, most companies store their **samples under recommended conditions** and test for various parameters from time to time.
- Now, they will have to **keep the drugs in a stability chamber**, set the proper temperature and humidity, and carry out an accelerated stability test as well.
- Currently, while companies **exporting medicines** to other countries already have to be **WHO-GMP certified**, those manufacturing medicines for the domestic market can be granted permission if they meet the requirements listed in **Schedule M of rules** under the **Drugs and Cosmetics Act**.
- **Schedule M** is a **section of the Drugs and Cosmetics Act of 1940** that outlines the ‘**Good Manufacturing Practices**’ (GMP) for pharmaceuticals in **India**. These are the standards that pharmaceutical manufacturers must adhere to to ensure the quality, safety and efficacy of their products.

About the WHO-GMP:

- **Good Manufacturing Practices** (GMP, also referred to as ‘cGMP’ or ‘current Good Manufacturing Practice’) is the aspect of quality assurance that ensures that medicinal products are consistently produced and controlled to the quality standards appropriate to their intended use and as required by the product specification.

GMP guidance:

- The **first WHO** draft text on **GMP** was adopted in **1968**.
- In **1969**, when the World Health Assembly recommended the first version of the WHO Certification Scheme on the quality of pharmaceutical products moving in the global market, it accepted the **WHO GMP** as an integral part of the Scheme.
- A supplementary annex on biological medicinal products was adopted by the Expert Committee on Biological Standardization (ECBS) in 1991 and establishes the general approach to the quality control of biological medicines that include products such as vaccines, blood and blood products, antigens, cell and tissue therapies, biopharmaceutical products, and others.
- **More than 100 countries** have incorporated the **WHO GMP provisions** into their national medicines laws, and many more countries have adopted its provisions and approach in defining their own national GMP requirements. The **WHO GMP** continues to be used as a basis for the **WHO Certification Scheme** and prequalification of vaccines for procurement by UN agencies.

Topic 2. HOW UIDAI IS USING AI TO TACKLE PAYMENT FRAUDS

Important for the subject: Science and technology

As more frauds related to the **Aadhaar enabled Payment System (AePS)** come to the fore, the **Unique Identification Authority of India (UIDAI)**, has turned to **artificial intelligence (AI) based systems** in response – this includes developing technologies around fingerprinting and facial recognition.

About AePS:

- **AePS** is a **payment service** that allows a bank customer to use Aadhaar to access her bank account and perform basic transactions like balance inquiry and cash withdrawals.
- **UIDAI** is the **statutory authority** that **issues** Aadhaar and administers the **unique biometric ID system**.

Step taken to prevent AePS frauds:

- To prevent **AePS frauds** by the use of manipulated fingerprints during Aadhaar authentication, the **UIDAI** has rolled out an **in-house AI/ machine learning technology-based “Finger Minutiae Record-Finger Image Record” (FMR-FIR)** modality that can check the “liveness” of a fingerprint to detect clones during the authentication process.
- In May, **Airtel Payments Bank** collaborated with **National Payments Corporation of India (NPCI)** to launch a **facial recognition-based authentication measure for AePS**

transactions. NPCI operates **retail payments and settlement systems** such as **UPI** and **BHIM**.

How does the Aadhaar fingerprint technology work?

- The technology, which has been developed in-house by **UIDAI** uses a **combination of finger minutiae and finger image** to check the **liveness** of the fingerprint captured.
- In effect, the **AI-based technology** is able to identify whether the fingerprint is from a real, or 'live' finger, or from a fake/ cloned one.

How serious is the problem of payment fraud?

- The volume of **financial crimes** reported in the country **went up** from **2.62 lakh** in **2020-21** to **6.94 lakh** in **2022**.
- The **payment-related frauds** in **India** rose from a little more than **7 lakh** in **2020-21** to close to **20 lakh** in **2022-23**.
- Due to the limited awareness of **cyber fraud**, a significant number of people do not report instances of fraud to the authorities.
- According to the **Indian Cyber Crime Coordination Centre (I4C)**, of the **694,424 complaints** related to financial fraud in the year 2022, **FIRs** were registered in **only 2.6% of cases**.

How far can technology help to address this problem?

- Technological measures can only go so far, especially since a sizable number of AePS frauds over the years have had a similar **modus operandi** – involving the participation of a key actor in the payments supply chain, the **business correspondent**.
- A **business correspondent (BC)** is an **informal bank agent** equipped with a **biometric point of sale (PoS) machine**, which works like a **micro ATM**.

About National Payments Corporation of India (NPCI):

- It is an umbrella organization for operating retail payments and settlement systems in India.
- It is an **initiative** of the **Reserve Bank of India (RBI)** and the **Indian Banks' Association (IBA)** under the provisions of the **Payment and Settlement Systems Act, 2007**, to create a robust Payment & Settlement Infrastructure in India.
- It has been incorporated as a **"Not for Profit"** Company under the provisions of **Section 25** of the **Companies Act 1956** (now Section 8 of the Companies Act 2013).
- The Company is focused on bringing innovations in the retail payment systems through the use of technology for achieving greater efficiency in operations and widening the reach of payment.
- NPCI is promoted by **ten major banks**, including the **State Bank of India, Punjab National Bank, Citibank, Bank of Baroda, and HSBC**.
- The **regulatory board** of the NPCI, headquartered in **Mumbai**, includes nominees from

the RBI along with nominees from ten core promoter banks.

Payment systems that the **NPCI** can operate include:

- National Financial Switch (NFS), Immediate Payment System (IMPS), Aadhaar-enabled Payments System (AEPS) and National Automated Clearing House (NACH).

Services Offered by NPCI:

- **Bharat Bill Payment Interface (BBPI):** It was developed by the NPCI to help the retail payments sector. With the introduction of the BBPI, a single platform has been made for aggregators and billpayers.
- **Immediate Payment Service (IMPS):** It gives you the option to transfer funds immediately. The facility is available at any given time. The beneficiary details must be added to transfer funds via IMPS. You can add the IFSC code and the account number to transfer funds via IMPS.
- **RuPay:** NPCI introduced RuPay so that average citizens can make financial decisions. RuPay is an affordable card and can be issued as credit cards, debit cards, and prepaid cards. More than 300 million RuPay cards are in India.
- **USSD Services:** Unstructured Supplementary Service Data (USSD) was introduced by the NPCI to allow individuals to make banking solutions without the need for the internet or smartphones.
- **BHIM:** BHIM uses UPI to complete payment transfers. You can make payments via BHIM by entering the Virtual Payment Address (VPA) or the registered mobile number. No smartphone is required to transfer funds via BHIM.
- **UPI:** Unified Payments Interface (UPI) allows you to transfer funds from your smartphone. However, you will need to link your bank account to complete payments via UPI. Money is transferred directly from one bank to another.

About Unique Identification Authority of India (UIDAI):

- It is a **statutory authority** established under the provisions of the **Aadhaar Act 2016** by the Govt. of India under the **Ministry of Electronics & Information Technology**.
- **Vision:** To empower residents of India with a unique identity and a digital platform to authenticate anytime, anywhere.
- It is created to issue **Unique Identification Numbers (UID)**, which is also known as '**Aadhaar number**' to all the residents of India.
- Under the **Aadhaar Act 2016**, **UIDAI** is responsible for Aadhaar enrolment and authentication, including operation and management of all stages of the Aadhaar life cycle and the system for issuing Aadhaar numbers to individuals.
- **Composition:** UIDAI consists of a Chairperson, two part-time Members and the Chief Executive Officer (CEO), who is also the Member-Secretary of the Authority.

Topic 3. ROOM-TEMPERATURE SUPERCONDUCTIVITY

Important for the subject: Science and technology

The South Korean researchers claimed to have developed a lead-based compound, LK99, that exhibits superconducting properties at room temperature and under normal pressure conditions.

What is a Superconductivity and Superconductor?

- **Superconductivity** is a physical phenomenon observed in certain materials at very low temperatures.
- A **superconductor** is a material that exhibits **zero electrical resistance to the flow of electric current**. It can conduct electricity without any loss of energy due to resistance.
- Superconductors have unique magnetic properties, such as the **Meissner effect** and **flux pinning**. **Meissner effect** – the ability to expel magnetic fields

Flux pinning – the capability to trap magnetic flux in specific patterns

What are the applications?

- **MRI machines** for medical imaging.
- **Maglev trains** for high-speed transportation.
- Efficient **electricity transmission**.

Particle accelerators for research.

Quantum computing

Energy storage

- Advancements in scientific research.

What are the current limitations of superconductors?

- High cost of production.
- **Cooling requirements** using liquid nitrogen or helium. **Limited critical temperature range** for practical applications. Sensitivity to magnetic fields, limiting high-field use. Some superconducting materials are **brittle and mechanically sensitive**.
- Superconducting wires are often rigid and difficult to shape. Limited availability of materials due to **rare elements**. **Cooling systems** can consume significant energy, affecting overall efficiency. Risk of sudden loss of superconductivity (**quenching**) in some systems.

What has been discovered so far?

Early Discoveries:

- First discovered in **1911** by Dutch physicist Heike Kamerlingh Onnes, who observed the abrupt drop in electrical resistance of **mercury** when cooled to very low temperatures.
- However, these required extremely low temperatures **close to absolute zero**, making them **impractical** for most applications.

High-Temperature Superconductors (HTS):

- In **1986**, a breakthrough occurred with the discovery of high-temperature superconductivity in **copper oxide (cuprate)**
- Could achieve superconductivity at significantly higher temperatures (up to around -123°C or -189°F), enabling the use of liquid nitrogen for cooling instead of the much costlier liquid helium. While this was a significant advancement, it was still far from room temperature.

What is room temperature superconductivity?

- Room temperature superconductivity occurs at **typical room temperature (20-25 degrees Celsius)**.
- It allows materials to **conduct electricity with zero resistance**.
- **No extreme cooling is required** for this phenomenon.
- The discovery of room temperature superconductivity has the potential to revolutionize various industries and technologies.

What are the challenges in achieving room-temperature superconductivity?

- **Finding materials** that can exhibit superconductivity at higher temperatures is a primary challenge.
- Room-temperature superconductors are **complex and difficult to synthesize and stabilize**.
- Understanding the **underlying physics and mechanisms** is a significant obstacle.
- Competing phases or properties in materials hinder their practical use. **Reproducing experimental results consistently is challenging, leading to skepticism among researchers.**

What is LK99?

- LK99 is a material developed by **South Korean scientists**. It is a **copper-doped lead apatite, a type of phosphate mineral**. The scientists claim that LK99 shows **superconducting properties at room temperature** and under normal pressure conditions.
- However, the claim is yet to be peer-reviewed and independently validated by other researchers.

What are Apatites?

- Apatites are minerals with a phosphate scaffold, and their properties vary based on the

atoms between the pyramids.

- The researchers started with lead apatite and substituted some lead atoms with copper, creating a material known as LK99.
- Tests revealed that LK99 emerged when **10% of the lead atoms were replaced with copper.**

What is the critical current in a superconductor?

- The critical current is the maximum current that a superconductor can carry without losing its superconducting properties.

How LK99 is different from earlier superconductors?

- LK99 claims to be a **room-temperature superconductor**, unlike earlier discoveries that required extremely low temperatures.
- It operates under normal pressure conditions, setting it apart from previous superconductors that needed high-pressure environments.

Why there is skepticism about LK99?

- It claims to be a room-temperature superconductor, which has been an elusive goal in the scientific community.
- Previous claims of room-temperature superconductivity have faced **controversies** and were not validated upon further scrutiny.
- The claim of LK99 is **yet to undergo peer review and independent verification** by other researchers.
- Some experts raise concerns about **potential technical errors or incomplete data** in the published work.

What is the way forward?

- Until the results are reproduced and confirmed by other scientific groups, skepticism remains regarding the authenticity and uniqueness of LK99 as a room-temperature superconductor.

Topic 4. THE CURIOUS CASE OF LACTOSE INTOLERANCE

Important for the subject: Science and technology

Lactose intolerance (Allergic to milk or milk products) is something one can develop at any point in life.

Irritable bowel syndrome (IBS):

Symptoms: Sensitive stomach, the frequent episodes of abdominal bloating, continuous belching, pain and occasional diarrhoea are symptoms of lactose intolerance or the IBS.

Lactose intolerance:

- Doctors do not consider **lactose intolerance** to be a disorder. They describe it as the **digestive system's reaction to milk sugar (lactose)** which it cannot digest.
- The body needs an enzyme called **lactase** which is produced by the **cells lining the small intestine**, to digest lactose.
- If one is **deficient in lactase**, the **undigested lactose passes on to the colon**, where it **produces extra gas and water**, resulting in **bloating, cramps and diarrhoea**.
- **Lactose intolerance** thus produces symptoms which can be uncomfortable, but it is never dangerous.
- The **degree of intolerance** depends on the **amount of lactose their system can tolerate**. As one ages, there is a **normal decline in the amount of lactase** that the small intestine produces.

Prevalence rate:

- According to literature, **estimates for lactose intolerance vary by ethnicity**. The **prevalence rate is 75-95%** in **African American** and **Asian ethnicities** while it is estimated to be **18-26%** amongst **Europeans**.
- **Lactose intolerance** does run in families and the symptoms can become evident during childhood or adolescence.
- It is possible to **develop secondary lactose intolerance** all of a sudden following **surgery** or **chemotherapy** or if one has an **infection, ulcerative colitis** or **Crohn's disease** which affects the **small intestine**. But this usually goes away once the small intestine regains health.

Detection Tests:

- Though there are specific tests like the **hydrogen breath test** to determine lactose intolerance, these tests do not have much use in clinical practice.
- This is a condition that is generally self-diagnosed and self-managed.

Difference between lactose intolerance and IBS:

- **Lactose intolerance** is a specific digestive issue associated with the consumption of dairy products and ceases to be a problem when the person totally avoids or restricts milk products in the diet.
- But its symptoms can easily overlap with another common and **chronic gastric disorders** such as **IBS**, the pathogenesis of which is quite different.

Lactose intolerance is different from allergy to milk:

- Lactose intolerance is the **digestive system's response to the milk sugar (lactose)**, whereas in the event of a **milk allergy, the entire immune system will react against the milk protein**.
- The reaction is often immediate and severe in the case of milk allergy, while lactose

intolerance will never lead to any serious disease or long-term complications.

Alternative supplement to the milk for lactose intolerant persons:

- There are options such as **plant-based milk** (soy/almond milk) or **lactose-free milk**. There are plenty of other food sources — **yoghurt, tofu, nuts, spinach, broccoli, orange, lentils and legumes** — that a lactose-intolerant person can depend on for calcium supplementation.

Topic 5. BREASTFEEDING WEEK: DATED WISDOM, LACTATION STIGMA STILL ASSAIL MOTHERS

Important for the subject: Science and technology

World Breastfeeding Week (WBW) is celebrated every year from **August 01 to August 07** in remembrance of the **Innocenti Declaration** from **1990**. Since **2016**, **Sustainable Development Goals (SDGs)** have been in sync with **WBW**.

Innocenti declaration:

- In **1990** the **Innocenti Declaration** on the **Protection, Promotion and Support of Breastfeeding** set an international agenda with ambitious targets for action.
- The **Innocenti Declaration** reflected both the spirit of the support that was being mobilized for breastfeeding, and the **recognition of the right of the infant to nutritious food** enshrined in the **Convention on the Rights of the Child**.

Stigma surrounding lactation

- Exclusively breastfeeding a child for **six months** is the best way to ensure infants are nourished, according to the **World Health Organisation**.
- It is one of the **U.N. Sustainable Development Goals for health**.
- The first milk, the **colostrum**, is thought to be **nutrient-rich** and full of antibodies good for the child.
- In **India**, most women are guided by the older women in their families on what to expect during childbirth and how to care for their children. However, even those older women don't have a good scientific basis for their knowledge.

What is good enough?

- In physiological terms, the **milk let-down reflex** causes a mother to lactate freely when stimulated by her baby's suckling and **oxytocin**, a hormone released when the mother feels bonded to her child.
- The natural supplements like **galactogogues** – **plant-based substances that increase milk production**. But no studies support their effectiveness.
- With **inadequate feeding**, the baby may face the problem of being underweight or having

weak immunity, and postpartum depression.

Alternate options:

- A **2018 survey** found that **almost 70% of mothers** have problems with **breastfeeding** – but unfortunately **there aren't many nutritious alternatives to breast milk**.
- **Breastmilk** is a **nutrition-dense substance** with **bioactive agents** that develop an **infant's gut, immunity** as well as **brain**.
- The **World Health Organisation** recommends that **cow's milk** or **goat's milk** should **never be given to infants**.
- **Human breast milk banks** – of which there are some **90 around India** – offer another viable alternative.

Topic 6. IRAQ ELIMINATES TRACHOMA AS A PUBLIC HEALTH PROBLEM

Important for the subject :Science and Technology

Iraq has now joined the league of **17** other countries that have **eliminated trachoma**, a **neglected tropical disease** and the **world's leading infectious cause of blindness**, the **World Health Organization (WHO)** announced recently.

- The country is also the **50th** to be acknowledged by the **United Nations health agency** for **eliminating at least one neglected tropical disease globally**.
- This major milestone is the halfway mark to the **100-country target set for 2030** in the **WHO** road map for neglected tropical diseases.

Trachoma:

- **Trachoma** starts off as a **bacterial infection** caused by **Chlamydia trachomatis** and can be easily treated.
- Over time, it **causes** the eyelashes to be pushed inward into the eye. So with every blink, they brush against the eyeball.
- This **advanced form of trachoma** is called **trichiasis**. Over time, if it's not treated, trichiasis can lead to blindness.
- The disease **thrives** where there are **water shortages, poor sanitation** and **infestations of flies**, which are considered physical vectors of the disease.
- **Trachoma** is the **world's leading infectious cause of blindness** and is one of the conditions known as **neglected tropical diseases**.
- The disease is still known to be **endemic in six countries** of the **WHO's Eastern Mediterranean Region**, but there has been substantial progress in the number of people in the region requiring antibiotic treatment for trachoma elimination purposes, which has fallen from 39 million in 2013 to 6.9 million in April 2023.

WHO SAFE strategy to end trachoma:

- To eliminate trachoma as a public health problem, **WHO** recommends the **SAFE**

strategy, a comprehensive approach to reduce transmission of the causative organism, clear existing infections and deal with their effects.

The SAFE strategy includes:

- **Surgery** to treat the blinding stage (trachomatous trichiasis);
- **Antibiotics** to clear the infection, particularly the antibiotic azithromycin; **Facial cleanliness** and **Environmental improvement**, particularly improving access to water and sanitation.

Countries that eliminate trachoma:

- The **17** other countries that have eliminated trachoma are: Benin, Cambodia, China, Gambia, Ghana, Islamic Republic of Iran, Lao People's Democratic Republic, Malawi, Mali, Mexico, Morocco, Myanmar, Nepal, Oman, Saudi Arabia, Togo and Vanuatu.

Iraq's effort to eliminate trachoma:

- Iraq established its **national trachoma programme in 2012** to coordinate the final domestic push against the disease.
- A **trachoma surveillance system** was developed to **detect and manage** cases within secondary and tertiary eye care facilities, as well as through school pre enrollment and school eye screening programmes conducted in collaboration with the Ministry of Education.

Neglected Tropical Diseases (NTD):

- **NTDs** are a group of infections that are most common among marginalized communities in the developing regions of **Africa, Asia** and the **Americas**. They are caused by a variety of pathogens such as **viruses, bacteria, protozoa** and **parasitic worms**.
- **NTDs** are especially common in **tropical areas** where people do not have access to clean water or safe ways to dispose of human waste.
- These diseases generally receive **less funding for research and treatment** than malaises like tuberculosis, HIV-AIDS and malaria. **Examples of NTDs are:** snakebite envenomation, scabies, yaws, trachoma, Leishmaniasis and Chagas disease etc.

Indian Initiatives to Eliminate NTDs:

- The **Accelerated Plan for Elimination of Lymphatic Filariasis (APELF)** was launched in 2018, as part of intensifying efforts towards the elimination of NTDs.
- A **WHO-supported** regional alliance established by the **governments of India, Bangladesh, and Nepal** in **2005** to expedite early diagnosis and treatment of the most vulnerable populations and improve disease surveillance and control of sandfly populations (Kala-azar).
- **India has already eliminated several other NTDs**, including guinea worm, and yaws.

Topic 7. WILL A NUCLEAR-POWERED ROCKET CUT TRAVEL TIME TO MARS BY HALF?

Important for the subject : Science and technology

NASA and DARPA selected Lockheed Martin to design, build, and test a propulsion system for speeding astronauts to Mars.

What is the purpose of the DRACO program announced by NASA and DARPA?

- The purpose of the **DRACO (Demonstration Rocket for Agile Cislunar Operations)** program is to design, build, and test a propulsion system that could speed up astronauts' trips to Mars.
- It aims to develop **Nuclear Thermal Propulsion (NTP) technology** for space exploration. The program intends to reduce the travel time to **Mars** significantly.

How long does it currently take to travel to Mars using conventional rocket engines?

- The travel time using conventional rocket engines takes **seven to nine months**. This duration is due to the **relatively long distance between Earth and Mars**.
- The launch window for shorter journeys between the planets occurs **every 26 months**.

How could nuclear-powered propulsion reduce travel time?

- Nuclear reactions, specifically **Nuclear Fission**, provide more energy for continuous acceleration.
- A spacecraft could **continue accelerating through the first half of the journey and then slow down again**.
- This continuous acceleration and deceleration could potentially cut the travel time significantly.

What is the role of the nuclear reactor in the DRACO engine?

- It **heats hydrogen to extremely high temperatures**, reaching up to 4,400 degrees Fahrenheit.
- The hot gas produced by the nuclear reactor is expelled through a nozzle to generate **thrust**, propelling the spacecraft forward.
- **What other applications does DARPA envision for nuclear propulsion technology?**
- Nuclear-powered propulsion could enhance the **maneuverability and responsiveness of military satellites**, providing **strategic advantages in space operations**.

What were the historical efforts related to nuclear propulsion for space exploration?

- In the 1950s and 1960s, projects like **Project Orion** and **Project Rover** explored the concept of using **atomic bomb explosions** and **Nuclear Thermal Engines (NTE)** for spacecraft acceleration.

- Efforts were made to develop nuclear reactors for space probes destined for destinations like Jupiter, Saturn, and beyond, as well as **to provide power at lunar bases.**

How does the use of uranium differ between NERVA and DRACO?

- **NERVA (Nuclear Engine for Rocket Vehicle Application)** used **weapons-grade uranium** for its reactors.
- In contrast, **DRACO** will use **a less-enriched form of uranium** to ensure safety and **minimize the risk of radioactive accidents.**

What precautions are taken to ensure safety?

- The reactor in the engine **will not be activated until the spacecraft reaches space**, reducing the possibility of a radioactive accident on Earth during launch.

What is the timeline and intended orbit for testing the nuclear-thermal engine?

- The **launch of the test flight** is currently scheduled for **late 2025 or early 2026.**
- The demonstration spacecraft will likely orbit at an **altitude between 435 and 1,240 miles.**
- This ensures that the spacecraft remains in space for **over 300 years, allowing radioactive elements in the reactor fuel to decay to safe levels.**
- **Another partner building the rocket: BWX Technologies**, based in Lynchburg, Virginia, will build the nuclear fission reactor at the heart of the engine.

Topic 8. IN TB DETECTION, SMEAR MICROSCOPY'S SHARE STILL HOLDS SWAY

Important for the subject :Science and technology

According to the **WHO Global TB report 2022**, over **40%** of **10.6 million** people globally who developed **TB** in **2021** were not diagnosed.

India along with **Indonesia** and the **Philippines** accounted for a **67%** drop in the number of people with **TB** being diagnosed in **2020**.

Sputum smear microscopy:

- **Sputum smear** is a **rapid test** to detect the presence of **acid-fast bacilli (AFB)** but a single sputum test lacks sensitivity.
- Even when people finally get tested for TB, **sputum smear microscopy** with about **50% sensitivity** has been used for diagnosis in a majority of the cases in India, thus leading to a **huge number of missed TB cases.**

Drawbacks:

- Besides lower sensitivity, **smear microscopy** is **ill-equipped to diagnose rifampicin resistance.**

- Way back in **2014**, the **WHO guidelines** clearly stated that **GeneXpert** may be used rather than **conventional microscopy** and culture as the initial diagnostic test in all adults suspected of having **TB**.

Molecular tests for TB:

- **Molecular tests** are not only more sensitive than **smear microscopy**, they also help **identify rifampicin resistance** at the outset.
- Yet, **India** has been overly relying on **smear microscopy** for the initial diagnosis. Even in **2015**, the **Joint monitoring mission report** had criticised the **national TB programme** for heavily relying on **smear microscopy** and for the “**slow uptake of the new molecular test**”.
- The **rapid molecular diagnostic machines** have been scaled up from **40** in **2014** to **5,090** in **2022**.

India's reliance on sputum smear microscopy for TB detection test:

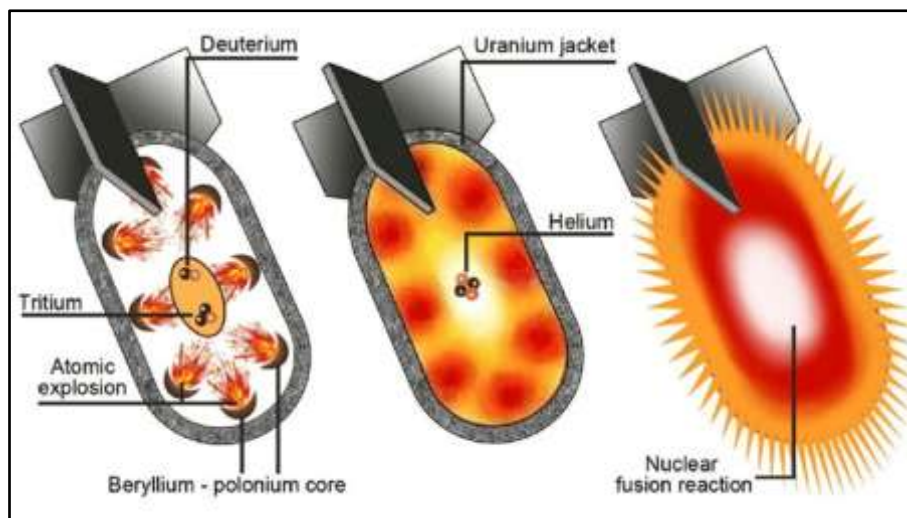
- As per the **India TB report 2023**, even last year, **77%** (13.9 million) of **presumptive TB cases** were examined using **smear microscopy** and just **23%** (4.1 million) with a **molecular test**.
- The **presumptive TB case examination rate (PTBER)** is a **good indicator** of the efforts to detect and diagnose TB cases.
- According to the **2019-2021 TB prevalence survey report**, nearly **43%** of the **TB cases** in the survey would have been missed if a chest **X-ray** was not included.

Tuberculosis (TB) cases in India:

- According to the **National TB prevalence survey in India 2019-2021** report, nearly **64%** did not get tested for **TB**. It varied from **46%** in the case of **Kerala** to **88%** in **Haryana**.
- **50%** of all people with **bacteriologically confirmed tuberculosis** have **no symptoms** and by the time symptoms develop, transmission has probably already occurred.
- There is emerging evidence that **TB** may not fall under a binary of latent infection (asymptomatic and non-infectious) and **active disease** (symptomatic and infectious).
- Instead, **TB may be a spectrum of disease**, including incipient and subclinical stages.
- In **2020**, the **RNTCP** was renamed as the **National TB Elimination Program (NTEP)** to underscore **India's goal to eliminate TB in the country by 2025**, five years ahead of the Sustainable Development Goals.

Topic 9. THE SCIENCE BEHIND A NUCLEAR BOMB

Important for the subject :Science and Technology



On **6 August 1945** World's deadliest bomb hit **Japan**: Carries blast power of 20,000 tons of TNT.

At the **G7 meeting in Hiroshima, Japan**, the only country to have suffered a nuclear strike, pushed for a **world without nuclear weapons**.

First, a primer on the atom:

- Atoms are the basic building blocks of all matter, such that they cannot be “broken down” further by simple chemical processes.
- Most of an atom is empty space. The rest comprises **three basic types of subatomic** (smaller than, or occurring within an atom) **particles** — **positively charged protons**, **negatively charged electrons**, and the **neutral neutrons**.
- The protons and neutrons combine to form the atom's nucleus, around which circle a “cloud” of electrons.
- The **number of protons** in an atom determines the **element**, and the **number of neutrons** determines the **isotope** of that element. Different isotopes of the same element have the same chemical properties, but very different nuclear properties.

Nuclear fission, U-235, and chain reaction:

- Most of the atoms on earth are **stable**, but few are **unstable** due to unequal composition of neutrons and protons. The **unequal composition** does not allow the atom to hold itself together.
- Such types of atoms are known to be **radioactive**. They tend to break apart or fission into two lighter elements. **Uranium-235**, an **extremely rare isotope** of the **heavy metal uranium**, is the most commonly used **nuclear fuel**, as it is one of the few elements that can undergo **induced fission (breaking apart of atoms)**.

Fission process in U-235:

- This is done by **Important for the subjecting a U-235 nucleus to neutrons**. The nucleus immediately absorbs an extra neutron and consequently becomes unstable — and immediately breaks apart into two lighter atoms, and a few extra neutrons. This process releases what is known as **atomic energy**.
- The **fission of a U-235 atom** produces about **2 to 3 new neutrons on average**. If these new neutrons are then absorbed by other **U-235 atoms**, it creates an **exponentially growing chain reaction**.
- Even though **not all neutrons engage in the fission process**, as long as each fission leads to more than one additional fission, the chain reaction grows exponentially and releases large amounts of energy.

Need for uranium enrichment:

- **Approximately 99.3% of naturally occurring uranium is of the isotope U-238, which is not fissionable.**
- Thus, **uranium ore** is enriched in order to increase the concentration of **U-235**. **Most nuclear power plants** require an **enrichment of 3-4% U-235** to sustain a chain reaction. **Fission bombs** on the other hand need closer to **90% enrichment**.
- Notably, the equipment needed to enrich fuel for nuclear power generations is the same as that needed to enrich it for a bomb — leading to one of the great challenges of enforcing nuclear non-proliferation.

Critical mass:

- **Critical mass** is the minimum mass of fissionable material required to sustain a nuclear fission.
- Thus, in a **fission bomb**, the fuel is kept in **separate subcritical masses** and then **brought together when the explosion is intended**.
- **Conventional explosives** shoot the bullet down the gun barrel, where it mates with the target, **forming a supercritical mass**, resulting in a **chain reaction**, and an atomic explosion. This was the kind of bomb that was used over **Hiroshima**.

There are also plutonium implosion devices:

- The **second way to create a supercritical mass** is to compress the subcritical masses together by means of an **implosion**.
- This is the kind of device required for **plutonium bombs**, which cannot be triggered by a simple gun mechanism.
- **Plutonium implosion bombs** are more complex to make but the fissionable isotope of plutonium, **Pu-239**, is easier and cheaper to obtain in **critical mass quantities**. If produced correctly, these bombs can also be more efficient than their U-235 counterparts.

Fusion bombs:

- **Nuclear fusion** is basically the opposite of fission — it is the process by which two light atomic nuclei combine to form a single, heavier one while releasing massive amounts of energy.
- For **fusion bombs**, the nuclei of two extremely rare isotopes of hydrogen — deuterium and tritium — are fused together under extremely high temperatures and pressure, thus giving these bombs the moniker of hydrogen bombs or **H-bombs**.
- **All H-bombs** are basically **two bombs** in one — a **fission bomb** which produces adequate heat and pressure, to trigger the **fusion reaction**.

Which is more destructive, Fission bomb or Fusion bomb?

- **Fission bombs**, although very destructive, are not very efficient. There is also a **theoretical limit to the yield** they can possibly generate. The **largest fission bombs** tested till date have had yields of around **500 kilotonnes**.
- **Fusion bombs**, on the other hand, have **no such limit**. The largest fusion bomb ever tested — the **Soviet Tsar Bomba** — gave a **yield of roughly 50 megatonnes, or 50,000 kt**.

Upon explosion, they produce four types of energy:

- A blast or a shock wave that can flatten and obliterate any physical structures in the blast radius; Bright light, which can cause permanent blindness even many kilometres away;
- Intense heat, which can literally turn human bodies into ashes in an instant; and Radiation, which includes both initial radiation, produced within a minute of detonation and residual (or delayed) nuclear radiation, which is emitted over a period of time.

Nuclear tests around the world:

- The **world's first nuclear weapon test** (code name: **Trinity**) was conducted in **July, 1945**.
- There have been at least **528 nuclear weapon tests** around the world that took place above the ground, plus the bombs dropped on **Hiroshima** and **Nagasaki**.
- The **1979 "Vela incident"** that most likely involved an **Israeli nuclear weapon test** with help from **South Africa**. Reprocessing of plants also exposes us to radioactive materials.

Topic 10. STARLINK: WHY THE NEW SOVEREIGN OF LOW-EARTH ORBIT IS BAD NEWS

Important for the subject: Science and technology

In January 2023, images circulated on Russian Telegram channels revealed a Ukrainian drone equipped with a modified Starlink dish, enabling remote control for tasks like surveillance and military coordination.

Space-Based Internet

- Space-based internet involves deploying constellations of satellites in **low Earth orbit (LEO)** to provide high-speed internet access to **remote and underserved regions**.

Role of Low Earth Orbit (LEO) in Space-Based Internet

- Low Earth orbit, typically located between **180 to 2,000 kilometers above Earth's surface**, plays a crucial role in the viability of space-based internet projects.
- LEO satellites have **significantly lower latency compared to traditional geostationary satellites** located much higher above the Earth.

Starlink: A Game-Changing Project

- **Starlink**, initiated by **Elon Musk's SpaceX**, is a leading player in the space-based internet arena.
- SpaceX aims to deploy a **mega-constellation of satellites**, numbering in the thousands, to offer global internet coverage.
- These satellites operate in LEO, allowing for **reduced latency and enhanced connectivity** compared to traditional geostationary satellites.

Starlink's Significance in Ukraine's Communication

- Amid the Russia-Ukraine war, **conventional infrastructure** like fiber lines and cell towers were destroyed.
- Starlink emerged as a lifeline for communication, underscoring its strategic importance in war-affected regions.
- Ukrainian reliance on Starlink highlighted **the control a tech CEO could exert over a nation's connectivity**.

Control Over Starlink Operations and Implications

- Ukrainian government had to **coordinate with Starlink** for enabling/disabling access in specific regions.
- This **reliance on a third party** raised concerns about accessibility during emergencies and **external control over national communication**.
- Similar control dynamics were observed in **Taiwan**, leading to discussions about a joint venture for local control.

Pentagon's Intervention and Challenges to Autonomy

- **Pentagon** approved a deal for 500 new Starlink terminals for Ukraine in June 2023.
- Aimed to reduce SpaceX's interference in Ukraine's communication operations. This move reflected the **need to mitigate external influence on sovereign nations' connectivity**.
- Traditional infrastructure operates under **public utility principles**, whereas satellite internet companies exercise considerable control due to technology and regulatory gaps.

Activism in Iran and Global Influence

- Starlink provided connectivity **to activists and protestors** during Iran's internet shutdowns.
- Over 100 Starlink terminals were active, enabling communication despite the government's opposition.
- This highlighted Starlink's global influence beyond the boundaries of traditional geopolitical power plays.

Monopoly Factors and Competing Initiatives

- Starlink's monopoly resulted from **Musk's vision, advantageous regulations, and SpaceX's reusable rockets.**
- Competitors faced **challenges** due to geopolitical considerations and technological limitations.

Competing Technologies and Initiatives

- **OneWeb**, backed by **Bharti Airtel and the U.K. government**, faced setbacks due to geopolitical concerns.
- **European Union** earmarked funds for a sovereign satellite constellation by 2027.
- **China** plans a massive LEO constellation as an alternative to Starlink's dominance.
- A diverse range of initiatives indicates the growing recognition of the need for connectivity sovereignty and reduced dependency on one individual's decisions.

Topic 11. WHY DID META BLOCK CANADA'S ACCESS TO NEWS REPORTS?

Important for the subject: Science and technology

On August 1st, Meta announced it would block Canadians from posting news on Facebook and Instagram, in response to Canada's Online News Act that came into effect on July 22nd.

Why did Meta block Canadian news access?

- Meta blocked Canadian news due to the **Online News Act**, enacted on **July 22, 2023.**
- The law mandates **compensation from tech giants like Meta and Google to authorized Canadian news publishers for content on their platforms.**
- Meta found compliance unfeasible, leading to the news availability termination on August 1, 2023.

What is the Online News Act's purpose?

- The Online News Act requires **digital platforms with strategic market dominance**, as outlined by the **Canadian Radiotelevision and Telecommunications Commission**, to negotiate and compensate news publishers fairly for content usage.
- The government also has the **authority to influence how platforms treat news topics.**

Why was the Act enacted?

- The Act responds to the **unequal influence tech giants** like Meta and Google have on **online ad revenue and content distribution**.
- Modeled after **Australia's News Media and Digital Platforms Mandatory Bargaining Code**, it aims to establish a balanced relationship between platforms and news publishers.

Why is revenue-sharing being emphasized?

- The existing model allows **tech platforms to aggregate and distribute news content without adequately compensating the original creators**.
- The goal is to rectify the imbalance and ensure news publishers receive their rightful share of revenue.

How did platforms respond elsewhere?

- In **Australia**, Facebook and Google temporarily blocked news links in February 2021 as a response to the **News Media and Digital Platforms Mandatory**

Bargaining Code.

- Both companies eventually **made revenue-sharing deals with Australian publishers**, contributing around 200 million Australian dollars annually.
- **France's Competition Authority (FCA)** negotiated deals with Google for fair revenue-sharing with news platforms.

What steps has India taken towards fair revenue-sharing?

- The **Competition Commission of India (CCI)** is examining unfair conduct and revenue-sharing agreements between tech platforms and news publishers.
- The Digital News Publishers Association (DNPA), News Broadcasters and Digital Association (NBDA), and the Indian Newspaper Society (INS) have approached CCI to address these concerns.

Why is fair revenue-sharing crucial for India's digital ecosystem?

- India's **digital market is rapidly expanding**, and both tech giants and news publishers play vital roles in this growth.
- **Ensuring a fair split of revenue** encourages sustainable growth of the internet economy and supports the news industry's credibility and sustainability.

Topic 12. SUPERNOVAE – THE UNIVERSE'S ENGINES

Important for the subject: Science and technology

What is a supernova, and how does it occur?

A supernova is a **cataclysmic explosion of a massive star**, releasing an enormous amount of

energy and radiation. It occurs when a **star exhausts its nuclear fuel**, leading to a sudden gravitational collapse and a violent explosion.

What are the main types of supernovae?

Core-collapse supernovae (Type II):

- Result from the core collapse of massive stars with hydrogen-rich outer layers.

Sub-types:

- **Type IIP**: Shows a **plateau** in its light curve due to recombination of hydrogen in the expanding envelope.
- **Type IIL**: Exhibits a **linear light curve** decline instead of a plateau.

Thermonuclear supernovae (Type I):

- Involve the explosion of a **white dwarf in a binary star system**.

Sub-types:

- **Type Ia**: Lacks hydrogen and helium in its outer layers, resulting from a white dwarf accreting mass from a companion star.
- **Type Ib**: Lacks hydrogen but has helium in its outer layers.
- **Type Ic**: Lacks both hydrogen and helium in its outer layers.

Other sub-types:

- **Type Iib**: A transitional type between Type II and Type Ib, displaying hydrogen lines at early stages but losing them later.
- **Type IIn**: Features narrow hydrogen lines in its spectrum due to interaction with a dense circumstellar material.

How do core-collapse supernovae differ from thermonuclear supernovae?

- **Core-collapse supernovae** occur in massive stars with hydrogen-rich outer layers, leading to a more complex explosion.
- **Thermonuclear supernovae** involve white dwarfs and lack hydrogen and helium in their outer layers, causing a more uniform explosion.

What is a neutron star, and how does it relate to supernovae?

- **Neutron Star**: A dense remnant of a massive star, mainly composed of tightly packed neutrons.
- **Relation to Supernovae**: Neutron stars form **from the collapsed core** of a massive star during a supernova explosion.
- **Formation Process**: Core-collapse supernovae occur when a massive star exhausts its nuclear fuel, leading to a gravitational collapse. The resulting shockwave expels the outer

layers, leaving behind a dense neutron star.

- **Properties:** Neutron stars are small yet incredibly dense, with strong gravitational fields. They can spin rapidly and emit radiation, observed as pulsars.

How do supernovae influence the universe?

- Supernovae disperse **heavy elements**, like **gold and uranium**, enriching the interstellar medium and aiding in the formation of new stars and planets.
- **Shockwaves** from supernovae trigger the collapse of nearby molecular clouds, leading to the formation of new stars.

Can supernovae be harmful to Earth?

- For Earth to be significantly affected, a supernova **must be relatively close**, which is **currently not the case**.
- In the past, supernovae might have influenced Earth's climate, but direct harm is unlikely due to the vast distances.

What is the significance of studying supernovae?

- Studying supernovae helps us **understand the life cycles of stars**, the universe's **chemical evolution**, and the formation of **heavy elements**.
- Supernovae serve as "**standard candles**", allowing us to measure cosmic distances and study the expansion of the universe.

Can we observe supernovae from Earth?

- Yes, astronomers regularly observe supernovae in distant galaxies using ground based and space telescopes.
- Observations of supernovae provide valuable data on stellar evolution and the properties of exploding stars.

What are some historical supernova observations, and what were their contributions?

- **SN 1006 (1006 A.D.):** One of the brightest supernovae ever recorded, observed by **multiple civilizations**.
- **SN 1054 (1054 A.D.):** Gave rise to the **Crab Nebula** and was visible for years. **Tycho's Supernova (SN 1572):** Discovered by **Tycho Brahe in 1572**, challenged the notion of a static universe.
- **Kepler's Supernova (SN 1604):** Observed by Johannes Kepler in 1604, contributed to the **shift from geocentrism to heliocentrism**.
- **SN 1987A (1987):** Located in the **Large Magellanic Cloud**, observed in 1987, and offered insights into neutrinos and supernova theories.

How often do supernovae occur?

- Supernovae are **relatively rare events**, with only a few occurring in our galaxy every

century.

- However, they are more frequent in other galaxies, with thousands of supernovae observed each year in the observable universe.

What role do supernovae play in the evolution of galaxies?

- Supernovae **regulate star formation rates** and inject **energy, heavy elements, and momentum** into the interstellar medium.
- The **enrichment of the interstellar medium** by supernovae influences the formation of subsequent generations of stars and planets.

What are some major supernovae observed recently?

1. **SN 2011fe (2011)**: Type Ia supernova in galaxy **M101**.
2. **SN 2014J (2014)**: Type Ia supernova in galaxy **M82**.
3. **iPTF14hls (2014)**: Unusual supernova in galaxy **UGC 9379**.
4. **ASASSN-15lh (2015)**: One of the most luminous supernovae in galaxy **PGC 1000170**.
5. **SN 2016aps (2016)**: Superluminous supernova in galaxy **CGCG 137-068**.

Topic 13. CENTRE PROHIBITS PRODUCTION, DISTRIBUTION OF TWO DRUGS TOXIC FOR VULTURES

Important for the subject: Environment

Why in news?

Govt has passed orders to stop veterinary use of **aceclofenac** and **ketoprofen** and its formulations

- These are two of three “vulture-toxic” drugs that conservationists have been seeking a ban on. The third drug is **nimesulide**.
- About 16 years ago, India had banned the veterinary use of diclofenac, as it was found to be toxic for vultures. But more recently, conservationists had approached the Ministry of Environment, Forest and Climate Change on the other three drugs as well, to take it up with the Drugs Controller General of India (DCGI). A public interest litigation was also filed on the issue in the Delhi High Court.

Why ban?

- A recently published study by IVRI and collaborators had said that aceclofenac metabolised into diclofenac in water buffaloes, as it did in cows, threatening the already critically endangered Gyps vultures in South Asia. They had recommended the immediate ban on the veterinary use of aceclofenac across vulture range countries.
- More research is being undertaken to establish safer alternatives and establish nimesulide’s toxicity as well.

Concept:

- The researchers gave the recommended dose of aceclofenac to nine domestic water buffaloes. They collected blood samples at intervals of up to 48 hours. And carried out an analysis of aceclofenac and its metabolite diclofenac in their plasma.
- It found that **aceclofenac was rapidly converted to diclofenac in the water buffaloes too**. Diclofenac was present in the plasma within 20 minutes of the treatment.
- The concentration reached its peak between four and eight hours. Allowing the use of aceclofenac was a very unfortunate loophole in India's vulture conservation according to press release of SAVE.

Background

- **Aceclofenac is a pro-drug of diclofenac** and behaves similarly in domestic water buffalo as it does in domestic cattle, posing the same risk to vultures.
- It is one among the three **non-steroidal anti-inflammatory drugs (NSAIDS) drugs — aceclofenac, ketoprofen and nimesulide**—were introduced as alternatives to diclofenac, that India banned in 2006 for animal use because it caused widespread vulture deaths.
- However, India's **vulture conservation action plan for 2020-25** recommends a ban on the **veterinary use of the three drugs**.

Diclofenac

- **Diclofenac, a drug used to treat cattle, was linked to kidney failure in vultures** and a decline in the bird's population.
- Though the drug was **banned in 2006**, it is reportedly still available for use. Diclofenac, that is potentially toxic to vultures being used by vets for treating cattle.
- The drugs make their way into the vulture's system as they feed on carcasses. **Three of India's vulture species** of the genus 'Gyps'— the **long-billed (Gyps indicus)** and the **slender-billed (G. tenuirostris)** had declined by **97%**, while in the **white-rumped (G. bengalensis)** declined nearly **99%** between 1992 and 2007.

Action Plan for Vulture Conservation 2020-2025

- It proposes to establish **Vulture Conservation Breeding Centers in Uttar Pradesh, Tripura, Maharashtra, Karnataka and Tamil Nadu**.
- There would also be a conservation **breeding programme for the Red Headed vulture and Egyptian vulture**, and at least one **"Vulture Safe Zone"** in every State for the conservation of the remnant populations.

There would be **four rescue centers** in different geographical areas:

- Pinjore in north India, Bhopal in central India, Guwahati in northeast India and Hyderabad in south India.
- There will also be regular surveys to track population numbers, the plan envisages.
- Also, the vulture action plan **recommends meloxicam over diclofenac and Tolfenamic**

acid is the other safe option.

SAVE (Saving Asia's Vultures from Extinction)

- The consortium of **like-minded, regional and international organizations**, created to oversee and coordinate conservation, campaigning and fundraising activities to help the plight of south Asia's vultures.
- **Objective:** To save three critically important species from extinction through a single programme.
- **SAVE partners:** Bombay Natural History Society, Bird Conservation Nepal, RSPB (UK), National Trust for Nature Conservation (Nepal), International Centre for Birds of Prey (UK) and Zoological Society of London.

Indian Veterinary Research Institute (IVRI)

- It was established in 1889 at Bareilly, UP.
- IVRI is one of the premier research institutions dedicated to livestock research and development of the region.

Vulture

- It is one of the **22 species of large carrion-eating birds** that live predominantly in the **tropics and subtropics**.
- They act an important function as **nature's garbage collectors** and help to keep the environment clean of waste.
- These scavengers do the dirty work of cleaning up after death helping to keep ecosystems healthy and prevent the spread of disease
- Vultures also play a valuable role in keeping wildlife diseases in check.
- **India is home to 9 species of Vulture** namely the Oriental white-backed, Long billed, Slender-billed, Himalayan, Red-headed, Egyptian, Bearded, Cinereous and the Eurasian Griffon.
- Most of these 9 species face danger of extinction.
- Bearded, Long-billed, Slender-billed, Oriental white-backed are protected in the Schedule-1 of the Wildlife Protection Act 1972. Rest are protected under 'Schedule IV'.

Topic 14. HIMALAYAN VULTURE BRED IN CAPTIVITY FOR THE FIRST TIME IN INDIA

Important for the subject: Environment

Researchers have recorded the **first instance of captive breeding of the Himalayan vulture (Gyps himalayensis)** in **India** at the Assam State Zoo, Guwahati.

About the Himalayan vulture:

- The **Himalayan Griffon Vulture**, *Gyps himalayensis*, is an **Old World vulture** in the

family **Accipitridae**, which also includes eagles, kites, buzzards and hawks.

- It is closely related to the **European Griffon Vulture**, *G. fulvus*. This vulture is a typical vulture, with a bald white head, very broad wings, and short tail feathers.
- It has a white neck ruff and yellow bill and the whitish body and wing coverts contrast with the dark flight feathers.
- The Himalayan vulture is a common winter migrant to the Indian plains, and a resident of the high Himalayas.
- **Categorized** as 'Near Threatened' on the **International Union for Conservation of Nature (IUCN) Red List** of threatened species.

Distribution Range:

- The **Himalayan vulture** mostly lives in the **Himalayas** on the **Tibetan plateau** (India, Nepal and Bhutan, central China and Mongolia).
- It is also found in the **Central Asian mountains** (from Kazakhstan and Afghanistan in the west to western China and Mongolia in the east). Occasionally it **migrates to northern India** but migration usually only occurs altitudinally.

Species in India:

- **India** is home to **9 species of Vulture** namely the Oriental white-backed, Longbilled, Slender-billed, Himalayan, Red-headed, Egyptian, Bearded, Cinereous and the Eurasian Griffon.
- Most of these 9 species face **danger of extinction**.
- Bearded, Long-billed, Slender-billed, Oriental white-backed are protected in the **Schedule-1 of the Wildlife Protection Act 1972**. Rest are protected under '**Schedule IV**'.

Breeding of himalayan vultures:

- The **Himalayan vultures** successfully bred at the **zoo** were rescued in **2011-2012** from different poisonings and accidents.
- The conservation breeding of the Himalayan vulture at **Vulture Conservation Breeding Centre (VCBC)** at **Rani in Assam** is the **second** such instance in the **world**, after **France**, where the species has been bred in captivity.

Vulture conservation centres in India:

- **Four VCBCs** established by **Bombay Natural History Society (BNHS)** at: Pinjore in Haryana, Bhopal in Madhya Pradesh, Rani in Assam, and Rajabhatkhawa in West Bengal

These are involved in conservation breeding of the:

- **White-rumped vulture** (*Gyps bengalensis*), **Slender-billed vulture** (*Gyps tenuirostris*), and **The Indian vulture** (*Gyps indicus*).
- The unprecedented scale and speed of declines in vulture populations has left **all the three resident Gyps vulture species** categorised '**Critically Endangered**'.

- The population has been augmented over the past few years, and so far, **39 White rumped vultures** from the VCBC in **Haryana** and **West Bengal** have been released in the wild with a transmitter, and they are being monitored.

Topic 15. ASSAM'S MANAS TIGER RESERVE 63% SHORT OF STAFF, ACTIVIST TELLS ENVIRONMENT MINISTER

important for the subject: environment



While the western Assam's Manas National Park and Tiger Reserve is moving from a low- to high-tiger-density area, it is almost **63%** short of staff.

Details:

- Manas had an effective staff strength of **109** against the **294 posts** sanctioned for the two grades of foresters and forest guards.

Implications:

- The **translocation of rhinos to Manas**, as approved during the **12th SBWL** (State Board of Wildlife) meeting (in September 2022) has been kept in abeyance.
- The poor security scenario in the Panbari and Kuklung ranges of the tiger reserve. Increased cases of elephant poaching.
- Increased encroachment of lands that belong to the reserve area.

About Manas National Park and Tiger Reserve:

- **Manas National Park** is a national park, Project Tiger reserve, and an elephant reserve in **Assam, India**.
- Located in the **Himalayan foothills**, it borders the **Royal Manas National Park** in **Bhutan**.
- The park is known for its **rare and endangered endemic wildlife** such as the **Assam roofed turtle, hispid hare, golden langur** and **pygmy hog**. Manas is also famous for its population of wild **water buffalo**. Because of its exceptional biodiversity, scenery, and variety of habitats, **Manas National Park** is a **biosphere reserve** and a **UNESCO World Heritage Site**.

The name of the park originated from the **Manas River**.

- The **Manas river** is a **major tributary** of **Brahmaputra River**, which passes through the heart of the national park.
- **On 21 June 2011**, it was **removed** from the **List of World Heritage in Danger** and was commended for its efforts in preservation.

There are two major biomes present in Manas:

- **The grassland biomes:** pygmy hog, Indian rhinoceros (re-introduced in 2007 after extinction due to heavy poaching during the Bodo uprising), bengal florican, wild Asian buffalo, etc.
- **The forest biomes:** slow loris, capped langur, wild pig, sambar, great hornbill, Malayan giant squirrel or black giant squirrel, Chinese pangolin etc.

Vegetation:

- The **monsoon forests of Manas** lie in the **Brahmaputra Valley semievergreen forests ecoregion**. The combination of **Sub-Himalayan Bhabar Terai region** with **riverine succession** leading up to the **Himalayan subtropical broadleaf forests** makes it one of the richest biodiversity areas in the world.

The main vegetation types are:

- Sub-Himalayan light alluvial semi-evergreen forests in the northern parts. East Himalayan mixed moist and dry deciduous forests (the most common type).
- Low alluvial savanna woodland, and Assam Valley semi-evergreen alluvial grasslands which cover almost 50% of the park.

Topic 16. THE IBERIAN WOLF IS EXTINCT IN SPAIN'S ANDALUSIA: REPORT

Important for the subject: Environment

The **Iberian wolf** (*Canis lupus signatus*), the **species of gray wolf native to the Iberian Peninsula** comprising **Spain** and **Portugal**, has been extinct in the historic region of

Andalusia in the **extreme south of Iberia** since 2020.

- **Andalusia** is an ‘**autonomous territory**’ of **Spain** and consists of **eight provinces**: Almería, Cádiz, Córdoba, Granada, Huelva, Jaén, Málaga, and Seville.

Iberian wolf:

- The **Iberian wolf** is currently distributed over most of the autonomous territories of Galicia, Asturias, Cantabria, Castilla y León and some areas of La Rioja, Madrid and northern Castilla La Stain.
- The **Iberian wolf**, like other types of **gray wolf**, lives in packs that are territorial and hierarchical and led by a dominant breeding pair.
- In **Andalusia**, it was mainly found in **Sierra Morena** which had good cover, prey base in the form of wild ungulates and a scarce asphalted road network as well as lack of other infrastructure. They form the **largest wolf population in Western Europe**.

Iberian peninsula:

- The **Iberian Peninsula** also known as **Iberia** is a peninsula in southwestern Europe, defining the **westernmost edge of Eurasia**.
- It is divided between **Peninsular Spain and Continental Portugal**, comprising most of the region, as well as **Andorra, Gibraltar** and a **small part of Southern France**.
- With an area of approximately 583,254 square kilometres (225,196 sq mi), and a population of roughly 53 million, it is the **second-largest European peninsula by area**, after the **Scandinavian Peninsula**.

Topic 17. LULA TO HOST SOUTH AMERICAN SUMMIT ON SAVING THE AMAZON

Important for the subject :Environment



Brazilian President Luiz Inacio Lula da Silva will host a regional summit with planetary

stakes, as leaders of the countries that share the Amazon seek a roadmap to save the world's biggest rainforest.

- The meeting of the **eight-nation Amazon Cooperation Treaty Organization** will be held in **Belem**, capital of the Amazon state of **Para**.
- It is the 28-year-old organization's **first summit** since **2009**. The **CoP30 of UNFCCC** will also be held in **Para**, Brazil in **2025**.
- **Norway** and **Germany**, key contributors to **Brazil's Amazon Fund to protect the rainforest**, are also invited, along with **France**, which has a share of the Amazon via the territory of **French Guiana**.
- **Brazil** also invited **tropical rainforest nations Indonesia** and the **Democratic Republic of Congo**.

Amazon Cooperation Treaty Organization (ACTO):

- Established: **25 February 1995**

Headquarters: **Brasília, Brazil**

- The **Amazon Cooperation Treaty Organization (ACTO)** is an international organization aimed at the promotion of sustainable development of the Amazon Basin.
- The **Amazon Cooperation Treaty (ACT)** was signed on **3 July 1978** and amended in **1998**.
- **ACTO** was created in **1995** to strengthen the implementation of the Treaty. The Permanent Secretariat was later established in **Brasilia** in **2002**.
- **Group members** — Brazil, Bolivia, Colombia, Ecuador, Guyana, Peru, Suriname and Venezuela.

Deforestation in Amazon rainforests:

- With its hundreds of billions of carbon-absorbing trees, the Amazon is a key buffer against global warming.
- The carbon emissions from the Amazon increased by 117 percent in 2020 compared to the annual average for 2010 to 2018.
- Deforestation is pushing it dangerously close to a "tipping point," beyond which trees would die off and release their carbon stores back into the atmosphere, with catastrophic consequences for the climate.
- **Brazil**, which **holds around 60 percent** of the Amazon, has pledged to **eradicate illegal deforestation by 2030**.
- Deforestation has already wiped out around one-fifth of the rainforest.

About Amazon Rainforest:

- Comprising about **40% of Brazil's total area**, it is bounded by the **Guiana Highlands** to the **north**, the **Andes Mountains** to the **west**, the **Brazilian central plateau** to the **south**, and the **Atlantic Ocean** to the **east**.

- These are large tropical rainforests occupying the drainage basin of the Amazon River and its tributaries in northern South America and covering an area of 6,000,000 square km.
- Tropical forests are closed-canopy forests growing within 28 degrees north or south of the equator.
- They are very wet places, receiving more than 200 cm rainfall per year, either seasonally or throughout the year.
- Temperatures are uniformly high – between 20°C and 35°C.

Countries sharing Amazon rainforests are:

- The majority of the forest, 60%, is in Brazil, followed by Peru with 13%, Colombia with 10%, and with minor amounts in Bolivia, Ecuador, French Guiana, Guyana, Suriname, and Venezuela.

Topic 18. THE ENIGMATIC INDIAN EAGLE-OWL

Important for the subject :Environment

The **Indian eagle-owl** was classified as a species only in recent years, thus distinguishing it from the **Eurasian eagle-owl**.

Indian eagle-owl:

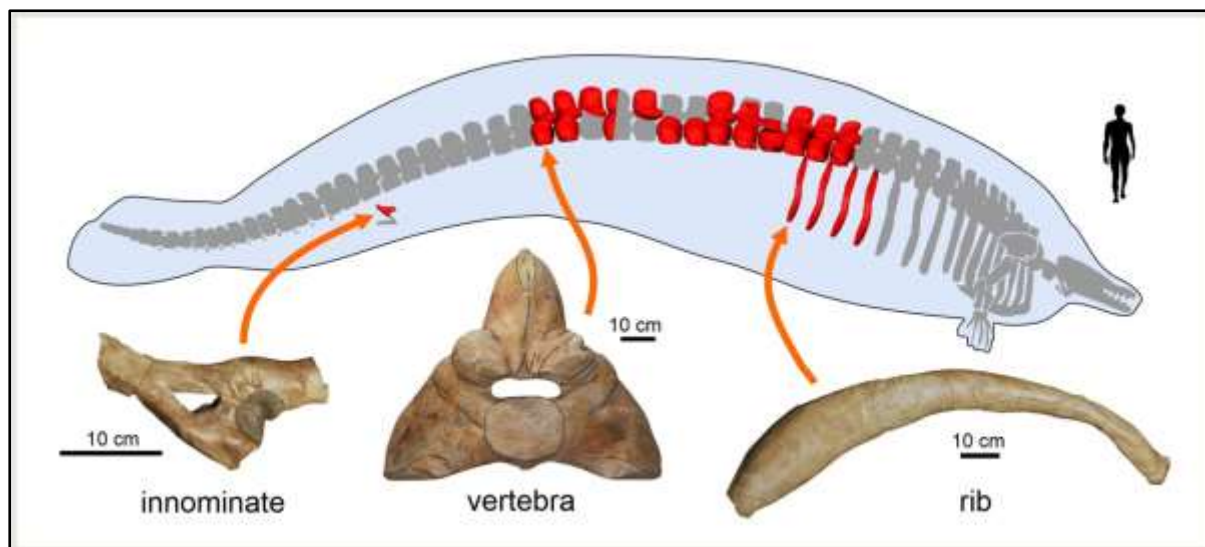
- The **Indian species** is an imposing bird.
- The slightly larger female can reach a total length of two and a half feet, with a wingspan of six feet. **Prominent ear tufts** that look like horns are seen to project from its head.
- One theory holds that these have evolved to impart a threatening look that keeps away predators. It is **nocturnal** in nature.
- It is **native** to hilly and rocky scrub forests in the **Indian Subcontinent**.
- The **widespread range** — the **entire Indian peninsula** — indicates that it is a **stable population**.
- It is usually seen in pairs. It has a **deep resonant booming call** that may be heard at dawn and dusk.
- The **Indian eagle-owl** does not have a dependency on forests as their diet includes rats, bandicoots, and even bats and doves which are found in **open scrubland** and **agricultural tracts**.
- It **nects** on rocky perches and crags of those scrublands. Near human settlements, they prefer mango trees.

Benefits to farmers:

- **Indian eagle-owls** nesting near agricultural lands had more, and healthier, owlets than scrubland nesters. It controls the rodent populations in agricultural tracts thus preventing the loss.

Topic 19. A 340-TONNE WHALE SPECIES LIVED 39 MILLION YEARS AGO

Important for the subject :Environment



The newly discovered **Perucetus colossus**, an ancient species of whale, is thought to be one of the largest and heaviest animals on record. **Perucetus colossus**:

The species is discovered in **Southern Peru** and estimated to be approximately **39 million years old**.

- Estimates of its size and weight, based on a partial skeleton, rival those of the **blue whale**, which was previously thought to be the **heaviest animal ever to exist**.
- It is predicted that the skeletal mass would be **two-three times** that of a **25- metres-long blue whale**.
- The findings suggest that the trend towards gigantism in marine mammals may have begun earlier than previously thought.
- The ancient whale species displays the highest degree of bone mass increase known to date, an adaptation associated with shallow diving.
- The **estimated skeletal mass of P. colossus** exceeds that of any known mammal or aquatic vertebrate.

Topic 20. BARING THE BIODIVERSE HEART OF THE THAR DESERT

Important for the subject: Environment

The **Thar**, one of the **most populated deserts in the world**, has long been perceived as a **barren wasteland**. However, a recent study by **IIT-Jodhpur** shows that this arid ecosystem harbours remarkable biodiversity, containing four distinct ecoregions.

Details:

- The study used **community science**, specifically **crowdsourced bird data** from the

online resource **eBird**, to assess the biota and delineate the ecoregions.

- **Crowdsourcing** data through citizen science programmes is a **cost-effective means of covering a wide spatial area**.

Four ecoregions of Thar desert:

- **Eastern Thar**, comprising nine districts, is marked by the Aravalli region and the eastern agro-industrial region.
- **Western Thar**, with five districts, includes the western arid regions. The **‘transitional zone’** consists of 13 districts on either side of the Aravalli range.
- The **‘cultivated zone’**, with six districts scattered across the Thar, was identified as an evolving zone due to anthropogenic activities and a higher risk of habitat fragmentation, posing a concern for near-threatened species.

Bird methodology:

- Birds have been found to be valuable indicators of ecosystem functions, making them essential to ecological research.
- A total of **492 bird species** were recorded across **33 districts in Rajasthan**, which collectively make up nearly 70 per cent of Thar.
- The **birds** serve as a representative biota for inferring shifts in **ecoregions**, the effect of anthropogenic activities, and the need for **ecoregion-based conservation strategies** to protect endangered habitats and species.
- **Birds also helped in identifying invasive species** and the **ecological changes** due to climate change or human activities.

Thar desert:

- The **Thar Desert**, also known as the **Great Indian Desert**, is an arid region in the **north-western part** of the **Indian subcontinent** that covers an area of 3.85 lakh sq km (82,000 sq mi) in **India** and **Pakistan**.
- The roughly 3.85 lakh sq km Thar Desert accounts for about 9 per cent of India's land area and 2.12 per cent of its fauna — 682 species of flora and 1,195 species of fauna.
- It is the **world's 20th-largest desert**, and the **world's 9th-largest hot subtropical desert**. About **85%** of the **Thar Desert** is in **India**, and about **15%** is in **Pakistan**.
- The **Thar Desert** is about **4.56%** of the **total geographical area of India**.
- More than **60%** of the desert lies in the **Indian state of Rajasthan**; the portion in India also extends into **Gujarat, Punjab, and Haryana**.
- The portion in **Pakistan** extends into the **provinces of Sindh and Punjab** (the portion in the latter province is referred to as the **Cholistan Desert**).
- The **Indo-Gangetic Plain** lies to the **north, west** and **northeast** of the **Thar desert**, the **Rann of Kutch** lies to its **south**, and the **Aravali Range** borders the desert to the **east**.

Climate:

- The climate is **arid** and **subtropical**. Average temperature varies with season, and extremes can range from near-freezing in the winter to more than 50° C in the summer months.

History of desertification of Thar:

Ice-age desertification:

- During the **Last Glacial Maximum 20,000 before present**, an approximately **2,400,000 square kilometers** (930,000 sq mi) **ice sheet** covered the **Tibetan Plateau**, causing excessive **radiative forcing**. the ice in Tibet reflected at least four times more radiation energy per unit area into space than ice at higher latitudes, which further cooled overlying atmosphere at that time.
- This impacted the **regional climate**. Without the **thermal low pressure** caused by the heating, there was **no monsoon over the Indian subcontinent**.
- This lack of monsoon caused extensive rainfall over the Sahara, expansion of the **Thar Desert**, more dust deposited into the Arabian Sea, a lowering of the biotic life zones on the **Indian subcontinent**, and animals responded to this shift in climate with the **Javan rusa deer** migrating into India.

Desertification due to drying up of Sarasvati river:

- **10,000-8,000 years ago** a **paleo channel of Ghaggar-Hakra River** – identified with the paleo **Sarasvati River**, after confluence with **Sutlej** flowed into the **Nara river** – a delta channel of the **Indus River**, changed its course, leaving the **Ghaggar-Hakra** as a system of monsoon-fed rivers which did not reach the sea and now ends in the Thar desert.
- Around **5,000 years ago** when the monsoons that fed the rivers diminished further, the **Indus Valley Civilisation (IVC)** prospered in this area, with the rise of numerous **IVC urban sites** at **Kalibangan** (Rajasthan), **Banawali** and **Rakhigarhi** (Haryana), **Dholavira** and **Lothal** (Gujarat) along this course. **4,000 years ago** when monsoons diminished even further, the **dried-up Hakra** become an **intermittent river**, and the **urban Harappan civilisation declined**, becoming localized in smaller agricultural communities.

eBird: Launched in: **2002**

Created by: **Cornell Lab of Ornithology**

- **eBird** is an **online database of bird** observations providing scientists, researchers and amateur naturalists with real-time data about bird distribution and abundance. Originally restricted to sightings from the **Western Hemisphere**, the project expanded to include **New Zealand** in **2008**, and again expanded to **cover the whole world** in June 2010.
- **eBird** has been described as an ambitious example of enlisting amateurs to gather data on biodiversity for use in science. **eBird** is an example of **crowdsourcing**, and has been hailed as an example of democratizing science, treating citizens as scientists, allowing the public to access and use their own data and the collective data generated by others.

Topic 21. 5% OF BIRDS IN INDIA ARE ENDEMIC, REVEALS ZOOLOGICAL SURVEY OF INDIA PUBLICATION

Important for the subject: Environment

A recent publication by the **Zoological Survey of India (ZSI)** points out that **about 5% of birds found in the country are endemic** and are not reported in other parts of the world.

- The publication, titled **75 Endemic Birds of India**, was recently released on the **108th foundation day of the ZSI**.
- The **75 bird species** belong to **11 different orders, 31 families, and 55 genera**, and exhibit remarkable distribution patterns across various regions in India.
- The **highest number of endemic species** have been recorded in the **Western Ghats**, with **28 bird species**. Some of the interesting species recorded in the country's bio-geographic hotspot are the:
- Malabar Grey Hornbill (*Ocyeros griseus*); Malabar Parakeet (*Psittaculacolumboides*); Ashambu Laughing Thrush (*Montecinclameridionalis*); and White-bellied Sholakili (*Sholicolaalbiventris*).

25 bird species are endemic to the Andaman and Nicobar Islands:

- Endemism in the Andaman group of islands must have developed because of the geographical isolation of the region.

Some interesting bird species which are **only found in the Andaman and Nicobar Islands** are:

- Nicobar Megapode (*Megapodius nicobariensis*); Nicobar Serpent Eagle (*Spilornisklossi*); Andaman Crake (*Rallinacanningi*); and Andaman Barn Owl (*Tyto deroepstorffi*).
- **Four species of birds are endemic to the Eastern Himalayas**, and **one** each to the **Southern Deccan plateau** and **central Indian forest**. **Bird diversity in India:**
- **India is home to 1,353 bird species**, which represents **approximately 12.40% of global bird diversity**. Of these **1,353 bird species, 78 (5%) are endemic** to the country. Of the **78 species, three species** have not been recorded in the last few decades.

They are the:

- **Manipur Bush Quail** (*Perdiculamanipurensis*), listed as **'Endangered'** by the International Union for Conservation of Nature's (IUCN) Red List of Threatened Species with its last recorded sighting in 1907; **Himalayan Quail** (*Ophrysiasuperciliosa*), listed as **'Critically Endangered'** with its last recorded sighting in 1876; and **Jerdon's Courser** (*Rhinoptilusbitorquatus*), listed as **'Critically Endangered'** with its last confirmed sighting in 2009.

The publication also throws light on the conservation status of these endemic species:

- Of the **78 endemic species, 25** are classified as **'Threatened'** by the IUCN.

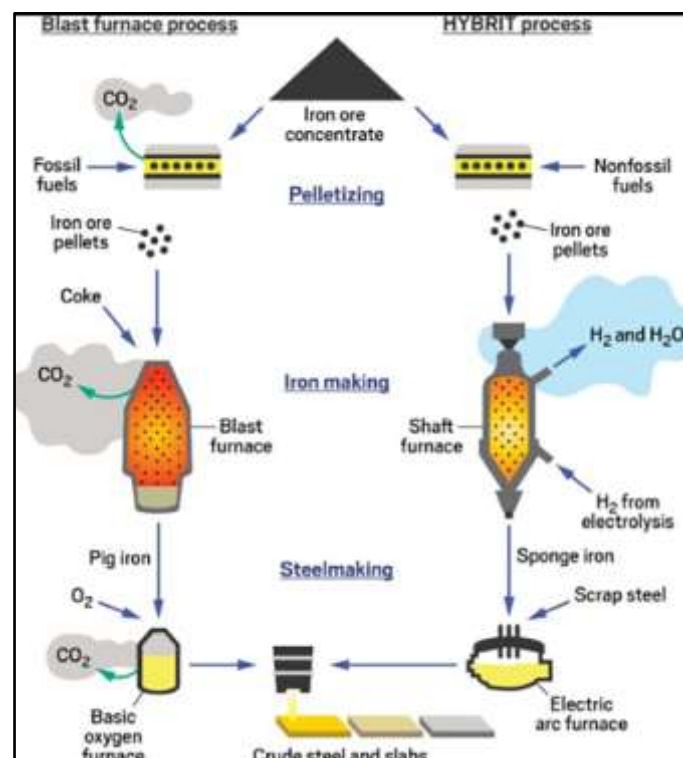
- Three species (Bugun Liocichla or Liocichla bugunorum; Himalayan Quail or Ophrysia superciliosa; Jerdon's Courser or Rhinoptilus bitorquatus) are listed as 'Critically Endangered'.
- Five of the endemic birds in India are categorised as 'Endangered', and 17 as 'Vulnerable', while 11 are categorised as 'Near Threatened' on the IUCN Red List.

Zoological Survey of India (ZSI):

- The Zoological Survey of India (ZSI), a subordinate organization of the Ministry of Environment and Forests was established in 1916.
- It is a national centre for faunistic survey and exploration of the resources leading to the advancement of knowledge on the exceptionally rich faunal diversity of the country.
- It has its headquarters at Kolkata and 16 regional stations located in different geographic locations of the country.

Topic 22. WHY GREEN STEEL PRODUCTION WILL NOT HAPPEN IN INDIA ANYTIME SOON

Important for the subject: Environment



Green steel production in India is unlikely to happen anytime soon, perhaps never.

Green steel:

- 'Green steel', or the steel produced through processes that do not emit carbon dioxide, essentially means using hydrogen as the 'reducing agent' (remover of oxygen)

in steel production.

- In other words, **iron ore** is basically **iron oxide** and **hydrogen** is used to **pull oxygen away from iron oxide**, leaving **pure iron** behind—to which **a little carbon is added to make steel**. Right now, **carbon**, in the **form of coke**, has been used for pulling away oxygen; when carbon joins hands with oxygen it becomes **carbon dioxide**, which is a Greenhouse gas.
- **Hydrogen** can do the job of **coke** just as well.

India iron ore is not suitable for making green steel:

- According to **Australia's Commonwealth Industrial and Scientific Research Organization (CSIRO)**, which is the **country's publicly funded research organisation** and an expert in mines and minerals, **66 per cent of India's (and Australia's) iron ore is not suitable for being made into green steel**.
- This is because **Indian iron ore is low-grade**. Low-grade iron ore can only be made into steel in **blast furnaces—huge cooking pots** in which iron ore is melted and made to combine with coke, before being poured into moulds for making steel slabs.
- For technical reasons, **green steel** making requires the '**electric arc furnace' route**; EAFs need **high-grade ores**, in which **iron content is over 60 per cent**.

Why can't hydrogen be injected into a blast furnace to do the same job as coke?

- This is theoretically possible, but there are **two major problems**. **First**, blast furnaces need to operate at **high temperatures**, or the order of **1,000-1,200 degrees C**. Combustion of hydrogen releases a lot less heat compared with the combustion of coke.
- **Hydrogen** must be **pre-heated to high temperatures** to provide sufficient heat for the blast furnaces.
- **Pre-heating hydrogen** means **using more energy**, which must again come from renewable sources so that the steel qualifies for the '**green**' label.
- **Second**, use of hydrogen results in '**embrittlement**' of iron, leading to **cracks and fractures in the metal**. To avoid this, you again need special alloys to resist hydrogen embrittlement.
- Therefore, producing green steel in blast furnaces by injecting hydrogen as a replacement of coke is technically challenging and economically infeasible.
- **Blast furnaces** are big **emitters of carbon dioxide**. A blast furnace capable of producing **2 million tons of steel annually** will emit at least **2.5 million tons of CO₂ a year**.
- In **2022**, **India** produced **124.5 million tonnes** of steel.

Alternative technologies:

- It is possible to **reduce CO₂ in electric arc furnaces** to some extent by replacing a part of the coke with used **automotive tyres**.
- Apart from reducing dependence on coking coal, which India imports, these tyres contain about 7 per cent hydrogen, which helps.

- The **Indian Institute of Science, Bengaluru**, is toying with the idea of replacing some of the **coke** with **biochar**.

HIsarna:

a new technology developed by Tata Steel:

- It is capable of slashing CO₂ emissions by 80 per cent compared with the blast furnace route.
- In a **conventional blast furnace**, a mixture of **iron ore, coke** and **limestone** – is put into the furnace and a blast of oxygen is sent in through a lance. The mixture melts and collects at the bottom. **In HIsarna**, the **ore** is **liquefied** in a **high temperature cyclone** at the top and the molten ore drips to the bottom of the reactor, where powder coal is injected.
- The technology removes a number of pre-processing steps and requires less stringent conditions on the quality of the raw materials used.
- Since it is highly concentrated carbon dioxide that leaves the reactor, the system is “ideally suited for carbon capture and either storage (CCS) or use (CCU), without the need for a costly gas separation stage.

India-Australia Green Steel Initiative:

- In **June 2021**, the **Indian** and **Australian** governments formed an **India-Australia Green Steel Partnership** to work on a range of research, technology and commercialisation projects over a **three-and-a-half year period** to accelerate the steel making value chain in both the countries.
- **CSIRO** of **Australia** is working with the **Institute of Minerals and Materials Technology (IMMT)**, **Bhubhaneshwar**, on a **plasma technology** for “very rapid melting of iron oxide using hydrogen”.

Promotion of Green Steel by Indian government:

- The **Ministry of Steel** is committed to the **Net-Zero target** by **2070**.

Steps taken for promoting decarbonization in steel industry include:-

- **Steel Scrap Recycling Policy, 2019** enhances the availability of domestically generated scrap to reduce the consumption of coal in steel making.
- The **Ministry of New and Renewable Energy (MNRE)** has announced the **National Green Hydrogen Mission** for green hydrogen production and usage. The steel sector has also been made a stakeholder in the Mission.
- **Motor Vehicles (Registration and Functions of Vehicles Scrapping Facility) Rules September 2021**, shall increase availability of scrap in the steel sector.
- **National Solar Mission** launched by **MNRE** in **January 2010** promotes the use of solar energy and also helps reduce the emission of steel industry.
- **Perform, Achieve and Trade (PAT)** scheme, under **National Mission for Enhanced**

Energy Efficiency, incentivizes steel industry to reduce energy consumption.

- The **steel sector** has adopted the **Best Available Technologies (BAT)** available globally, in the modernization & expansions projects.
- **Japan's New Energy and Industrial Technology Development Organization (NEDO)** Model Projects for Energy Efficiency Improvement have been implemented in steel plants.

Topic 23. THE 'TEMPORARY' NATURE OF ARTICLE 370 AND ITS CONSTITUTIONAL CHALLENGE

Important for the subject: Polity

On Wednesday, the Supreme Court commenced the hearing of the constitutional challenge regarding the 2019 abrogation of Article 370 of the Constitution, which provided special status to Jammu and Kashmir.

What was Article 370 and its features?

Article 370:

- It was a provision in the Indian Constitution that granted **special autonomous status** to the state of Jammu and Kashmir.

Temporary Provision:

- Article 370 was intended to provide temporary provisions for the governance of Jammu and Kashmir following its accession to India in 1947.

Autonomy:

- The provision allowed Jammu and Kashmir to have their **own constitution**, a **separate flag**, and a high degree of autonomy in matters of governance.

Limitations:

- However, **defense, communication, and foreign affairs** were not under the purview of the state and **were controlled by the Indian government**.

Special Laws:

- Article 370 allowed the state to have its own laws and regulations for permanent residents, which included restrictions on outsiders purchasing land or settling in the region.

What were the main changes brought about by its abrogation in August 2019?

- On August 5, 2019, the Indian government abrogated Article 370 through a **presidential order**.

End of Special Status:

- The abrogation resulted in the revocation of the special status of Jammu and Kashmir, effectively ending its autonomy.

Reorganization:

- Following the abrogation, the state was reorganized into two separate union territories: **Jammu and Kashmir, and Ladakh.**

Why is Article 370 referred to as a “temporary provision”?

- Article 370 is in Part XXI of the Constitution, titled “**Temporary, Transitional and Special Provisions**”.

370(3) reads:

- “Notwithstanding anything in the foregoing provisions of this article, the President may, by public notification, declare that this article shall cease to be operative or shall be operative only with such exceptions and modifications and from such date as he may specify:
- Provided that the recommendation of the Constituent Assembly of the State referred to in Clause (2) shall be necessary before the President issues such a notification.” due to the **specific provisions** laid out within the article itself, allowing the President to make it inoperative or operative with certain exceptions and modifications.
- The framers of the Constitution designed Article 370 with the intention of it being a temporary provision **to facilitate the process of integrating Jammu and Kashmir into India.**

Why Article 370 considered permanent?

- **Clause (3) of Article 370** provided that any change to the relationship between the State of Jammu and Kashmir and the Indian Union could only be brought about on the **recommendation of the Constituent Assembly.**

As per petitioners:

- The Constituent Assembly of Jammu and Kashmir, which had the power to recommend changes to Article 370, ceased to exist after adopting the State’s Constitution.

Topic 24. PARLIAMENTARY COMMITTEE RECOMMENDS LOWERING MINIMUM AGE FOR CONTESTING ELECTIONS

Important for the subject :Polity

The Standing Committee on Personnel, Public Grievance, Law and Justice has made recommendations.

Recommendation:

- **Lower the minimum age for contesting Lok Sabha and Assembly elections to 18 years**, aligning it with the voting age in India.
- Young individuals can be reliable and responsible political participants.

Supportive Evidence:

- Examined global practices from countries like **Canada, the UK, and Australia**, where 18-year-olds can contest national elections. Young individuals can **effectively participate** in politics and contribute to the decision-making process.

Election Commission's Opposition:

- The Election Commission of India opposes the recommendation, citing a lack of experience and maturity in 18-year-olds.
- Maintains the current minimum age requirements for contesting elections.

Current Minimum Age Requirements:

- Presently, the minimum age for contesting Lok Sabha and Assembly elections is 25 years.
- To become a member of the Rajya Sabha or State Legislative Council, the minimum age is 30 years. Provided under **Article 84 (b)** and **Article 173 (b)** of the Constitution of India.

Voting Age in India:

- The legal voting age in India is 18 years.
- **Article 326** of the Constitution of India.
- The 61st amendment of the Constitution of India, officially known as **The Constitution (Sixty-first Amendment) Act, 1988**, lowered the voting age of elections to the Lok Sabha and to the Legislative Assemblies of States from **21 years to 18 years**.

Delimitation Process Recommendation:

- Election Commission **to collaborate with the legislative department** to study the effects of delimitation, especially in **challenging areas**. **Address regional differences** and challenges for fair representation.

Benefits of Common Electoral Rolls:

- Collaboration between **the Election Commission of India and State Election Commissions** to create accurate and up-to-date electoral rolls. Reduces discrepancies and improves the efficiency of the electoral process.

Topic 25. JAN VISHWAS BILL: DEBATING COMPOUNDING OF DRUG OFFENCES

Important for the subject: Polity

Why in News?

Recently, the **Jan Vishwas (Amendment of Provisions) Bill, 2023** was passed in both the house of parliament during the monsoon session and aims at giving a boost to **Ease of Living and Ease of Doing Business**.

Central Idea

- The Jan Vishwas Bill, aimed at enhancing ease of doing business, has sparked a heated debate over certain amendments that modify the Drugs and Cosmetics Act, 1940.
- While the bill intends to streamline regulatory provisions, critics argue that it may allow manufacturers of substandard medicines to evade imprisonment and instead pay fines for their offenses.

Jan Vishwas (Amendment of Provisions) Bill, 2023:

About:

- The Bill proposes to **amend 183 provisions in 42 Central Acts administered by 19 Ministries/Departments**, covering various domains such as environment, agriculture, media, industry, trade, information technology, copyright, motor vehicles, cinematography, food safety, etc.
- The main objective of the Bill is to **decriminalize minor offences** that do not involve any harm to the **public interest or national security** and replace them with civil penalties or administrative actions.

Amendments to Drugs and cosmetics act 1940:

- **First Amendment:** The first amendment under the Jan Vishwas Bill eliminates imprisonment for companies repeatedly using government analysis or test reports to promote their products. Instead, offenders will be Important for the subject to a fine not less than five lakh rupees, as opposed to the previous fine of not less than ten thousand rupees.
- **Second Amendment:** The second, more contentious amendment allows for the “compounding” of offenses under section 27 (d) of the existing Drugs and Cosmetics Act. Compounding enables companies to pay a fine as an alternative to undergoing criminal proceedings. However, section 27 (d) covers offenses related to drugs not of standard quality (NSQ) or colloquially termed substandard drugs.

Topic 26. SC: IS ARTICLE 370 BEING EQUATED TO BASIC STRUCTURE OF CONSTITUTION?

Important for the subject : Polity

Why in news:

Recently the Supreme Court asked whether Article 370, which gave special status to Jammu and Kashmir, is being equated to the Basic Structure of the Constitution.

Article 370:

- The Constituent Assembly of Jammu & Kashmir was empowered to recommend which articles of the Indian Constitution should apply to the state.
- The J&K Constituent Assembly was dissolved after it drafted the state's constitution. Clause 3 of the article 370 gives the President of India the power to amend its provisions and scope.

Article 35A:

- Article 35A empowers the Jammu & Kashmir legislature to define the permanent residents of the state, and their special rights and privileges.

Removal of Article 370:

- It commenced with a presidential order issued nearly four years ago.
- Amendments were made to make applicable the entirety of India's Constitution to Jammu and Kashmir (J&K). The State was also sundered into two Union Territories: J&K and Ladakh.
- It was done when the State was under President's Rule with no elected Legislative Assembly in place.

How was Article 370 introduced?

- The Indian Independence Act, 1947: It allowed the Government of India Act, 1935, to serve as an interim constitution until the country adopted its own.
- The statute permitted princely States to accede to India by executing an instrument of accession.
- In the case of J&K, the instrument came with qualifications that were ultimately written into Article 370.
- It stipulated that Parliament could legislate for J&K only over matters concerning external affairs, defense, and communications.
- Where Parliament intended to legislate over areas otherwise provided for in the instrument of accession, it could do so by consulting the State government. where it proposed to enact laws beyond the agreed Important for the subjects, it required

additional ratification by the State's Constituent Assembly.

- After 1957, when J&K's Constitution came into force, its Constituent Assembly was disbanded and replaced by a Legislative Assembly.
- Article 370 remained unaltered.

How was it altered?

- Part XIX of the Constitution, Article 367 comprises a set of general rules for interpreting the Constitution.
- Through this Article, the President's order on August 5, 2019, amended with a view to transforming the existing status of J&K.
- It was done by adding a new clause to Article 367: It stipulated that wherever the term "Constituent Assembly of the State" was used in Article 370, it would now refer to the "Legislative Assembly of the State."

Topic 27. THE LANGUAGE USED IN COURTS: WHAT THE CONSTITUTION AND LAWS SAY

Important for the subject :Polity

Earlier this week, the Supreme Court observed that although there are at least 22 official languages in the country, **Hindi is "the national language"**.

What was the case before the Supreme Court about?

- The motor accident case in Siliguri, West Bengal, involved injuries and resulted in death, leading to a compensation claim under **Section 166 of the Motor Vehicles Act, 1988**.
- The plea for transfer to the MACT in Darjeeling, West Bengal, was based on the contention that all witnesses were from Siliguri, and **language could be a barrier**.

Is Hindi India's "national language"?

- Although **Hindi is the official language of the Union**, the Constitution **does not explicitly designate it as India's "national language."**
- **Article 343(1)** of the Constitution states, "The official language of the Union shall be Hindi in Devanagari script."
- However, it does not use the term "national language." India has more than 100 languages and 270 mother tongues spoken across the country, reflecting its linguistic diversity.

What is the Eighth Schedule in the Indian Constitution?

- The Eighth Schedule **initially listed 14 languages**, and later, four more languages, including **Bodo, Dogri, Maithili, and Santhali**, were added in 2004, making a total of 22 languages in the schedule.

There have been **demands to include another 38 languages**

- Such as Bhojpuri, Garhwali (Pahari), and Rajasthani.
- However, the **dynamic nature of language evolution** makes it challenging to fix criteria for their inclusion.

What is the status of English in India?

- English is one of the two official languages of the central government and continues to be used for all official purposes even after the initial 15-year period specified in the Constitution.
- **Article 343(3)** grants Parliament the authority to provide for the use of English or the Devanagari form of numerals for specific purposes **through legislation**.
- On January 26, 1965, **Section 3 of the Official Languages Act, 1963**, came into effect, which ensured the **continuation of English** for official purposes of the Union and in Parliament.

What is the language to be used in courts?

- **Article 348 (1):** All proceedings in the **Supreme Court and High Courts**, as well as Bills, Acts, ordinances, rules, and orders at the Union and state levels, are conducted in **English** until Parliament decides otherwise.
- **Article 348(2):** permits the **use of Hindi or any other official language** of the State in proceedings **in the High Court with the Governor's authorization and the President's consent**.
- However, judgments, decrees, and orders passed by the High Court must be in **English**.
- Some High Courts have initiated changes in their court procedures to allow the optional use of Hindi or the official language of the State in judgments, decrees, or orders, accompanied by an English translation.
- **The Rajasthan High Court** allowed Hindi to be used during court proceedings in 1950, citing Article 348(2).

How did the use of regional languages in courts evolve?

- In 1965, the **Cabinet Committee** decided that the **Chief Justice of India's consent must be taken** on any proposal concerning the use of any language besides English in the **High Courts**.

Some states sought to use Hindi in their respective High Courts

- The proposals were **rejected** by the Full Court of the Supreme Court upheld the use of English for judgments, decrees, and orders. growing recognition of the need to encourage the **use of regional languages in courts** to facilitate better understanding and access to justice for a diverse population.
- In May 2022, Prime Minister emphasized the importance of **"encouraging the use of local languages in courts"** to make the judicial process more accessible to the people.
- Then CJI N V Ramana also expressed the possibility of such changes happening **"over a**

period of time.” Then Law Minister, supported the use of regional languages in the curricular activities of courts.

What is the situation in courts subordinate to the High Court?

- **State governments** have the authority to determine the language used in courts subordinate to the High Court.

Section 272 of the Code of Criminal Procedure, 1973,

- “The State Government may determine what shall be, for purposes of this Code, the language of each Court within the State other than the High Court.”

The Code of Civil Procedure, 1908,

Section 137(1)

- The language initially used in subordinate courts is the language of the court until the State Government directs otherwise.

Section 137(2),

- The State Government can declare the language and character in which applications and proceedings in such courts should be written.

Section 137(3)

- Allows for the use of English in writing, but if a party or pleader is unacquainted with English, they can request an English translation in the language of the court.
- Rajasthan has since carried out a state amendment to this section, replacing the words “such writing may be in English” with the words “such writing shall be in Hindi in Devnagri Script with the international form of Indian numerals.”

Topic 28. NO SCOPE FOR HOLDING TALKS WITH KARNATAKA OVER CAUVERY ISSUE

Important for the subject: Polity

There is no scope for talks with Karnataka over Tamil Nadu’s demand for its rightful share of Cauvery water.

- The Centre constituted the **Tribunal** only because no decision could be taken even after talks from 1967 until 1990.

What is Cauvery Water Dispute?

- The river **Cauvery** originates in **Karnataka’s Kodagu district**, flows into **Tamil Nadu** and reaches the **Bay of Bengal**.

- **In 1892:** The dispute started between the **Madras Presidency** (under British rule) and the **Princely state of Mysore**.
- Madras disagrees with the Mysore administration's proposal to build irrigation systems, arguing that it would impede water flow into Tamil Nadu.
- **1924:** The dispute comes close to being resolved when **Mysore** and **Madras** reach an agreement under which Mysore is allowed to build a dam at **Kannambadi village**.
- The agreement is to be valid for 50 years and reviewed thereafter. Based on this agreement, Karnataka builds the Krishnaraja Sagar dam.
- **1974:** The **1924 water-sharing agreement** between the then **Madras Presidency** and **Princely State of Mysore** (now Tamil Nadu and Karnataka) lapses after the expiration of its term of 50 years.
- **In 1990, Cauvery Water Disputes Tribunal** was set up to adjudicate upon the water dispute regarding the **Inter-State river Cauvery** and the river valley thereof among the States of **Karnataka, Kerala, Tamil Nadu** and **Union territory of Puducherry**.
- **In 2007**, the tribunal declared its **final award**, in which it said **Tamil Nadu** should receive **419 tmcft** (thousand million cubic feet) of water more than double the amount mentioned in the interim order of **1991**.
- **In 2016**, the **Tamil Nadu government** said that there was a **deficit of 50.0052 tm cft** of water released from **Karnataka**. The **Karnataka government** said it wouldn't be able to release any more Cauvery water due to low rainfall. **Tamil Nadu** then sought the Supreme Court's intervention.
- **In 2017** the SC ordered the **Karnataka government** to release **15,000 cusecs of water a day for 10 days**, to **Tamil Nadu**. This led to widespread protests and bandhs in Karnataka.
- After several modifications of the order, the Karnataka government has been directed by SC to release **2,000 cusecs of water per day to Tamil Nadu** till further orders.
- **In 2018**, The apex court gave its final verdict saying that **Karnataka** will get an **additional 14.75 TMC** of the river water and **Tamil Nadu** will get **177.25 instead of 192 TMC water**.
- The court considered the water scarcity in Bengaluru while delivering the final judgment and also said no deviance shall be shown by any state to the order.

Constitutional Provisions related to Interstate water dispute

- **Article 262** of the Constitution deals with the adjudication of water disputes. The provisions in this regard are:
- **Article 262 (1)** Parliament may, by law, provide for the adjudication of any dispute or complaint with respect to the use, distribution or control of the waters of, or in, any inter-State river or river valley.
- **Article 262 (2)** Notwithstanding anything in this Constitution, Parliament may, by law, provide that neither the Supreme Court nor any other court shall exercise jurisdiction in respect of any such dispute or complaint as is referred to in clause (1).

Kaveri (Cauvery):

- The Cauvery (also spelt as 'Kaveri'), known as '**Ponni**' in **Tamil**.
- It rises in the **Brahmagiri range** of the **Western Ghats** and it reaches the **Bay of Bengal** in the **south of Cuddalore**, in **Tamil Nadu**. Its **main tributaries** are **Amravati, Bhavani, Hemavati and Kabini**.
- The **Cauvery basin** is spread in the states of **Karnataka, Tamil Nadu** and **Kerala** and the **Union Territory of Puducherry**.

Topic 29. DID HINDU KINGS DESTROY BUDDHIST STRUCTURES IN ANCIENT INDIA? THIS IS WHAT HISTORY SUGGESTS***Important for the subject: History***

Swami Prasad Maurya, a prominent leader in Uttar Pradesh, called for an archaeological survey of Hindu temples to determine if they were constructed by demolishing previously existing Buddhist structures.

What is the ongoing litigation around the Gyanvapi mosque complex in Varanasi?

- The **Gyanvapi mosque**, located in the city of **Varanasi**, has been a Important for the subject of dispute **between Hindu and Muslim communities** for many years.
- The dispute centers around **the belief held by some Hindu groups that the mosque was built on the site of a pre-existing Hindu temple**, which they claim was demolished to construct the mosque.
- The case has been in the courts for decades, and the **Allahabad High Court's recent decision to allow an archaeological survey** is seen as a significant development in resolving the long-standing controversy.

What is the popular narrative about religious tolerance in ancient India?

- **Popular narrative:** Ancient India is known for religious tolerance and peaceful coexistence.
- **Jadunath Sarkar's work:** Highlighted religious intolerance by some Muslim rulers like Aurangzeb, contrasting with ancient Indian Hindus' tolerance – **"History of Aurangzib" (1912-1924)**.
- **Jawaharlal Nehru's view:** Ancient Indian society embraced freedom of thought and tolerance for diverse beliefs – **"The Discovery of India" (1946)**.
- **Creation of an idealized image:** Historical works shaped the perception of ancient India as a peaceful and tolerant civilization, influencing the national identity.

What do some historians say about contradictions in this idea?

- **Historian Upinder Singh**, in her exhaustive study **"Political Violence in Ancient India,"** argues that the idea of a peace-loving and tolerant ancient India was a carefully cultivated self-image **to bolster the nonviolent ideology of Gandhian nationalism**.

- While there were instances of coexistence and dialogue among different religious groups, **there were also conflicts and violent episodes.**
- **Historical texts and archaeological evidence** indicate instances of religious iconoclasm, temple destruction, and conflicts between religious communities in ancient India.
- **D N Jha's "Against the Grain"** (2018) shows temple desecration and religious violence were common in pre-Islamic India, employed by ruling elites irrespective of religious affiliation.

How does religion relate to political authority in ancient India?

- Historian **Richard Eaton**, in his book *"Temple Desecration and Indo-Muslim States"*, (2000) noted that **religious institutions and political authority were often closely intertwined in ancient India.** Rulers sought **religious leaders' support** to legitimize their rule and boost authority.
- Temples served as **centers of economic and political power**, crucial for rulers to maintain control.

How did Buddhism emerge in ancient India?

- Buddhism emerged in the 5th or 6th century BCE in the Gangetic plains. It was founded by **Siddhartha Gautama** (Gautama Buddha) after attaining enlightenment in Bodh Gaya.
- Buddhism **emerged as an alternative to prevailing religious ideas, challenging the ritualistic and hierarchical nature of Brahmanism (early Hinduism).**
- Gautama Buddha's teachings offered a practical path to end suffering and attain liberation (**nirvana**).
- Buddhism gained popularity **due to its inclusive nature, accepting people from all social backgrounds and rejecting caste distinctions.**
- **Emperor Ashoka's** patronage in the 3rd century BCE played a crucial role in spreading Buddhism further.

What structures did ancient Buddhists build, and what was their significance?

- **Stupas:** Dome-shaped structures for relics, like the Sanchi Stupa in India.
- **Monasteries:** Centers for learning and spiritual practice.
- **Viharas:** Residential quarters within monasteries.
- **Chaityas:** Prayer halls and pilgrimage sites.
- **Rock-Cut Caves:** Carved dwellings and sanctuaries.
- **Pillars and Inscriptions:** by Ashoka, moral teachings.
- **Buddha Statues:** Symbols of reverence and devotion.
- **Libraries:** Preserved sacred texts and promoted education.

Significance:

- These structures reflect Buddhism's cultural heritage and dissemination of teachings.
- They hold spiritual, artistic, and historical importance, attracting pilgrims and tourists

alike.

Is there evidence of the desecration of Buddhist sites?

- Historian **D N Jha**'s "*Brahmanical Intolerance in Early India*" (2016) cites accounts of **Pushyamitra Shunga** destroying thousands of Buddhist stupas and monasteries.
- Chinese traveler **Xuanzang**'s writings (7th century) document violence towards Buddhists during his travels in India.
- **Gail Omvedt**'s "*Buddhism in India: Challenging Brahmanism and Caste*" (2003) mentions the story of Shaivite king **Shashanka** cutting down the Bodhi tree and attempting to destroy other Buddhist images.
- **Huan Tsang (Xuanzang)** mentions the destruction of a monumental cave temple in Vidarbha.
- Overall, historical evidence confirms conflicts and hostility between Buddhist and other religious communities in ancient India.

Topic 30. THE GOVERNMENT IS BRINGING HOME INDIA'S HERITAGE

Important for the subject :History

The USA government will return over 105 ancient statues and antiquities to India.

- Of these, **two 12th-century statues** — Lord Shiva's rare **Lingodbhava statue** and **Bodhisattva Manjushri statue** — have already reached India.
- So far over **351 ancient artefacts** and items of historical importance have been brought back. Contrast this with the **1947-2013 period**, when **less than 20 ancient statues** were brought back.
- Recently, the **International Museum Expo 2023** was inaugurated in **New Delhi**. **Stolen artefacts that were brought back to India:**
- The **18th-century Maa Annapurna statue**, which was stolen some **100 years ago** from **Varanasi** and was spotted in Canada and being brought back in **2021**.
- The **10th-century statue of Natraj** was also repatriated from **London** the same year.
- The **900-year-old "Parrot Lady" sculpture** from **Khajuraho** was brought back from **Canada**.
- A **14th-15th Chola period bronze statue of Lord Hanuman** was returned by **Australia**, while a **1,200-year-old Buddha idol, Avalokiteshvara Padmapani**, smuggled from **DevasthanKundulpur temple** in **Bihar** was repatriated from **Italy**.
- The US returned the **11th-century statue of the poet-saint Manikkavachakar**.
- The **10th-century statue of Maa Durga's Mahishasur Avatar** is back from **Germany**, while the **rare bronze statue of Lord Ram, Lakshman and Sita** which was **stolen in 1978** was retrieved from **London**.
- Also, the **ancient Yogini statue** which was **stolen from Banda** in **Uttar Pradesh** in the **1980s** has been brought back from **London**.
- Recently, **29** ancient items of archaeological importance were brought back from

Australia.

- The **statues of Shri Devi** from the **Chola dynasty** and the **terracotta statue of a woman** from the **Maurya period** have been returned.
- The Australian government returned **two rare statues** — a **900-year-old statue of Pratyangara** stolen from an **Amravati temple** and a **meditating Buddha statue** that was smuggled from **Mathura**.

What are antiquities?

- The **Antiquities and Art Treasures Act, of 1972**, defines **antiquity** as a certain category of objects listed below that has been in **existence for not less than one hundred years**. They are:
- Any coin, sculpture, painting, epigraph or other work of art or craftsmanship, Any article, object or thing detached from a building or cave.
- Any article, object or thing illustrative of science, art, crafts, literature, religion, customs, morals or politics in bygone ages. Any article, object or thing of historical interest.
- For a **manuscript**, record or other documents of scientific, historical, literary or aesthetic value the duration is **fixed at not less than 75 years**.

International convention:

- The **UNESCO 1970 Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property** defines **cultural property** as property having importance for archaeology, prehistory, history, literature, art or science for the designated country.
- The convention also says that **illicit import, export and ownership transfer** is depriving the cultural heritage of the country of origin.
- The **Convention** also suggests international cooperation as a means to protect the cultural property of the country.

Indian Laws on Antiquities

- The **seventh schedule** of the Constitution contains the following items related to antiquities:
- Item-67 of the Union List
- Item-12 of the State List
- Item-40 of the Concurrent List
- One of the major acts implemented since **1976** was the **Antiquities and Art Treasures Act, of 1972 (AATA)**.
- Before enacting the **Antiquities and Art Treasures Act, of 1972**, **Antiquities (Export Control) Act** was passed in **1947** to ensure that antiquities are exported with a **license**.
- **Ancient Monuments and Archaeological Sites and Remains Act** were enacted in **1971**.
- **Antiquities and Art Treasures Act, 1972 (AATA)** prohibits trade in antiquities without a license and makes it unlawful for persons other than the government to export antiquity

or art treasure.

- **AATA mandates** those who possess antiquity to register and obtain certificates.
- There has been registration of 3.52 lakh antiquities among the 16.70 lakh documented under the National Mission on Monuments and Antiquities.

Retrieval of Antiquity from Abroad:

- For antiquities taken out of the country before independence, the issue needs to be raised bilaterally or in international forums.
- Objects taken out of the country after independence can be retrieved easily by raising the issue bilaterally through submitting proof of ownership and using the UNESCO convention.

Why are Ancient Indian sculptures illegally traded?

- Indian art, including ancient sculptures, is highly sought after by collectors and art enthusiasts worldwide, leading to a lucrative market for these artefacts.
- **India** has **weak laws and regulations** when it comes to the protection of its cultural heritage.
- **India** has a **long history of looting and plundering by foreign invaders**, leading to the loss of many precious artefacts.
- In many cases, **poverty and lack of resources in rural areas** make it easier for smugglers to bribe locals and obtain artefacts.
- Corruption sometimes facilitates the illegal trade of artefacts for personal gain.

Lack of awareness

- In a globalized world, it is easier for smugglers to transport and sell artefacts across borders, making it more challenging to track and recover stolen or smuggled artefacts.

Topic 31. DISTRIBUTE COPIES OF THE VEDAS TO ALL MPS, RAJYA SABHA CHAIR TELLS EDUCATION MINISTER

Important for the subject :History

Maharishi Sandipani Rashtriya Ved Vidya Pratishthan was given recognition by the Board of Education under the visionary leadership of the Prime Minister.

Objective: Veda Vidya and **Sanskrit education** should reach every section of the society without any discrimination.

- The government will soon establish five regional centres of Maharshi Sandipani Rashtriya Ved Vidya Pratishthan at the four Dhams — Badrinath, Dwarka, Jagannath and Rameswaram – and in Guwahati, to promote “Ved Vidya”.
- Currently, there are 123 schools affiliated to the board across the country with 4600 students and 632 teachers.

- Soon after the establishment of the board last year, the All-India Council for Technical Education (AICTE) asked its approved institutions to consider Veda Bhushan and Veda Vibhushan certifications awarded to candidates by MSRVP equivalent to Class 10 and 12 certificates issued by the central and state boards of education.
- The government has also established model Vedic schools called Rashtriya Adarsh Veda Vidyalaya in six states, including Madhya Pradesh, Odisha, Gujarat, Assam, Karnataka and Uttarakhand, the report said. These schools admit students on the merit of their proficiency in the Veda Bhushan and Veda Vibhushan in various grades.
- Apart from the four Vedas – Rigveda, Samaveda, Yajurveda, and Atharva — students can opt for science, English, mathematics, social science, computer science, and agriculture.

Vedas

- The Vedas are known as ‘Shruti’ meaning ‘through hearing’, as they were handed down through generations orally with the help of elaborate mnemonic techniques.

There are four Vedas:

1. The Rigveda
2. The Yajurveda
3. The Samaveda
4. The Atharvaveda

Each Veda has four subdivisions

- The Samhitas (mantras and benedictions). The Aranyakas (text on rituals, ceremonies, sacrifices, and symbolic sacrifices) The Brahmanas (commentaries on rituals, ceremonies, and sacrifices)
- The Upanishads (texts discussing meditation, philosophy, and spiritual knowledge).
- Some scholars add a fifth category – the Upasanas (worship).

Topic 32. KUTTIKKANAM PALACE: SOON-TO-BE HISTORICAL MONUMENT

Important for the subject :History

The 130-year-old Kuttikkanam Palace, once the summer residence of the kings of erstwhile Travancore, is set to be declared a historical monument.

Why is the Kuttikkanam Palace soon to be declared a historical monument?

- Former summer residence of **Travancore kings**. Verified eligibility under the **Ancient Monuments Act and Archaeological Sites and Remains Act, 1958..**

What are the key historical and other details of the Palace?

- Built around 1890 during **Moolam Thirunal Rama Varma**’s reign. Additions made in the 1900s. Known as “**Ammachi Kottaram**” previously. Documented history since 1892.

Situated on 14 acres of land.

- Special **hall for administrative discussions**. Houses a **stud farm** showcasing royal lifestyle.

What is Ancient Monuments and Archaeological Sites and Remains (AMASR) Act?

- It is an Act to provide for the **preservation** of ancient and historical monuments and archaeological sites and remains of national importance, for the **regulation** of archaeological excavations and for the **protection** of sculptures, carvings and other like objects. It extends to the whole of India.
- The **AMASR Act, 1958**, was amended in 2010 to declare **the 100-metre radius of protected monuments as prohibited areas and the next 300-metre radius as regulated areas**.

What is Ancient Monument and antiquity?

- **Ancient Monument** means any structure, erection or monument, or any tumulus or place of interment, or any cave, rock-sculpture, inscription or monolith which is of historical, archaeological or artistic interest and which has been in existence **for not less than 100 years** and includes— **remains** of an ancient monument, **site** of an ancient monument, such portion of land **adjoining** the site of an ancient monument as may be required for fencing or covering in or otherwise preserving such monument, and the **means** of access to, and convenient inspection of, an ancient monument.
- **Antiquity** includes.— any coin, sculpture, manuscript, epigraph, or other work of art of craftsmanship, any article, object or thing detached from a building or cave, any article, object or thing illustrative of science, art, crafts, literature, religion, customs, morals or politics in bygone ages, any article, object or thing of historical interest, and any article, object or thing **declared by the Central Government, by notification in the Official Gazette to be an antiquity for the purposes of this Act**, which has been in existence for not less than one hundred years.

What are the steps required to declare the Palace a historical monument?

- Obtain and **verify revenue details**.
- Seek government notification for declaration.

What is the historical connection between the Palace and the Peermade Sreekrishna Swami temple?

- Presence of an **abandoned tunnel**, possible link to Peermade Sreekrishna Swami temple.

How does the declaration of the Kuttikkanam Palace as a monument impact tourism in the region?

- Becomes a **major tourist attraction in Idukki district**. Tourism programs organized by the Tourism Promotion Council. Boosts tourism growth and interest in the area.

Topic 33. SUBRAMANIA BHARATI: INDIAN POET, WRITER, AND REFORMER

Important for the subject: History

President Droupadi Murmu on Sunday unveiled a portrait of nationalist Tamil poet journalist **Subramania Bharathi** at the Raj Bhavan here. She also renamed the Durbar Hall on the campus as '**Bharathiar Mandapam**'.

Introduction:

- Subramania Bharati, a prominent Indian literary figure, was celebrated for his multifaceted contributions as a **poet, writer, journalist, and social reformer**.
- He is often referred to by the honorifics "**Mahakavi Bharati**" or "**Bharathiyar**," which signify his esteemed status in the literary realm.

Life and Timeline:

- Bharati was born on December 11, 1882, in Ettayapuram, **Tamil Nadu**, India. He passed away at the age of 38 on September 11, 1921, leaving behind a profound legacy.

Literary Contributions:

- Bharati's literary works encompassed a wide range of themes, reflecting his deep insights into Indian society and its challenges. In the late 19th century, Bharati began his literary journey, contributing to various

Tamil newspapers and magazines.

- During 1900-1907, he composed stirring **nationalist poetry**, including "**Vande Mataram**" (originally composed by Bankim Chandra Chattopadhyay) in 1907, which became an anthem for India's struggle for freedom.
- He published the sensational "**Sudesa Geethangal**" in 1908. In 1912, "**Panchali Sabatham**" emerged as a significant work, criticizing social injustices and advocating for reform. an epic poem based on the **Mahabharata**
- His collection "**Kuyil Pattu**" (1912) and "**Kannan Pattu**" (1912) portrayed nature's beauty and human emotions.
- "**Kannan Pattu**" explored spirituality and devotion through **Lord Krishna's life**, composed in 1912.
- The iconic "**PuthiyaAathichudi**" was penned in 1910, emphasizing human values and unity.
- "**Desa Matrikai**" (1910) celebrated India's diverse culture while promoting a united identity.
- During 1910-1911, Bharati contributed to newspapers like "**India**," passionately critiquing colonial rule.
- "**Pudhumai Penn**" (1912) empowered women, while "**Nindru Kol**" (1910) urged the youth to be socially responsible. During his association with newspapers like "India," he

coined slogans like (**Freedom Fighter**).

- Bharati's writings, while deeply rooted in India, resonated globally, inspiring freedom movements.
- In **1949**, he became **the first poet** whose **works were nationalised by the state government**.

Role in Indian Independence Movement:

- Bharati played an active role in **India's fight for independence** from British colonial rule.
- His powerful translation and adaptation of "**Vande Mataram**," originally composed by Bankim Chandra Chattopadhyay, transformed the song into a potent rallying cry for the nation's freedom fighters.

Advocacy for Social Reform:

- Recognizing the **entrenched caste-based discrimination** prevalent in society, Bharati employed his writings to champion the cause of social reform.
- His fervent appeals for equality among different social groups struck a chord with many, encouraging a **more inclusive and just society**.

Empowerment of Women:

- A progressive thinker ahead of his time, Bharati staunchly advocated for the rights and empowerment of women.
- His writings **challenged prevailing gender norms and encouraged the participation of women in various aspects of society**.

Nationalism and United India:

- Bharati's deep-seated nationalism found expression in his impassioned writings that celebrated the **spirit of India and its diverse cultural heritage**.
- He ardently believed in **the idea of a united India**, advocating for the dissolution of regional and linguistic barriers to foster a stronger national identity.

Impact and Legacy:

- Bharati's contributions have had a lasting impact on **Tamil literature**, with his works continuing to inspire generations of readers.
- His writings not only ignited a sense of patriotism but also awakened **social consciousness and political awareness** among the masses.

Topic 34. JEDDAH: HOPE FOR PEACE IN UKRAINE?

Important for the subject: International Relations

Jeddah will host peace talks on the Russia-Ukraine war, with Ukraine, the U.S., European countries, India, and Brazil participating on August 5 and 6.

What is Russia-Ukraine War?

- The war began in February 2014 when Russia annexed **Crimea** from Ukraine and supported pro-Russian separatists in the **Donbas**
- The war has **escalated since February 2022** when Russia launched a full-scale invasion of Ukraine, breaking the Minsk agreements and triggering international sanctions and condemnation.
- Caused a **humanitarian crisis** in Ukraine, as Russia has cut off gas supplies, blocked food aid, and launched drone attacks on Kyiv and other cities.
- The war has sparked a **global security threat**, as NATO and other allies have sent troops and weapons to support Ukraine.

Who has been invited to participate in the peace talks?

- The invited countries include Saudi Arabia, Ukraine, the U.S., some European countries (such as the United Kingdom and Poland), major developing countries (such as **India** and Brazil), and South Africa.
- Up to 30 countries have been invited for the talks, but **Russia is notably excluded from the list of participants.**
- The United Kingdom, the European Union, South Africa, and Poland have already **confirmed** their attendance for the talks.
- The U.S. National Security Advisor, Jake Sullivan, is also likely to attend the talks.

What is the purpose of these peace talks?

- To find a resolution to the ongoing Russia-Ukraine war, which has been ongoing since February 2022.
- Ukraine seeks to garner international support for its **10-point peace plan**, which was proposed last year during the **G20 Summit**.
- The talks are seen as a constructive way of **promoting third-party mediation** and **involving non-aligned countries from the Global South in the peace process**. The talks provide an opportunity **to bring both the West and non-aligned countries to the table** to address the conflict.

How likely are these peace talks to lead to an effective resolution?

- UN Secretary-General doubts peace talks now **due to both sides' belief in winning.**
- Analysts mostly agree that effective peace talks in the near future are unlikely.
- However, Talks are considered constructive for promoting third-party mediation outside the West.

What are the key points of Ukraine's peace plan?

- **10-point peace plan**, promoted by President Volodymyr Zelenskyy, involves the **withdrawal of Russian troops** from Ukrainian territory.

- The plan aims to **restore Ukraine's territorial integrity based on its 1991 borders** after the collapse of the Soviet Union.
- It also calls for **prosecuting war crimes committed by Russia** during the course of the conflict.
- Ukraine asserts that peace negotiations **cannot happen without the withdrawal** of Russian troops and that **it should define its own terms of peace**.

How has Russia responded to Ukraine's peace plan?

- **Russia has rejected** Ukraine's 10-point peace plan and is unwilling to relinquish any of the captured territories.
- Russia insists that any negotiation **should consider "new realities,"** implying recognition of the territories it has annexed.

What previous attempts at negotiations and mediation have taken place?

- In the initial weeks of the conflict, both parties engaged in talks for temporary ceasefires **to establish humanitarian corridors**.
- The talks were first **held in Belarus and Turkey** but broke down as evidence of war atrocities and attacks on civilians increased.
- The **International Criminal Court at The Hague** has issued an **arrest warrant** against Russian President Vladimir Putin in relation to the conflict.
- Multiple countries and blocs have shown a willingness to become mediators between the two parties, offering their own roadmaps for peace.

What was China's proposed peace plan for the Ukraine crisis?

- **China's 12-point plan**, released in February, aimed at a **political settlement of the Ukraine crisis**.
- The plan expressed **support for the territorial integrity of states and the principles of the UN Charter**.
- It also called for the cessation of hostilities and the resumption of **dialogue** between the conflicting parties.
- However, the plan was seen as an attempt to placate criticism of China's silence on Russia's actions and was perceived **as skewed in favor of Moscow**.

How did Ukraine and Russia respond to China's peace plan?

- **Ukraine rejected China's 12-point plan outright**, as it did not adequately address its concerns and demands.
- Russia saw the plan as a **potential basis for certain peace processes** but found some provisions, like a ceasefire, to be "impossible" to implement.
- China's paper was also seen as an attempt to position itself as a responsible power in the Global South and the UN Security Council.

What peace initiatives were proposed by African countries and Brazil?

- In June, seven African countries proposed a **10-point plan**, recognizing Russia and Ukraine's sovereignty and **calling for prisoner release**.
- The conflict impacted African economies with **shortages of grain and fertilizers from Ukraine and Russia**.
- Brazilian President Luiz Inacio Lula da Silva suggested a **"peace club" of noninvolved countries to mediate discussions between Russia and Ukraine**, aiming to restore Brazil's global relevance after Bolsonaro's regime.

What is known about the upcoming talks in Jeddah?

- The talks are seen as a **constructive way of promoting third-party mediation by players apart from the West**.
- Observers are **not expecting an overall breakthrough in achieving peace**, given the entrenched positions of both Russia and Ukraine.
- Russia, which rejected Ukraine's peace plan, is not among those invited, but it has expressed interest in understanding the meeting's goals.
- Any attempt to promote a peaceful settlement deserves a positive evaluation, according to the Kremlin spokesperson, Dmitry Peskov.

Topic 35. RISHI SUNAK DEFENDS GRANTING NEW NORTH SEA OIL AND GAS LICENCES

Important for the subject: International Relations

Prime Minister Rishi Sunak defended the decision to grant **100 new North Sea oil and gas licences**.

- Project known as **Acorn Project** in **St Fergus, Aberdeenshire**. The **UK** government has also said it will support a **carbon capture project** in the **north east of Scotland**.
- It said that granting the new licenses was **"entirely consistent" with net zero commitments**.
- Between the projects announced in **2021** and today **10 mega tonnes of carbon dioxide** will be captured and stored by **2030**.
- That includes emissions from **Mosmorran**, from **Grangemouth**, from a **new power station** to be built at **Peterhead** and, potentially, from **direct air capture**.

About the St. Fergus project:

- The **St Fergus project** is a **joint venture** between **Shell UK** and other companies.
- It would become **Scotland's first carbon capture and storage facility**, which would see harmful **greenhouse gas emissions** piped under the **North Sea**.
- This would **prevent the release of carbon dioxide** into the atmosphere, by capturing it at the point where the fossil fuel is being burnt.

North Sea:

- The **North Sea** lies between **Great Britain, Denmark, Norway, Germany, the Netherlands, Belgium and France.**
- An **epeiric sea** on the **European continental shelf**, it connects to the **Atlantic Ocean** through the **English Channel** in the **south** and the **Norwegian Sea** in the **north.**
- It is more than **970 kilometers (600 mi)** long and **580 kilometers (360 mi)** wide, covering **570,000 square kilometers (220,000 sq mi).**
- It hosts key **north European shipping lanes** and is a major fishery. The coast is a popular destination for recreation and tourism in bordering countries, and a rich source of energy resources, including wind and wave power.

Topic 36. SAUDI, KUWAIT REJECT IRAN CLAIMS TO DISPUTED GAS FIELD

Important for the subject: International Relations



Saudi Arabia and Kuwait said they have **sole ownership of a disputed gas field** also claimed by **Iran**, in an escalating feud after Tehran threatened to pursue exploration.

- The offshore field, known as **Arash in Iran** and **Dorra in Kuwait and Saudi Arabia**, has long been a focal point of contention between the three countries.
- The **two Arab Gulf states** renewed their previous and repeated calls to the **Islamic Republic of Iran** to negotiate the **demarcation of their maritime borders** to settle the issue.
- **Iran and Kuwait** have held unsuccessful talks for many years over their **disputed maritime border area**, which is **rich in natural gas.**

Origin of the dispute:

- The row over the field stretches back to the **1960s**, when **Iran and Kuwait** each awarded an **offshore concession**, one to the **Anglo-Iranian Oil Company, the forerunner to BP,** and one to **Royal Dutch Shell.**
- The **two concessions** overlapped in the northern part of the field, whose recoverable

reserves are estimated at some **220 billion cubic metres** (nearly eight trillion cubic feet).

- Last year, **Kuwait** and **Saudi Arabia** signed an agreement to jointly develop the field, despite objections from **Iran** which branded the deal as “illegal”.
- It is noteworthy that the **borders between Saudi Arabia and Iran have been delineated**, while the **borders between Iran and Kuwait remain a Important for the subject of bilateral dispute**.

Countries sharing Border:

Iran:

- Iran borders Afghanistan, Armenia, Azerbaijan, Iraq, Pakistan, Turkey, and Turkmenistan.
- It shares **maritime borders** with Bahrain, Kuwait, Oman, Saudi Arabia, and the United Arab Emirates.

Saudi Arabia:

- Shares border with: Iraq, Jordan, Kuwait, Oman, Qatar, United Arab Emirates, and Yemen.
- Saudi Arabia shares **maritime boundaries** with Egypt, Sudan, and Eritrea in the Red Sea, and with Iran, and Bahrain in the Persian Gulf.

Kuwait:

- Kuwait is bounded to the west and north by **Iraq**, to the east by the **Persian Gulf**, and to the south by **Saudi Arabia**.

Topic 37. CAN UKRAINIAN GRAIN BE SHIPPED TO THE WORLD VIA CROATIA?

Important for the subject: International Relations



Ukraine announced that **Croatia** had agreed to allow Ukrainian grain to be exported via its **ports** on the **Danube** and the **Adriatic Sea**.

Huge logistical challenges:

- Ukrainian grain can be shipped via **two Ukrainian ports** on the **Danube: Izmail and Reni**.
- Another option would be to ship the grain via the **Black Sea** to the **Romanian port of Constanta** and from there to the **River Danube**.
- The grain would then have to be transported **1,000 kilometers (621 miles) upstream** to the **Croatian Danube river port of Vukovar**.

Does Vukovar have the capacity?

- The port in **Vukovar** is small. It is currently capable of handling a **maximum 1.2 million tons of freight per annum**.
- This capacity does not relate to **bulk freight (such as grain) alone but to all freight**, including containers.
- Moreover, **Vukovar** currently has **only one silo** that could be used to **store grain** and it has a capacity of just **10,000 tons**.
- According to the **European Union**, **Ukraine** exported over **30 million tons of grain** and other foodstuffs as part of the **Black Sea Grain Initiative** between **August 2022 and May 2023**. It took over **1,080 ships** to transport this volume of freight.

How would Croatia transport this huge volume of grain to the Adriatic ports of Rijeka, Zadar or Split?

- Even large trucks can transport no more than 45 tons of freight at a time. More than 22,000 such trucks would be needed to transport one million tons of grain.
- Rail transport is another option but Croatia has not a well developed railways system.

Does it really solve the wheat crisis?

- Wheat is currently selling for about **€350 (\$385) per ton** on the world market and **maize for €260**.
- Even if **Croatia** did manage to ship one million tons of grain, this would bring a profit of just **€300 million**. Much of this would not go to Ukrainian farmers.

Croatia:

- **Croatia** shares borders with **Slovenia** and **Hungary** to the **north**, **Serbia** and **Bosnia and Herzegovina** to the **east**, **Montenegro** to the **south**, and it also shares a **sea border** with **Italy** on the **west**.

Black Sea:

- There are **six countries** with coastlines on the **Black Sea** (clockwise), **Ukraine, Russia, Georgia, Turkey (Türkiye), Bulgaria, and Romania**.

Topic 38. OLDEST SPECIES OF SWIMMING JELLYFISH DISCOVERED IN 505M-YEAR-OLD FOSSILS

Important for the subject :Geography

The oldest species of **swimming jellyfish** ever recorded has been discovered in **505m-year-old fossils**.

- The fossils were found at **Burgess Shale** in **Canada**, an area known for the number of well-preserved fossils found there.
- The **new species**, which has been named **Burges some dusaphasmi form** is, resembles a **large, swimming jellyfish** with a **saucer or bell-shaped body up to 20cm high**.
- Its roughly **90 short tentacles** would have allowed it to capture sizable prey.
- The discovery of **Burges some dusaphasmi form** is has shown that the **Cambrian food chain** was much more complex than previously imagined.

About Jellyfish:

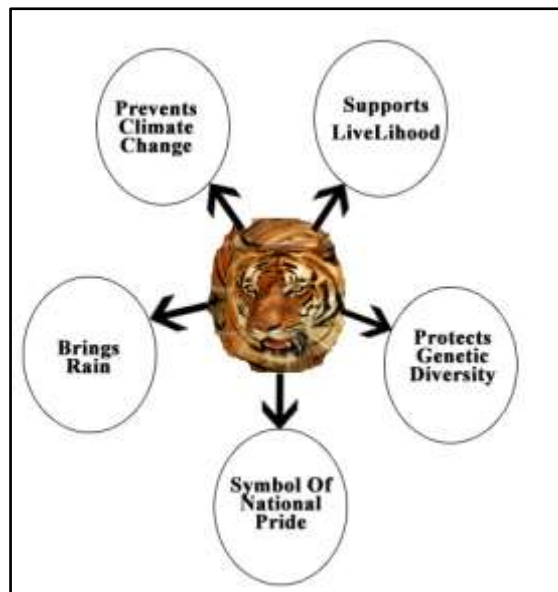
- **Jellyfish** belong to a subgroup of **cnidaria**, the oldest group of animals to exist, called **medusozoans**.
- **Jellyfish** are mainly **free-swimming marine animals** with **umbrella-shaped bells** and **trailing tentacles**, although a few are anchored to the seabed by stalks rather than being mobile. They are made of **95% water** and **decay quickly**, so fossilized specimens are rarely found, but the specimens – found in the late **1980s** and early **1990s** – were exceptionally well preserved.
- **Jellyfish**, along with their relatives, have been “**remarkably hard to pin down in the Cambrian fossil record**” despite being part of one of the earliest groups of animals.
- **Jellyfish** are found **all over the world**, from **surface waters** to the **deep sea**.

Burgess shale, Canada:

- The **Burgess Shale** is a **fossil-bearing deposit** exposed in the **Canadian Rockies of British Columbia**, Canada.
- It is famous for the exceptional preservation of the soft parts of its fossils. At **508 million years old** (middle Cambrian), it is one of the earliest fossil beds containing **soft-part imprints**.
- The **rock unit** is a black shale and crops out at a number of localities near the town of Field in **Yoho National Park** and the **Kicking Horse Pass**. Another outcrop is in **Kootenay National Park** 42 km to the south.

Topic 39. HOW TIGER RESERVES BENEFIT HUMANS

Important for the subject: Geography



Tigers have adapted to diverse habitats and thrive in areas with high human densities. The ability to breed well is one of the major reasons why this feline could beat extinction.

The **Article 51 A(g)** of the **Constitution** makes it our fundamental duty to protect species and their habitats.

Importance of tigers:

Ecological importance:

- Tigers play a crucial role as **top predators** in **maintaining trophic levels and ecological functionalities**.
- They ensure that we get clean water and air, provide natural resources, keep our economy running, food security, the list can go on and on.
- **Tiger reserves** are home to nearly **50 per cent of threatened bird species of India** and many other endangered species that find refuge within them.
- These reserves, encompassing just **3 per cent of India's landmass**, are the origins of around **300 rivers**, supplying water for hundreds of millions of people and irrigation purposes.

Economic importance:

- A **2019 report** evaluating **ten tiger reserves** based on **27 ecosystem services** estimated that their **annual monetary value is up to ₹16,202.11 crore**.
- This means, for every rupee we spent on conserving tigers in these reserves, we received a benefit of up to ₹7,488.
- Additionally, in terms of water provisioning, these tiger reserves provided benefits worth

₹330 billion.

- A study published in the journal Nature Ecology and Evolution revealed that of the **45 tiger reserves assessed, 11 collectively avoided carbon emissions of around 1.08 tonnes**, which, if integrated into voluntary carbon markets, would be worth around \$6.24 million.
- Tigers and tiger reserves ensure security and well-being for all of us; not just the millions who live in and around these reserves but also across the country's borders extending across the sub-continent.

Topic 40. INDIA'S EXCESS SUGAR PRODUCTION IS GUZZLING GROUNDWATER

Important for the subject: Geography

In **2021-2022, India** surpassed **Brazil** to become the **largest sugar producer in the world**, producing **359 lakh tonnes** – an **all-time high**. But this isn't sweet news: with the resources that go into making all that sugar dwindling at an alarming rate, **India's sugar market might slip into its biggest crisis ever in the coming decades**.

What is the issue with sugarcane production?

- The impact of high sugarcane production on the country's **groundwater** is disastrous – and it has also been overlooked. If we don't address the chronic overuse of groundwater in the sugar industry soon and effectively, India's agricultural sector will be at risk of collapse.

Reasons for excess sugar production in India:

- High consumption (India is the world's largest sugar consumer) and demand.

Government policies and measures:

- Central Government's Fair and remunerative price (FRP) for sugarcane Mandatory payment of a minimum price to sugarcane farmers by the sugar mills.
- Heavy subsidies and incentives by the state governments. The resulting **sugar surplus** has led to **higher exports**, with a **record 110 lakh tonnes** exported in **2021-2022**.
- In fact, **Brazil, Australia, and Guatemala** filed a complaint with the **World Trade Organisation** against **India** for **violating international trade rules** by offering **excessive export subsidies** and **domestic support to farmers** to outcompete other countries in the global sugar market. The Organisation ruled against India and India also lost its appeal.

Ethanol production as a solution to the surplus production:

- To deal with the **sugar surplus**, the Indian government considered diverting it to the production of **ethanol**.
- **Ethanol** is the **active ingredient** in **alcoholic beverages** and is also used in the **chemicals and cosmetics industries**.

- The government launched the **ethanol-blended petrol (EBP)** programme in **2003** to reduce crude oil imports and curtail greenhouse gas emissions from petrol-based vehicles; it has been fairly successful.
- It started with the modest goal of achieving a **blending rate of 5%**, but the **target set for 2025 is 20%**.
- The government also reduced the **Goods and Services Tax** on **ethanol** from **18%** to **5%** in **2021**.
- In the same year, of the **394 lakh tonnes of total sugar produced**, about **350 lakh tonnes** were diverted to produce **ethanol**, while India achieved a **blending rate of 10%** months ahead of target.

How does excessive sugarcane cultivation impact groundwater?

- **Sugarcane** is a **highly resource-intensive cash crop**: it needs a **large swath of land** and **guzzles groundwater**.
- Experts recommend that **installing solar panels** would be a better use of land than sugarcane cultivation, to reduce net emissions.
- **India's top sugarcane-growing states** are **Maharashtra, Uttar Pradesh, Karnataka, Gujarat, and Tamil Nadu**.
- The **first three** account for **85-90%** of the **sugar produced** in the country. If sugarcane were a **purely rainfed crop**, it would need around **3,000 mm of rainfall a year** to be irrigated.
- But these **three states** receive **around 1,000-1,200 mm a year**. The remaining water requirement is met by **groundwater**.
- Most of this groundwater resides in **confined aquifers** so it is a **limited resource**.
- The **110 lakh tonnes of sugar** that India exported in **2021-2022** 'includes' **26 lakh crore litres of groundwater**.
- The **top sugarcane growing states** are already **drought-prone** as well as **groundwater-stressed**.
- In a **2022 report**, the **Central Ground Water Board (CGWB)** noted that a **third of all its groundwater assessment units** in **Maharashtra, Uttar Pradesh, and Karnataka** were '**semi-critical**', '**critical**' or '**over-exploited**'.

What are the solutions to this problem?

- Assess and then correct incentives that do not favor sugarcane over other crops.
- Introducing fair and comprehensive subsidy schemes for a variety of crops.
- Prevent monoculture and ensure an equitable income. Use of drip irrigation (reduces water consumption by upto 70%) in sugarcane cultivation practices.
- **Adopt the practices like:** Rainwater harvesting, watershed management, wastewater treatment, and canal irrigation networks.

Topic 41. NSEL CASE: SEBI CANCELS BROKING LICENCE OF MMTC***Important for the subject: Economy***

In News: Capital market regulator SEBI has cancelled the stock broking licence of Stateowned MMTC as recommended by designated authority in the National Spot Exchange case.

- SEBI has directed MMTC to cease all broking activity owing to involvement in the NSEL scam.
- **Metals and Minerals Trading Corporation (MMTC)** of India, is one of the two highest earners of foreign exchange for India and India's largest public sector trading body.
- SEBI in 2020 in its enquiry report, found that MMTC as a stock broker of the NSEL had **facilitated trading in 'paired contracts'** on the exchange platform of NSEL, which was in violation of the applicable provisions of erstwhile **Forward Contracts (Regulation) Act, 1952**. the stock broker failed to meet the **"fit and proper" criteria** mentioned in the intermediaries rules and accordingly Sebi has canceled the certificate of registration of the MMTC.

What are 'paired contracts' by NSEL?

- NSEL introduced the concept of "paired contracts" for trading, which allowed buying and selling of the same commodity through two different contracts at two different prices on the exchange platform, wherein the investors could buy a short duration contract and sell a long duration contract and vice-versa at the same time at a predetermined price.
- The transactions were structured in a manner that buyers of the short duration contract always ended up making profits. The scheme of "paired contracts" traded on the NSEL had caused huge losses to investors to the extent of Rs 5,500 crore.

National Spot Exchange case

- NSEL was set up as a company incorporated under the Companies Act, 1956 in 2005. NSEL was incorporated by MCX and the nominees of FTIL. The shareholding of MCX and nominees were transferred and consolidated later in 2005 with FTIL.
- Against the regulations, short-selling, too, was allowed in many cases. The then regulator Forward Market Commission (FMC), then intervened and asked NSEL to wind down existing contracts. This ended in payment default.
- The crisis came to light when the physical commodities were short of the record. Warehouse Receipts were not backed by any physical commodity. When investors claimed commodities worth their money, the borrowers could not provide them, as goods were way short in warehouses. This is how the most controversial scam of the commodities market was born.

Topic 42. GOVERNMENT TO DELAY IMPLEMENTATION OF LAPTOP, PC IMPORT CURBS

Important for the subject: Economy

The **Directorate General of Foreign Trade (DGFT)** on August 4 **delayed** Thursday's notification restricting imports of laptops, PCs, tablets, and servers to India 'with immediate effect' to November 1.

What does the notification for the restriction on imports state?

- Restricts import of laptops, tablets, all-in-one personal computers, and 'ultra-small form factor computers and servers **under HSN 8741**. Import **allowed only with a valid license for restricted imports**.
- Exempts one laptop, tablet, all-in-one personal computer, or ultra-small form factor computer imports **purchased through e-commerce portals via post or courier**.
- Allows import of up to 20 items per consignment without a license **for R&D, testing, etc., but not for sale**.

Repair and return of re-imported goods do not require a license.

Why have the restrictions been imposed?

- Aims to promote domestic manufacturing and **reduce imports, especially from China**.
- Boosts the **Production-Linked Incentive (PLI)** scheme for IT hardware. Addresses the **trade deficit** caused by increased electronic goods and laptop imports.

When will the implementation of the import curbs take effect?

- Implementation delayed to **November 1**.
- IT hardware can be imported without a license until October 31.

What is the government's goal behind the import restrictions?

- Aims to **achieve self sufficiency in electronics production**.
- Import curbs are **not directly linked to the PLI scheme** but align with the goal of promoting local manufacturing.

How will the import licensing process be affected by the restrictions?

- Import curbs were **implemented immediately** after notification, leading to shipment hold-ups at entry ports.
- The government assures prompt processing of license applications for restricted electronics products.

Topic 43. AMRIT BHARAT STATION SCHEME: MODERNIZING INDIAN RAILWAY STATIONS

Important for the subject: Schemes

PM Narendra Modi to virtually lay the foundation stone for 508 railway stations nationwide on Sunday. 25 Southern Railway stations set for renovation.

What is the Amrit Bharat Station Scheme?

- The Amrit Bharat Station Scheme is a Ministry of Railway's scheme for the **continuous modernization of railway stations with a long-term vision**.
- Aims to create **modern, passenger-friendly, and sustainable** railway stations for an improved travel experience.

What is the scope of work under the scheme?

- The scheme involves creating **Master Plans for stations** to improve facilities and create **Roof Plazas and city centers**.
- It includes cost-efficient entrance improvements, relocation of old buildings, and **optimizing waiting halls**.
- Amenities for **differently-abled individuals** will be provided as per Railway Board guidelines.
- Station approaches, platform lines, drainage, and cable management will be improved.
- The scheme aims to provide **free WiFi access, space for 5G towers**, and sustainable solutions.
- Furniture, signages, and public announcement systems will be upgraded for comfort and convenience.
- **Escalators** may be installed at select stations, and toilets will be improved for **cleanliness and accessibility**.
- **Landscaping and local art** will enhance the overall station experience.

Which Chennai Division stations are being renovated under ABSS?

- The eight stations being renovated in Chennai Division are **Chengalpattu junction, Perambur, Guduvanchery, Tiruvallur, Tiruttani, Gummidipoondi, Arakkonam, and Jolarpettai junction**.

Which other divisions will have railway stations renovated in the Southern Railway zone?

- The remaining 17 railway stations being taken up for renovation in the Southern
- Railway zone are distributed across different divisions as follows:
- Four stations in **Salem** division
- Four stations in **Tiruchi** division
- Two stations in **Madurai** division

- Six stations in **Palakkad** division
- One station in **Thiruvananthapuram** division

Topic 44. MERI MAATI MERA DESH

Important for the subject :Schemes

Why in news:

Prime Minister of India, Shri Narendra Modi, recently announced the 'Meri Maati Mera Desh' campaign during his Mann Ki Baat broadcast.

Objectives of the campaign:

- This campaign aims to honour the brave freedom fighters and bravehearts who sacrificed their lives for the country. Shilaphalakams (memorial plaques) commemorating them will be installed in gram panchayats, close to Amrit Sarovars.
- The 'Meri Maati Mera Desh' campaign is a **part of the larger 'Azadi Ka Amrit Mahotsav' initiative** launched by the Centre earlier this year to commemorate 75 years of India's independence.
- The Centre has invited people from all walks of life to participate in the campaign by sending soil samples from their native places or places of historical significance to the Ministry of Culture. The soil samples will be collected at various centres and then transported to Delhi for the creation of the garden.

Key Components of the Campaign:

Shilaphalakam:

- Installing a **memorial plaque in every gram panchayat or village**, bearing the names of the freedom fighters, defence personnel, CAPF personnel, and state police personnel who have laid down their lives in the line of duty.
- It will serve as a reminder of their courage and sacrifice and will inspire future generations to follow in their footsteps. The installation will be done through the MGNREGA scheme, using local materials and resources.

Vasudha Vandhan:

- **Planting 75 saplings of indigenous species in every gram panchayat or village**, creating an Amrit Vatika (a sacred grove) that will symbolize the renewal of 'Mother Earth'. The saplings will be nurtured by the local community and will provide ecological benefits such as soil conservation, water recharge, biodiversity enhancement, and carbon sequestration.

Veeron Ka Vandan:

- **Saluting the freedom fighters and their families**, as well as the retired and deceased

defence, CAPF, and state police personnel and their families. This will acknowledge their contribution to the nation's freedom and security and will express gratitude and respect for their service. It will be done at various levels, from gram panchayats to district headquarters.

Collection of Soil:

- **Collecting soil from every gram panchayat or village by young volunteers and others, who will bring it to the block level in 'Mitti Kalash' (earthen pots).**
- The soil will represent the diversity and richness of the country's land and culture and will be used to create a unique garden in Delhi.

Amrit Vatika:

- One of the main highlights of the campaign is the development of a unique garden called Amrit Vatika along the Kartavya Path in Delhi. **The garden will be made with soil brought from all parts of the country, representing the different regions, cultures and traditions of India.** The soil will also symbolise the blood and sweat of the brave men and women who fought for the country's freedom.
- The Amrit Vatika will be inaugurated on August 15 by Prime Minister, who will also pay tributes to the martyrs and freedom fighters at the National War Memorial. The garden will be open to the public from August 16 onwards, and will showcase various cultural and artistic performances, exhibitions and workshops related to the theme of 'Meri Maati Mera Desh'.

Meri Mati Mera Desh Campaign Implementation:

- Young volunteers will gather soil from every panchayat and hamlet and bring it to the block, where **'Mitti Kalash' (pots of soil)** would be ceremoniously conveyed to Delhi. The gathered soil will be used to build the Amrit Vatika, a special garden celebrating national integrity and the warriors of the Indian freedom struggle, near Delhi's Kartavya Path.

Amrit Kalash Yatra:

- There will also be an Amrit Kalash Yatra during the "Meri Mati Mera Desh" campaign. With 7,500 Kalash from villages and other parts of the nation, this "Amrit Kalash Yatra" would transport soil from these locations to Delhi. Additionally, this yatra will transport plants from different regions of the nation. These 7,500 Kalash of earth and vegetation will be used to construct a "Amrit Vatika" next to the National War Memorial.