ASTRA

COMPLETE COVERAGE OF MONTHLY CURRENT AFFAIRS

SEP 2024

Ignite IAS
IGNITING INTELLECTUALISM IN YOUNG MINDS

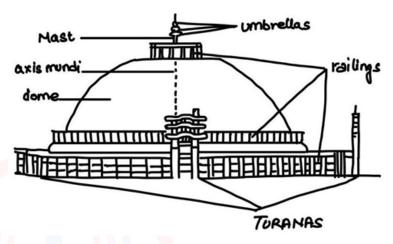Ignite IAS

Why in news?

- India's External Affairs Minister recently visited the full-scale replica of the East Gate of the Sanchi Stupa, exhibited at the **Humboldt Forum Museum** in Berlin, Germany.

About Sanchi Stupa

- The Sanchi Stupa was built by the Mauryan emperor **Ashoka** in the **third century** BC.
- During the 2nd century BC, in the **Shunga period**, the stupa was expanded with sandstone slabs, a circumambulatory walkway, and a harmika topped with a chattra (umbrella).
- Carved gateways or **toranas** were added later during the **Satavahana dynasty**.
- The site of Sanchi was rediscovered by **General Henry Taylor** in 1818.
- The first scientific excavation was led by **Major Alexander Cunningham** and **Lieutenant-Colonel F.C. Maisey** in 1851.

Structure of the Stupa

- The stupa has a hemispherical dome that is surrounded by a railing and four gateways, each adorned with intricate carvings and sculptures depicting stories from the life of Buddha (**Jataka tales**).
- The main body (anda) of the stupa symbolises the cosmic mountain. It is topped by a **'harmika'** to hold the triple umbrella, or **'chhatraveli',** which represents the three jewels of Buddhism – the Buddha, the Dharma, and the Sangha.
- At Sanchi Stupa, the historical narratives such as the siege of Kushinara, Buddha's visit to Kapilavastu, visit of Ashoka to the Ramgrama Stupa are carved with considerable details.
- Today, the **Sanchi Stupa** is recognized as a **UNESCO World Heritage Site.**

Why in news?

- The Government of India has **renamed Port Blair** to 'Sri Vijaya Puram' to shed its colonial past and honour the area's historical connection to the ancient Srivijaya Empire.

About Port Blair

- The **gateway to the Andaman and Nicobar Islands** takes its name from **Archibald Blair, a naval surveyor and lieutenant in the Bombay Marine.** His comprehensive survey of the Andaman Islands was instrumental in the city's establishment.
- Port Blair, now officially named **Sri Vijaya Puram**, is the capital of the Andaman and Nicobar Islands, a union territory in the Bay of Bengal.
- The city is home to several key military installations. The Indian Navy's major naval base, **INS Jarawa, is located in Port Blair.**
- It also hosts air and sea bases operated by the Indian Coast Guard, and Andaman and Nicobar Police.
- The Andaman and Nicobar Command, India's first integrated tri-command comprising the Army, Navy, and Air Force, is based here.
- **Historical Significance:** On 30 December 1943, **Netaji Subhas Chandra Bose** raised the national flag for the first time on Indian soil at Port Blair, fulfilling his pledge that the Indian National Army (INA) would set foot on Indian territory by the end of 1943.

Port Blair's connection with the imperial Cholas and Srivijaya

- **Srivijaya** was an ancient empire based in Sumatra, with influence across Southeast Asia, and played a key role in spreading Buddhism.
- The empire is believed to have **declined in the 11th century** after a series of naval raids by the Chola dynasty on its ports.
- Historical records suggest that the **Chola emperor Rajendra I used the Andaman Islands** as a strategic naval base in the 11th century.
- The **Chola invasion of Srivijaya was significant,** as it marked a rare instance of conflict in India's otherwise peaceful relations with Southeast Asia.
- An **inscription found at Thanjavur**, dating to 1050 CE, **refers to Nicobar as "Ma-Nakkavaram land"** (meaning great open land), which possibly influenced the modern name Nicobar under British rule.
- Renaming Port Blair to Sri Vijaya Puram is seen as a **tribute to the city's role in shaping Independent India**, while moving beyond its colonial legacy.

Multilingual Technical Terms Portal | Art & Culture

Why in news?

- Commission for Scientific and Technical Terminology (CSTT) under the aegis of the Union Education Ministry, has launched a unique website which provides technical terms in all 22 official Indian languages.

About the 'Shabd' Glossary Platform

- The **"Shabd" platform**, launched in March 2024, serves as a **digital repository**
- for the Commission for Scientific and Technical Terminology (CSTT) glossaries.
- It offers **searchable access to technical terms** across all 22 official Indian languages.
- **Key Features:**
  - Users can search terms by language, subject, type of dictionary, and language pairs.
  - The platform also allows users to provide feedback on existing terms and supports the inclusion of digital glossaries from other institutions.
  - The terminology produced by CSTT is widely used by **Granth Academies,** textbook boards, and educational institutions such as the **NTA, NCERT, and AICTE** for academic and educational purposes.

Jaipur's UNESCO Status | Art & Culture

Why in news?

- The heritage conservation and redevelopment of UNESCO World Heritage Sites of The Walled City of Jaipur to be funded with **Rs 100 Crores.**

About the Walled City of Jaipur

- **Founded by Sawai Jai Singh II, the Kachwaha Rajput ruler of Amber,** the historic fortified city of Jaipur was laid out on the plains with a grid plan inspired by Vedic architecture.
- Known for its distinctive pink-coloured buildings, which give it the nickname **"Pink City."**
- The Walled City's heritage status reflects its distinctive grid-based street layout with colonnades that form large public squares called **chaupars.**
- **The city's urban planning** integrates ancient Hindu, Mughal, and Western influences.
- The Walled City is renowned for its landmarks, including **the** 400-year-old Man Sagar Lake, Hawa Mahal, Govind Dev Temple, City Palace, Tripolia Gate, Ajmeri Gate, Sanganeri Gate, Zorawar Singh Gate, Jantar Mantar Observatory.

> **About UNESCO**
> - **United Nations Educational, Scientific and Cultural Organization (UNESCO)**
> - is a specialised agency of the United Nations (UN).
> - Founded in **November 1945** .
> - Headquartered at **Paris, France**.
> - It seeks to build peace through international cooperation in Education, the Sciences and Culture.

UNESCO World Heritage Sites in India

- As of 2024, India has 43 UNESCO World Heritage Sites:
- Cultural sites - 35 , Natural sites - 7 , Mixed sites - 1

LIST OF UNESCO WORLD HERITAGE SITES IN INDIA

Jantar Mantar
Jaipur City
Fatehpur Sikri
Taj Mahal
Agra Fort
Mahabodhi Temple
Keoladeo National Park
Hill Forts of Rajasthan
Manas Wildlife Sanctuary
Kaziranga N.P
Archaeological Site of Nalanda Mahavihara
Dholavira
Rani ki Vav
Elephanta Caves
Ajanta Caves
Khajuraho Group of Monuments
Group of Monuments at Pattadakal
Buddhist Monuments at Sanchi
Group of Monuments at Hampi
Rock Shelters of Bhimbetka

Why in news?

- International Conference on Green Hydrogen (ICGH-2024) was held from September 11–13, 2024 at **Bharat Mandapam in New Delhi.**

About ICGH

- India launched the National Green Hydrogen Mission on 4th January, 2023. The Mission aims to establish a Green Hydrogen ecosystem in India. This will require synergising demand and supply, creation of enabling policy and regulatory frameworks for innovative and affordable solutions. Green Hydrogen can replace fossil fuels and fossil-based feedstocks in several hard-to-abate sectors like Refineries, Fertilisers, Steel and Chemicals and also in sectors like Aviation and Shipping.

- Government of India is organizing an International Conference on Green Hydrogen (ICGH-2024) on 11-13 September 2024 at Bharat Mandapam, New Delhi to discuss the recent advances and upcoming technologies across the entire Green Hydrogen value chain. The forum will provide an opportunity to discuss the evolving Green Hydrogen landscape and network with global scientific community and industry. The 3-day mega event will feature plenary talks, expert panel discussions and technical deliberations around establishing Green Hydrogen ecosystem and catalyzing a systemic approach for meeting the global goals for decarbonization through Green Hydrogen. Apart from domain-specific interaction on hydrogen production, storage, distribution and downstream applications, the conference will also be discussing green financing, human resource upskilling and startup initiatives in this area.

India's Achievements:

- Paris Commitments: India is among the first G20 nations to meet its Paris Agreement commitments on green energy, achieving its targets nine years ahead of the 2030 deadline.
- Energy Goals: India has pledged to increase its non-fossil energy capacity to 500 GW and reduce projected carbon emissions by 1 billion tonnes by 2030.
- Capacity Increase: Non-fossil fuel capacity in India has grown by nearly 300% over the past decade.

Emerging Importance of Green Hydrogen:

- Decarbonization: Green hydrogen is crucial for decarbonizing sectors that are difficult to electrify, such as refineries, fertilizers, steel production, and heavy-duty transportation.
- Energy Storage: It also acts as a storage solution for surplus renewable energy, offering a way to manage energy supply and demand.

Investment in Research:

- The conference advocated for increased investment in research and development, encouraging partnerships between industry and academia and supporting start-ups and entrepreneurs in the green hydrogen sector.
- The Prime Minister urged experts and the scientific community to lead the adoption of green hydrogen technologies.

G20 Summit Insights:

- Hydrogen Principles: The New Delhi G-20 Leaders' declaration introduced five high-level voluntary principles on hydrogen, aiding in the creation of a unified roadmap for hydrogen development.
- Critical Questions: The PM highlighted the need to improve electrolyser efficiency, explore the use of seawater and municipal wastewater for hydrogen production, and assess green hydrogen's role in public transport and shipping.

India's Upcoming Initiatives:

- European Hydrogen Week Partnership: India has announced a partnership with European Hydrogen Week in November 2024, focusing on aligning with the EU's green regulations.
- Hydrogen-Fueled Train Trials: Indian Railways plans to trial the first hydrogen-fueled train in January 2025, converting a 1200 KW DEMU (Diesel Electric Multiple Unit) into a hydrogen fuel cell-based DPRS (Distributed Power Rolling Stock).

National Green Hydrogen Mission
- Components:
  - Facilitating demand creation through exports and domestic utilization.
  - **Strategic Interventions for Green Hydrogen Transition (SIGHT) programme**, which includes incentives for manufacturing of electrolysers and production of green hydrogen.
  - Pilot Projects for steel, mobility, shipping etc.
  - Development of **Green Hydrogen Hubs.**
  - Support for infrastructure development.
- Expected outcomes of the Mission, by 2030:
  - Development of green hydrogen production capacity of at least **5 MMT (Million Metric Tonne) per annum** with an associated renewable energy capacity addition of about **125 GW** in the country.
  - Creation of over **Six lakh jobs**.
  - Cumulative reduction in fossil fuel imports over **Rs. 1 lakh crore**.
  - Abatement of nearly **50 MMT** of annual greenhouse gas emissions.

International Big Cat Alliance | Environment

Why in news?
- India has formally joined the International Big Cat Alliance (IBCA), which it launched in 2023. After an approval from the Union Cabinet, **India signed and ratified the framework.**

About International Big Cat Alliance
- The International Big Cat Alliance (IBCA) is a collaborative platform consisting of
- **96 big cat range countries**, non-range countries, conservation partners, scientific organizations, business groups, and corporations, working together for big cat conservation.
- The alliance aims at conservation of the **world's seven principal big cats**, which include the **tiger, lion, snow leopard, leopard, jaguar, puma, and cheetah.**
- Out of the 7 big cats, **five— tiger, lion, leopard, snow leopard, and cheetah** are found in India.

Objectives of IBCA
- To combat the **illegal wildlife trade** affecting the seven big cat species.
- To focus on **preserving the natural habitats** of the seven big cat species.
- To mobilize **financial and technical resources** for the effective implementation of conservation and protection initiatives.
- The platform promotes conservation initiatives aligned with **climate leadership** across member countries.
- IBCA integrates biodiversity conservation with the **UN Sustainable Development Goals (SDGs)**.

La Nina | Environment

Why in news?
- Multiple global weather models have now forecasted a delayed emergence of La-Nina. The previous month's La Nina forecasts from all of the top international agencies were wildly inaccurate.

Normal Conditions
- During the normal phase, the eastern Pacific is cooler than the western Pacific
- This is because prevailing trade winds - caused by Earth's rotation, between 30 degrees north and south of the equator - move east to west.
- This sweeps warmer surface water along with them and relatively cool waters from below rise to the surface to replace the displaced water

El Nino

- During the El Nino phase, these trade wind systems weaken, leading to lesser displacement of warmer waters off the American coasts.
- As a result, the eastern Pacific becomes warmer than usual.

La Nina

- The opposite happens in the La Nina phase i.e., trade winds become stronger than usual and push larger quantities of water to the western Pacific.

Impact on Indian Monsoon

- It will have a limited impact on **Southwest Monsoon**
- It may affect the **northeast monsoon**, impacting Tamil Nadu, coastal Andhra Pradesh, Rayalaseema, southern interior Karnataka, and Kerala
- It may bring more frequent, intense, and long-lasting cyclones in the **north Indian Ocean**.
- La Nina is associated with harsher, colder winters in **northern India.**

Cyclone Asna   Environment

Why in news?

- Cyclone Asna, a rare August event, has garnered attention as the first cyclone in the North Indian Ocean during this month since 1981.

About Asna Cyclone

- Its **name**, Asna, was given by **Pakistan.**
- Cyclone Asna initially formed from a strong land-based low-pressure system.
- As the system moved into the warm waters of the Arabian Sea, it intensified into a cyclone. The intensification was fueled by global warming and regional weather patterns.
- However, the cyclone eventually weakened as dry desert air entered and disrupted its circulation.

About Tropical Cyclone

- Tropical cyclones are intense **low-pressure areas** that originate in warm tropical oceans and can extend up to 500–1,000 km horizontally and 12–14 km vertically.
- Tropical cyclones are formed between **30° N and 30° S latitudes.**
- They are known as **Cyclones** in the Indian Ocean, **Hurricanes** in the Atlantic, **Typhoons** in the Western Pacific and South China Sea, and **Willy-willies** in the Western Australia.

> **Cyclone Management in India**
> - The IMD's **early warning system** detects cyclones early, enabling timely evacuations and damage reduction.
> - The **NCRMP**, supported by the World Bank, improves coastal community resilience through cyclone shelters, infrastructure, and evacuation routes.
> - Coastal protection initiatives use **natural barriers** like mangroves and artificial barriers such as seawalls to mitigate cyclone impact.

- The Indian government's **retrofitting program** strengthens cyclone shelters in vulnerable areas.
- The **ICZM Project** enhances coastal resilience through sustainable practices, including vulnerable zone mapping and conservation efforts.
- IMD uses a **colour-coding system** (green, yellow, orange, red) to indicate the severity of cyclones and alert the public.

Mission Mausam   Environment

Why in news?
- The Union Cabinet approved Mission Mausam with a budget outlay of 2,000 crores over two years. It aims to make India '**Weather Ready' and 'Climate Smart'**.

About Mission Mausam
- **Objectives**:
    - Improve understanding of weather and climate processes and prediction capabilities
    - Develop improved earth system models, and data-driven methods (use of AI/ML)
- **Features**:
    - Develop Cutting Edge Weather Surveillance Technologies & Systems
    - Implement Higher-resolution atmospheric observations with better temporal and spatial sampling/coverage Implement Next generation radars and satellites with advanced instrument payloads
    - Implement High-Performance Computers (HPC).
- **Ministry**: Ministry of Earth Sciences (MoES)
- **Implementing agencies**:
    - India Meteorological Department (IMD)
    - National Centre for Medium-Range Weather Forecasting (NCMRWF)
    - Indian Institute of Tropical Meteorology (IITM)

World Ozone Day   Environment

Why in news?
- World Ozone Day is celebrated every year on 16 September

About world ozone day
- Its purpose is to spread awareness among people about the depletion of the ozone layer
- This day is celebrated in memory of the Montreal Protocol.
- The Montreal Protocol was signed on 16 September 1987
- The Montreal Protocol is a landmark multilateral environmental agreement
- It regulates the production and consumption of man-made chemicals referred to as ozone-depleting substances (ODS).
- The first World Ozone Day was celebrated in the year 1994
- Theme of World Ozone Day 2024 - "Montreal Protocol: Advancing Climate Action"

Initiatives to preserve ozone layer
- **Vienna Convention for the Protection of the Ozone Layer**
    - This was formalized in the Vienna Convention for the Protection of the Ozone Layer, which was adopted and signed by 28 countries, on 22 March 1985.
    - In September 1987, this led to the drafting of The Montreal Protocol on Substances that Deplete the Ozone Layer.
- **The Montreal Protocol and Kigali Agreement**
    - **The Montreal Protocol on Substances that Deplete the Ozone Layer** is considered the world's most successful international environmental treaty.
    - It was adopted on 16 September 1987 and entered into force in 1989.

- **Universal ratification:** On 16th September 2009, the Vienna Convention and the Montreal Protocol became the first treaties in the history of the United Nations to achieve universal ratification.
- Under the Protocol, nations phased **out chlorofluorocarbons (CFCs)** – a class of compounds that were used mostly in **aerosol sprays, refrigerants, foams and as solvents, and were damaging the protective ozone layer.**
- Because ozone-depleting substances and many of their substitutes are also potent greenhouse gases, their phase-out under the Montreal Protocol is critical to international efforts to address climate change.
- **Kigali agreement**
- A landmark agreement was reached October **15, 2016, at the 28th Meeting** of the Parties of the Montreal Protocol in Kigali, Rwanda, to phase down **hydrofluorocarbons (HFCs).**
- On January **1, 2019, the Kigali Amendment entered into force.**
- HFCs are not **harmful to the ozone layer**, but a fast-growing source of potent **greenhouse gases contributing to climate change.**
- HFCs are widely used in **refrigeration** and air conditioning, foam blowing, and other applications.
- The Kigali Amendment sets out a **schedule of targets and timetables** for all developed and developing countries to phase down their use of HFCs (**Phase-out by 2030 in developed countries and 2040 in developing countries).**
- The amendment links these control requirements with a renewed commitment by developed countries to provide financial support for developing countries through the **Protocol's Multilateral Fund.**
- **The Multilateral Fund**
- The Multilateral Fund for the Implementation of the Montreal Protocol was established in 1991 under Article 10 of the treaty.
- The Fund's objective is to provide financial and technical assistance to developing country parties to the Montreal Protocol whose annual per capita consumption and production of ODS is less than 0.3 kg to comply with the control measures of the Protocol.
- Since its inception, the Multilateral Fund has supported over 8,600 projects including industrial conversion, technical assistance, training and capacity building worth over US$3.9 billion.

Wildlife Week India   Environment

Why in News?
- The Forest department has organises **awareness rally to launch Wildlife Week India**.

About Wildlife week:
- The Wildlife Week is celebrated all over the country every year **between 2nd October and 8th October**
- The aim of this week is to **preserve animal life in India**.
- The event is **organized by National Board of Wildlife since its establishment in 1972**.
- The **theme** of this year's event is "**Wildlife Conservation Through Coexistence.**"
- The events are organized to teach people about animal life and encourage them to save a large number of animals by not killing them for food and other purposes.

About National Board of Wildlife:
- The NBWL has been constituted under the **Wildlife Protection Act,1972.**
- NBWL advises the government on **policy and strategy for wildlife conservation**
- It also **reviews proposals for non-forestry use of forestland within National Parks** and **Wildlife Sanctuaries** and issue or deny permissions.
- The **NBWL is chaired by the Prime Minister**.It also comprises of a **Standing Committee headed by Union Environment Minister**
- The **Wildlife Protection Act,1972** specifies that the **committee should comprise of 10 eminent ecologists and five NGOs.**
- The committee **considers the merits of projects** that come to it for scrutiny

Why in news?

- India is the **top plastic polluter, emitting 9.3 million tonnes** annually, or about one-fifth of global emissions, according to new study published in the journal Nature.

About the report

- India burns roughly 5.8 million tonnes (mt) of plastic each year, and releases another 3.5 mt of plastics into the environment (land, air, water) as debris.
- **Nigeria and Indonesia** are the **second and third** largest polluters, with 3.5 million tonnes and 3.4 million tonnes respectively, while **China ranks fourth.**
- 69% (35.7 million tonnes) of the **world's plastic waste annually comes from 20 countries.**
- High-income **countries generate more plastic waste** but rank outside the top 90 polluters due to 100% collection coverage and controlled disposal.
- On a per-capita basis, **China ranks 153rd and India 127th,** despite being high absolute emitters, reflecting significant population sizes and varying waste management systems.

Reasons for Plastic Pollution in India

- **Population Growth and Affluence:** India's large and growing population, coupled with increasing affluence, leads to more waste. The country struggles to provide adequate waste management services, exacerbating the issue.
- **Dumping Sites vs. Landfills:** Uncontrolled land disposal in dumping sites is prevalent, outnumbering sanitary landfills by a ratio of 10 to 1.
- **Waste Generation and Collection Rates:** India's official waste generation rate is 0.12 kg per capita per day, which may be underestimated, while waste collection is potentially overestimated. The study indicates a more accurate waste collection average of 81%.
- **Plastic Waste Burning:** Approximately 5.8 million tonnes of plastic waste are openly burned each year in India.

Government Initiatives Toward Plastic Management

- Plastic Waste Management Rules, 2024.
- Swachh Bharat Mission-Urban (SBM-U) 2.0.
- Global Plastic Action Partnership (GPAP).
- World Environment Day.

SIMULTANEOUS ELECTIONS

LS + Ass
Local (within 100 days)

[Why]
CA → High powered committee (R. kovind comm.) Reco.; Cabinet ✓
EC → Expressed Readiness.

• For Synchronization

History

1st 3 general elections — Simultaneous; exceptions — Kerala (1960) / Nagaland & Puducherry

Last SE → 1967

why last → After 1977 elec → Assemblies dissolution.
→ Premature dissolution of 4th LS. in 1971.
→ Extension of LS during emergency

Need / +ves:

1) Cost efficiency & resource savings.
   • 2019 LS — 60k cr. Single → Mul. booth → electi -on

2) Admin. efficiency - MCC ↓
   • Policy paralysis ✗

3) Focus on gov. > populism.
   • Election centric policies ↓ ↑
   [Law comm (2018)]

4) Reduced political polarization.
   • Constructive governance

5) Improved voter turnout
   • EC → UP / Bihar — LS elec ↑ / Assem. ↓

6) Social Harmony.
   • ↑ string escalation of commu -nalism & casteism.

7) Sus. dev. (long term)

Challenges in Impl.

1) Constl & legal — Ar. 83
   • Fixed tenure of LS & Ass.
   [Ar. 83, 85, 172, 174, 356]
   Amendments — Ar. 172
   Special maj → ② — States ratification 50%.

2) Political will & Consensus
   • Regional parties ✗ Issues ↓   TMC, DMK

3) Impact on federalism
   • Undermine Ⓕ structure

4) Logistical Challenges
   └ EM's, VVPAT's, personnel
   • 2019 LS → 10M. Empl.

5) Premature dissolution of assm.
   • JEK, MP (2020)

6) Voter confusion & impact on voting behaviour.
   • Coattail effect (EC)

7) Against multiparty democracy
   • Blurred lines of U & S. elec.

8) Inconsistent with west mini -ster dems. & fed.

World | SE's

S. Africa
Indonesia,
Sweden, Belgium,
Phillipines, Brazil

WF:
1) Debate on SE
   L calls for careful
   consideration & consensus

Recommendations : [Advance + post pone] ; No.cofidence motion → CV of NC

1) Law comm. (707ᵗʰ)
   - 2 phases over time, CA to Ar.83 & 172. [Amend RPA]
   - Mid term elections to assemblies of dissolved earlier & Synchronisation [scheduled bye-elections]
   - Awareness ; conducting elections falling in a Calender yr. together
   - Dilute Anti-defection Law → make exceptions to prevent stalem -ates in the assembly during hung.   Indi. as future PM

2) EC
   - No-confidence motion should include a confidence motion for a named
   - If unavoidable situation → President + appointed CoM.   [Germany]
   - Mandatory simultaneous confidence motion ; Gov+com/Ar.356 PH → Premali dissolves

3) Par. stan. comm. on P, PG & L.Justice — Political Consensus, addressing concerns of [Premati dissolves] Regional Parties issues.

4) NITI AAYOG (Discussion Paper 2017)   SE ✓ [Phased Impl.
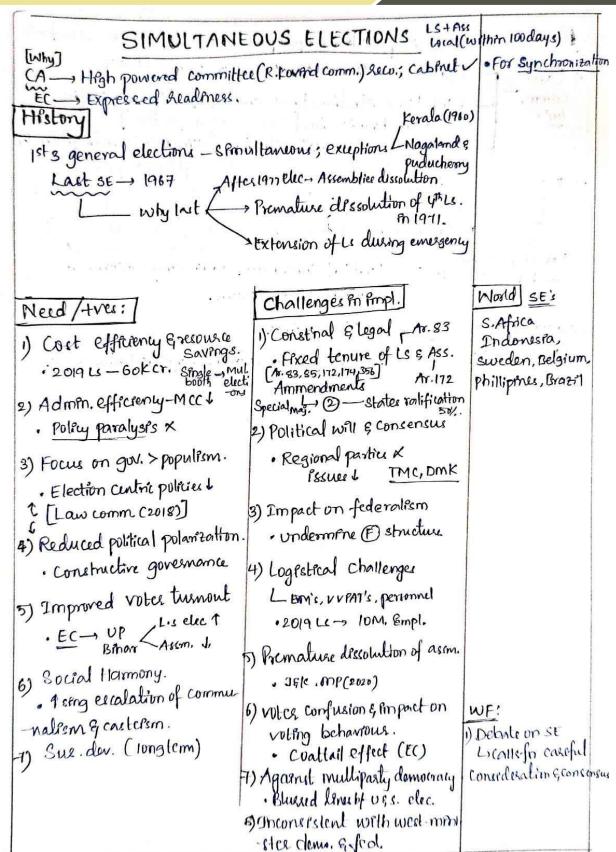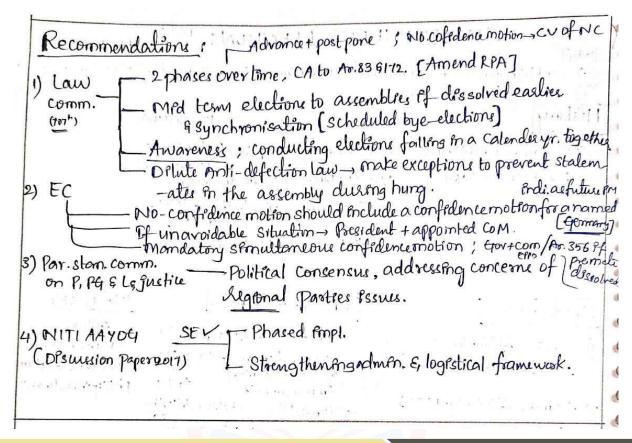   [Strengthening admn. & logistical framework.

Why in news?
- The Public Accounts Committee (PAC) will hold a performance review of "regulatory bodies established by Act of Parliament", such as the Securities and Exchange Board of India (SEBI)

About Public Accounts Committee
- Set up first under the **Government of India, Act 1919**.
- It consists of **22 members** (15 from Lok Sabha + 7 from Rajya Sabha).
- Members are elected according to the principle of **proportional representation**
- by means of a single transferable vote. The term of office is one year.
- A minister **cannot** be elected as its member.
- The chairman is appointed from amongst its members by the speaker.
- It examines the annual audit reports of the **Comptroller and Auditor General of India (CAG)**, which are laid before the Parliament by the President.

Limitation on effectiveness
- **Lack of enforcement power**: The PAC's recommendations are advisory in nature and not binding on the government. On average, only about 80% of PAC recommendations are accepted by the government each year. The PAC has no mechanism to enforce corrective measures even when it identifies irregularities in public expenditure.
- **Examining past expenditures only:** The PAC examines government expenditures already incurred. It has no power to limit or control ongoing or future expenses. This limits its ability to prevent financial irregularities in real time.
- **Limited mandate:** The PAC cannot examine or question broader government policies. It is restricted to reviewing the financial propriety and economy of expenditure within existing policies.
- **Lack of technical expertise:** PAC members are often generalists without specialized financial/accounting

knowledge to analyze complex CAG reports. The PAC report on the 2010 Commonwealth Games, submitted in 2016-17, highlighted issues like delays and opaque appointments but lacked in-depth financial scrutiny.

- **Delays in reporting:** There are often significant delays between the actual expenditure, the CAG audit, and the PAC examination. For example, the PAC report on the 2010 Commonwealth Games was submitted 6-7 years after the event.
- **Workload challenges:** The number of PAC reports has increased significantly in recent years—from 11 in the 12th Lok Sabha to 187 in the 16th Lok Sabha. This increasing workload strains the committee's capacity.
- **Political considerations:** While the PAC chair is traditionally from the opposition, the majority of members are from the ruling party/coalition. This can potentially impact the committee's ability to examine government expenditure critically.
- **Limited public engagement:** PAC proceedings are not open to the press or public, limiting transparency.
- **Inadequate follow-up:** While sub-committees are formed to examine the implementation of recommendations, there is no robust mechanism to ensure compliance.
- **Resource constraints:** The PAC often lacks adequate professional staff and research support to conduct in-depth examinations of complex financial matters.

23rd Law Commission Polity

Why in news?
- The Union Government notified the constitution of 23rd Law Commission with effect from **1st September 2024 to 31st August 2027.** The chairpersons and members of the commission are yet to be decided by the Cabinet Committee on Appointments chaired by the PM.

About Law Commission
- **A non-statutory**, **non-constitutional** and **advisory body** of the Union Government.
- Created by the **President's assent** when the **resolution** for the same is passed by the Union government.
- Established for a **fixed tenure**.
- **Composition**- headed by a **Chairperson**, who is usually a retired Supreme Court judge + other legal experts, academicians, and senior advocates.

History of Law Commission
- The First Law commission in **pre-independent India** was formed in **1834** by the **Charter Act of 1833** and was headed by **Lord Macaulay**. It recommended the codification of the **Indian Penal Code** and **Criminal Procedure Code**.
- The First Law Commission of **Independent India** was established in **1955**, headed by **M.C. Setalvad.**
- **22nd Law Commission** was chaired by **Justice Ritu Raj Awasthi**.

Terms of Reference of 23rd Law Commission
- **Review/Repeal/Amendment** of obsolete laws.
- Examine **laws affecting the poor** and conduct post-enactment audits of
- **socio-economic legislation**.
- Ensure economic disposal of cases by **elimination of delays**, **simplification of process** and **speedy clearance of arrears**.
- Examine existing laws and suggest reforms to ensure the **effective implementation of DPSP**s and to attain the objectives set out in the **Preamble**.
- Examine the impact of globalisation on **food security**, and **unemployment** and recommend measures for the **protection of the marginalised**.
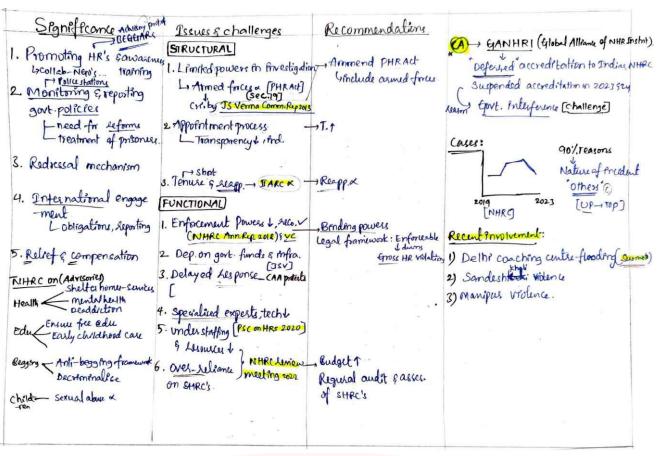
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Why in news?

- Human rights groups question the **delay in the appointment** of the NHRC chairperson.

Why in news?

- President Droupadi Murmu emphasised that poor villagers should not hesitate to approach courts due to fears of prolonged litigation caused by frequent adjournments. She stressed that they should not endure injustice in silence but instead seek justice through the legal system.

Current Statistics

- **Supreme Court**: As of September 2023, the Supreme Court of India has around 70,000 cases pending.
- **High Courts**: There are over 4.5 lakh cases pending in the High Courts.
- **District and Subordinate Courts**: The total pendency is approximately 4.5 crore cases.

Culture of Adjournments in the Indian Judiciary

- The "culture of adjournments" refers to the frequent postponement or deferral of court hearings, leading to delays in case resolutions. This practice has become prevalent in Indian courts, contributing to the rising backlog of cases.
- **Common Reasons for Adjournments**
    - **Advocate Unavailability**: Lawyers often request adjournments due **to** scheduling conflicts or unavailability.
    - **Case Unpreparedness**: Either party might seek more time to prepare or submit evidence, leading to adjournments.
    - **Witness Absence**: Non-appearance of key witnesses or parties involved in the case can cause delays.

- **Judge's Workload**: Judges, dealing with a high volume of cases, may also request adjournments to manage their schedule.
- **Recommendations for Improvement**
  - **Enforcing Adjournment Limits**: Stricter adherence to legal provisions limiting the number of adjournments during a trial.
  - **Judicial Accountability**: Judges should maintain control over case management, ensuring adjournments are granted only when absolutely necessary.
  - **Digitization and Case Management Systems**: Adoption of technology and digital tools can help track case progress, manage schedules efficiently, and reduce adjournments. For example: **E-Courts Project**
  - **Penalising Unnecessary Adjournments**: Courts should impose penalties on lawyers or litigants who misuse adjournments for undue advantage.

Lie Detector Tests & Judicial Cases   Polity

Why in news?
- The CBI has been authorized to perform a polygraph test on the key suspect in the rape and murder case of a postgraduate doctor at Kolkata's RG Kar Medical College.

Polygraph Test (Lie detector test)
- A **polygraph test** (lie detector test) is a scientific method used to assess if someone is being truthful or deceptive.
- The test measures physiological responses such as **heart rate**, **blood pressure**, **respiratory rate**, and **skin conductivity**.
- Sensors are attached to the individual while they answer a series of questions.
- The examiner monitors changes in physiological responses to detect any significant deviations.
- These deviations may indicate **dishonesty** or inconsistencies in the person's answers. The data analysis helps in identifying possible signs of lying.

Judicial Cases
- In Selvi v. State of Karnataka (2010), the Supreme Court of India ruled that compulsory polygraph tests, narco-analysis, and brain mapping are unconstitutional as they violate the **right against self-incrimination (Article 20(3))** and **personal liberty (Article 21)**, and can only be conducted with the individual's **consent** and necessary safeguards.
- In Nandini Satpathy v. P.L. Dani (1978), the Supreme Court reaffirmed that compelling a person to undergo any self-incriminating test or procedure violates the **right to silence** under **Article 20(3)**, setting a precedent for later rulings on forced tests.
- In Ramchandra Reddy v. State of Maharashtra (2004), the Bombay High Court allowed the use of **narco-analysis** for investigative purposes, but not as conclusive evidence, a decision later refined by the **Selvi judgment**, which made **consent mandatory**.
- In Ritesh Sinha v. State of Uttar Pradesh (2019), the Supreme Court ruled that **voice samples** could be collected for investigations. Still, it reaffirmed that all investigative techniques, including polygraph tests, must be **voluntary** and no compulsion is permissible.

Limitations of Polygraph Tests in India
- **Inadmissibility in Court**: Polygraph test results are generally **not accepted as conclusive evidence** in Indian courts, as they lack scientific reliability.
- **Voluntary Consent Required**: As per the **Selvi v. State of Karnataka (2010)** ruling, polygraph tests can only be conducted with the **individual's consent** and safeguards in place, such as legal representation.
- **Potential for Inaccurate Results**: The test may produce **false positives or negatives**, as physiological responses can be affected by stress, anxiety, or other emotional factors unrelated to deception.
- **Violation of Constitutional Rights**: Forced administration of polygraph tests can violate the **right against self-incrimination (Article 20(3))** and **personal liberty (Article 21)**.

-

Why in news?

- The Supreme Court ruled that the **Enforcement Directorate (ED)** cannot violate an **accused's right to silence** by coercing self-incriminatory statements in a separate money laundering case while in judicial custody.

Overview of the Verdict

- The Supreme Court ruled that the ED cannot compel a judicially detained accused to make self-incriminatory statements in a separate money laundering case, reinforcing the right to silence and protection against self-incrimination under Article 20(3).
- **Article 20(3)** ensures that no person accused of an offence shall be compelled to be a witness against themselves. It is a fundamental right that protects individuals from being compelled to be witnesses in their own criminal prosecution. The judgment emphasised that individuals in
- custody lack the capacity to operate with a free mind, rendering any self-accusatory statement inadmissible. The court mandated that the ED must seek judicial permission before recording such statements, reinforcing protections against coercive interrogation practices.

Prevention of Money Laundering Act 2002

- Objective: To prevent and control money laundering. To confiscate and seize the property obtained from the laundered money.
- Defines Money Laundering: Section 3 of PMLA defines offence of money laundering as whosoever directly or indirectly attempts to or knowingly assists or is actually involved in any process or activity connected with the proceeds of crime and projecting it as untainted property shall be guilty of offence of money-laundering. This is a wide definition so that everyone who is part of the process can be brought to justice.
- Obligations for Financial Reporting Entities: The Act prescribes obligation of banking companies, financial institutions and intermediaries (called 'Reporting Entities') for verification and maintenance of records of the identity of all its clients and also of all transactions and for furnishing information of such transactions in prescribed form to the Financial Intelligence Unit-India (FIU-IND).
- Enforcement Bodies Empowered under PMLA-
  - Enforcement Directorate: to carry out investigations in cases involving offence of money laundering and also to attach the property involved in money laundering
  - Financial Intelligence Unit-India (FIU-IND): empowered to impose fine on banking company, financial institution or intermediary if they or any of its officers fails to comply with the provisions of the Act.
  - Special Courts: PMLA envisages designation of one or more courts of sessions as Special Court or Special Courts to try the offences punishable under PMLA
  - Appellate Authority: to hear appeals against the order of the Adjudicating Authority and the authorities like Director FIU-IND

Concerns with the PMLA Act 2002

- **Inclusion of minor and less serious offenses:** Including minor offenses in the PMLA dilutes the law's original intent and focus.
- **Equates punishment for ordinary crimes with serious crimes:** PMLA equates penalties for ordinary crimes and serious economic offenses, treating them similarly.
- **Broad Definition of 'Proceeds of Crime':** The broad definition of 'proceeds of crime' gives authorities considerable discretion, raising concerns about misuse.
- **Stringent Bail Conditions:** Accused individuals face denied bail unless proven innocent, contradicting principles of Anglo-Saxon jurisprudence.
- **Burden of Proof of innocence on the accused:** Placing the burden of proof on the accused challenges the fairness of the trial process.
- **Against the Federal principles and Basic structure Doctrine:** The ED can investigate without state consent, undermining federalism and the Constitution's Basic Structure.

Why in news?

- West Bengal Governor forwarded the Aparajita Woman and Child (West Bengal Criminal Laws Amendment) Bill, 2024 to the President for her review and approval.
- The **Aparajita Woman and Child Bill (2024)**, passed by the West Bengal Assembly, introduces stringent legal measures to combat sexual crimes, especially targeting crimes against children.

Key Points

- **Capital Punishment for Rape**: The bill allows the death penalty for cases where rape results in the victim's death or leaves the victim in a vegetative state. Life imprisonment without parole is also mandated for rape convictions.
- **Faster Investigations and Trials**: The bill requires that investigations in rape cases be completed within 21 days, and trials are to be concluded within 30 days. This is a significant reduction compared to existing timelines.
- **Aparajita Task Force**: A dedicated task force is proposed to oversee timely investigations and ensure enforcement of the law.
- **Protection of Minors**: The bill brings stricter punishments for crimes against children, including life imprisonment and death for penetrative assault on minors
- **Amendments to Central Laws**: The bill modifies sections of the Bharatiya Nyaya Sanhita (BNS) and the Indian Penal Code (IPC), aiming to close gaps in current laws. These amendments make punishments more severe than central legislation.

Rape-related laws in India

- **Section 375 & 376 of IPC**: These sections define rape and outline punishments. Section 376 provides imprisonment ranging from 10 years to life, with stricter penalties for aggravated cases like gang rape, child rape, or when rape leads to death or vegetative state.
- **POCSO Act, 2012:** It prescribes stringent punishments, including the death penalty for aggravated sexual assault on children under 12.
- **Criminal Law (Amendment) Acts (2013 & 2018):** These amendments expanded the definition of sexual crimes, introduced harsher punishments, and fast-tracked legal proceedings.
- **POSH Act (Prevention of Sexual Harassment Act), 2013**: This act provides a legal framework to prevent and address sexual harassment of women at the workplace.
- **Vishaka Guidelines (1997)**: Issued by the Supreme Court, these guidelines laid the foundation for addressing workplace harassment before the POSH Act was enacted.

Why in news?

- The Bombay High Court **struck down** the amended provision of **Information Technology Rules, 2023,** which empowered the Centre to set up a **fact check unit (FCU).**

Judgment

- Violative of **Article 14 and 19 (1) (a) and 19 (1) (g)** of the Constitution.
- The expressions "**fake, false or misleading**" are vague and overbroad, and the test of proportionality is not satisfied.
- Restrict the fundamental right under **Article 19 (1) (a)** (Freedom of speech and expression) by placing restrictions which were not as per reasonable restrictions provided under Article 19 (2).
- Chilling effect for the intermediary due to the threat of **losing safe harbour protection**.
- The Centre's argument that FCU decisions can be challenged in a constitutional court does not constitute an adequate safeguard.

Anusandhan National Research Foundation (ANRF) — Polity

Why in news?
- Inaugural Governing Board meeting of the Anusandhan National Research Foundation (ANRF) chaired by the Prime Minister of India.

Anusandhan National Research Foundation (ANRF)
- **ANRF** is established under the **ANRF Act, 2023**, with the mandate to fund, promote, and coordinate research activities across India's higher education institutions.
- Its creation responds to the long-standing research infrastructure gaps in Indian universities, particularly **state-run institutions**, which host 95% of the student population but often lack the resources for research.

Significance of ANRF
- **Addressing Infrastructure Gaps in Higher Education**:
  - ANRF's primary goal is to fill the **infrastructure void** in both **state and central universities**.
  - Unlike prestigious IITs and IIMs, which cater to less than 1% of the student body, state institutions often lack access to quality research facilities.
  - By targeting these underfunded institutions, ANRF seeks to democratize research and bring about **inclusive academic development** across the country.
- **Funding Structure and Private Sector Involvement**:
  - The total funding for ANRF is **Rs 50,000 crore** over five years, with **Rs 14,000 crore from the government** and the remaining funds sourced from **industry, philanthropists, and non-governmental entities**.
  - This mirrors successful international models where **private sector R&D** funding plays a crucial role in driving innovation, ensuring that research aligns with **market needs** and provides financial sustainability.
- **Alignment with National Education Policy (NEP) 2020**:
  - ANRF's mission complements the goals of the **National Education Policy (NEP) 2020**, which emphasizes transforming India into a **knowledge-based economy**.
  - It bridges the gap between **teaching and research**, ensuring that universities become centres of both **academic learning and innovation**.
- **Promoting Industry-Academia Collaboration**:
  - One of ANRF's core objectives is to foster **industry-academia collaboration**, following the **US model** where industries often invest in academic research after a proof-of-concept is established.
  - **Technology transfer offices** in universities, as seen in the US, help convert research ideas into commercially viable solutions.
  - ANRF aims to replicate this by building frameworks for industries to collaborate with Indian universities, ensuring mutual benefit.
- **Simplifying Research Funding and Reducing Bureaucracy**:
  - A key aspect of ANRF's operational structure is to **streamline the disbursal of research funds**, eliminating the **bureaucratic dela**ys that have historically stifled innovation.

- By reducing **General Financial Rules (GFR)** constraints and cumbersome paperwork, ANRF ensures that **researchers receive timely funding** and have more autonomy in pursuing their projects.
- **Coordinating R&D Efforts Across Sectors**:
  - ANRF will act as a **coordinating body**, overseeing R&D efforts across various sectors and ministries such as **defence, agriculture, and health**, to avoid **duplication of efforts** and ensure optimal use of resources.
  - This **streamlined approach** will enhance collaboration and ensure that India's R&D efforts are more cohesive and impactful.
- **Encouraging Research at Lower Technology Readiness Levels (TRLs)**:
  - ANRF focuses on supporting research at **lower Technology Readiness Levels (TRLs)**, where academic institutions play a critical role. These early-stage research projects often involve higher risks and longer timelines, ideal for students and young researchers.
  - Complementing this, the government's **Rs 1 lakh-crore corpus** for higher TRL research through **Focused Research Organisations (FROs)** and **deep-tech startups** ensures that research advances from basic innovation to market-ready technology.
- **Leveraging Philanthropy for Social Good**:
  - Besides industry participation, ANRF encourages **philanthropic contributions** to fund research in areas of **social and public good**, such as healthcare, agriculture, and environment.
  - This dual focus—**market-driven innovation** and **philanthropy-backed social research**—ensures that India's R&D efforts address both commercial and societal needs.
- **Enhancing India's Global Competitiveness**:
  - With ANRF's support, India can significantly enhance its **global competitiveness** in innovation and technology. By nurturing homegrown talent and research capabilities, India can better participate in global markets, akin to countries like **Germany, South Korea, and Israel**.
  - This also positions India as a leader in **knowledge exchange and research partnerships**, especially among developing nations.
- **Building a Sustainable R&D Ecosystem**:
  - ANRF is designed to create a **sustainable research ecosystem**, ensuring that **academic institutions become innovation hubs** and industries benefit from **commercial-ready technologies**.
  - This ecosystem will foster continuous **feedback loops** between academia, industry, and government, driving long-term innovation and development.
- **Bringing Global Best Practices to India**:
  - Drawing inspiration from global research models like the **US National Science Foundation (NSF)**, ANRF aspires to implement best practices in **funding mechanisms**, **research coordination**, and **industry-academia collaboration**.
  - These practices will be adapted to fit the unique context of India's higher education system, ensuring both innovation and inclusivity.

National Award for e-Governance 2024 to Ministry of Women and Child Development   Polity

Why in the news
- Recently the Ministry of Women and Child Development received the National Award for e-Governance 2024 (Gold) for the Poshan Tracker initiative

Poshan Tracker
- Poshan Tracker App was launched by the Ministry of Women and Child Development (MoWCD).
- Poshan Tracker App provides complete beneficiary management of Anganwadi Centre (Child Care Centre) activities, service delivery of Anganwadi workers and pregnant women, lactating mothers and children below six years of age.
- Technology is used to dynamically identify stunting, wasting, underweight children and delivery of nutrition service.
- It ensures a healthy future for children with real-time monitoring and assessment of children's nutritional development.
- It is a key and beneficiary centric service delivery application under Poshan Abhiyaan which encourages analysis with real-time visibility.
- It enables tracking and monitoring of all Anganwadi workers as well as beneficiaries.

Why in news?
- NITI Aayog has released an Expert Group report titled '**Future Pandemic Preparedness and Emergency Response —A Framework for Action'**.

About the report
- This report has provided a blueprint for the country to **prepare for any future public health emergency or pandemic and have a rapid response system in place.** The report **highlights the inevitability of new pandemics** due to dynamic planetary factors such as climate change, human-animal interactions, and ecological changes.

Key Recommendations
- **Enactment of Public Health Emergency Management Act (PHEMA)**
- **Existing laws like the Epidemic Diseases Act (1897) and National Disaster Management Act (2005) were found insufficient during Covid-19.** The Epidemic Diseases Act lacks definitions for "dangerous," "contagious," or "infectious" diseases, and doesn't outline processes for drug/vaccine dissemination or quarantine measures. Similarly, the NDMA does not focus on health-related disasters.
- PHEMA would address these gaps and **empower central and state governments to effectively manage not only pandemics but also other public health emergencies such as those arising from bioterrorism or non-communicable diseases.**

Creation of Empowered Group of Secretaries (EGoS)
- A committee led by the Cabinet Secretary would be established to prepare and monitor public health emergency preparedness during non-crisis periods. The **group would focus on governance, finance, R&D, surveillance, and collaborations, as well as develop Standard Operating Procedures (SOP) for pandemic response.**

Strengthening Disease Surveillance
- Surveillance systems must be improved, particularly for zoonotic diseases like those caused by bat-related viruses, which have been linked to numerous epidemics in recent history.
- **National Biosecurity and Biosafety Network**: The report recommends **a coordinated system of biosafety labs, genome sequencing centers, and research institutions to monitor and respond to biological threats**.
- **Emergency Vaccine Bank**: A reserve of vaccines would be maintained for immediate response to emerging threats.

Building an Epidemiology Forecasting Network
- A **forecasting and modelling network** would be developed to predict disease transmission dynamics and evaluate the effectiveness of countermeasures like vaccines.
- **Network of Centers of Excellence (CoE)** would focus on diagnostics, therapeutics, and vaccines for priority pathogens as identified by the World Health Organisation (WHO).

Independent Drug Regulatory Framework
- India's clinical trial and regulatory framework must be strengthened for faster access to innovative public health solutions during emergencies. **The Central Drugs Standards Control Organisation (CDSCO) should be made independent with special powers to ensure its swift response in future health crises.**

Four Pillars of Pandemic Preparedness
- **Governance, Legislation, Finance, and Management**
- **Data Management, Surveillance, and Early Warning Systems**
- **Research, Innovation, and Capacity Building**
- **Partnerships and Community Engagement**

100-Day Action Plan
- The report emphasizes the importance of the first 100 days in controlling an outbreak. It outlines a strategy for tracking, testing, treating, and managing outbreaks in this critical window to prevent widespread transmission. **The 100-Day Action Plan aims to establish clear roles for agencies, provide adequate resources, and ensure rapid decision-making.**

Why in news?

- India, with over a million people affected, has the **second-largest burden** of sickle cell disease in the world.

Sickle Cell Disorder

- An **inherited disorder** causes red blood cells to assume a crescent shape, leading to increased rigidity and impaired circulation.
- **Symptoms of sickle cell disease**: chronic anaemia leading to fatigue and paleness, painful episodes (sickle cell crisis) causing intense pain in various body parts, and delayed growth and puberty.

Treatment Processes:

- **Blood Transfusions:** Used to alleviate anaemia and lower the risk of pain crises.
- **Hydroxyurea**: A medication that reduces the frequency of painful episodes and helps prevent long-term complications.
- **Gene Therapy and Stem Cell Transplantation:** Techniques like **CRISPR-based gene editing or bone marrow transplants** offer potential curative options for the disease.

Challenges in SCD Treatment and Accessibility

- **Lack of Awareness:** Limited understanding of SCD among the public and healthcare providers leads to delays in diagnosis and treatment.
- **Insufficient Healthcare Infrastructure:** Many rural and tribal areas lack specialised facilities and trained professionals to manage SCD effectively.
- **High Treatment Costs:** Managing SCD involves significant expenses for medications, regular check-ups, and hospitalizations, with advanced treatments like CRISPR costing $2-3 million and difficulties in finding bone marrow donors.
- **Limited Medication Availability:** Inconsistent access to essential medications like hydroxyurea and pain relievers can impact effective management of the disease.
- **Inadequate Screening Programs:** The lack of systematic newborn screening and early detection efforts results in missed opportunities for early intervention and genetic counselling.

Smart Cities Mission

Social Issues & Schemes

Why in news?

- The Smart Cities Mission (SCM), which was launched to enhance the quality of life in urban spaces, has completed more than 90% of the total projects: **Ministry of Housing and Urban Affairs.**

About Smart Cities Mission

- Centrally Sponsored Scheme
- Ministry of Housing and Urban Affairs
- The Smart Cities Mission aims to boost economic growth and enhance quality of life by leveraging technology for local development and smart outcomes in 100 selected cities.
- **Area-based development**
  - Upgrade (retrofit and redevelop) existing areas, including slums, to enhance city livability.
  - New greenfield areas will be developed to accommodate growing urban populations.
- **Pan-city development** will apply smart solutions using technology and data to improve services. For example, intelligent traffic management systems, wastewater recycling and smart metering.

Challenges

- **Funding**: Cities must create a business model to ensure the economic sustainability of smart city technology.
- **Lack of convergence** between the Smart Cities Mission and other urban sector programs.
- **Urban problems** like air pollution, overpopulation etc.
- **Infrastructure**: challenges in replacing ageing infrastructure, like underground wiring, and transport tunnels, while installing high-speed internet.
- **Security** and data privacy.

Why in news?

- The Union Cabinet approved Pradhan Mantri Janjatiya Unnat Gram Abhiyan with a total outlay of Rs. 79,156 crore for improving the **socio-economic condition of tribal communities.**

About PM Janjatiya Unnat Gram Abhiyan

- **Objective:** It envisions fulfilling **critical gaps** in social infrastructure like health, education, and livelihood, through **different schemes of the Government of India** by convergence and outreach.
- **Nodal Ministry:** Ministry of Tribal Affairs
- **Type:** Centrally Sponsored Scheme with ₹79,156 crore (₹56,333 crore central;
- ₹22,823 crore state share)
- **Target Area and Coverage:** This will cover around 63,000 villages benefitting more than 5 crore tribal people as announced in the Budget Speech 2024-25. It will cover 549 districts and 2,740 blocks spread across all tribal majority villages across 30 States/UTs.
- **Goals of the Mission:** The Mission comprises 25 interventions which will be implemented by 17-line ministries in a time-bound manner through funds allocated to them under the Development Action Plan for Scheduled Tribes (DAPST) in the next 5 years to achieve the following goals:
  - **Goal 1: Developing Enabling Infrastructure**
  - **Goal 2: Promotion of Economic Empowerment**
  - **Goal 3: Universalization of Access to Good Education**
  - **Goal 4: Healthy Lives and Dignified Ageing**

Some innovative schemes for tribals and forest-dwelling communities

- **Tribal Home Stay**: To boost tourism in tribal areas and provide alternative livelihoods, the Ministry of Tourism will promote 1,000 homestays under the **Swadesh Darshan scheme**.
- **Sustainable Livelihood for Forest Right Holders:** The mission places a special focus on 22 lakh **Forest Rights Act, 2006** patta holders in forest areas. It aims to expedite the recognition of forest rights, empower tribal communities, and provide sustainable livelihoods through various governmental schemes.
- **Advanced facilities for diagnosis of Sickle Cell Disease:** Centre of Competence **(CoC)** would be set up in **AIIMS** and premier Institutes in states where Sickle cell disease is prevalent.
- **Tribal Multipurpose Marketing Centre (TMMCs):** 100 TMMCs will be set up for effective marketing of tribal products and for improving marketing infrastructure, awareness, branding, packaging, and transportation facilities.

Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB PM-JAY)

Why in news?

- The Union Cabinet approved the health coverage to all the senior citizens aged 70 years and above irrespective of income under the flagship scheme Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB PM-JAY).

Objective

- Preventive healthcare through access to Health and Wellness Centers (HWCs) at the primary level
- Provision of financial protection for accessing curative care at the secondary and tertiary levels through engagement with both the public and private sectors.

Funding

- Centrally Sponsored Scheme
- The Centre-State premium contribution ratio is **60:40** for all states, except North Eastern and 3 Himalayan states, where it is **90:10**.

Why in news?

- Union Finance Minister Smt. Nirmala Sitharaman will launch the NPS Vatsalya Scheme, a significant initiative aimed at securing the financial future of children in India

.

Objectives of the NPS Vatsalya Scheme

- The main objective of the NPS Vatsalya Scheme is to give sound financial backing to children. By enabling parents to contribute to a pension account on behalf of their minors, the scheme aims to:
  - **Promote Financial Literacy:** Guide families on the right financial planning strategies to adopt since childhood.
  - **Secure Future Needs:** Contribute to creating a large base to meet and be able to cater for more important expenses that are likely to be incurred in future like education and health.
  - **Encourage Saving Habits:** Help children develop the habits of saving as they grow and provide them with good habits of handling funds in future.

Key Features of the NPS Vatsalya Scheme

- **Eligibility Criteria:** The scheme is specifically intended for the use of a person who is below the age of eighteen years. Despite this, the parents or legal guardians can open an account on behalf of the child thus making this a useful financial tool for every child.
- **Flexible Contribution Options:** Both parents can contribute a minimum of ₹ 1000 per annum towards the cm of their child. Due to the low operation cost threshold, it is affordable for families from all economic standards. Donations can be made regularly each month or once a year depending on what one's situation is like financially.
- **Investment Growth through Compounding:** The funds that people deposit under the NPS Vatsalya Scheme are invested in the securities that are linked to the market and therefore, the funds attract compounding benefits. Now it means that not only the initial capital increases but the interest which was received also adds to further increase.
- **Account Transition at Age 18:** The child will get an NPS Vatsalya account until the age of 18. In the end, the NPS Vatsalya account will be converted into the normal NPS account. This feature enables the young adults to perform all their financial planning and control on their own while still reaping from the long-term financial plans.
- **Partial Withdrawals:** Besides, parents can make partial withdrawals from the account after three years for allowed purposes such as education or medical bills. It can be withdrawn up to three times before the child turns the age of eighteen up to 25% of the total accumulated amount.

Launch Highlights

- The Finance Minister Nirmala Sitharam will inaugurate the launch of the online portal for subscribing to the NPS and come up with the detailed brochure on the features of NPS Vatsalya Scheme.
- Moreover, new minor subscribers who are opening new PRANs will receive their PRAN cards from nearly 75 locations that will be virtually present at the occasion.

Government's Commitment to Financial Security

- The new NPS Vatsalya Scheme is one of the examples of the Indian government's efforts to improve and increase the financial sustainability of its citizens.
- With an emphasis on the financial future of children this initiative seeks to empower a generation of financially responsible individuals.

Why in news?

- Prime Minister launched the Dharti Aaba Janjatiya Gram Utkarsh Abhiyan

Dharti Aaba Janjatiya Gram Utkarsh Abhiyan:

- Launched on – **October 2, 2024**
- Objective – Holistic development of tribal villages to transform the socio-economic landscape.
- Named after **Birsa Munda**, a revered tribal freedom fighter.
- Key Features –
  - Covers approximately 63,000 tribal villages in 30 States/Union Territories.
  - Inaugurated 40 **Eklavya Model Residential Schools** (EMRS).
  - Various projects aimed at enhancing rural infrastructure and tribal welfare.
- **Birsa Munda (1875-1900):**
  - Tribal Leader and Freedom Fighter
  - Belonged to the **Munda tribe in the Chhotanagpur Plateau**.
  - Known as – "**Dharti Aba" (Father of the Earth).**
  - Key Contributions –
    - **(Ulgulan) –** Led a mass movement against British colonial policies, particularly land grabbing and oppressive taxes.
    - Religious Leader – Founded the **Birsait faith**, blending animism and indigenous beliefs
- Legacy – **November 15**, the birth anniversary of Birsa Munda is celebrated as '**Janjatiya Gaurav Divas**'.

India Semiconductor Mission Economy

Why in news?

- The Union Cabinet approved the proposal for Kaynes Semicon Pvt Ltd under the India Semiconductor Mission to establish a **semiconductor manufacturing unit in Sanand, Gujarat.**

About India Semiconductor Mission (ISM)

- A specialized and independent Business Division within the Digital India Corporation.
- Its primary objective is to build a vibrant semiconductor and display ecosystem that enables India to become a global hub for electronics manufacturing and design.
- ISM has been working as a **nodal agency for the schemes** approved under **the Semicon India Programme.**

Unified Lending Interface by the RBI Economy

Why in news?

- The Reserve Bank of India's introduction of the Unified Lending Interface (ULI) promises to revolutionise credit access by streamlining data integration for seamless lending.

About Unified Lending Interface (ULI)

- **Functionality of ULI:**
  - ULI will enable a seamless and consent-based flow of digital information from multiple data providers to lenders.
  - By integrating data from diverse sources, including land records and other state-specific information, ULI will significantly reduce the time required for credit appraisal, particularly benefiting smaller and rural borrowers.

Standardized APIs and 'Plug and Play' Approach:

- ULI will employ common and standardized APIs (Application Programming Interfaces) to facilitate a 'plug and play' approach.
- This design will allow for easy integration and access to information from various sources, promoting a more efficient and unified lending process.
- 'Plug and Play' approach: A design philosophy that enables systems or components to be integrated with minimal configuration and adjustments.

The 'New Trinity

- ULI, alongside JAM (Jan Dhan, Aadhar, and Mobile) and UPI, constitutes a transformative 'new trinity' in India's digital infrastructure.

Potential Benefits

- **Faster Loan Approvals**: With standardised processes and greater transparency, loans can be approved more quickly.
- **Reduced Costs**: Automation and digital integration reduce operational overheads, making lending cheaper for financial institutions.
- **Greater Financial Inclusion**: The ULI can extend lending services to individuals and businesses that are currently outside the traditional banking system, such as small and medium enterprises (SMEs) and rural populations.
- **Credit Democratisation**: The platform encourages competition, enabling borrowers to access multiple lenders with diverse offers based on better terms and conditions.

Challenges

- **Data Privacy and Security**: With vast amounts of borrower data being used, ensuring the privacy and security of personal financial data is critical.
- **Interoperability**: Achieving seamless integration among various financial institutions and their disparate legacy systems can be complex.
- **Financial Viability and Maintenance:** There are concerns about the cost of scaling and maintaining ULI, with uncertainty over whether these expenses will be transferred to borrowers, potentially raising borrowing costs.

Why in news?

- The Reserve Bank introduced a scheme to permit foreign investors in the International Financial Services Centre (IFSC) to invest in sovereign green bonds to facilitate wider non-resident participation in such instruments.

About Sovereign Green Bonds

- Sovereign Green Bonds (SGrBs) are **government-issued debt instruments**
- aimed at funding projects that facilitate the shift toward a low-carbon economy.
- India launched its first-ever sovereign green bond issuance in 2023 to support green infrastructure projects.
- These bonds are recognized as **green government securities (G-Secs) for both the Statutory Liquidity Ratio (SLR) and Repurchase Transactions (Repo)** and can be traded in the secondary market.
- Sovereign Green Bonds **offer lower yields compared to traditional G-Secs**, with the difference in returns for banks investing in them referred to as the "**Greenium.**"

About International Financial Services Centre (IFSC)
- The authority **regulates financial products, services, and institutions** that have been approved by regulators like the Reserve Bank of India (RBI) and the Securities and Exchange Board of India (SEBI).
- The authority can also recommend additional financial products, services, or institutions for **approval in an IFSC** to the central government.
- The International Financial Services Centres Authority **will have nine members appointed by the central government**, including the chairperson, representatives from RBI, SEBI, IRDAI, PFRDA, two from the Ministry of Finance, and two recommended by a Selection Committee.
- **Each member will serve a 3 year term**, with the possibility of reappointment.
- IFSCs are designed to give Indian corporations easier access to global financial markets while supporting the growth of financial markets in India.
- he **first IFSC in India is located at Gujarat International Finance Tec-City (GIFT City)** in Gandhinagar.

Why in news?

- On September 2, 2024, the Union Cabinet Committee, led by Prime Minister Narendra Modi, approved the **Digital Agriculture Mission** with a total budget of ₹2,817 crore, including ₹1,940 crore from the central government.

Key benefits of the Digital Agriculture Mission

- Under the Digital Agriculture Mission, **the Digital General Crop Estimation Survey (DGCES)** will provide accurate yield estimates through crop-cutting experiments, improving agricultural output precision.
- The mission will also **generate employment** for around 2,50,000 trained youth and **Krishi Sakhis**.
- **Digital authentication** will make it easier for farmers to access services and benefits without paperwork or physical visits.
- **Crop mapping and monitoring** to enhance disaster response and facilitate smoother insurance claims.
- Digital infrastructure development to **optimise agricultural value chains** and offer personalised advice on crop planning, health, pest control, and irrigation.

Challenges in Implementation

- **Digital Literacy:** Many farmers in rural India still lack the digital skills needed to effectively use these technologies.
- **Infrastructure Gaps:** Rural areas often suffer from poor internet connectivity and electricity supply, which can hinder the adoption of digital tools.
- **Data Privacy:** The creation of large-scale farmer databases like AgriStack raises concerns about data privacy and security.

- **Cost of Technology:** Advanced technologies such as drones, IoT sensors, and AI solutions may be expensive for small and marginal farmers.

Digital Public Infrastructure (DPI) for Agriculture
- **Implementation:** To be rolled out over three years with state collaboration.
- **Coverage:** Updating data for 6 crore farmers in 400 districts.
- **Objective:** Provide detailed farmer info and integrate with state and central systems.
- **Services:** Includes data on livestock, fisheries, soil health, and benefits.

AgriSURE Fund and Krishi Nivesh Portal — Economy

Why in news?
- The Union Minister of Agriculture and Farmers' Welfare and Rural Development recently launched the AgriSURE Fund and the Krishi Nivesh Portal at PUSA, New Delhi.

About AgriSURE Fund
- AgriSURE Fund announced in Budget 2022-2023 stands for **Agri Fund for Startups and Rural Enterprises Scheme.**
- Launched by the **Ministry of Agriculture and Farmers' Welfare** of the central government.
- **Objectives**
  - fuel growth and foster innovation in the agriculture sector and rural startup ecosystem
  - main focus on **technology driven**, **high risk** and **high impact** ventures.
  - Create employment opportunities
  - Encourage youth participation in agriculture
  - Strengthen the agriculture value chain
- Funding Pattern - A Blended capital **fund of ₹750 crore** with **SEBI Registered Category II**, Alternative Investment Fund (AIF), contributions from the Government of India is ₹250 crore, NABARD is ₹250 crore, and ₹250 crore is being mobilised from banks, insurance companies, and private investors.
- **NABVENTURES**, a fully owned subsidiary of NABARD will act as the fund manager.

Blue Revolution- PM Matsya Sampada Yojana — Economy

Why in news?
- Pradhan Mantri Matsya Sampada Yojana (PMMSY) has **completed four years** of Implementation.

Salient Feature of the Scheme
- **Subsidies and Incentives:** Under the scheme, fishermen and fish farmers are provided with various subsidies and incentives to encourage the adoption of modern fishing techniques, aquaculture practices, and value addition activities. These incentives play a crucial role in boosting productivity and income levels in the fisheries sector.
- **Infrastructure Development**: Infrastructure development forms a pivotal component of the PM Matsya Sampada Yojana. Investments are made in the construction of fishing harbours, cold chain facilities, fish landing centers, fish markets, and storage facilities to improve post-harvest handling and reduce wastage.
- **Modernization of the Fisheries Sector:** The scheme envisages the adoption of cutting-edge technologies and best practices to modernize the fisheries sector. Initiatives such as introducing deep-sea fishing vessels, promoting cage culture, and establishing fish processing units contribute towards enhancing efficiency and competitiveness.
- **Implementation Process**: The implementation of PM Matsya Sampada Yojana involves meticulous planning and execution. Funds are allocated based on the specific requirements of each state, considering factors like coastline length, fish production potential, and existing infrastructure. Beneficiary identification is carried out transparently, ensuring that the benefits reach the deserving individuals. Moreover, a robust monitoring mechanism is put in place to track the progress of various projects and evaluate their impact.
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Impact of PM Matsya Sampada Yojana

- **Economic Growth:** The PM Matsya Sampada Yojana has the potential to catalyze economic growth by creating new employment opportunities, attracting investments, and boosting exports. The increased production and value addition in the fisheries sector contribute significantly to the country's GDP.
- **Employment Generation:** One of the key outcomes of the scheme is the generation of employment opportunities, particularly in rural and coastal areas. By providing training and skill development programs, the government aims to empower youth and women to become self-reliant entrepreneurs in the fisheries sector.
- **Sustainable Development:** The emphasis on sustainable fisheries management practices ensures the long-term viability of marine resources while preserving the ecological balance. By promoting responsible fishing practices and conservation efforts, the PM Matsya Sampada Yojana contributes towards achieving environmental sustainability.

White Revolution 2.0   Economy

Why in news?

- Union Home and Cooperation Minister launched 'White Revolution 2.0', an initiative to transform India's dairy cooperative sector.

About White Revolution 2.0

- **Objective:** It is an initiative to **increase milk production**, **empowerment of women** and the fight against **malnutrition, strengthen diary infrastructure** and **boost exports**.
- **Target:** White Revolution 2.0 will **increase milk procurement** of dairy cooperatives by **50%**, over the next five years.
- **NDDB's Action Plan:** To drive the White Revolution 2.0, the National Dairy Development Board (NDDB) plans to establish 56,000 new multipurpose dairy cooperative societies (DCSs) over the next five years and strengthen 46,000 existing ones.
- **Funding:**
    - The National Programme for Dairy Development (NPDD) 2.0 will provide the bulk of the funding for White Revolution 2.0.
- **Launch of Margdarshika (SOPs):** Margdarshika (SOPs) has been launched to **form 200,000 new multipurpose primary agricultural cooperatives (MPACs).**
    - It will foster new cooperatives in **panchayats**.
    - Prepared by the **Ministry of cooperation** in collaboration with **NABARD,**
    - and **NDDB.**
    - The initiative will empower women by absorbing them in **formal employment** as the money will be deposited in their **bank accounts.**

Need for White Revolution 2.0

- **To Increase Milk Productivity:** The average yield is only 8.55 kg per animal per day for exotic/crossbred animals, and 3.44 kg/animal/day for indigenous animals.
- **Reversing the Decline in Annual Growth Rate of Milk Production:** The growth rate decreased from 6.47% in 2018-19 to 3.83% in 2022-23.
- **Formalisation of Milk Consumption Pattern:** About two-thirds of the marketable milk is in the unorganised sector. In the organised sector, cooperatives account for the major share.
- **Milk as the Top Food Expenditure in India:** In India, the average monthly expenditure on milk per person is higher than other food items like vegetables, cereals, and eggs.
- **Checking Rising Milk Prices**: The all-India modal price of milk increased from Rs 42 to Rs 60 per litre over the past five years due to rising input costs, including fodder and feed.
- **Methane Emissions:** Livestock emissions from manure and gastroenteric releases account for roughly 32% of human-caused methane emissions which is a major cause of global warming.

NITI Aayog's Report on Edible Oils and Atmanirbharatha

Why in news?
- Recently, NITI Aayog released a report titled "Pathways and Strategies for Accelerating Growth in Edible Oils Towards the Goal of Atmanirbharta".

NITI Aayog's Report on Edible Oils and Atmanirbharatha:
- The report from NITI Aayog outlines strategic interventions aimed at significantly increasing India's domestic edible oil production by **43.5 million tonnes** (MT) to bridge the **import gap.**

Key Highlights:
- Surge in Edible Oil Consumption – **Per capita consumption of edible oil in India has risen** to 19.7 kg/year.
  - In 2022-23, India imported 16.5 million tonnes (MT) of edible oils, with domestic production fulfilling only 40-45% of the requirements.
- Projected Growth and Demand – Under a Business-As-Usual (BAU) scenario, **domestic supply is expected to reach 16 MT by 2030** and 26.7 MT by 2047.
  - **Demand forecasts** vary, with potential gaps of up to 29.5 MT by 2030 and 40 MT by 2047 under high consumption scenarios.
- The proposed strategy is structured across 3 key pillars:
  - **Crop Retention and Diversification –** Retaining existing crops & adding new crops or cropping systems to farms4.
  - **Horizontal Expansion** – Increasing the cultivation area for oilseeds by utilizing rice fallow lands and wastelands for crops like palm.
  - **Vertical Expansion** – Enhancing yields through improved farming practices, better-quality seeds, and advanced production technologies.
- State-wise Quadrant Approach – Identifies state clusters for targeted interventions based on cultivation area & yield
  - High Area-High Yield (HA-HY)
  - High Area-Low Yield (HA-LY)
  - Low Area-High Yield (LA-HY)
  - Low Area-Low Yield (LA-LY)
- Recommendations –
  - Emphasizes the need for robust systems, public-private partnerships, a dynamic trade policy to support growth.
  - Public awareness and consumption could encourage domestic oilseed consumption and awareness of dietary guidelines.

PM E drive scheme

Why in news?
- The Scheme (under Ministry of Heavy Industries) is approved with outlay of Rs 10,900 crore for 2 years **for promotion of electric mobility in India**.

Major Components of PM E-DRIVE Scheme
- **Subsidies/Demand incentives** to incentivize e-2Ws, e-3Ws, e-ambulances, e-trucks and other emerging EVs.
- **Installation of Electric vehicle public charging stations (EVPCS)** in selected cities and on selected highways.
- **Provision for procurement of e-buses** by public transport agencies through **Convergence Energy Services Limited (CESL).**
- **Test agencies** to be **modernized** to deal with the new and emerging technologies to promote **green mobility.**

Significance of the scheme
- Promote the **deployment of e-trucks** in the country.
- **Promotes mass mobility** by supporting means of public transportation
- **Reduce the environmental impact of transportation** and improve air quality
- **Incorporates phased manufacturing programme (PMP)** which encourages domestic manufacturing and supply chain.

Delhi Declaration

Why in news?

- **The 2nd Asia-Pacific Ministerial Conference on Civil Aviation concluded with the approval of the Delhi Declaration.**

About the 2nd Asia-Pacific Ministerial Conference on Civil Aviation

- **The Ministry of Civil Aviation in partnership with the International Civil Aviation Organisation (ICAO) has organized the conference at Bharat Mandapam in New Delhi.**
- **It brought together ministers, policymakers and key stakeholders from 29 countries.**
- **They stressed the importance of maintaining high safety and security standards in the rapidly developing Asia-Pacific aviation sector.**
- **The conference unanimously adopted the 'Delhi Declaration' to promote sustainable and inclusive growth in the civil aviation sector.**
- **The main objective of the Delhi Declaration is to strengthen regional cooperation to overcome aviation challenges and guarantee durable, sustainable expansion.**

CSIRT-Power

Why in news?

- **Union government** launched the **Computer Security Incident Response Team Power(CSIRT-Power) at Northern Regional Power Committee in New Delhi.**

About the scheme

- To serve as the **responsible agency for responding to and preventing cybersecurity incidents** within the power sector.
- To **ensure a prompt and coordinated response** to cyber threats in the power sector.
- To **collect, analyze, and share information** regarding power sector-specific **cyber threats.**
- To **ensure implementation of proactive measures** to increase cybersecurity awareness and improve the overall cybersecurity posture of the power sector.
- To promote **sector specific best practices**, Standard Operating Procedures **(SOPs) and security policies.**
- **To provide cybersecurity expertise** and **assistance** to constituent utilities.
- **To enhance cybersecurity in the power sector** through capacity building measures like training, development of standards, and incident response drills, collaboration with educational institutions and industry.
- **To facilitate cooperation among stakeholders** in the power sector to build awareness and strengthen collective cybersecurity efforts.

Bharat Startup Knowledge Access Registry (BHASKAR)

Why in news?

- DPIIT to launch Bharat Startup Knowledge Access Registry (BHASKAR) initiative for India's Startup Ecosystem

BHASKAR Initiative:

- Stands for – **Bharat Startup Knowledge Access Registry.**
- Launched By – **Ministry of Commerce and Industry** under the Startup India program.
- Objective – To build the world's largest **digital registry for stakeholders within the startup ecosystem**.

Key Features of the initiative:

- Networking – Bridges the gap between startups and other stakeholders.
  - Facilitates seamless interaction across various sectors.
- Centralized Access to Resources – Provides startups with immediate access to critical tools and knowledge.
  - Enables faster decision-making and efficient scaling.

- Personalized Identification – Assigns a unique BHASKAR ID to every stakeholder.
  - Ensures personalized interactions and tailored experiences across the platform.
- Enhancing Discoverability – Powerful search features to locate relevant resources, collaborators, and opportunities.
  - Promotes faster decision-making and action.
- Supporting India's Global Brand – Promotes India's global reputation as a hub for innovation.
- Facilitates cross-border collaborations for startups and investors.
- Significance –
  - Ecosystem Development – Strengthens the startup ecosystem by fostering innovation and encouraging investments.
  - Global Positioning – Enhances India's position as a global innovation hub, making it easier for international collaborations.

Indian Start-up ecosystem:
- **3ʳᵈ largest ecosystem** for start-ups globally as of May 2023.
- In terms of **Global Innovation Index (GII)**, 2ⁿᵈ among lower middle-income economies and 1ˢᵗ among Central and Southern Asian economies.

World Employment and Social Outlook Report　　Economy

Why in news?
- The **International Labour Organisation (ILO)** recently released the World Employment and Social Outlook: Trends 2024 report, highlighting a projected rise in the global unemployment rate for 2024, alongside concerns over growing inequalities and stagnant productivity.

About the International Labour Organisation (ILO)
- It is one of the first and oldest **specialized agencies of the UN**, founded in 1919.
- Headquartered at Geneva, Switzerland.
- The foundation of the ILO operates on the **tripartite principle**, where negotiations within the organization take place between representatives of governments, trade unions, and employers from member states.

World Employment and Social Outlook Report 2024
- **Unemployment**: It forecasts a slight increase in global unemployment in 2024.
- **Income inequality**: The report stresses the need for policy action to tackle rising income inequality, particularly in G20 countries.
- **Real wage growth** in India and Türkiye was positive as compared to other G20 countries, but the available data refers to 2022 relative to 2021.

India Status Report on Road Safety 2024　　Economy

Why in news?
- Recently, the India Status Report on Road Safety 2024 was released by the
- **Transportation Research and Injury Prevention (TRIP)** Centre at IIT Delhi.

Findings of the Report
- This report highlights India's **slow progress in meeting international goals** of reducing road accident deaths and most Indian States are unlikely to meet the **United Nations Decade of Action for Road Safety goal to halve traffic deaths by 2030**.
- In 2021, road injuries were the **13th leading cause of death** and the **12th leading cause of health loss**, as measured by **Disability-Adjusted Life Years (DALYs)**.
- In terms of **inter-state disparity**, the per capita death rates differ more than threefold between States. In 2021, **Tamil Nadu (21.9),** Telangana (19.2), and Chhattisgarh (17.6) had the highest rates while **West Bengal and Bihar** recorded the lowest at 5.9 per 100,000.

- Despite the life-saving potential of helmet usage, more than 50% of motorised two-wheeler riders wear helmets in only seven states.

Measures Taken to Improve Road Safety
- **National Road Safety Policy (NRSP), 2010:**
  - Key features include the establishment of a road safety information database, periodic reviews of road and vehicle safety standards, and the creation of a National Road Safety Council.
- **District Road Safety Committees (DRSC):**
  - Established under the Motor Vehicle Act of 1988, DRSCs are tasked with developing district-level road safety plans and emergency medical plans.
- **Motor Vehicles (Amendment) Act, 2019:**
  - Establishes a National Road Safety Board.
  - Increases penalties for traffic violations.
  - Introduces a Solatium Fund for hit-and-run victims.
  - Mandates vehicle recalls for safety issues and strengthens driver testing.
- **Technical Initiatives:**
  - Front and side crash tests for new cars.
  - Mandatory airbags in vehicles.
  - Roadside crash barriers and rectification of black spots.
- **Global Initiatives for Road Safety**
  - **Brasilia Declaration on Road Safety (2015):** India is a signatory, committing to halving traffic deaths by 2030 under the UN's Sustainable Development Goal 3.6.
  - **Decade of Action for Road Safety 2021-2030:** The UN General Assembly's goal to prevent at least 50% of road traffic deaths by 2030.

Why in news?

- Prime Minister Modi visited Brunei and Singapore to enhance bilateral trade relations, reinforce India's **"Act East" policy**, and support efforts to promote a **free and open Indo-Pacific**. This visit continues India's ongoing efforts to strengthen ties with ASEAN countries

Key Aspects of India-ASEAN Relations

- **Historical and Cultural Ties:** India and Southeast Asia share ancient cultural and religious links, particularly through Buddhism and Hinduism, alongside strong maritime trade history.
- **Economic Cooperation:** India-ASEAN trade reached $130 billion in 2022,
- bolstered by the 2 009 ASEAN-India Free Trade Agreement (AIFTA) and India's
- role in ASEAN economic forums like the East Asia Summit (EAS) and ASEAN Regional Forum (ARF).
- **Strategic and Security Collaboration:** India and ASEAN collaborate on maritime security, counterterrorism, and military training, with initiatives like the India-ASEAN Maritime Exercises and participation in ASEAN Defence Ministers Meeting (ADMM-Plus).
- **Connectivity Initiatives:** India is enhancing regional connectivity through projects like the India-Myanmar-Thailand Trilateral Highway, as well as expanding air and sea links with Southeast Asia.
- **Cultural and People-to-People Engagement:** India fosters cultural exchange, tourism, and education with ASEAN through programs like the ASEAN-India Youth Summit and Artists Camp, strengthening interpersonal ties.

Challenges in India-ASEAN Relations

- **Trade Imbalances:** There is a trade imbalance favouring ASEAN, and India withdrew from the RCEP in 2019 to protect domestic industries.
- **China's Influence:** China's strong influence in Southeast Asia poses challenges, but India's engagement is seen as diversifying ASEAN's strategic options.
- **Connectivity and Implementation Delays:** Infrastructure and political challenges, particularly in Myanmar, have delayed connectivity projects like the India-Myanmar-Thailand Trilateral Highway.

India's Act East Policy

- **Launched in 2014** during the 12th ASEAN-India Summit in Myanmar as an upgrade of the Look East Policy.
- Focuses on strengthening ties with **Indo-Pacific countries**.
- **Core focus on ASEAN**, fostering political, economic, and cultural connectivity.
- Promotes **bilateral and multilateral engagement**, emphasising trade, connectivity, and strategic cooperation.
- The Act East Policy **helps India counter China's growing influence in Southeast Asia**. This policy aligns with India's involvement in the Q UAD
- (Quadrilateral Security Dialogue) and addresses China's expansionist claims over contested islands.

Why in news?

- Recently, India and the United Arab Emirates (UAE) held bilateral talks with the aim to deepen ties and enhance their **Comprehensive Strategic Partnership.**

India-UAE Relations

- India and the United Arab Emirates (UAE) enjoy strong bonds of friendship based on age-old cultural, religious and economic ties between the two nations.
- **Diplomatic Relations established in 1972**, a year after UAE's formation in 1971.
- Current Engagement of **Comprehensive Strategic Partnership**.
- **Phase of Active Engagement**: Indian PM Narendra Modi visited UAE in 2015. It was after 24 years that any Indian PM visited the country, after Indira Gandhi's visit in 1981. PM Modi has visited UAE six times so far since 2015.

Key Highlights of Recent Talks

- **Economic Relations:**
  - The **Comprehensive Economic Partnership Agreement (CEPA)** signed in 2022 has further boosted trade, with bilateral trade having increased from **USD 72.9 billion** (April 21-Mar'22) to **USD 84.5 billion** (April 22-Mar' 23).
  - The UAE is a significant source of **Foreign Direct Investment (FDI)** for India. Between April 2000 and September 2023, India received an FDI of $16.7 billion from the UAE.
- **Civil Nuclear Cooperation**:
  - India and UAE signed a Memorandum of Understanding (MoU) for **civil nuclear cooperation.**
  - The deal involves the **Nuclear Power Corporation of India Limited (NPCIL)** and the **Emirates Nuclear Energy Company (ENEC)** for operation and maintenance of **Barakah Nuclear Power Plant** at Al Dhafra.
- **Strategic and Defense Relations:**
  - Both are actively engaged in various groupings and initiatives like the I**2U2 and the India-Middle East-Europe Economic Corridor (IMEC),** reflecting shared interests and strategic alignment.
  - Joint Military **Exercise Desert Cyclone.**
  - The UAE's interest in Indian defence products such as **BrahMos missiles**.
- **Energy Relations:**
  - **LNG Supply**: An MoU was signed for long-term **Liquefied Natural Gas (LNG)** supply between UAE and India**.**
  - **Strategic Petroleum Reserve (SPR):** An MoU was signed with **India Strategic Petroleum Reserve Limited (ISPRL)** for supply of petroleum.
- **Food Parks:**
  - A MoU was signed with the **Government of Gujarat** on **food parks1** development in India.
- **Cultural and Diaspora Relations:**
  - UAE extended support to the **Maritime Heritage Complex- Lothal, Gujarat.**
  - **Gratitude for BAPS Temple Construction**
  - The large Indian diaspora in the UAE, comprising **about 3.5 million people**, forms a crucial link between the two nations

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QUAD Summit   International Relations

Why in news?

- Recently, the 6th QUAD Summit was held in Delaware, United States, marking the 4th in-person meeting of QUAD leaders.

Key Outcomes of the Summit

- **Maritime Security**
  - **MAITRI Maritime Initiative:** A new training program for QUAD partners to monitor and secure their waters, enforce laws, and deter unlawful behaviour. The inaugural symposium will be hosted by India in 2025.
  - **Indo-Pacific Partnership for Maritime Domain Awareness (IPMDA)**: Expansion of this partnership to enhance regional capabilities against illicit maritime activities through improved training and resource sharing.
- **Humanitarian Assistance and Disaster Relief**
  - **Indo-Pacific Logistics Network Pilot:** Development of a joint airlift capability to enhance the efficiency of humanitarian assistance and disaster response operations in the Indo-Pacific region.
  - **Aid for Cyclone Yagi:** Announcement of $4 million in humanitarian assistance for Vietnam following Typhoon Yagi.
- **Health Initiatives**
  - **QUAD Cancer Moonshot Initiative:** Aims to combat cervical cancer by promoting increased HPV vaccinations, expanding access to screenings, and enhancing treatment options across the Indo-Pacific.
- **Education and Research**
  - **QUAD Scholarships:** India announced an initiative offering 50 scholarships worth $500,000 for students from the Indo-Pacific to pursue education in various fields.

- **QUAD BioExplore Initiative:** Focuses on joint research to utilise AI for agricultural advancements across member countries.
- **Infrastructure and Connectivity**
  - **Centre for Cable Connectivity and Resilience:** This centre will develop and manage undersea cable networks critical for global data traffic.
  - **Quality Infrastructure Development:** Commitment to improving connectivity through sustainable infrastructure projects.
- **Climate Change and Clean Energy**
  - **QUAD Climate Change Adaptation and Mitigation Package (Q-CHAMP):** An initiative aimed at enhancing resilience against climate impacts across the region.

About QUAD

- The Quadrilateral Security Dialogue (QSD), commonly known as the QUAD, is an informal strategic forum consisting of like-minded democracies from the Indian and Pacific Oceans. Its primary objective is to promote and uphold a free, open, and prosperous Indo-Pacific region. The QUAD comprises four member countries: **the United States, India, Japan, and Australia.**

Significance of the QUAD

- **Geopolitical Stability:** The QUAD acts as a counterbalance to China's growing influence in the Indo-Pacific, promoting a rules-based international order and regional stability.
- **Security Cooperation:** It enhances military collaboration among member nations through joint exercises and intelligence sharing.
- **Economic Collaboration:** The QUAD fosters economic partnerships to secure supply chains, particularly in critical sectors such as semiconductors, healthcare, and clean energy.
- **Health and Humanitarian Assistance:** Initiatives like the QUAD Health Security Partnership aim to improve pandemic preparedness and disaster response.

Challenges Facing the QUAD

- **Diverse Strategic Interests:** Differing national priorities among member countries can complicate consensus-building on key issues.
- **China's Assertiveness:** The QUAD faces challenges from China's military and economic expansion, which may lead to regional tensions.
- **Regional Perception:** The QUAD might be viewed as a military alliance against China, potentially alienating other nations in the region.
- **Evolving Security Threats:** New security challenges, such as cyber warfare and non-state terrorism, require the QUAD to adapt its strategies, which can be difficult given the varied capabilities of its members.

UN Summit of the Future   International Relations

Why in news?

- At the UN Summit of the Future 2024, Secretary-General Antonio Guterres urged **urgent reforms to outdated UN institutions** concerning global peace, security, and finance.

Key Highlights of the UN Summit of the Future

- Builds on recent UN efforts, including the **2022 Stockholm+50 conference and the High Seas Treaty.**
- **Theme:** "Multilateral Solutions for a Better Tomorrow."
- Concluded with the adoption of **"A Pact for the Future"** which aims to accelerate SDGs and the Paris Agreement, with commitments to a just transition from fossil fuels and securing a sustainable, peaceful future.
- Includes two annexes: the Global Digital Compact and A Declaration on Future Generations.
- **Global Digital Compact:** Advocates for equitable access to technology to benefit all.
- **Declaration on Future Generations:** Encourages long-term thinking, urging leaders to prioritise future generations' interests.

India's Stance at the Summit

- Called for **reforms in the UN and Security Council**, advocating for expanded permanent membership, including India and African nations.
- Highlighted cyber, maritime, and space as emerging conflict arenas, urging global security framework and offered India's digital public infrastructure for global cooperation.

Need for Reforms

- **Outdated Structure**: The UN's 1945 framework doesn't reflect today's 193-member world.
- **Global Disparities**: Current systems fail developing nations, increasing debt and inequality.
- **Technological and Geopolitical Shifts**: Old institutions can't address modern challenges like climate change and inequality.
- **Legitimacy Issues**: The Security Council lacks credibility, dominated by a few permanent members.
- **Inequitable Representation**: Asia, Africa, and Latin America need more representation in the Security Council.
- **Financial Reform**: The UN requires fairer contributions for peacekeeping and development.
- **Global Security**: Reform is necessary to address terrorism and regional conflicts more effectively.

India – UAE Sign Civil Nuclear Energy Agreement | International Relations

Why in news?

- Recently, India and the United Arab Emirates (UAE) signed a Memorandum of Understanding (MoU) for **Civil Nuclear Energy Agreement**

About the agreement

- Along with the civil nuclear cooperation MoU, India and the UAE signed several other important agreements:
- **Long-Term LNG Supply:** An MoU was signed between Abu Dhabi National Oil Company (ADNOC) and Indian Oil Corporation Limited for a long-term supply of liquefied natural gas (LNG).
- **Strategic Petroleum Reserve:** ADNOC and India Strategic Petroleum Reserve Limited (ISPRL) reached an agreement concerning the strategic petroleum reserve.
- **Production Concession Agreement:** Urja Bharat and ADNOC agreed on a deal for Abu Dhabi Onshore Block 1.
- **Food Parks Development:** An MoU was signed between the Government of Gujarat and Abu Dhabi Developmental Holding Company PJSC (ADQ) to develop food parks in India. This initiative is part of the I2U2 grouping, which also includes Israel and the United States.

Global Agreements and Cooperation

- **Nuclear Suppliers Group (NSG) Agreement (2008):** This agreement opened up opportunities for sourcing reactors and fuel from international suppliers.
- **Civil Nuclear Cooperation Agreements:** India has signed agreements with various countries, including the USA, Russia, France, the UK, South Korea, the Czech Republic, Canada, Australia, Argentina, Kazakhstan, Mongolia, and Namibia.
- **UK Agreement (2015):** Involving £3.2 billion ($4.9 billion) in programs and initiatives focused on energy security and climate change.
- **Japan Agreement (2016):** This agreement allows India to import Japanese nuclear technology and secures Japan's support for India's membership in the NSG.

About Civil Nuclear Energy Agreement

- This agreement was made between India's **Nuclear Power Corporation of India Limited (NPCIL) and the UAE's Barakah Nuclear Power Plant Operations and Maintenance,** led by Emirates Nuclear Energy Company (ENEC).
- This MoU builds on a 2015 commitment during Indian Prime Minister's visit to the UAE, where both nations agreed to work together **on the peaceful use of nuclear energy,** focusing on safety, health, agriculture, and technology.
- It underscores a broader effort to strengthen nuclear energy ties between the two countries.

- It also coincides with the UAE's announcement of the completion of the **Arab world's first nuclear power plant, the Barakah Nuclear Energy Plant in Abu Dhabi.** Once its fourth and final reactor starts commercial operations, the plant will produce 40 terawatt-hours of electricity annually.

India's Nuclear Power Plants
- Presently, India has 22 operating reactors, with an installed capacity of 6780 MWe.
- Among these eighteen reactors are Pressurised Heavy Water Reactors (PHWRs) and four are Light Water Reactors (LWRs).
- Asia's first nuclear reactor is the **Apsara Research Reactor** situated in Mumbai.

Indo-Pacific Oceans Initiative (IPOI) — International Relations

Why in news?
- Indo-Pacific Oceans Initiative (IPOI) completes five years since its launch in 2019.

About Indo-Pacific Oceans Initiative (IPOI)
- It was launched by India in November 2019 at the East Asia Summit (EAS) in Bangkok, and aims to foster cooperation for a free, open, and rules-based Indo-Pacific.
- IPOI emphasizes maritime security, stability, and development, building on India's Security and Growth for All in the Region (SAGAR) vision.
- It operates as a non-treaty-based, voluntary arrangement, relying on existing frameworks like the EAS mechanism.

Key Pillars and Leadership of IPOI
- IPOI has seven pillars, with countries taking the lead in specific areas:
- Maritime Security: UK and India
- Maritime Ecology: Australia and Thailand
- Maritime Resources: France and Indonesia
- Capacity Building and Resource Sharing: Germany
- Disaster Risk Reduction and Management: India and Bangladesh
- Science, Technology, and Academic Cooperation: Italy and Singapore
- Trade, Connectivity, and Maritime Transport: Japan and the US

Significance of IPOI
- IPOI aims to ensure a rules-based regional order in the Indo-Pacific, promoting the free movement of goods, services, and people while safeguarding the sovereignty of countries.
- The IPOI strengthens regional maritime security by encouraging cooperation among nations to address shared threats, such as piracy, illegal fishing, smuggling, and other maritime crimes.
- IPOI seeks to strengthen regional capacity for disaster risk reduction and management, promoting cooperation in disaster preparedness and response, thereby mitigating the impact of natural calamities.
- As a non-treaty-based and voluntary initiative, IPOI remains flexible, allowing countries to participate based on shared interests without creating new institutional burdens.

Operation Sadbhav — International Relations

Why in news?
- India launched Operation Sadbhav to provide humanitarian assistance and disaster relief (HADR) to Laos, Myanmar and Vietnam.

About
- The operation was launched in the wake of disasters caused by **Typhoon Yagi.**
- **Operation Sadbhav** is part of India's broader effort to contribute to HADR within the ASEAN region, in line with its longstanding 'Act East Policy'.

Why in news?

- India has officially joined the US-led Minerals Security Finance Network (MSFN) to secure supply chains for critical minerals.

About the network

- **India formally joined the Minerals Security Finance Network (MSFN), a US-led group focused on securing supply chains for critical minerals**. This announcement was made during the United Nations General Assembly on September 23.

About Minerals Security Partnership (MSP)

- **It is an international alliance formed in August 2022 by the US and 10 other nations**. Currently, it includes 14 countries; the USA, Australia, Canada, Estonia, Finland, France, Germany, India, Italy, Japan, the Republic of Korea, Norway, Sweden, the United Kingdom, and the European Union (EU). **India joined the MSP in June 2023.**
- Its main goal is to **ensure a stable supply of critical minerals needed for clean energy technologies**. These minerals include lithium, cobalt, nickel, manganese, graphite, rare earth elements, and copper.
- The **Minerals Security Finance Network (MSFN) is part of the Minerals Security Partnership (MSP)** initiated to minimise dependency on China for critical minerals supplies.

Objectives of the Minerals Security Finance Network (MSFN)

- **To create diverse, sustainable, and responsible supply chains for critical minerals,** to ensure that the production, processing, and recycling of these minerals support economic growth.
- **To bring together Development Finance Institutions (DFIs) and Export Credit Agencies (ECAs) from participating nations** to improve investment in critical mineral supply chains.
- **To minimise risk in the supply chain,** as the current energy transition is at risk due to limited production capacity for these minerals, which are concentrated in just one or two countries.
- The MSP has identified around 150 potential projects, including developing battery materials and building a minerals processing facility in South America.

India's Participation in the Minerals Security Finance Network (MSFN)

- **India joined the MSFN to diversify and secure its supply of critical minerals** from countries like Argentina, Chile, Australia, and some African nations.
- India aims to establish itself in the lithium value chain and reduce its dependence on imports of critical minerals like lithium, nickel, cobalt, and copper. In FY23, India spent around ₹34,000 crore on these imports.
- **India aims to transform its transport sector by increasing the use of electric vehicles** and the energy sector by increasing renewable energy capacity.
- Joining the Minerals Security Finance Network (MSFN) is **part of India's larger plan to boost electronics manufacturing and secure a steady supply of critical minerals.**

Agni-4 Ballistic Missile

Why in news?

- India carried out a successful launch of an **Intermediate Range Ballistic Missile, Agni-4** from the **Integrated Test Range in Chandipur, Odisha.**

Features of Agni-4 Ballistic Missile

- **Surface-to-surface** missile with an intermediate range of 4,000 km.
- It is a **nuclear-capable** missile.
- **Two-Stage** Solid Propulsion
- Payload with a re-entry heat shield
- Can be fired from a road-mobile launcher.
- **Lightweight Design** compared to its predecessors.
- It has features to correct and guide itself for in-flight disturbances.
- Equipped with Ring Laser Gyro-based Inertial Navigation System and Redundant Micro Navigation System.
- **RINS** is a super-accurate system that helps the vehicle know its exact position and movement using ring lasers while **MINGS** is like having an extra set of eyes to make sure the vehicle stays on the right path.

National Blockchain Framework

Why in news?

- MeitY launched the National Blockchain Framework (NBF) to promote research and application development, enabling transparent, secure, and trusted digital services for citizens.

About National Blockchain Framework

- The National Blockchain Framework technology stack includes Distributed Infrastructure, Core Framework, Smart Contracts & API Gateway, Security, Privacy & Interoperability, and Applications, offering Blockchain as a Service (BaaS).
- NBF currently supports **two permissioned Blockchain platforms** and is extensible.
- The Technology Stack is hosted on geographically distributed infrastructure at NIC Data centers i.e. **Bhubaneswar, Pune, Hyderabad**.
- MeitY also unveiled:
  - **Vishvasya-Blockchain Technology Stack** to offer **Blockchain-as-a-Service** with a geographically distributed infrastructure designed to support various permissioned Blockchain based applications.
  - **NBFLite** a Blockchain sandbox platform, is developed especially for startups/academia for rapid prototyping of applications, carrying out research and capacity building.
  - **Praamaanik** - an innovative blockchain-enabled solution for verifying mobile app origin.
  - **National Blockchain Portal** to manage the content related to the National blockchain framework initiative.

Bio-Ride Scheme

Why in news?

- The Union Cabinet approved the continuation of the two umbrella schemes of Department of Biotechnology (DBT), merged as one scheme- '**Biotechnology Research Innovation and Entrepreneurship Development (Bio-RIDE)'** with a new component namely **Biomanufacturing and Biofoundry.**

About BioRide Scheme

- A comprehensive scheme by the **Department of Biotechnology (DBT) under the Ministry of Science and Technology**.
- It merges 2 previous schemes—**Biotechnology Research and Development (R&D) and Industrial and Entrepreneurship Development (I&ED)**—with a new component, Biomanufacturing and Bio-foundry.

- Aim –
  - Accelerate research and product development.
  - Bridge the gap between academic research and industrial applications.
  - Foster innovation and bio-entrepreneurship.
  - Strengthen India's position in global biomanufacturing and biotechnology.
- **Components –**
  - Biotechnology Research and Development (R&D)
  - Industrial & Entrepreneurship Development (I&ED)
  - Biomanufacturing and Bio-foundry (new component)
  - Implementation Period – During the **15ᵗʰ Finance Commission** period (2021-2026).

Key Features of the scheme:

- Promote Bio-Entrepreneurship – Seed funding, incubation, and mentorship for startups.
- Advance Innovation – Grants and incentives for research in synthetic biology, biopharmaceuticals, bioenergy, and bioplastics.
- Facilitate Industry-Academia Collaboration – Strengthen partnerships to commercialize biotech products.
- Encourage Sustainable Biomanufacturing – Focus on environmentally sustainable practices.
- Support Researchers – Extramural funding for research in agriculture, healthcare, and environmental sustainability.
- Nurture Human Resources – Develop skilled manpower through holistic support and capacity building.

ISRO's Missions   Science & Technology

Why in news?

- The Union Cabinet approved the expansion of the **Chandrayaan-4** mission, **Venus Orbiter WhyMission (Shukrayaan Mission)** and the development of **India's first space station (the Bharatiya Antriksh Station)**

About Shukrayaan Mission/ Venus Orbiter Mission (VOM)

- **Mission Name:** The VOM, also called Shukrayaan-1, is an upcoming ISRO mission
- **Launch Target:** target in **2028.**
- **Objective:** The mission aims to study **Venus' surface, atmosphere, volcanic activity**, and **solar wind** interactions with its ionosphere.
- **Duration:** It will have a mission **duration of 4 years**.
- The spacecraft will **operate in an elliptical orbit**, with **distances of 60,000 km at apoapsis** and 500 km at periapsis.
- **Scientific Payloads**: Total of around 12 instruments, including:
  - **Synthetic Aperture Radar (SAR)**: For surface and subsurface mapping.
  - **Infrared Camera**: For thermal mapping of Venus' atmosphere and surface.
  - **Mass Spectrometer**: To study the composition of Venus' atmosphere.
  - **Ultraviolet Camera**: For studying the upper atmosphere and cloud patterns.
  - **International Collaboration:** For the mission's payload and technology, **collaborations** with **NASA, CNES (France), and Russia** have been established.
- This mission aims to explore one of Earth's nearest planetary neighbours and understand why Venus evolved so differently from our planet.

About Chandrayaan 4

- **Objective:** Chandrayaan-4 aims to collect and return lunar samples to Earth, marking India's first lunar sample return mission.
- **Launch Timeline:** The mission is scheduled for launch in 2027.
- **Mission strategy:** The mission will feature five spacecraft modules - Propulsion system, Descender, Ascender, Transfer module, and Re-entry module, launched via two separate rockets.

- **Launch Vehicles:** Chandrayaan-4 will utilise two different rockets:
  - **Launch Vehicle Mark-3 (LMV-3):** The heavy lifter will carry the propulsion, descender, and ascender modules.
  - **Polar Satellite Launch Vehicle (PSLV):** The workhorse will transport the transfer and re-entry modules to their designated lunar orbits.
- **Significance:**
  - Chandrayaan-4 is a significant step toward ISRO's long-term goal of
  - **landing Indian astronauts on the Moon by 2040.**
  - It will also contribute to future space initiatives like the development of **India's space station by 2035.**
  - It builds on the success of previous Chandrayaan missions and focuses on key technologies for **future crewed lunar landings.**
  - Chandrayaan-4 will be more complex than its predecessor, **involving five separate modules and requiring two space docking operations**— a first for ISRO

About Bharatiya Antriksh Station (BAS)
- **Planned Indian Space Station**: The Bhartiya Antriksh Station is ISRO's ambitious project to establish an indigenous space station in low Earth orbit (LEO).
- **Orbit:** The station is planned to be placed in low Earth orbit, likely between 400–500 kilometers above Earth.
- **Completion Target:** The space station is expected to be operational by 2035.
- **Crew Capacity:** The station will accommodate astronauts for 15-20 days at a time, supporting various scientific experiments and space research.
- **Independent Mission:** Unlike the International Space Station (ISS), it will be entirely operated by India and not part of any international collaboration.
- **Gaganyaan Link:** The space station is part of ISRO's long-term human spaceflight plan, following the success of the Gaganyaan mission, India's first crewed space mission.
- **Modular Design:** The station will be a modular structure, similar to other space stations, allowing future expansions.
- **Primary Objectives:** It will focus on microgravity experiments, space biology, and material sciences, as well as serve as a stepping stone for future interplanetary missions.

Anusandhan National Research Foundation (ANRF) — Science & Technology

Why in news?
- The Prime Minister presided over the first meeting of the Governing Board of the Anusandhan National Research Foundation (ANRF).

About ANRF
- The Anusandhan National Research Foundation (ANRF) was e**stablished by the ANRF Act of 2023** to promote a culture of research and innovation throughout India.
- The foundation aims to cultivate and enhance research and innovation in
- **alignment with the National Education Policy (NEP).**
- It **incorporates the functions of the Science and Engineering Research Board (SERB)**, which previously managed various research funding initiatives in the country.
- The ANRF has set a **funding goal of ₹50,000 crore** for the period from 2023 to 2028.

Current Status of the Research and Development (R&D) Sector in India
- **Gross Expenditure Growth:** India's Gross Expenditure on Research and Development (GERD) rose from ₹601,968 million in 2010-11 to ₹1,273,810 million in 2020-21.
- **Patent Grants:** India secured the sixth position in patent grants in 2022, with a total of 30,490 patents awarded

Government Initiatives for Boosting the Research and Development (R&D) Sector in India
- **National Research Foundation (NRF):** Established a ₹50,000-crore fund in 2021 to promote interdisciplinary research.

- **Private Sector Engagement:** The government fosters an environment for private sector participation in R&D through substantial funding.
- **Space Program Expansion:** Significant achievements in space, such as the Mars Orbiter Mission and Chandrayaan missions, are being leveraged for commercial growth.
- **Nuclear Energy Development:** Investments are being made in small and modular nuclear reactors to meet energy demands and reduce carbon emissions.

Strengthening India's R&D Ecosystem
- **Addressing Funding Gaps**: To bolster its R&D ecosystem, India needs to tackle existing funding deficiencies and increase private sector involvement.
- **Effective Policy Implementation**: It is crucial to execute recent policy initiatives efficiently to maximise their impact on R&D.
- **Equitable Resource Allocation**: Efforts should focus on fair distribution of funds and fostering interdisciplinary collaborations.
- **Global Standards**: Maintaining high global standards is vital for enhancing India's R&D capabilities.

India Graphene Engineering and Innovation Centre | Science & Technology

Why in news?
- The Ministry of Electronics and Information Technology has officially announced the launch of the **India Graphene Engineering and Innovation Centre (IGEIC)**, a key initiative under the vision of Viksit Bharat@2047.

About IGEIC
- Established in **Trivandrum, Kerala,** under the **Graphene Aurora Program** as a Non-profit, section 8 company with the following **objectives:**
  - To establish a **centre of excellence in graphene technology**, focusing on applications in electronics, energy storage, healthcare, material coatings, conveyance systems, and sustainable materials.
  - It aims to **harness the transformative potential of graphene**, a material known for its strength, flexibility, and electrical conductivity, to drive innovation across diverse industries.

The Significance of the Graphene Ecosystem for India
- **Economic Growth and Industry Innovation**
  - Creation of more efficient batteries and supercapacitors.
  - Its exceptional electrical conductivity and flexibility make it ideal for next-generation electronics.
- **Sustainable Development**
  - Graphene-enhanced solar panels and batteries can improve energy efficiency and storage.
  - Graphene's use in lightweight and durable materials can lead to reduced material consumption.
- **Job Creation and Skill Development**
  - Establishing specialized R&D centers like the IGEIC will create high-skilled job opportunities for scientists and engineers.

Vishanu Yuddh Abhyaas | Science & Technology

Why in news?
- The "Vishanu Yuddh Abhyas" **(Virus War Exercise)** was conducted in Ajmer district, Rajasthan, from August 27 to August 31, 2024, to assess pandemic preparedness under One Health Mission.

About Vishanu Yuddh Abhyaas
- The "Vishanu Yuddh Abhyas" mock drill, was aimed to evaluate **India's preparedness for zoonotic disease outbreaks**.
- The exercise assessed the readiness of the **National Joint Outbreak Response Team (NJORT)**, comprising experts from human health, animal husbandry, and wildlife sectors.

- A simulated outbreak scenario was created to test the response of various agencies, including the **National Centre for Disease Control (NCDC)**, **Indian Council of Medical Research (ICMR)**, **Indian Council of Agricultural Research (ICAR)**, **Directorate General of Health Services (DGHS)**, the **Department of Animal Husbandry and Dairying (DAHD)** and state authorities.
- The main goals of the drill were:
  - To **investigate and identify** the virus responsible for the mock outbreak.
  - To initiate actions to **control the spread** of the illness among human and animal populations.

About One Health Mission
- Launched in **2022**, spearheaded by
- The goal is to develop **strategies for integrated disease surveillance**, **joint outbreak response, coordinated research and development (R&D)** and ensure seamless information sharing for better control of routine diseases as well as those of a pandemic nature.
- The mission will help in institutionalising the one health approach which recognises that the health of humans is closely related to the health of the animals and our shared environment.

Reusable Hybrid Rocket (RHUMI-1) — Science & Technology

Why in news?
- India achieved a significant milestone in its space journey with the launch of its first reusable hybrid rocket, RHUMI-1.

About RHUMI - 1
- It is India's first reusable hybrid rocket.
- Reusable rockets release the payload, lands back on Earth and can again be launched with new payload.
- It was developed by the Tamil Nadu-based startup Space Zone India.
- **Key Features:**
  - **Hybrid Rocket Engine:** RHUMI-1 is a hybrid rocket engine that uses a combination of solid and liquid propellants to improve efficiency and reduce operational costs.
  - **Adjustable Launch Angle:** Precise adjustments from 0 to 120 degrees allow for meticulous control over its trajectory.
  - **Electrically Triggered Parachute System:** An innovative, cost-effective, and eco-friendly descent mechanism ensures safe recovery of rocket components.
  - **Environment Friendly:** RHUMI is 100% pyrotechnic-free and 0% TNT.
- **Benefits of the Reusable Rocket:**
  - **Cost Savings:** Reduces expenses by up to 65% compared to constructing a new rocket for each launch.
  - **Minimizes Space Debris:** Lowers the amount of discarded rocket components.

DART Mission — Science & Technology

Why in news?
- A new study found that rocky debris blasted away from a football stadium-sized asteroid, Dimorphos, during the DART mission could create the **first human-made meteor shower** known as the **Dimorphids**.

About NASA's DART Mission
- According to **NASA**, DART was the first-ever mission dedicated to investigating and demonstrating one method of deflecting asteroids by changing an asteroid's motion in space through kinetic impact.
- As part of the mission, a spacecraft has intentionally collided with asteroid moonlet **Dimorphos** in space.
- With the success of the DART mission, NASA found that the mission's **kinetic impactor technique** could effectively change an asteroid's trajectory.
- This technology could be used to deflect hazardous asteroids on a collision course with Earth.

About the first human-made meteor shower- Dimorphids
- Scientists estimated the intentional collision in the DART mission generated more than 2 million pounds of rocks and dust.
- These debris can eventually reach Earth and Mars, creating a potential meteor shower known as the **Dimorphids**.
- Though these fragments could create a visible streak of light as they burn up in the Earth's atmosphere, they are not expected to pose any threat to life.

Polaris Dawn Mission

Why in news?
- Recently, SpaceX Falcon 9 rocket launched the world's first private spacewalk,Polaris Dawn Mission.

About the mission
- Polaris Dawn mission SpaceX Falcon 9 launched Polaris Dawn to low-Earth orbit from NASA's Kennedy Space Center in Florida.
- It is a five-day orbital expedition carrying a four-member civilian crew for the first spacewalk by non-professional astronauts.
- The crew travelling in SpaceX's Dragon capsule is aiming to fly deeper into space than any other manned mission in more than half a century, reaching a peak altitude of 1,400 km.
- The plan is to spend 10 hours at that height (1400 Km) — filled with extreme radiation and riddled with debris — before reducing the oval-shaped orbit by half (around 700 Km).
- The crew will reach up to the inner band of the Van Allen radiation belts —regions in space that encircle the Earth and are highly radioactive — which begins at around 1,000 km altitude.
- This mission is the first of three testing and development missions under the Polaris Program.
- Mission I: World's first Private spacewalk.
- Mission II: It will be a building upon the mission of Mission I.
- Mission III: The first human spaceflight on Starship — the world's first fully reusable transportation system.

[SpaceX]
- It is an American aerospace company founded in 2002.
- It was the first private company to successfully launch and return a spacecraft from Earth orbit and the first to launch a crewed spacecraft and dock it with the International Space Station (ISS).

Bharatiya Anthariksh Station (BAS-1)

Why in news?
- Cabinet gave approval for development of **first module of Bharatiya Anthariksh Station (BAS-1)** and undertake missions to **demonstrate and validate various technologies** for building and operating BAS.

Revised Gaganyaan Programme
- Gaganyaan Programme approved in 2018 envisages undertaking the **human spaceflight to Low Earth Orbit (LEO)**.
- It targets **development and demonstration of critical technologies** for long duration human space missions.
- **Under Revised Programme,** ISRO will undertake **four missions** under ongoing Gaganyaan Programme by **2026** and development of **BAS-1 & four missions** for demonstration & validation of various technologies for BAS by December, 2028.
- By **2035**, ISRO plans to construct **additional modules to achieve full operational status** for space station.
- BAS is currently in **conceptualization phase**, under which overall architecture, number and types of modules, docking ports etc. are being studied.

Significance of BAS
- **Fulfil Amrit Kaal vision** for creation of BAS by 2035 and Indian Crewed Lunar Mission by 2040.
- **Boost microgravity-based scientific research**, technology development activities, and encourage innovations.
- **Boost employment** in high-tech space and allied sectors with enhanced industrial participation.

Why in news?

- Astronomers at the **Kodaikanal Solar Observatory** have **mapped variation in the rotation speed of the Sun's chromosphere**, from the equator right up to its polar regions for the first time using 100 years of daily records of the Sun.

Key Findings from the Mapping of Sun's Chromosphere

- **Chromosphere:** The chromosphere is a thin layer of **plasma** that lies **between** the **Sun's visible surface (the photosphere)** and the **corona (the Sun's upper atmosphere)**
- It extends for **at least 2,000 km (1,200 mi.)** above the surface
- It **appears bright red** because the hydrogen in the Sun emits a reddish-coloured light at high temperatures.
- **Differential Rotation Rates:** The Sun **rotates faster at the equator** (13.98 degrees per day) and **slower towards the poles** (10.5 degrees per day at 80 degrees latitude).
- **Similar Rotation of Features:** **Plages and network** features **exhibit similar rotation rates**, suggesting a shared origin deep within the Sun.
- **First Mapping Achievement:** This study is the **first** to successfully use **chromospheric network cells to map the Sun's rotation from the equator to the poles.**

About Differential Rotation

- **Definition:** The **difference in rotation speed** between the **Sun's equator and poles** is known as differential rotation.
- **Earth vs. Sun's Rotation**
- **Earth's Uniform Rotation:** Earth rotates as a rigid body, **completing a full rotation every 24 hours,** with **uniform rotation speed from equator to poles.**
- **Sun's Differential Rotation:** The **Sun**, **made of plasma**, **rotates at different speeds based on latitude.**
- The Sun's equator spins much faster than its poles.
- It takes the equatorial region **only about 25 days** to complete one rotation, while the **poles take a leisurely 35 days. (**Diagram represents the Sun's differential rotation, where surface regions at various latitudes rotate at different speeds.)

Significance of Differential Rotation

- Understanding the intricacies of the variation in rotation speed, as a function of latitude as well as time, is crucial to **understand the Sun itself.**
- It **drives the solar dynamo**, the 11-year solar cycle, and **periods of intense solar activity** that can trigger magnetic storms on Earth.

- **Discovery of Differential Rotation**: The discovery of differential rotation **dates back to Carrington in the 19th century**, who observed that sunspots on the visible surface of the Sun rotate at different speeds depending on their latitude.
- **Challenges of Relying on Sunspot Observations** for Differential Rotation:
- **Limited Latitude Coverage**: **Sunspots do not appear above 35 degrees latitude**, restricting their use in measuring the Sun's rotation closer to the poles.
- **Infrequency at High Latitudes**: Sunspots occur **rarely at higher latitudes**, making data collection **sparse and unreliable for studying** the Sun's full rotational dynamics. This necessitated alternative methods
- **Inadequate for Time-Dependent Studies**: **Sunspot-based methods are insufficient for tracking** how differential rotation varies over time, such as across the solar cycle, due to limited and sporadic data.

Why in news?
- Cases of Dengue and **Leptospirosis** rises on the urban areas as a **sesonal flu**.

About
- Leptospirosis, also known as "**rat fever**", is a **rare bacterial infection** that affects people and animals.
- The disease is **caused b**y a **bacterium called Leptospira interrogans**, or **Leptospira**.

Infection
- The **carriers** of the disease **can be either wild or domestic animals**, including **rodents, cattle, pigs, and dogs.**

Signs and symptoms
- It generally **takes 2-30 days to get sick** after having contact with the bacteria. Leptospirosis may **occur in two phases.**
- In the **first phase,** people may have **fever, chills, headache,** muscle aches, vomiting, or **diarrhea**. The person may **feel better for a while** but **become ill again.**
- Some people may suffer a more **severe second phase** with **kidney or liver failure**, or **inflammation** of the membrane **around the brain and spinal cord** (**meningitis**).

Acute Form
- Weil's disease, the acute, severe form of leptospirosis, causes the infected individual to become jaundiced (skin and eyes become yellow), develop kidney failure, and bleed.
- Bleeding from the lungs associated with leptospirosis is known as severe pulmonary haemorrhage syndrome.

Transmission
- **Infected animals spread** the **bacteria through their urine (pee).** They may continue to urinate the bacteria into the environment for several months or years.
- The bacteria can **survive in contaminated water or soil for weeks to months**
- It is **not spread from person to person,** except in very **rare cases.**
- It is most **common in tropical areas** and warmer climates **with lots of rainfall** each year.

Why in News?
- Recently the Quality Council of India approved the Ghaziabad branch of National Test House as a certification body for type certification of drones.

National test house:
- It is a premier testing and quality assurance institution under the Ministry of Consumer Affairs, Food and Public Distribution.
- Established in 1912
- It carries out almost all types of testing, calibration and quality assessment related to industry, commerce, trade etc. as per international and national standards.
- Currently it has branches in Kolkata, Mumbai, Chennai, Ghaziabad, Jaipur, Guwahati and Varanasi.

Quality Council of India (QCI):
- It was established as a national body in the year 1996.
- It was set up through the PPP model with the support of the Government of India and three major industry associations -
  - Associated Chambers of Commerce and Industry of India
  - Confederation of Indian Industry
  - FICCI
- It aims to establish a mechanism for independent third-party evaluation of products, services and processes.

India-US Joint Military Exercise

Why in news?

- The 20th edition of India-US Joint Military Exercise **YUDH ABHYAS-2024** commenced on 9th September, at Foreign Training Node in Mahajan Field Firing Ranges, Rajasthan.

Key Details of the Exercise

- Aim: To enhance joint military capabilities for **counter-terrorism operations in a semi-desert environment.**
- The Indian Army is represented by **600 personnel** from the RAJPUT Regiment and other units. The exercise will feature one of the **largest U.S. contingents to date**, with approximately 600 personnel.
- The U.S. Army will deploy Stryker infantry vehicles and the M142 HIMARS (High Mobility Artillery Rocket System).
- Exercise YUDH ABHYAS has been held **annually** since 2004, alternating between India and the USA.

Cybersecurity Attack in Lebanon

Why in news?

- Recently, Hezbollah pagers detonated across Lebanon, causing deaths and injuries. The next day, attacks on radios, cell phones, and laptops resulted in more casualties.

About Pagers

- Pagers, also known as beepers, are **wireless devices** that receive and display messages or alerts via **radio signals**.
- The basic operation of the device includes receiving and sending messages.
- These messages can be **numeric** (e.g., a phone number) or **alphanumeric** (text).
- Pagers often emit a tone, beep, or vibration to notify the user of an incoming message. This feature is particularly useful in noisy environments or situations where silence is preferred, such as in hospitals.

Advantages of using a pager

- These are less traceable than mobiles.
- Pagers leave a small electronic footprint for communication making it **less vulnerable to hacking or surveillance**.
- These devices are simple to use and able to transmit basic messages **without Internet or cellular networks**, reducing risks.
- Pagers are even good to work in areas where there is poor mobile coverage.

Exercise Tarang Shakti

Why in news?

- Exercise Tarang Shakti-24 is one of the largest multinational air exercises being conducted by the Indian Air Force in Jodhpur

About Exercise Tarang Shakti

- It will be the **largest international air exercise** ever conducted in India, with invitations extended to **51 countries**.
- The exercise will be conducted in **two phases.**
- **Phase one** of the exercise will be conducted at **Sulur in Tamil Nadu**. Four countries including France, Germany, Spain, and the United Kingdom will participate in phase one with their assets.
- **Phase two** will be held at **Jodhpur in Rajasthan**. It will see participation from Australia, Bangladesh, Greece, Singapore, UAE, and the USA with their assets.
- The exercise will have a variety of aircraft from homegrown models like the **LCA Tejas** to advanced fighters like the **Rafale and Sukhoi.**
- The event will also feature a **defence industrial expo** that will showcase top Indian defence companies and innovative startups.

Why in news?
- The Ministry of Defence (MoD) signed a significant ₹26,000-crore contract with Hindustan Aeronautics Limited (HAL) for the supply of 240 advanced jet engines for the **Sukhoi Su-30MKI fighter jets.**

About Su-30MKI
- The Su-30MKI is powered by two Al-31FP turbojet engines (**Twin-engine aircraft**).
- Sukhoi Su-30MKI is a **multi-role fighter jet** that is a key part of the Indian Air Force's (IAF) fleet.
- Maximum unrefueled flight range of **3,000 km**.
- Capable of carrying and launching the air-launched version of the **BrahMos supersonic cruise missile**.

Jet Fighter Generations

1st Gen jet fighters (1940s-1950s)	Used turbojets for propulsion instead of piston-driven aircraft.	Messerschmitt-Me262 MiG-15
2nd Gen fighters (1950s-1960s)	Integrated new technologies, swept or delta wings & guided missiles for BVR (beyond visual range) combat.	Sukhoi-7 F-104 Starfighter
3rd Gen fighters (1960s-1970s)	Inducted improved radars, missiles & avionics.	Mirage-III F-4 Phantom-II
4th Gen fighter (1970s-1980s)	Incorporated fly-by-wire controls & multi-role capabilities.	Tornado F-16 Fighting Falcon
4.5 Gen fighters (1990s-onwards)	Use more advanced avionics & electronics, with some stealth.	Sukhoi-30MKI F-16F Desert Falcon
5th Gen fighters	Multi-role or swing-role but also incorporate advanced stealth technology, composite materials & super cruise	F/A-22 Raptor

Why in news?
- The INDUS-X defence initiative between the USA and India marks its first anniversary this year.

About INDUS-X initiative:
- INDUS-X, was launched on June 21 2023 by the U.S. Department of Defence and the Indian Ministry of Defence.
- It has advanced both countries' commitment to building a defense innovation bridge under the **Initiative on Critical and Emerging Technology (iCET).**
- The third INDUS-X Summit will take place in Silicon Valley in September 2024 with a focus on harnessing private capital for defence innovation.
- The summit will be co-hosted by the U.S.-India Strategic Partnership Forum (USISPF) and Stanford University.

About iCET
- The iCET was launched by the Indian Prime Minister and U.S. President on the sidelines of the QUAD summit in Tokyo on May 24, 2022.
- The "iCET" framework aims to strengthen cooperation between India and the US in critical & emerging technologies.
- It focuses on enhancing economic growth, fostering innovation, and promoting strategic trade.
- Under it, India is set to share its key technologies with the US, expecting reciprocal access to American technologies

Significance of INDUS-X
- It has strengthened private sector cooperation between the United States and India by facilitating partnerships among defence technology companies, investors, and researchers.
- It sets the stage for future technological advancements and strategic partnerships, stimulating cross-national science and technology networks.

Other Key defence and security pacts of India and USA
- Logistics Exchange Memorandum of Agreement (LEMOA) in 2016.
- Countering America's Adversaries Through Sanctions Act (CAATSA) in 2017.
- Communications Compatibility and Security Agreement (COMCASA) in 2018.
- Basic Exchange and Cooperation Agreement (BECA) in 2020.

Why in news?

- India secured **Tier 1 status** in the Global Cybersecurity Index (GCI) 2024, published by the International Telecommunication Union (ITU).

About Global Cybersecurity Index

- The GCI is a comprehensive assessment tool that evaluates countries' cybersecurity efforts and capabilities.
- Published by the **International Telecommunication Union (ITU).**
- Assessment Criteria: The GCI 2024 evaluates national efforts based on **five key pillars:**
  - Legal measures
  - Technical aspects
  - Organisational structures
  - Capacity development
  - Cooperation initiatives

India's Performance

- **Score:** India achieved an impressive 98.49 out of 100.
- **Status**: Elevated to Tier 1, joining the ranks of 'role-modelling' countries.
- **Significance:** Demonstrates India's strong commitment to global cybersecurity practices.
- **Nodal Agency:** Department of Telecommunications, Ministry of Communications.

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