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WEEK 4 FEBRUARY 2025

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DISCLAIMER

*T*he current affairs articles are segregated from prelims and mains perspective, such separation is maintained in terms of structure of articles. Mains articles have more focus on analysis and prelims articles have more focus on facts.

However, this doesn't mean that Mains articles don't cover facts and PT articles can't have analysis. You are suggested to read all of them for all stages of examination.

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★★★★★

SECTION -A

MAINS ISSUES

NORTH IRAQ SINKING?

Context

The northern region of Iraq, especially around the **Zagros Mountains**, is slowly sinking into the Earth. This process is happening very slowly, over millions of years, and is caused by forces deep inside the Earth. This is not something that can be seen happening quickly like a **sinkhole;** it's a very gradual change.

Key-findings of the Study

- **Neotethys Oceanic Plate Rupture:** The study reveals that the **Neotethys oceanic plate** (once the seafloor between the Arabian and Eurasian continents) is slowly breaking off horizontally. This rupture is extending from southeast Turkey to northwest Iran.

- The sinking of this oceanic plate (part of plate tectonics) beneath the Earth's surface contributes significantly to the **bending and subsiding of the region's surface.**

- **Surface Depression and Sediment Accumulation:**

  - Over millions of years, the immense weight of the **Zagros Mountains** has caused the Earth's surface around the mountains to bend downward. Sediments eroded from the mountains accumulated in the depression, forming plains like **Mesopotamia** in the **Middle East.**

  - Depression of 3-4 km deep is observed, which could not be solely explained by the weight of the mountains. Instead, the sinking oceanic plate beneath the region is playing a key role in pulling the surface downward, making space for more sediment to accumulate.

Why is it Sinking?

- The sinking is caused by a **tectonic process**. The Earth's surface is made up of large plates, and these plates are constantly moving.

  - **Tectonic Plates:** The plates that make up the Earth's surface are constantly moving, and where they meet, they can cause changes to the land above.

  - **Neotethys Slab:** Below the **Zagros Mountains**, there is a piece of ocean floor called the **Neotethys slab**. This slab is slowly sinking into the Earth's mantle (the layer below the crust). This process started millions of years ago when the oceanic plate broke off, and it's still happening today.

  - **Plate Collision:** The sinking is happening because the **Arabian Plate** and the **Eurasian Plate** are colliding. This collision has created the **Zagros Mountains**, and the sinking slab is pulling the land down with it.

🔍 FACT BOX

Key Concepts:

- **Plate Tectonics:** The movement of **tectonic plates** causes the collision of continents and oceanic plates. The collision of the **Arabian Plate** with the **Eurasian Plate** resulted in the formation of mountain ranges like the **Zagros**.

- **Oceanic plates** are typically denser than continental plates and tend to sink beneath them when plates collide. The **Neotethys oceanic plate** is an example of this sinking process.

⊙ **Orogeny (Mountain Building):** The **Zagros Mountains** were formed through a process known as **orogeny**, where tectonic plate collisions lead to the uplift of large rock masses, creating mountains over millions of years.
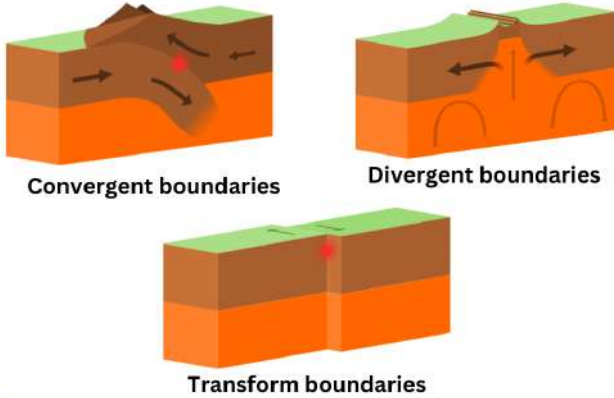
Key-location

Zagros Mountains (Kurdistan Region, Iraq):

⊙ The Zagros Mountains stretch across southwestern Iran, extending from the border regions of **eastern Turkey and northern Iraq** to thAe **Strait of Hormuz.**

⊙ The range is approximately 1,600 km long and 240 km wide.

⊙ **Geological Composition:** The oldest rocks in the range date back to the **Precambrian period (over 541 million years ago).** Most rocks are limestone and shale, with formations from the **Mesozoic Era (252 million to 66 million years ago)** and the **Paleogene Period (66 million to 23 million years ago).**

⊙ **Formation and Tectonic Activity**: The range was formed through **orogenies (mountain-building events)** caused by the Arabian Plate moving beneath the **Eurasian Plate** during the **Miocene and Pliocene epochs (23 to 2.6 million years ago).**

⊙ **Highest Peak:** The highest point is Mount Dena, which reaches an elevation of 4,409 meters (14,465 feet).

Mesopotamia (Middle East):

⊙ Mesopotamia, located between the Tigris and Euphrates rivers, is a historic and fertile plain that has accumulated sediments from the erosion of the Zagros Mountains over millions of years.

⊙ The depression caused by the weight of the Zagros Mountains has influenced the topography of this region, which has historical significance for civilization.
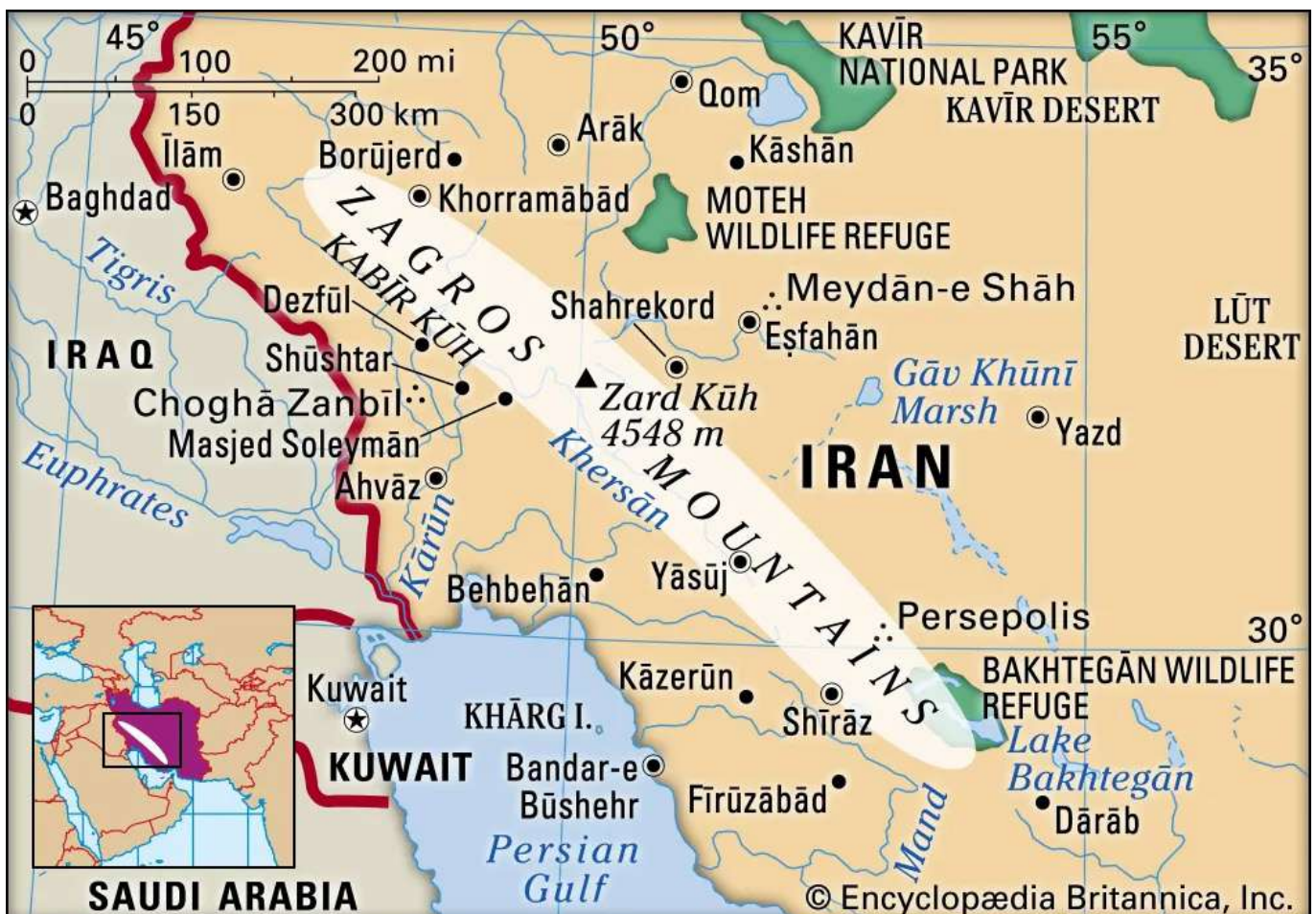
(Figure No. 2 given below)

Figure No. 02

US-UKRAINE MINERALS DEAL

Context:

Ukraine and the United States are all set to finalize a significant deal that would give the United States access to **Ukraine's rare earth minerals,** essential for producing modern technologies, including electric vehicle batteries, wind turbines, and military equipment.

Key Terms of the Agreement:

- Ukraine is home to 5% of the world's critical raw materials, including substantial reserves of **graphite, lithium, and titanium.**
- These minerals are crucial for producing products like electric vehicle batteries, electronics, and defense technologies.
- Ukraine is one of the top five global suppliers of graphite, with an estimated 19 million tonnes of proven reserves.
- Now, these minerals will be available for U.S. investment, with the potential for future commercial exploitation.
- **Investment Fund for Reconstruction**: Ukraine and the U.S. have agreed to set up an "investment fund" for the reconstruction of Ukraine, to be managed jointly. Ukraine will contribute 50% of the future revenues from these resources into the fund. The primary goal of this fund is to invest in various reconstruction projects within Ukraine, benefiting both the U.S. and Ukraine.

Implications for Global Geoeconomics:

- **Strategic Importance of Rare Earth Minerals**: Rare earth minerals have become increasingly important for modern industries, particularly in the production of technologies related to renewable energy, electric vehicles, and defense systems. The U.S. and China are currently locked in a strategic competition for control over these resources. This deal marks Ukraine's mineral wealth as an important asset in the broader global competition, with the U.S. seeking to reduce its dependency on China, which dominates global rare earth supplies.
- **Potential for Broader Economic Engagement**: The deal reflects a broader trend of resource-based diplomacy, where access to strategic minerals and resources becomes a key factor in international relations. This move by Ukraine, along with its efforts to align with the U.S., underscores its pivot towards Western alliances for both economic and security reasons.

FACT BOX

Rare Earth Metals (REEs)

- Rare Earth Elements (REEs), also known as rare earth metals or rare earth oxides, are a group of 17 silvery-white, soft heavy metals that are crucial for many modern technologies. Despite their name, rare earth metals are not particularly rare in the Earth's crust but are difficult to find in large, concentrated deposits.

- **The 17 rare earth elements are:** Lanthanum (La), Cerium (Ce), Praseodymium (Pr), Neodymium (Nd), Promethium (Pm), Samarium (Sm), Europium (Eu), Gadolinium (Gd), Terbium (Tb), Dysprosium (Dy), Holmium (Ho), Erbium (Er) Thulium (Tm), Ytterbium (Yb), Lutetium (Lu)
  - ➤ **Scandium (Sc)** – Not part of the lanthanide series but often included because it occurs with them in the same deposits.
  - ➤ **Yttrium (Y)** – Similarly, included due to its occurrence with lanthanides.
- Rare earth metals are essential for producing a wide range of products and technologies, including:
  - ➤ **Electric vehicles** (batteries)
  - ➤ **Wind turbines** (magnets)
  - ➤ **Smartphones** (screens, magnets)
  - ➤ **Computers** (hard drives, screens)
  - ➤ **Military equipment** (lasers, radar, missiles)
  - ➤ **LED lights** (lighting)
  - ➤ **Medical equipment** (MRI machines)

China's Dominance in the Rare Earth Industry

- China plays a dominant role in the global rare earth market.
- In 2010, China controlled 92% of global rare earth production. By 2020, this share decreased to 58%, as other countries started mining their own rare earth resources.
- However, China still holds a dominant position, producing **85% of the world's refined rare earths** in 2020.

DELIMITATION AND SOUTHERN STATES CONCERNS

Context

In a latest development, Union Home Minister Amit Shah responded to concerns raised by Tamil Nadu Chief Minister M K Stalin about the **proposed delimitation exercise**, assuring that southern states, including Tamil Nadu, will not lose any **Parliamentary seats** as a result of it.

What is Delimitation?

- Delimitation is the process of adjusting the boundaries of electoral constituencies and redistributing the number of seats in Parliament based on population changes. This ensures that each constituency has a roughly equal number of people.

  Background: Delimitation took place after every Census until 1971.

Population-wise seat ratio was broadly equitable after last delimitation

States	1961 Population	1967 Seats	Population/ Seat Ratio	1971 Population	1976 Seats	Population/ Seat Ratio
Uttar Pradesh	7,01,43,635	85	8,25,219	8,38,48,797	85	9,86,456
Bihar	3,48,40,968	53	6,57,377	4,21,26,236	54	7,80,115
Rajasthan	2,01,55,602	23	8,76,331	2,57,65,806	25	10,30,632
Tamil Nadu	3,36,86,953	39	8,63,768	4,11,99,168	39	10,56,389
Kerala	1,69,03,715	19	8,89,669	2,13,47,375	20	10,67,369
India	43,92,34,771	520	8,44,682	54,81,59,652	542	10,11,365

➤ After the **42nd Amendment in 1976**, the number of seats in Parliament was frozen until the **2001 Census**, mainly to allow states with high population growth to manage family planning without losing seats.

⊙ **Need:** Every Census in India results in changes in the population, so delimitation helps to reflect those changes. It ensures that all regions are fairly represented based on their population size.

What Does Delimitation Involve?

➤ **Reapportionment of Seats**: Based on the latest population data, constituencies may be redrawn, and some states may gain or lose seats.

➤ **Equal Representation**: The goal is to ensure that each elected representative represents a similar number of people. This prevents over- or under-representation of any state or region.

Concerns of Southern States

⊙ Southern states, like **Tamil Nadu and Kerala**, have slower population growth compared to northern states. If delimitation were done based on current population data, northern states could gain more seats in Parliament, while southern states might lose representation.

⊙ This has led to concerns that southern states would have less political influence in the future.

Potential Effects of Delimitation

➤ **Northern States' Gain**: States with higher population growth (like those in the north) might get more seats, potentially increasing their influence.

➤ **Southern States' Concerns**: States in the south, with slower population growth, might not gain as many seats, and could even lose some.

Based on projected 2025 population, current seat ratios not equitable

States	Current Seats	2025 Projected Population	Seats at the same ratio as last time #	Seats at 15 lakh ratio	Seats at 20 lakh ratio
UP*	85	25,23,42,000	250	168	126
Bihar*	54	17,08,90,000	169	114	85
Rajasthan	25	8,27,70,000	82	55	41
Tamil Nadu	39	7,73,17,000	76	52	39
Kerala	20	3,60,63,000	36	24	18
India	543	141,33,24,000	1,397	942	707

CONCERNS RAISED OVER DPDP ACT PROVISION FOR PWDS

Context

The **Digital Personal Data Protection Act (DPDP Act), 2023**, has introduced a provision **(Section 9(1))** that mandates legal guardians' consent for the use of personal data for any person with a disability. This provision has sparked concerns among disability rights activists, who argue that it undermines the autonomy of PwDs by assuming they cannot make decisions for themselves.

What does this provision state?

- **Section 9(1)** of the Act requires **data fiduciaries (those processing personal data)** to obtain the consent of a **legal guardian** before processing the data of any PwD with a guardian. This is similar to how consent is required for children under the law.

- Activists argue that this provision **infantilizes PwDs** by assuming that they cannot make their own decisions, regardless of the nature of their disability or level of support required.

- **Types of Guardianship and Their Impact**

  ➤ **Limited vs Full Guardianship**: The RPWD Act, 2016, provides for **"limited guardianship"** where support is provided for specific legal decisions, while the **NT Act, 1999**, mandates full guardianship for certain disabilities.

  ➤ The DPDP Act does not adequately differentiate between these forms of guardianship, which leads to concerns about PwDs being treated as incapable of making their own decisions, even when they are capable.

- **International Disability Rights Conflict:** The **UN Convention on the Rights of Persons with Disabilities (UNCRPD)** advocates for decision-making support rather than full guardianship.

  ➤ The DPDP Act's provision seems to conflict with this principle, especially for **PwDs governed by the NT Act,** which contradicts the principles of autonomy and decision-making capacity recognized by the **UNCRPD.**

Challenges with Implementation

- **Ambiguity in Consent Process**: The absence of clear guidelines or illustrations for PwDs, as seen with children, leaves many questions unanswered about how consent will be gathered and what it will mean for PwDs with different disabilities.

- **Practical Concerns**: Disability rights organizations note that guardians often manage all affairs of PwDs, even under the RPWD Act's limited guardianship. This could lead to situations where PwDs are unable to exercise their rights independently.

Data Privacy and Digital Access

- **Potential Privacy Issues**: PwDs may face difficulties in asserting their privacy rights. For example, platforms might store sensitive data on their disability without the user's consent if a guardian is involved.

- **Inaccessible Platforms**: A report from the Vidhi Centre for Legal Policy shows that many popular platforms, like Paytm and Flipkart, are not accessible to PwDs, limiting their ability to exercise digital rights regardless of guardianship.

🔍 FACT BOX

Types of Disabilities

- According to the **Census 2011**, the number of Persons with Disabilities (PwDs) in India stands at **2.68 crore**, which is **2.21%** of the total population.

- As per **the Persons with Disabilities (Equal Opportunities, Protection of Rights & Full Participation) Act, 1995** - A person with disability can be defined as one with one or more of disabilities falling under any of the below mentioned categories:

  ➤ **Blindness:** "Blindness" refers to a condition where a person suffers from any of the following conditions namely:-

  ➤ **Total absence of sight;** or Visual acuity not exceeding 6/60 or 20/200 (Snellen) in the better eye with correcting lenses; or **Limitation of the field of vision** subtending an angle of 20 degree or worse;

  ➤ **Cerebral Palsy:** "Cerebral Palsy" means a group of non-progressive conditions of a person characterized by abnormal motor control posture resulting from brain insult or injuries occurring in the pre-natal, peri-natal or infant period of development;

  ➤ **Low vision:** " Low vision" means a person with impairment of visual functioning even after treatment of standard refractive correction but who uses or is potentially capable of using vision for the planning or execution of a task with appropriate assistive device;

  ➤ **Locomotor disability**: "Locomotor disability" means disability of the bones, joints or muscles leading to substantial restriction of the movement of the limbs or nay form of cerebral palsy;

  ➤ **Leprosy-cured:** "Leprosy-cured person" means person who has been cured of leprosy but is suffering from-

    ♦ **Loss of sensation** in hands or feet as well as loss of sensation and paresis in the eye and eye-lid but with no manifest deformity;

- ♦ **Manifest deformity and paresis** but having sufficient mobility in their hands and feet to enable them to engage in normal economic activity;

- ♦ **Extreme physical deformity** as well as advanced age which prevents him from undertaking and gainful occupation and the expression "Leprosy Cured" shall be construed accordingly;

- ♦ **Mental retardation**: "Mental retardation" means a conditions of arrested or incomplete development of mind of a person which is specially characterized by sub normality of intelligence;

- ♦ **Mental illness:-** "Mental illness" means any mental disorder other than Mental retardation

- ♦ **Hearing Impairment**: "Hearing Impairment" means loss of sixty decibels or more in the better ear in the conversational range of frequencies.

Laws Granting Disability Rights

- ⊚ **RPwD Act, 2016**: Replaces the 1995 Act, ensuring equal opportunities, protection of rights, and full participation for PwDs.

- ⊚ **National Trust Act, 1999**: Aims to support the welfare of persons with autism, cerebral palsy, mental retardation, and multiple disabilities.

- ⊚ **Rehabilitation Council of India Act, 1992**: Regulates training and registration of professionals working in disability rehabilitation.

- ⊚ **Mental Health Care Act, 2017**: Protects the rights and dignity of persons with mental illness.

Major Initiatives for the Empowerment of PwDs

- ⊚ **PM-DAKSH**: Skill development and rehabilitation scheme for PwDs.

- ⊚ **Accessible India Campaign**: Aims to make the built environment accessible.

- ⊚ **DeenDayal Disabled Rehabilitation Scheme**: Provides assistance for the rehabilitation of PwDs.

- ⊚ **Assistance to Disabled Persons for Purchase/Fitting of Aids and Appliances**: Financial aid for purchasing assistive devices.

- ⊚ **National Fellowship for Students with Disabilities**: Fellowship opportunities for disabled students.

- ⊚ **Global Initiatives**

  - ➤ **Incheon Strategy**: A global framework to improve the lives of PwDs in Asia and the Pacific.

  - ➤ **United Nations Convention on the Rights of Persons with Disabilities**: International treaty to protect the rights of PwDs.

  - ➤ **International Day of Persons with Disabilities**: A day to raise awareness about the issues faced by PwDs globally.

UPSC PYQ

Q: India is home to lakhs of persons with disabilities. What are the benefits available to them under the law? (2011)

(1) Free schooling till the age of 18 years in government run schools.

(2) Preferential allotment of land for setting up business.

(3) Ramps in public buildings.

Which of the statements given above is/are correct?

(a) 1 only   (b) 2 and 3 only

(c) 1 and 3 only   (d) 1, 2 and 3

Solution: (d)

THEE-LANGUAGE FORMULA

Context

There has been ongoing tension between the **Union Government** and the **Tamil Nadu government** over the implementation of the **three-language policy** as part of the **New Education Policy (NEP) 2020**.

Why is the Three-Language Policy Controversial in Tamil Nadu?

- ⊚ The **three-language formula** was first introduced in the **NEP of 1968** with the aim of promoting Hindi as a language in non-Hindi speaking States.

- ⊚ However, this was met with strong resistance and protests in **Tamil Nadu**, where the state had already adopted a **two-language policy**, teaching **Tamil** and **English** in government schools.

- ⊚ **NEP 2020:** The NEP 2020 reintroduces the three-language formula but with a key difference: *it does not impose any language on States.*

  - ➤ The policy specifies that the languages to be taught will be chosen by **States, regions, and students**, with the only requirement being that *at least* two of the three languages should be **native to India.**

- ⊚ **Tamil Nadu's Stand:** Tamil Nadu remains steadfast in maintaining its two-language policy, insisting that the three-language formula is a cover for promoting Hindi imposition and does not align with the state's linguistic and cultural preferences.

What Are the Issues?

- ⊚ **Learning Outcomes:** According to the Annual Status of Education Report (ASER) by Pratham, there are significant learning deficits in India's education system:

  - ➤ In **Class V**, almost **60%** of students could not read a Class II level text.

  - ➤ In 2023, **25%** of youth aged **14-18 years** could not read a Class II level text fluently in their **regional language**, and more than **40%** could not read sentences in **English**.

➤ Foundational numeracy skills, such as **subtraction** and **division**, are similarly poor among schoolchildren.

◎ **Expenditure on Education:** As per the 2022 budget analysis by the Ministry of Education, while the Centre contributes 15% of the total revenue expenditure on elementary education, States bear the remaining 85%.

◎ **Total expenditure** on education (elementary to technical education) by both the Centre and States is approximately **4-4.5%** of India's **GDP**, falling short of the **6%** target set by the **NEP 2020**.

What needs to be done?

◎ While the idea of learning additional **Indian languages** in schools is desirable, the existing **learning outcomes** need to be addressed first. The priority should be to improve the teaching of:

➤ **Mother tongue** or **local languages**

➤ **English proficiency**

➤ **Foundational numeracy skills** in government schools.

◎ **English**, although not native, has become a global language and helps in **international competitiveness**, especially in sectors like **IT** and **services**. Therefore, its proficiency remains essential.

The Need for Autonomy and Constructive Dialogue

◎ The **rapid urbanization** and **migration** trends are expected to increase the number of bilingual and trilingual individuals across India. This implies a growing need for **language diversity** in schools, but not at the expense of undermining the **local languages**.

◎ There needs to be a **constructive dialogue** between the **Centre** and **Tamil Nadu** to ensure that disputes over the three-language formula do not delay **funding for education** and **other state-specific educational needs**.

◎ Given the **regional diversities** and the **financial burden** on States, there should be a **discussion** on providing more **autonomy** to States in **policy matters related to school education**.

Constitutional Provisions Regarding Language in India

◎ **Official Language of the Union:** The Constitution of India designates **Hindi** as the official language of the Union.

➤ English was initially intended to be the official language for only 15 years after the Constitution came into effect (until 1965), but it has been allowed to continue indefinitely under the **Official Languages Act, 1963**. This provides for the continued use of English, along with Hindi, for all official purposes of the Union.

◎ **State Official Languages**: Each State legislature has the authority to adopt any language(s) used in the State or Hindi as the official language(s) for the State's official purposes.

◎ **Promotion of Hindi**: The Constitution tasks the Union Government with promoting the spread of the Hindi language to make it a medium of expression for all elements of India's composite culture.

INTERNET SHUTDOWNS IN INDIA

Context:

India, in 2024, witnessed 84 internet shutdowns, making it the second-highest country globally for such disruptions. According to reports, India accounted for 58% of all documented internet shutdowns in the first half of 2023. Internet shutdowns have profound effects on citizens, businesses, and governance. Here's a detailed breakdown of the provisions governing internet shutdowns, their impacts, arguments for and against them, and possible solutions to minimize their use.

Legal Provisions Governing Internet Shutdowns

◎ **Indian Telegraph Act, 1885 & Suspension Rules (2017):**

➤ **Section 5(2) of the Indian Telegraph Act** empowers the Union or State Home Secretary to order the suspension of telegraph services, including the internet, during a public emergency or when public safety is threatened.

➤ **Temporary Suspension of Telecom Services Rules, 2017** stipulate that such an order must be reviewed by a committee within five days, and cannot last longer than 15 days. In urgent situations, a joint secretary-level officer or above can issue the order without prior committee review.

Code of Criminal Procedure (CrPC) - Section 144:

➤ **Section 144** allows district magistrates or any empowered executive magistrates to issue orders to prevent public disturbances. Internet suspension can be part of such orders for maintaining public order.

Impacts of Internet Shutdowns

Violation of Fundamental Rights:

➤ **Freedom of Speech and Expression (Article 19(1)(a))**: The Supreme Court in the *Anuradha Bhasin vs. Union of India* (2020) case highlighted that internet shutdowns violate the freedom of speech and expression.

➤ **Right to Practice Profession (Article 19(1)(g))**: It also impacts the right to practice any profession, particularly those relying on the internet.

➤ **Right to Information (Article 19)**: The *Raj Narain vs. State of UP* (1975) case declared the right to information as fundamental. Internet shutdowns hinder access to critical information.

➤ **Right to Internet (Article 21)**: The Kerala High Court, in *Faheema Shirin v. State of Kerala*, declared access to the internet as a fundamental right, further undermined by shutdowns.

◎ **Economic Consequences***:* Shutdowns cause significant economic disruptions. In the first half of 2023, India lost Rs 2,091 crore (USD 255.2 million) due to internet shutdowns.

◎ **Disruption of Education**: Schools, colleges, and universities increasingly rely on online platforms for teaching and exams. Shutdowns prevent students from accessing educational content and resources, affecting their studies.

◎ **Health Sector Impact**: Shutdowns affect the ability to coordinate medical services, access urgent healthcare information, and maintain mental health services. Studies have shown that such disruptions exacerbate public health challenges.

◎ **Impeding Disaster Response**: Internet shutdowns complicate the communication required for disaster management, hampering the flow of vital information during crises and reducing the effectiveness of humanitarian aid.

◎ **Erosion of Trust**: Frequent shutdowns can diminish public trust in the government and its institutions. There are concerns about increasing censorship and control over information flow, which reduces transparency and accountability.

Arguments For and Against Internet Shutdowns

Arguments in Favor	Arguments Against
◎ **Preventing Hate Speech & Fake News**: Shutdowns are often implemented to curb the spread of misinformation and hate speech, which can lead to violence or riots.	◎ **Undermining Democracy**: Internet shutdowns inhibit free access to information, making it difficult for citizens to participate in public discourse and hold authorities accountable.
◎ **Curbing Mobilization for Protests**: Shutdowns can prevent the organization of protests that threaten public order, such as during the abrogation of **Article 370** in Jammu and Kashmir.	◎ **Increased Authoritarianism**: Shutdowns may empower governments to silence opposition and dissent, leading to greater centralization of power.
◎ **National Security**: In sensitive areas, such as border regions, internet shutdowns may be used to prevent espionage, sabotage, or coordination by hostile forces.	◎ **Ineffectiveness**: Critics argue that shutdowns do not address the root causes of unrest or violence and may worsen the situation by increasing anger and resentment.

◎ **Controlling Offensive Content**: Internet shutdowns can be used to block the distribution of harmful, offensive, or provocative content, such as graphic images or videos.	◎ **Information Vacuums**: Rather than curbing misinformation, shutdowns create voids that can be filled by malicious or false information, making the problem worse. ◎ **Arbitrary Decisions**: Internet shutdowns are often imposed **without transparency**, due process, or judicial oversight, leading to potential abuse of power.

INDIA'S SOCIAL SECURITY COVERAGE HITS 49%: ILO

Context

According to the **World Social Protection Report 2024-26**, the Director-General of the **International Labour Organization** highlighted that India's social protection coverage has nearly doubled, with the proportion of the population covered increasing from 24% to 49% in a short period.

What is Social Security?

◎ Social security refers to a system designed to provide financial support and protection to individuals, particularly during times of need, such as retirement, unemployment, illness, or disability.

◎ It aims to ensure that people have access to essential services and resources that promote their well-being.

◎ Generally, India's social security schemes cover the following types of social insurances:

➤ Pension

➤ Health Insurance and Medical Benefit

➤ Disability Benefit

➤ Maternity Benefit

➤ Gratuity

India's Efforts to Expand Social Security Coverage

◎ The proportion of India's population covered under at least one branch of social protection has increased dramatically, from **24%** to **49%**, nearly doubling in a short period.

◎ This improvement is largely attributed to government efforts to expand and modernize the social protection system.

Key Achievements in Social Protection

➤ **Doubling of Coverage**: India's efforts to expand social protection have led to a significant increase in coverage. As mentioned earlier, the proportion of

the population covered under social protection has doubled, from **24%** to **49%**. This achievement is seen as a model for other nations looking to improve their social security systems.

➤ **Reduction in Unemployment**: India's unemployment rate has decreased significantly, from **6%** in **2017-18** to **3.2%** in **2023-24**. This reduction reflects the success of various policies aimed at creating jobs, promoting inclusive economic growth, and improving the overall labour market.

➤ **Improved Social Security for Informal Workers**: The government has taken steps to extend social security coverage to informal workers, including those in agriculture, construction, and gig economies. This has been crucial in ensuring that a larger portion of the workforce has access to benefits like healthcare, pensions, and insurance.

Key Initiatives to Enhance Social Protection

▢ **e-Shram Portal:**

➤ **Launched in:** 2021

➤ The **E-Shram Portal** is a flagship initiative to support and empower the unorganized workforce, which forms the backbone of the nation's economy.

➤ Launched by the Ministry of Labour and Employment, this portal is designed to create a comprehensive **National Database of Unorganised Workers (NDUW),** verified and seeded with Aadhaar, enabling the delivery of targeted welfare schemes and benefits.

◉ **Labour Reforms and Simplified Labour Codes**: India has consolidated **29 labour laws** into **4 simplified Labour Codes** to ensure better protection for workers. These codes help in the universalization of wages and social security, promote safer working conditions, and streamline compliance procedures for businesses. These reforms make it easier for both employees and employers to navigate the legal and regulatory environment, ensuring better protection and rights for workers.

◉ **Increased Labour Force Participation**: Efforts to boost employment opportunities and improve working conditions have contributed to an increase in the **Labour Force Participation Rate** (from **49.8%** to **60.1%**).

▢ **Other Initiatives:**

➤ Pradhan Mantri Shram Yogi Maan-dhan (PM-SYM)

➤ Pradhan Mantri Rojgar Protsahan Yojana (PMRPY)

➤ PM SVANidhi: Micro Credit Scheme for Street Vendors

➤ Atmanirbhar Bharat Rozgar Abhiyan

➤ Deendayal Antyodaya Yojana National Urban Livelihoods Mission

➤ PM Garib Kalyan Ann Yojana (PMGKAY)

◉ **Key social security laws:** the Employees' Compensation Act, 1923; the Employees' State Insurance Act, 1948; the Employees' Provident Funds and Miscellaneous Provisions Act, 1952; the Maternity Benefit Act, 1961; the Payment of Gratuity Act, 1972; the Cine Workers Welfare Fund Act, 1981; the Building and Other Construction Workers Welfare Cess Act, 1996; and the Unorganised Workers' Social Security Act, 2008

Global Coalition for Social Justice

◉ **Launched in:** 2023

◉ The **Global Coalition for Social Justice** aims to promote decent work, social protection, responsible business conduct, and fair work across the globe.

◉ The coalition has over 340 members, including governments, academic institutions, financial organizations, and businesses.

➤ India is playing a key role in leading the Asia Pacific region's discussions under this coalition, specifically on **Responsible Business Practices for Sustainable and Inclusive Societies**.

➤ India's involvement is part of a broader strategy to ensure that business practices are ethical, sustainable, and inclusive.

UGC DISCONTINUES UGC-CARE LIST

Context

The **University Grants Commission (UGC)** has decided to discontinue the **UGC Consortium for Academic and Research Ethics (UGC-CARE) list**. The list will now be replaced by a set of **suggestive parameters** for choosing academic journals.

About UGC-CARE List

◉ **UGC Consortium for Academic and Research Ethics (UGC-CARE) list** was introduced in 2018 to list reputable academic journals.

◉ UGC-CARE was designed to ensure that only reputable journals were considered for **faculty selection**, **promotions**, and **research funding applications**.

◉ **Criticism:** The list faced criticism for various reasons:

➤ **Over-centralization**: Academics complained that the UGC was making the final decision on what constituted high-quality research and journals, which led to delays in updating the list.

➤ **Lack of Representation**: Journals in certain academic fields, especially in regional languages (like Tamil), were not included, limiting academic growth in those areas.

➤ **Transparency Issues**: There were concerns that the decision-making process behind the list lacked transparency.

The New Suggestive Parameters

- In place of the UGC-CARE list, the UGC has issued a draft notification titled **"Suggestive Parameters for Peer-Reviewed Journals."** These parameters aim to guide authors in evaluating journals. Some of the key criteria include:

  - **Preliminary Criteria**: Title of the journal; International Standard Serial Number (ISSN); Periodicity and continuity; Transparent review policy

  - **Editorial Board Criteria**: Details about the journal's editorial board, including its composition.

  - **Other Key Criteria**:

    - **Editorial policy**: The journal's approach to content review.

    - **Standards**: How the journal adheres to academic and ethical standards.

    - **Visibility**: How widely the journal is circulated and accessed.

    - **Research ethics**: The integrity of the publication process.

- These criteria are meant to help authors identify credible journals before submitting their articles for publication.

Rationale Behind the Change

- **Decentralize the process**: Higher education institutions (HEIs) will now have the responsibility to evaluate journals. This gives them the flexibility to create their own mechanisms for assessing journal quality based on their specific needs and academic norms.

- **Combat Predatory Journals**: The new system is designed to tackle fake or unethical journals by encouraging institutions to develop their own evaluation standards.

- **Encourage Diversity**: The decentralization allows institutions to adapt the evaluation process to suit newer or niche disciplines that may not fit into a one-size-fits-all list.

Concerns Raised

- **Risk of Low-Quality Journals**: Critics worry that without a central list like UGC-CARE, low-quality or "predatory" journals may proliferate.

- **Lack of Oversight**: The SFI has expressed concerns that decentralizing the process could lead to inconsistent journal evaluation practices across institutions, resulting in arbitrary decisions.

- **Deregulation**: The move is also seen as part of a larger trend of deregulation in higher education under the **National Education Policy (NEP) 2020**, which critics argue could undermine academic integrity.

TELANGANA TUNNEL COLLAPSE HIGHLIGHTS 'QUESTIONABLE' INDUSTRIAL SAFETY

Context

The current state of industrial safety in India remains a critical concern, with a high frequency of industrial accidents occurring daily across various sectors. A tragic incident that highlights this issue was the recent accident at the Srisailam Left Bank Canal (SLBC) tunnel in Telangana, where eight workers were trapped.

What is the current state of industrial safety in India?

- India's industrial safety is in a dire state, marked by a significant number of fatalities and injuries in workplace accidents.

- As of December 2025, over 400 workers have died, and more than 850 have been seriously injured, with the chemical, pharmaceutical, mining, and energy sectors seeing the highest number of incidents.

- Notably, the chemical and pharmaceutical industries have witnessed deadly explosions and fires, claiming numerous lives and injuring many others.

- Root causes of these accidents:

  - Systemic failures in workplace oversight

  - Poor safety precautions

  - Lack of proper training

  - Use of untrained, precarious workers

- The **government's relaxation of safety regulations**, such as allowing companies to self-certify their compliance and reducing unannounced inspections, has worsened the situation. There is growing criticism of these regulatory changes, as they have weakened accountability and failed to ensure worker protection.

Challenges

- **Weak Enforcement and Implementation:** There is often inadequate enforcement of safety regulations, especially in small-scale industries and informal sectors. Corruption and lack of resources may hinder proper inspections and safety measures.

- **Training and Awareness Gaps:** Workers, especially in the informal sector, are often unaware of their rights or proper safety procedures. Regular safety training and awareness programs are necessary.

- **Delayed Compensation:** Compensation and rehabilitation often face delays, with families of victims waiting for years to receive full compensation, leaving them financially vulnerable.

- **Inadequate Safety Infrastructure:** Many industrial units, especially in rural or remote areas, lack proper safety equipment and emergency response infrastructure. There's also a lack of disaster preparedness drills.

Required Measures

- **Stronger Implementation of Safety Standards**: The government needs to strengthen the implementation of existing safety standards. Regular inspections, penalties for non-compliance, and creating a monitoring mechanism will deter violations. Additionally, promoting the adoption of advanced safety technologies and automated systems can minimize human error.

- **Better Worker Training and Awareness**: Workers must be properly trained in the use of safety equipment, emergency protocols, and risk management. Government, industry bodies, and employers must work together to ensure that workers are equipped with the knowledge and tools to prevent accidents.

- **Enforcement of Labor Rights and Welfare Programs**: Labor laws and welfare programs should be more robust and rigorously enforced. Workers should be provided with adequate health insurance, compensation, and benefits in case of accidents. Additionally, a dedicated helpline or legal recourse for industrial accident victims could help ensure timely compensation.

- **Creation of a National Industrial Safety Authority**: A dedicated body focusing on industrial safety could be established to conduct regular audits of industrial units, implement stricter regulations, and ensure compliance with safety norms. This body could work in coordination with the NDMA to design safety frameworks tailored specifically to industrial settings.

- **Promoting Safe Working Conditions through Corporate Social Responsibility (CSR)**: Encouraging industries to adopt CSR initiatives that focus on worker safety and welfare is crucial. Industries should be incentivized through tax breaks or recognition programs to prioritize safety standards and better working conditions.

FACT BOX

Related Constitutional Provisions

- India's Constitution provides a framework for the protection of workers' rights. Under the Indian Constitution, Labour is a subject is in the Concurrent List.

- **Article 39(e) and Article 39(f)** direct the state to ensure that children, young persons, and workers do not work under conditions harmful to their health and that they are not subjected to exploitation.

- **Article 41** emphasizes the provision of just and humane conditions of work.

- The **Factories Act of 1948** and the **Employees' State Insurance Act (ESI) of 1948** aim to provide for workers' health, safety, and welfare in factories.

  - The Factories Act specifically mandates provisions for worker safety, hazardous work, and the duty of employers to ensure safe working conditions.

- **Occupational Safety, Health and Working Conditions Code, 2020:** The Code seeks to regulate health and safety conditions of workers in establishments with 10 or more workers, and in all mines and docks.

Disaster Management Framework

- **National Disaster Management Authority (NDMA)** and **State Disaster Response Forces (SDRF)** coordinate disaster response for industrial accidents.

- **Industrial Disaster Management Plans (IDMP)** guide companies in managing emergencies, especially in hazardous industries.

- **Labor Departments** conduct inspections and ensure compliance with safety norms.

KARNATAKA-MAHARASHTRA BORDER DISPUTE

Context

Bus services between Karnataka and Maharashtra have come to a standstill after tensions flared up recently when a bus conductor was beaten up in Belagavi for allegedly not responding in Marathi.

What is the Karnataka-Maharashtra Border Dispute?

- The border dispute between Karnataka and Maharashtra primarily centers around the region of **Belagavi** (formerly Belgaum), a district that has a significant Marathi-speaking population.

- The dispute dates back to **1956** when India reorganized its states based on linguistic lines.

- Belagavi was allocated to Karnataka, but Maharashtra claims that the district and several surrounding areas should belong to it, as they were part of the **Bombay Presidency** before independence.

Timeline:

- **1956**: The States Reorganisation Act was passed, forming new states based on linguistic majorities. Belagavi, despite its large Marathi-speaking population, was allocated to Karnataka.

- **1960**: Maharashtra started claiming Belagavi and several villages along the border, arguing that they were wrongly assigned to Karnataka. Maharashtra's objections were primarily based on the linguistic makeup of these areas.

- **1966**: The **Mahajan Commission** was set up by the Indian government to resolve the issue. The commission ruled in favor of Karnataka, recommending that **Belagavi** and 247 villages remain with Karnataka, while 264 villages should be transferred to Maharashtra. Maharashtra rejected this recommendation.

- **2004**: Maharashtra took the matter to the Supreme Court, where it remains pending. The **border dispute** between the two states remains unresolved, with the **Supreme Court** yet to pass a final ruling.

Claims of Both States

- **Maharashtra's Claims**: Maharashtra claims **814 villages** and the urban settlements of **Belagavi**, **Karwar**, and **Nippani** as historically belonging to the Bombay Presidency before India's independence.

➤ Maharashtra argues that these regions, predominantly Marathi-speaking, should be part of Maharashtra.

➤ In **2004**, Maharashtra filed a petition in the Supreme Court, staking its claim over Belagavi.

◉ **Karnataka's Claims**: Karnataka defends its position, claiming that Belagavi and surrounding areas were rightly included based on the **States Reorganisation Act of 1956**.

➤ The **1966 Mahajan Commission Report** supports Karnataka's claim, as it recommended that Belagavi and 247 villages should stay with Karnataka.

➤ Karnataka has also cited the linguistic lines drawn by the Act and the economic development in Belagavi since it became part of Karnataka.

➤ Karnataka has built a **Suvarna Vidhana Soudha** in Belagavi to assert its control and hold the **winter sessions** of the Karnataka legislature there since 2006.

FACT BOX

Mahajan Commission

◉ The **Mahajan Commission** was set up in **1966** under the leadership of **Mehr Chand Mahajan**, the then Chief Justice of India.

➤ The Commission's task was to review the border dispute and recommend solutions.

➤ It recommended that **264 villages** be transferred to Maharashtra, but **Belagavi** and **247 villages** remain part of Karnataka.

➤ Maharashtra rejected the Commission's findings, while Karnataka accepted them.

➤ Karnataka has since argued that the Commission's decision should be implemented in full, or the **status quo** should be maintained.

Key Inter-State Border Disputes in India:

◉ **Assam-Mizoram**: Dispute over boundaries stemming from two British-era notifications. Mizoram claims the 1875 boundary, Assam the 1933 boundary.

◉ **Haryana-Himachal Pradesh**: Focused on the Parwanoo region, with Haryana claiming parts of Himachal's territory.

◉ **Himachal Pradesh-Ladakh**: Disagreement over Sarchu, a strategically important area on the Leh-Manali route.

◉ **Arunachal Pradesh-Assam**: Arunachal disputes the transfer of forested areas to Assam during the North Eastern States reorganisation; the matter is pending in the Supreme Court.

◉ **Meghalaya-Assam**: Meghalaya contests the Assam Reorganisation Act (1971), claiming Blocks I and II of Mikir Hills.

◉ **Assam-Nagaland**: The longest-running border dispute, concerning Naga-dominated areas post-Nagaland's formation in 1963.

SC ADVOCATED INCLUSION OF SEXUAL EQUALITY IN SCHOOL CURRICULUM

Context

The **Supreme Court of India** addressed a petition regarding the rising incidents of crimes against women, including rape, and emphasized the importance of **moral education** and **sexual equality** as part of school curricula to address these issues.

Key Points from the Court's Observations

◉ **Moral and Ethical Education in Schools:** Schools should teach moral education and ethics, particularly focusing on how men should respect women and treat them equally. This kind of education should be a mandatory part of the school syllabus from an early age.

➤ Currently, while some schools offer moral education, it is often skipped or canceled, and it should become a regular part of the curriculum.

◉ **Sexual Equality from the Home**: Discrimination between boys and girls often begins at home. Parents sometimes focus on restricting daughters' freedoms while not imposing similar expectations on sons.

◉ Women, who make up **50% of the population,** continue to live under significant strain and insecurity. There is a growing misogynistic attitude towards them, and education is needed to change this mindset.

Key Factors Contributing to Sexual Violence in India

◉ **Gender Inequality & Cultural Traditions:** Male superiority and cultural practices (like dowry and purdah) perpetuate gender discrimination and increase the risk of sexual violence.

◉ **Marriage Dynamics:** Women in traditional marriages, especially child brides, face sexual violence as husbands often feel entitled to sex, with marital rape not being criminalized.

◉ **Education & Employment:** Lack of education and employment opportunities limits women's autonomy, increasing their vulnerability to violence.

◉ **Male-to-Female Ratio:** A skewed sex ratio due to female foeticide leads to increased competition among men, potentially contributing to sexual violence.

◉ **Poverty:** Poor women, especially from marginalized castes, are more vulnerable to sexual assault due to financial and social disadvantages.

◉ **Criminal Justice System:** Inadequate police investigations, slow trials, and low conviction rates allow offenders to go unpunished, perpetuating sexual violence.

Consequences of Sexual Violence in India

- **Stigmatization:** Victims and their families face shame and humiliation. Unmarried victims are often rejected by communities, and some are even forced to marry the rapist.
- **Mental Health Issues:** Victims, particularly of intimate partner violence, often develop depression, anxiety, and PTSD. They are also at a higher risk of suicide, even without mental illness.
- **Social Isolation:** Married victims may be abandoned, leading to further isolation and suffering.
- **Pregnancy & STDs:** Rape can lead to unwanted pregnancies and sexually transmitted diseases. Unsafe abortions may occur if the victim cannot legally access abortion services.
- **HIV Risk:** Victims are at higher risk for HIV and other STDs, particularly due to cultural factors that hinder negotiation for protection during sex.
- **Loss of Productivity:** Sexual violence leads to lost work days, with victims often taking time off or quitting their jobs due to safety concerns.
- **Educational Impact:** Sexual assault affects educational outcomes, with victims often achieving lower academic and career success, and earning less as adults. Some schools even expel victims.

Provisions Against Rape in India

- **Legal Provisions (Section 375, IPC):** Rape occurs when a man has sexual intercourse with a woman:
  - ➤ Against her will or without consent.
  - ➤ With consent obtained through fear or deceit.
  - ➤ When she is unable to understand consent due to mental incapacity or intoxication.
  - ➤ If the woman is under 18 years old.
- **Punishments (Section 376, IPC):**
  - ➤ Death or life imprisonment for rape leading to death or vegetative state.
  - ➤ Group rape results in separate punishments for each participant (Section 376D).
  - ➤ Repeat offenders may face the death penalty (Section 376E).

Laws Related to Rape in India

- **Criminal Law (Amendment) Act, 2013:** The Act increases the minimum sentence for rape from 7 years to 10 years, with a higher minimum for cases resulting in death or vegetative states.
- **Protection of Children from Sexual Offences Act (POCSO), 2012: It r**aises the age of consent to 18, criminalizing sexual activities with anyone under 18, even if consent is given.

- ➤ 2019 amendments increased penalties for child protection.

Rights of Rape Victims

- **Zero FIR:** Victims can file an FIR at any police station.
- **Free Medical Treatment:** Hospitals cannot charge for rape treatment (Section 357C, CrPC).
- **No Two-Finger Test:** Doctors cannot perform or use the two-finger test during medical examination.
- **Compensation:** Victims are entitled to compensation under Section 357A of CrPC.

Important Judgements

- **Tukaram and Ganpat vs. State of Maharashtra (1972) - Mathura Rape Case:** It highlighted flaws in the legal system, calling for reforms in rape laws after public outrage over acquittal.
- **State of Punjab vs. Gurmit Singh (1984):** The Supreme Court emphasized that a victim's character should not influence rape cases.
- **Delhi Domestic Working Women v. Union of India (1995):** It established guidelines for legal representation, victim anonymity, compensation, and medical help.
- **B. Gautam v. Shubra Chakraborthy (1996):** The court ruled that interim compensation should be given to victims.
- **Chairman, Railway Board vs. Chandrima Das (2000):** It granted compensation to rape victims based on constitutional and international human rights principles.

INDIA'S CONCERNS OVER THE EUROPEAN UNION'S CARBON TAX (CBAM)

Context

As part of ongoing negotiations to finalise a Free Trade Agreement (FTA), India is raising concerns over the European Union's proposed **Carbon Border Adjustment Mechanism (CBAM)**, which will impose tariffs on **carbon-intensive imports such as steel and aluminium** starting in **January 2026**. This carbon tax could be as high as **30%** on certain products, and it will affect **India's exports to the EU,** especially metals and other goods that are carbon-intensive.

What is CBAM?

- **CBAM** is a carbon tax that the EU plans to impose on goods imported from countries that have less strict environmental regulations.
- The tax targets products that produce high carbon emissions during production, such as **steel**, **aluminium**, **cement**, **fertilizers**, and **electricity**.

⊙ It will start in **January 2026**, but exporters must begin providing **data on their carbon emissions** from **October 2023**.

India's Concerns:

⊙ **Unfair Measure**: India views CBAM as **unfair** because it believes it violates the **"common but differentiated responsibilities" (CBDR)** principle of climate negotiations. According to CBDR, countries with different levels of economic development should share responsibility for climate change, but not equally.

  ➤ The **EU's position** is that CBAM complies with **World Trade Organization (WTO) rules**, as it is an extension of **EU domestic regulations** to international trade.

⊙ **Data Privacy**: Indian exporters have raised concerns about the **data requirements** under CBAM. The EU demands over **1,000 data points** from companies to comply, which many **small and medium enterprises (SMEs)** in India cannot provide.

⊙ **Trade and Environmental Issues Should Be Separate**: India argues that environmental issues like carbon taxes should not be tied to international trade policies.

⊙ **Global Reaction:**

  ➤ Several countries, including **China**, **Russia**, **Brazil**, and **South Africa**, have already raised concerns at the **World Trade Organization (WTO)** about CBAM.

  ➤ India has not yet filed a formal complaint at the WTO but is actively discussing other trade agreements, including a **Free Trade Agreement (FTA)** with the EU. The carbon tax issue is a major **sticking point** in these negotiations.

Impact on India's Exports:

⊙ India exports a large amount of goods to the EU, particularly **metals like steel and aluminium**. These exports are expected to be heavily impacted by CBAM, with **tax rates of 20–35%** on affected products.

⊙ **2022-23 Exports**: India exported goods worth **$75 billion** to the EU, and **over 15%** of its total exports go to the EU. Key sectors like **metals**, **textiles**, and **chemicals** will face increased tariffs under CBAM.

⊙ If CBAM applies to more products, **43% of India's total exports** to the EU (around **$37 billion**) could be at risk.

India-EU Trade

⊙ EU is India's largest merchandise trading partner, with bilateral trade reaching **USD 135 billion** in fiscal year 2024.

⊙ The EU is India's **second-largest export destination** after the United States. Indian exports to the EU totalled **USD 76 billion**, while imports amounted to **USD 59 billion**.

⊙ Additionally, trade in services between India and the EU reached a record **USD 53 billion** in 2023, with India exporting **USD 30 billion** in services.

Free Trade Agreement (FTA)

⊙ A free trade agreement is a pact between 2 or more countries to eliminate or reduce import duties on a maximum number (90-95 per cent) of goods traded between them.

  ➤ **Types**: PTA (preferential) or RTA (regional), or BTA (bilateral).

⊙ The European Union (EU) and India are currently engaged in ongoing negotiations to finalize a Free Trade Agreement (FTA), with significant discussions expected around tariff reductions, market access, and other key trade issues.

⊙ With the world's most extensive trade agreement network covering 76 countries, the EU is a key player in global trade.

⊙ India, by contrast, has fewer FTAs but is currently in negotiations with both the EU and the United Kingdom.

  ➤ India has inked trade deals with **Sri Lanka, Bhutan, Thailand, Singapore, Malaysia, Korea, Japan, Australia, the UAE, Mauritius and ASEAN and EFTA blocs**.

  ➤ India is now prioritizing FTAs with the **UK, EU, and US** to expand exports and strengthen trade ties with major western economies.

UPSC PYQ

Q: **Consider the following countries: (2018)**

  (4) Australia

  (5) Canada

  (6) China

  (7) India

  (8) Japan

  (9) USA

  Which of the above are among the 'free-trade partners' of ASEAN?

  (a) 1, 2, 4 and 5   (b) 3, 4, 5 and 6

  (c) 1, 3, 4 and 5   (d) 2, 3, 4 and 6

  Solution: (c)

Q: **'Broad-based Trade and Investment Agreement (BTIA)' is sometimes seen in the news in the context of negotiations held between India and (2017)**

  (a) European Union

  (b) Gulf Cooperation Council

  (c) Organization for Economic Cooperation and Development

  (d) Shanghai Cooperation Organization

  Solution: (a)

Q: **The term 'Regional Comprehensive Economic Partnership' often appears in the news in the context of the affairs of a group of countries known as (2016)**

(a) G20 (b) ASEAN

(c) SCO (d) SAARC

Solution: (b)

GOVERNMENT EXPENDITURE

Context

Governments don't have their own money; it's the taxpayers' money. Every penny the government spends comes from citizens either through **taxes or borrowing**. So, it's important to know how the government is using that money.

What the RBI Study Shows?

- The Reserve Bank of India (RBI) has a new study that looks at how well the Indian government, both at the Centre and state levels, spends its money.

- The study introduces a **Quality of Public Expenditure (QPE) index** to measure this.

- **Why Focus on Spending?** There are two key goals in India's public spending:

  ➤ **Fiscal Discipline** – The government should avoid overspending and borrowing too much.

  ➤ **Boosting Capital Expenditure** – More money should go into things that help the economy grow, like building infrastructure, rather than just paying salaries and other regular costs.

- Over time, India has focused on controlling its borrowing (via laws like the **Fiscal Responsibility and Budget Management (FRBM) Act**) and increasing investment in infrastructure to help economic growth.

- However, challenges like financial crises, political pressures, and increased government spending have sometimes hurt the quality of public expenditure.

Key Measures of Public Spending Quality

To assess how well the government spends, the RBI looks at five important factors:

- **Capital Outlay to GDP Ratio**: How much money is spent on building infrastructure like roads, schools, etc.

- **Revenue Expenditure to Capital Outlay Ratio**: The balance between regular spending (like salaries) and investment in infrastructure.

- **Development Expenditure to GDP Ratio**: Spending aimed at long-term growth, like education, healthcare, and research.

- **Development Expenditure as a % of Total Expenditure**: More focus on development is a sign of better quality spending.

- **Interest Payments to Total Expenditure Ratio**: Less money spent on paying interest means more money is available for productive uses.

India's Spending Record

The RBI's study tracks public expenditure quality from 1991 to now. The study is divided into six phases, based on major events that shaped public spending.

- **Phase 1 (1991-2003)**: Quality improved slightly at the Centre but worsened at the state level due to fiscal pressures.

- **Phase 2 (2003-2008)**: Both the Centre and states faced a drop in quality due to high spending and rising interest payments.

- **Phase 3 (2008-2012)**: Quality improved with fiscal discipline and better economic growth, helping both the Centre and states.

- **Phase 4 (2012-2016)**: The **Global Financial Crisis (GFC)** led to increased spending (stimulus packages), which temporarily boosted quality but later hurt it.

- **Phase 5 (2016-2020)**: States saw improvements due to higher funds from the 14th Finance Commission, but the Centre faced challenges with new tax-sharing rules.

- **Phase 6 (2020-Present)**: The Covid-19 pandemic led to more spending, but a focus on capital expenditure helped improve the quality of public spending.

Current Status

Right now, the quality of public expenditure in India is the best it has ever been since the start of economic reforms in 1991, according to the RBI's index. This improvement is mainly driven by a focus on infrastructure and growth-oriented investments.

LNG'S CENTRALITY

Context

India and Qatar have a long-standing trade relationship, primarily fueled by India's heavy imports of **Liquefied Natural Gas (LNG)** from Qatar. As India's energy demand grows, LNG plays an even bigger role. During a recent state visit by Qatar's Amir, both nations agreed to **double their bilateral trade** to **$28 billion annually by 2030**.

India's LNG Imports Surge

- India is the 4th largest importer of **liquefied natural gas (LNG)** from **Qatar, USA, Russia and Australia.**

- **Qatar** is India's largest LNG supplier, contributing to nearly **50%** of India's LNG imports.

- **India's LNG imports** from Qatar in 2024 were **9.82 million tonnes**, making up **38.8%** of total LNG imports.

- **Future Growth in LNG Imports**: India's **LNG demand** is expected to grow significantly over the next few years due to the government's plan to increase the share of natural gas in the energy mix to **15% by 2030**.

  ➤ As a result, **India's LNG imports** will double by **2030** to **65 bcm** (billion cubic meters) annually.

◉ **Qatar's LNG Export Capacity Expansion**: Qatar is set to increase its **LNG export capacity** to **142 million tonnes per year (mtpa)** by **2027**, nearly doubling its current capacity of **77 mtpa**.

➤ This will further cement Qatar as India's **leading LNG supplier**.

The US Factor:

◉ The United States is becoming a strong competitor to Qatar in supplying LNG to India, currently being the second-largest LNG supplier to India.

◉ The US is expanding its LNG exports, and Indian companies are also exploring **long-term contracts** with US suppliers.

Government Initiatives

◉ **Pradhan Mantri Ujjwala Yojana (PMUY):** Launched in 2016, the scheme aims to make clean cooking fuel such as LPG available to the rural and deprived households which were otherwise using traditional cooking fuels such as **firewood, coal, cow-dung cakes** etc.

◉ **Pradhan Mantri Urja Ganga Project**: Launched in 2016, it is a gas pipeline project aimed to meet the energy demands of only river ganga flowing states.

◉ **Pradhan Mantri JI-VAN Yojana** spports bio-ethanol projects, including second and third-generation plants, to promote sustainable fuel production.

◉ **Strategic Petroleum Reserves (SPR)** enhances energy security with underground storage facilities in **Visakhapatnam, Mangalore**, and **Padur (Karnataka)**, holding **5.33 MMT** of crude oil.

◉ **Ethanol Blending Program** aims for **20% ethanol blending** in petrol by **2025-26**. Ethanol blending has increased from **38 crore litres** in 2013-14 to **707.4 crore litres** in 2023-24.

◉ **City Gas Distribution Network Expansion** extends **PNG** and **CNG** infrastructure to **733 districts** across 34 states/UTs, covering nearly **100%** of India's mainland.

◉ **Energy Security Initiatives** focus on overseas oil block acquisitions and exploration to enhance energy security.

▫ **Greener Fuel Initiatives**

➤ **SATAT Initiative** encourages investment in **Compressed Biogas (CBG)** production from agricultural waste, cattle dung, and municipal solid waste, boosting rural income.

➤ **Mission Green Hydrogen** aims to produce **Green Hydrogen** to meet global demand (over **100 MMT** by 2030), with potential exports of **10 MMT/year**. Targeted investments of **Rs 8 lakh crore** and **6 lakh jobs** created.

➤ **National Bio-Energy Programme** promotes bio-energy production and waste reduction.

➤ **Hydrocarbon Exploration and Licensing Policy (HELP)** attracts private investment in exploration and production to enhance domestic energy production.

INDIA'S FERTILIZER STRATEGY AND THE SHIFT TOWARD BALANCED FERTILISATION

Context

India is increasingly focusing on **reducing its reliance on imported fertilisers** such as **urea**, **di-ammonium phosphate (DAP)**, and **muriate of potash (MOP)**. This shift is crucial for the country's agricultural strategy and economic efficiency, especially given that these fertilisers are heavily imported, making India vulnerable to fluctuations in global prices and currency depreciation.

What is the current state of India's fertilizer sector?

◉ Globally, India is the second largest producer and consumer of fertilizers only after China.

◉ **Major Fertilizers Produced:** The main fertilizers produced in India include **urea, DAP (diammonium phosphate), NP (nitrogen-phosphorus), NPK (nitrogen-phosphorus-potassium) complex fertilizers, ammonium sulphate, potash, and single super phosphate (SSP).**

◉ **Import Dependency**: India heavily relies on imports for key raw materials for fertilizer production:

➤ **Potash**: Entirely imported, with no domestic sources.

➤ **Phosphates**: Phosphate rock and phosphoric acid are imported.

➤ **Urea:** 30% of India's urea requirement is met by imports.

➤ **MOP**: MOP is entirely imported from countries like **Canada**, **Russia**, **Jordan**, and **Israel** because India lacks potash reserves.

➤ **DAP**: Both the finished product and its raw materials (like **rock phosphate** and **sulphur**) are imported, mostly from countries such as **Saudi Arabia**, **China**, **Russia**, and **Morocco**.

◉ **Fertilizer Subsidy:** The government provides subsidies to ensure affordable prices for fertilizers:

➤ Urea is sold at a subsidized price under the **Retention Pricing Scheme (RPS).**

➤ Phosphate, complex, and potassic fertilizers are under the **Nutrient Based Subsidy (NBS) scheme.**

The Shift:

◉ Now, India is focusing to promote **balanced fertilisation**, where **fertiliser use is tailored** to the specific nutrient needs of crops. This will help in **reducing dependency on imported fertilisers** while improving the **efficiency** of nutrient use in agriculture.

- **Ammonium Phosphate Sulphate (APS)** is emerging as an effective **substitute for DAP**. APS, with a formula of **20:20:0:13** (20% nitrogen, 20% phosphorous, 13% sulphur), provides **balanced nutrition** for a variety of crops like **oilseeds**, **pulses**, and **maize**.

- This complex fertiliser helps farmers avoid using DAP, which has a very high phosphorous content but lacks sulphur and nitrogen.

Why APS is Better:

➤ APS is cheaper to produce than DAP.

➤ It requires less phosphoric acid and uses **sulphuric acid** to make the fertiliser, which is a cheaper source of sulphur.

➤ By using APS, fertiliser companies can sell it at a lower price while reducing waste.

Why the Shift Is Necessary?

- **Import Dependence**: India is highly dependent on imports.

- **High Analysis Fertilisers**: Urea, DAP, and MOP are all **high-analysis fertilisers**, meaning they contain very high amounts of individual nutrients (like **46% nitrogen** in urea and **60% potash** in MOP).

  ➤ While these nutrients are essential, most crops require a **balanced mix** of nutrients, including **secondary nutrients** (such as **sulphur**, **calcium**, and **magnesium**) and **micronutrients** (like **zinc**, **iron**, and **boron**).

  ➤ The overuse of high-analysis fertilisers leads to inefficient nutrient absorption, harming both the environment and farmers' costs.

- **Economic Impact**: Importing these high-analysis fertilisers is expensive, and the **depreciation of the Indian Rupee** makes imports even more costly. This puts a strain on India's **foreign exchange reserves** and increases the subsidy burden for the government.

Government's Role:

- The government is working to **cap the consumption of high-analysis fertilisers** like urea, DAP, and MOP.

- Encouraging farmers to use fertilisers with the correct **nutrient mix** is crucial for improving **nutrient use efficiency** and **maximising foreign exchange savings**.

  ➤ For example, **NPKS (Nitrogen, Phosphorous, Potassium, and Sulphur)** complex fertilisers, such as **10:26:26:0**, **12:32:16:0**, and **15:15:15:0**, are designed to meet the complete nutritional needs of crops.

🔍 FACT BOX

About Fertilisers

- Fertilisers are basically food for crops, containing nutrients necessary for plant growth and grain yields.

- Balanced fertilisation means supplying these following nutrients in the right proportion, based on soil type and the crop's own requirement at different growth stages.

  ➤ **Primary** (N, phosphorus-P and potassium-K)

  ➤ **Secondary** (sulphur-S, calcium, magnesium)

  ➤ **Micro** (iron, zinc, copper, manganese, boron, molybdenum)

- India is among the **world's largest buyers of fertiliser**, besides **China, Brazil, and the US**.

- **India imports four types of fertilisers:**

  ➤ Urea

  ➤ Diammonium phosphate (DAP)

  ➤ Muriate of potash (MOP)

  ➤ Nitrogen-phosphorous-potassium (NPK)

AILING INDIA'S TEXTILE INDUSTRY

Context

Despite its large size, India's textile industry has struggled with slow growth in recent years.

Current state of India's textile industry

- India is the **sixth-largest** exporter of textiles globally, contributing **8.21%** to the country's total exports in 2023-24. The sector holds a **4.5%** share in global trade, with the **United States and** European Union accounting for **47%** of India's textile and apparel exports.

- It employs over 4.5 crore people, with a significant portion of the industry focused on small and medium enterprises (MSMEs) across specialized hubs like **Bhiwandi (Maharashtra), Tiruppur (Tamil Nadu), and Surat (Gujarat).**

- **Cotton Production**: India is the second-largest cotton producer globally, contributing to 24% of the world's cotton output. Cotton cultivation employs about 60 lakh farmers, especially in Gujarat, Maharashtra, and Telangana.

- **Man-Made Fibres (MMF)**: India is the second-largest producer of synthetic fibres, with Reliance Industries and Grasim Industries leading production. However, MMF consumption per capita in India is low compared to countries like China and the U.S.

Growth and Exports:

➤ India's textile and apparel industry contributes 13% to industrial production, 12% to exports, and 2% to GDP.

➤ **Exports were stagnant**, reaching USD 34.1 billion in FY24, only slightly higher than USD 33.4 billion in FY20.

➤ India's exports face tough competition from countries like **China, Vietnam, and Bangladesh**, which benefit

from lower production costs, vertically integrated supply chains, and simpler regulations.

Challenges:

- **Production Costs**: High production costs, particularly in cotton and MMF, reduce India's export competitiveness. Raw materials like polyester and viscose fibres are more expensive in India compared to China.

- **Fragmented Supply Chain**: India's cotton supply chain is fragmented, leading to higher logistical costs and inefficiencies.

- **Complex Regulations**: India's textile exporters face complicated customs procedures, unlike competitors in countries with free trade agreements and simpler regulations.

Sustainability Concerns:

- Global demand for sustainability is rising, and the textile industry must comply with stricter environmental standards. The EU's new regulations on sustainability pose challenges, especially for small enterprises.

- India is looking at a growing textile recycling market, but the shift to sustainable production methods is costly and challenging for smaller firms.

- Fashion waste is a global issue, and India, like others, needs to address textile waste recycling to meet future sustainability goals.

Government/Policies for Textile Sector

- **PM MITRA: Pradhan Mantri Mega Integrated Textile Region and Apparel:** The PM MITRA scheme focuses on establishing **Mega Integrated Textile**

Regions and Apparel Parks across India to stimulate investment, innovation, and growth in the textile sector.

- **Production-Linked Incentive (PLI) Scheme:** The Production-Linked Incentive (PLI) Scheme is a strategic initiative aimed at boosting domestic manufacturing and reducing imports within the textile sector. It incentivizes companies based on their cumulative sales of domestically manufactured goods, specifically targeting man-made fiber (MMF) apparel, MMF fabrics, and technical textiles.

- **Samarth Initiative:** The Samarth initiative is a flagship skill development program led by the **Ministry of Textiles**, designed to enhance skills across the textile sector.

  ➤ This **demand-driven and placement-oriented scheme** aims to train 10 lakh individuals from 2017 to 2020, focusing on the entire textile value chai n, excluding spinning and weaving.

- **National Technical Textiles Mission (NTTM):** Launched in 2020, the National Technical Textiles Mission (NTTM) focuses on enhancing technical education, promoting research and innovation, and expanding market growth within the technical textiles domain over a four-year period.

- **Bharat Tex 2025:** It was India's largest global textile event. Bharat Tex 2025 served as a platform to accelerate the government's **"Farm to Fibre, Fabric, Fashion, and Foreign Markets"** vision.

SEGREGATION OF WASTE: SC

Context

The Supreme Court of India highlighted the crucial importance of proper garbage segregation at the household level for the well-being of the environment. The court emphasized that this practice is vital for effective waste management, especially as cities, particularly in the **National Capital Region (NCR),** grapple with increasing waste production.

What is Segregation of Waste?

- **Waste segregation** refers to the process of separating different types of waste materials at the source (usually at homes, offices, or industries) to make waste management more efficient.

- Proper segregation is essential for recycling, reusing, or disposing of waste responsibly.

- It ensures that recyclable materials, organic waste, and non-recyclable materials are separated, which not only helps in reducing the amount of waste sent to landfills but also supports environmental sustainability.

Types of Waste:

- ➤ **Biodegradable Waste:** This is organic waste that can be broken down by natural processes. Examples include food scraps, garden waste, and other organic materials.

- ➤ **Non-Biodegradable Waste:** Waste that cannot naturally decompose. Examples include plastics, glass, metal, and certain chemicals.

- ➤ **Recyclable Waste:** Materials that can be reused or recycled to make new products. Common recyclables include paper, cardboard, glass bottles, plastic bottles, and metals like aluminum.

- ➤ **Hazardous Waste:** This includes any materials that are toxic or dangerous to human health or the environment. Examples are batteries, electronic waste, and certain chemicals.

- ➤ **Construction and Demolition Waste:** This includes debris from construction activities, such as concrete, bricks, tiles, and metal.

- ➤ **E-waste:** Electronic waste such as old computers, mobile phones, and electrical appliances.

Importance of Waste Segregation:

- **Recycling Efficiency:** Proper segregation ensures that recyclable materials are not contaminated with non-recyclables, making the recycling process more efficient.

- **Environmental Protection:** Segregating waste helps reduce pollution, conserve natural resources, and minimize the need for landfills.

- **Reduction in Landfill Waste:** By separating out recyclables and organic waste, less waste ends up in landfills, which reduces environmental damage and greenhouse gas emissions.

- **Energy Recovery:** Segregation allows waste-to-energy projects to run efficiently by processing organic waste into energy.

Methods of Waste Segregation:

- **At the Source (Primary Segregation):**

  - ➤ **Household Segregation:** Waste is separated at the household level into different bins or containers based on the type of waste. **For example:**

    - ♦ **Green Bin:** For biodegradable waste (organic waste such as food scraps, garden waste).

    - ♦ **Blue Bin:** For recyclables (plastic, paper, metal).

    - ♦ **Red Bin:** For non-recyclable waste (such as plastic bags, broken items).

    - ♦ **Yellow Bin:** For hazardous waste (e-waste, batteries).

  - ➤ **Businesses and Industries:** Larger institutions or industries also segregate waste at the source. They usually have separate bins for recyclables, organic waste, and non-recyclable waste, following similar principles to households but on a larger scale.

- **Secondary Segregation (Post-Collection):** This occurs after waste is collected from households and businesses. Waste management companies or recycling centers further sort the waste if primary segregation was not done properly.

  - ➤ **Manual Sorting**: Waste is sorted manually by workers into categories like plastics, metals, glass, paper, etc.

  - ➤ **Mechanical Sorting**: Machines and automated systems are used to sort waste, especially in large waste management plants. These systems may use technology like air classification, magnetic separation, or vibrating screens to separate different materials.

- **Composting of Organic Waste**: Biodegradable waste, such as food scraps and garden waste, can be composted to create nutrient-rich soil. This process involves breaking down organic materials using microbes under controlled conditions.

- **Waste-to-Energy Conversion: In some cases, waste that cannot be recycled or composted is converted into energy. Organic waste can be used in anaerobic digesters to produce biogas, while other types of waste can be incinerated to generate electricity.**

Recycling Processes:

- ➤ **Mechanical Recycling**: Materials like paper, glass, and plastic are processed in facilities that clean, break down, and remanufacture the waste into new products.

- ➤ **Chemical Recycling**: Involves breaking down polymers in plastic waste into their chemical components to create new plastics.

UPSC PYQ

Q: As per the Solid Waste Management Rules, 2016 in India, which one of the following statements is correct? (2019)

(a) Waste generator has to segregate waste into five categories.

(b) The Rules are applicable to notified urban local bodies, notified towns and all industrial townships only

(c) The Rules provide for exact and elaborate criteria for the identification of sites for landfills and waste processing facilities.

(d) It is mandatory on the part of the waste generator that the waste generated in one district cannot be moved to another district.

Solution: (c)

Q: What are the impediments in disposing of the huge quantities of discarded solid waste which are continuously being generated? How do we safely remove the toxic wastes that have been accumulating in our habitable environment? (2018)

GLOBAL SEA ICE COVER HITS NEW RECORD LOW

Context

In early February 2025, **global sea ice cover** reached a new record low, dipping to 15.76 million square kilometers over a five-day period, surpassing the previous low of 15.93 million square kilometers from January-February 2023, according to data from the **US National Snow and Ice Data Center (NSIDC).** This decline highlights the ongoing effects of climate change, with both Arctic and Antarctic regions experiencing unprecedented reductions in sea ice extent.

What Is Sea Ice?

- Sea ice refers to frozen seawater that forms and floats on the ocean's surface in polar regions.

- Unlike icebergs, glaciers, and ice sheets that form on land, sea ice forms on the ocean and plays a vital role in regulating the Earth's climate by reflecting sunlight and cooling the planet.

- Current Situation

  ➤ **Arctic Sea Ice**: The extent of Arctic sea ice has hit its lowest recorded level for the time of year. This continues a trend observed since the 1970s, where Arctic sea ice has been shrinking at an average rate of 12.2% per decade.

  ➤ **Antarctic Sea Ice**: Antarctic sea ice is also at risk, approaching a record low as well. After a brief period of increase in the 2010s, the Antarctic region lost two million square kilometers of sea ice between 2014 and 2017, and the trend has continued, with 2023's maximum ice extent being more than two million square kilometers below average.

Factors Contributing to the Decline

- **Warming Air and Oceans**: Higher-than-usual air temperatures and warm seas are primary drivers of the sea ice loss. In the Antarctic, warm air and waters in the Southern Hemisphere's summer (December-February) melt the ice, while the Arctic's delayed freezing due to unusually warm oceans around Hudson Bay also contributed to the decline.

- **Winds and Storms**: Antarctic sea ice is particularly vulnerable to ice-breaking winds because it is surrounded by the ocean. In the Arctic, storms have also contributed to breaking up ice in regions like the Barents Sea and Bering Sea, where thinner ice is more prone to disruption.

Implications of the Dip

- **Feedback Loop**: The loss of sea ice exposes more water to the Sun, increasing heat absorption and leading to further warming. Sea ice's reflective white surface helps cool the planet by reflecting solar radiation, but as more ice melts, darker ocean water absorbs more sunlight, accelerating warming.

- **Global Climate Impact**: The decrease in sea ice slows the flow of water through global oceans, as melting freshwater reduces ocean salinity and disrupts ocean currents. This can lead to severe consequences for the global climate, marine ecosystems, and ice shelf stability.

RARE GENETIC DISORDER TREATED IN WOMB FOR THE FIRST TIME

Context

A two-and-a-half-year-old girl has shown no signs of a genetic disorder — known as **spinal muscular atrophy (SMA)** — becoming the first person in the world to be treated for the disease while in the womb.

What is Spinal Muscular Atrophy (SMA)?

- Spinal Muscular Atrophy (SMA) is a **severe genetic disorder** that causes the progressive weakening of muscles due to the degeneration of motor neurons, which are responsible for controlling movement.

- This condition is caused by mutations in the **SMN1 gene**, leading to a deficiency of survival motor neuron (SMN) protein, which is essential for the health and function of motor neurons.

- As a result, individuals with SMA experience muscle wasting, difficulty in movement, and in severe cases, respiratory failure.

- SMA is the leading genetic cause of death in infants and children, with **SMA type 1** being the most severe form, where symptoms start in infancy and can lead to death by the age of 2-3 years.

- It affects about 1 in 10,000 births.

How Was SMA Treated While in the Womb?

- For the first time, SMA has been treated in **utero** — during pregnancy — in an innovative trial. The treatment

involved administering a drug called **Risdiplam,** which targets the **root cause of SMA** by increasing the production of the **SMN protein.**

- ➤ **Risdiplam** is typically given to patients after birth, and it is most effective when started early.

- ➤ In this case, the drug was administered to the mother at 32 weeks of pregnancy. The mother took the drug daily for six weeks, and soon after birth, the baby began taking the drug as well.

- ◎ As a result of the treatment, the baby showed higher levels of the SMN protein compared to typical SMA-1 patients. The girl displayed normal muscle development and had no sign of muscle atrophy at 30 months, a remarkable improvement.

Genetic Disorders

- ◎ **Genetic diseases** are due to **mutations in genes or chromosomal alterations**.

- ◎ Genomes consist of genetic materials, or **DNA (deoxyribonucleic acid),** which holds the instructions for protein synthesis that determine cell functions and the characteristics of living organisms.

- ◎ DNAs are inherited from both parents; hence one can inherit mutated genes from them.

- ◎ Some genetic diseases may manifest symptoms at birth, while others may develop symptoms later in life.

- ◻ **Types of genetic disorders**

  - ➤ **Monogenic disorders** are secondary to a mutation in one specific gene.

  - ➤ **Multifactorial disorders** are due to multigene mutations and environmental factors such as dietary choices, certain medications, chemical exposure, smoking, and alcohol consumption.

  - ➤ **Chromosomal disorders** from missing or extrachromosomal materials.

UPSC PYQ

Q: **In the context of hereditary diseases, consider the following statements: (2021)**

(1) Passing on mitochondrial diseases from parent to child can be prevented by mitochondrial replacement therapy either before or after in vitro fertilization of egg.

(2) A child inherits mitochondrial diseases entirely from mother and not from father.

Which of the statements given above is/are correct?

(a) 1 only   (b) 2 only

(c) Both 1 and 2   (d) Neither 1 nor 2

Solution: (c)

TESTING QUANTUM GRAVITY

Context

The proposal for testing quantum gravity recently made headlines because of its potential to bridge the gap between two fundamental theories of physics: **quantum mechanics** and **general relativity**. A recent experiment to test **quantum gravity** proposes a way to measure whether gravity, a force that is typically explained by **general relativity**, behaves according to the rules of **quantum mechanics**.

Why is this significant?

- ◎ **Quantum mechanics** and **general relativity** have both been extremely successful in explaining different aspects of nature, but they don't **fit together** in a way that explains everything in the universe.

  - ➤ **General relativity** explains the force of gravity at large scales (e.g., planets, stars, and black holes).

  - ➤ **Quantum mechanics** explains the behavior of particles at microscopic scales and includes phenomena like superposition and entanglement.

- ◎ However, these two theories are not easily compatible, and scientists have long been searching for a unified theory that can explain both gravity and quantum phenomena. This search has led to various proposals, including string theory and loop quantum gravity.

The Challenge of Quantum Gravity

- ◎ Quantum gravity refers to the hypothetical idea of unifying these two theories into a single framework that can explain both the microscopic and macroscopic worlds.

- ◎ The central problem is that gravity has never been successfully incorporated into quantum mechanics.

- ◎ While quantum mechanics works well for the other three forces (electromagnetic, strong nuclear, and weak nuclear forces), gravity has resisted quantization.

- ◎ In the search for quantum gravity, scientists have been proposing **experiments** to test the **quantum nature of gravity**.

- ◎ **Quantum Nature of Gravity:** Quantum mechanics is known for strange phenomena like:

  - ➤ **Superposition** (a system can exist in multiple states at once, like Schrödinger's cat being both alive and dead).

  - ➤ **Entanglement** (two particles can instantly affect each other, even if they are far apart).

- ◎ Classical systems (e.g., planets and cars) do not behave in this way, but quantum systems do. The key difference is that **measurement** in quantum mechanics forces a system into a definite state, while classical systems do not change when measured.

What is the new proposed method?

- ◎ The new proposal for testing quantum gravity focuses on **weak gravity**, unlike previous efforts that have focused on strong gravity (near black holes or other extreme

conditions). The goal is to look for signs of quantum mechanics in **low-gravity environments**, such as near small objects.

- The Proposed Experiment: The experiment involves two *masses*:
  - ➤ A **test mass** in a **quantum superposition** of two possible paths it could take.
  - ➤ A **probe mass** interacting gravitationally with the test mass, which would force it to choose one path.

- The key idea is that both masses are in superposition, and their paths will result in different **gravitational interactions**. By measuring the gravitational effects, the scientists can test whether gravity behaves in a quantum mechanical manner (i.e., whether the measurement collapses the system's state).

- If gravity affects the system's quantum state, it will suggest that **gravity itself is quantum**, and the experiment would provide crucial insights into the intersection of gravity and quantum mechanics.

DATA LOSS IN CLOUD STORAGE

Context:

A recent legal dispute has brought the **issue of data loss in cloud storage** to the forefront. **Adarsh Developers**, a Bengaluru-based real estate firm, filed a complaint against **Amazon Web Services (AWS)**. The company claims that years' worth of **vital data stored on AWS was lost**, leading to a financial loss exceeding Rs 100 crores. This incident has raised serious concerns regarding the **security of cloud storage**, **data protection**, and **cloud service reliability**.

What are the possible Causes of Data Loss?

- **Cloud Misconfiguration:** Cloud misconfigurations refer to errors in setting up cloud storage systems that leave data exposed or vulnerable. **Inadequate security protocols, poorly managed permissions, or wrong settings** can result in accidental data deletion or unauthorized access. This incident could involve such misconfigurations, where system architecture or settings were not correctly implemented.

- **Human Error:** Often, large-scale outages and data losses are a result of human mistakes. For instance, errors during maintenance, software updates, or even by vendors working with the cloud system can result in the deletion of critical data.

- **Cybersecurity Issues:** While the primary concern in this case was misconfiguration or human error, cybersecurity breaches, such as unauthorized access by hackers, are a common threat to cloud-stored data. In this case, it has yet to be determined whether a cyberattack contributed to the data loss.

Role of Cloud Service Providers:

- Cloud service providers like **Amazon Web Services (AWS)** offer secure data storage solutions, but the responsibility for data security is often shared between the provider and the client.

- While AWS provides security measures, users must also ensure proper configurations, backups, and access control mechanisms are in place.

Regulatory and Legal Implications:

- This incident highlights the importance of **data protection laws** and **cloud service agreements**. In India, the **Information Technology Act, 2000** and related regulations such as the **IT (Reasonable Security Practices and Procedures) Rules, 2011** provide the legal framework for data protection, but issues related to cloud storage security and vendor liability are still evolving.

- Globally, cloud service providers are also expected to comply with regulations like **General Data Protection Regulation (GDPR)** in the European Union, which imposes strict guidelines on data handling and security breaches.

What is cloud computing?

- Cloud computing is the **on-demand delivery of IT resources** over the Internet with **pay-as-you-go pricing.**

- Instead of buying, owning, and maintaining physical data centers and servers, one can access technology services, such as **computing power, storage, and databases**, on an as-needed basis from a cloud provider like **Amazon Web Services (AWS).**

- **Usage:** Organizations of every type, size, and industry are using the cloud for a wide variety of use cases, such as **data backup, disaster recovery, email, virtual desktops, software development and testing, big data analytics, and customer-facing web applications.**

Types of Cloud Computing

- **Infrastructure as a Service (IaaS)** provides virtualized computing resources like servers, networking, and storage. Offers high flexibility and control over IT resources, allowing users to manage and configure as needed.
  - ➤ **Use Case:** Suitable for businesses needing scalable IT infrastructure.

- **Platform as a Service (PaaS)** delivers a platform allowing users to develop, run, and manage applications without dealing with underlying hardware or software management.
  - ➤ **Use Case:** Ideal for developers focused on application development without worrying about infrastructure.

- **Software as a Service (SaaS)** provides fully managed software applications over the internet. Users only focus on using the software, while the provider handles maintenance and infrastructure.
  - ➤ **Use Case:** Commonly used for web-based applications like email or CRM systems.

SECTION -B

QUICK BYTES

UNESCO WORLD HERITAGE SITE

Context

The Maharashtra government has submitted a proposal to the **United Nations Educational, Scientific and Cultural Organization (UNESCO)** under the theme '**Maratha Military Landscape of India**', urging the inclusion of 12 forts in the prestigious World Heritage Sites, said an official statement. These include 11 forts in Maharashtra in **Raigad, Rajgad, Pratapgad, Panhala, Shivneri, Lohagad, Salher, Sindhudurg, Suvarnadurg, Vijaydurg, Khanderi Fort**, and one **Jinji Fort** in Tamil Nadu.

Chhatrapati Shivaji Maharaj (1630-1680):

Early Life:

- ➤ **Born**: February 19, 1630, at Shivneri Fort (Pune District) to Shahaji Bhosle and Jijabai.
- ➤ He was influenced by his mother, Jijabai, who instilled a strong sense of culture and religion.
- ➤ He was raised by **Dadoji Kondadeo**, who educated him in military strategy, administration, and revenue systems.
- ➤ Shivaji's paternal grandfather, **Maloji**, was a distinguished general and awarded Fort Shivneri for his service.

Formation of the Maratha Kingdom:

- ➤ **Independence**: Established an independent kingdom by breaking away from the Bijapur Sultanate.
- ➤ **Government**: Created a strong and efficient administrative system with a well-trained army.
- ➤ **Recognition**: In 1674, he was formally crowned **Chhatrapati** at **Raigad Fort**.

Contributions and Innovations:

- ➤ **Father of the Indian Navy**: He built a strong naval force, constructing forts along the Konkan coast to safeguard maritime routes.
- ➤ Shivaji was known for his **guerrilla warfare tactics**, also called **"Ganimi Kawa"**, using surprise attacks and mountain forts to his advantage.
- ➤ He [romoted **religious harmony**, welcomed people from diverse religions into his administration, and treated women with honor.
- ➤ **Language Promotion**: He advocated for the use of **Marathi** and **Sanskrit**, replacing Persian and Arabic terms in official matters.

Wars and Conquests:

- ➤ **Early Campaigns**: He captured **Torna Fort** in 1646 at age 16, beginning his military campaigns against the Bijapur Sultanate.
- ➤ **Conflict with Bijapur**:
  - ♦ **Battle of Pratapgarh (1659)**: Defeated Bijapur's Afzal Khan, marking a significant victory.
  - ♦ **Capture of Panhala Fort (1660)**: Shivaji faced siege and later recaptured it in 1673.
- ➤ **Mughal Empire**:
  - ♦ Shivaji initially allied with the Mughals but later rebelled, engaging in battles like the **Battle of Surat (1664)** and **Battle of Purandar (1665)**, where he agreed to Mughal authority temporarily.
  - ♦ **Escape from Agra (1666)**: After being imprisoned by Aurangzeb, Shivaji escaped from Agra in 1666, eventually leading to peace negotiations.
  - ♦ **Battle of Sinhagad (1670)**: Recaptured the Sinhagad fort from the Mughals.

- ♦ **Battle of Salher (1672)**: The first major Maratha victory against the Mughals.

- ### Conquests in Southern India:

  - ➤ From 1674, expanded Maratha control over **Khandesh**, **Karwar**, and **Kolhapur**.

  - ➤ Initiated a campaign in southern India, forming a treaty with the **Qutubshah of Golkonda** in 1677.

- ### Administration:

  - ➤ **Ashta Pradhan**: A council of eight ministers responsible for various functions like administration, finance, and military.

  - ➤ He introduced an efficient governance system with **Sanskrit as the official language.**

  - ➤ **Religious Policies**: He encouraged religious tolerance and built alliances with Muslim states, incorporating them into his administration.

- ### Military Strategy and Organization:

  - ➤ **Guerrilla Warfare**: He used the mountainous terrain to conduct surprise attacks.

  - ➤ He built **240-280 forts** (including **Rajgad**, **Torna**, **Purandar**) and maintained a strong naval presence, particularly along the Konkan coast.

  - ➤ He established a **Maratha navy** with forts like **Sindhudurg**, recruiting both Hindus and Muslims for naval operations.

- ### Legacy:

  - ➤ After his death in 1680, Shivaji's kingdom was inherited by his son **Sambhaji**, who continued his father's expansionist policies but was captured and executed by the Mughals.

  - ➤ **Rajaram** (Sambhaji's brother) took over but was later forced to flee.

  - ➤ **Shahu**, son of Sambhaji, later became Chhatrapati and the rise of the **Peshwas** began under **Balaji Vishwanath in 1713.**

What is World Heritage Sites?

- ⊙ World Heritage Sites are **cultural and/or natural locations** deemed of **Outstanding Universal Value,** recognized by **UNESCO** for their global significance.

- ⊙ These sites represent the most important and unique examples of the world's heritage, transcending national boundaries and benefiting future generations.

- ⊙ **UNESCO's World Heritage Convention (1972)** protects these sites, with States Parties nominating eligible sites for inclusion on the World Heritage List, which brings international recognition and responsibility for their preservation.

- ⊙ India has **43 sites** in the list, the highest among South Asian countries

  (See table given below)

State	Site	Year	Type
Maharashtra	Ajanta Caves	1983	Cultural
	Ellora Caves	1983	Cultural
	Elephanta Caves	1987	Cultural
	Chhatrapati Shivaji Terminus (formerly Victoria Terminus)	2004	Cultural
	Victorian Gothic and Art Deco Ensembles of Mumbai	2018	Cultural
Uttar Pradesh	Agra Fort	1983	Cultural
	Taj Mahal	1983	Cultural
	Fatehpur Sikri	1986	Cultural
Odisha	Sun Temple, Konârak	1984	Cultural
Tamil Nadu	Group of Monuments at Mahabalipuram	1984	Cultural
	Great Living Chola Temples	1987	Cultural
Assam	Kaziranga National Park	1985	Natural
	Manas Wildlife Sanctuary	1985	Natural
	Moidams – the Mound-Burial system of the Ahom Dynasty	2024	Cultural
Rajasthan	Keoladeo National Park	1985	Natural
	The Jantar Mantar, Jaipur	2010	Cultural
	Hill Forts of Rajasthan	2013	Cultural
	Rani-ki-Vav at Patan, Gujarat	2014	Cultural
	Jaipur City	2019	Cultural
Goa	Churches and Convents of Goa	1986	Cultural
Madhya Pradesh	Khajuraho Group of Monuments	1986	Cultural
	Buddhist Monuments at Sanchi	1989	Cultural

	Rock Shelters of Bhimbetka	2003	Cultural
Karnataka	Group of Monuments at Hampi	1986	Cultural
	Group of Monuments at Pattadakal	1987	Cultural
	Sacred Ensembles of the Hoysalas	2023	Cultural
West Bengal	Sundarbans National Park	1987	Natural
	Santiniketan	2023	Cultural
Uttarakhand	Nanda Devi and Valley of Flowers National Parks	1988	Natural
Delhi	Humayun's Tomb	1993	Cultural
	Qutb Minar and its Monuments	1993	Cultural
	Red Fort Complex	2007	Cultural
Bihar	Mahabodhi Temple Complex at Bodh Gaya	2002	Cultural
	Nalanda Mahavihara at Nalanda	2016	Cultural
Gujarat	Champaner-Pavagadh Archaeological Park	2004	Cultural
	Rani-ki-Vav at Patan	2014	Cultural
	Dholavira: a Harappan City	2021	Cultural
	Ahmadabad	2017	Cultural
Himachal Pradesh	Great Himalayan National Park Conservation Area	2014	Natural
Sikkim	Khangchendzonga National Park	2016	Mixed
Chandigarh	The Architectural Work of Le Corbusier	2016	Cultural
Telangana	Kakatiya Rudreshwara (Ramappa) Temple	2021	Cultural

NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL (NAAC)

Context

The **National Assessment and Accreditation Council (NAAC)** removed around 900 assessors after a bribery case and is reforming its accreditation process, including virtual assessments and a new binary accreditation system set to launch in May 2024.

What is NAAC?

- **Established in:** 1994
- NAAC is an **autonomous government body**.
- **Nodal Ministry:** Ministry of Education
- It is responsible for conducting evaluations of higher educational institutions (colleges and universities) in India.
- The evaluation is carried out to derive an understanding of **education quality (Quality Status)** among different institutes.
- NAAC assesses if the institutes comply with the quality standards in different areas such as **educational processes, teaching-learning process, faculty, infrastructure, research, learning resources, organization, governance, student services and financial well-being**.
- Education plays a pivotal role in the development of a nation. The teaching and research facilities offered by institutes must have a standard and recognition comparable to international standards.
- **Purpose:** The purpose of NAAC accreditation is to foster the core values within the higher education institutes:
  - ➤ Contribute towards the development of a high-quality higher education system
  - ➤ Promote competent skills and value systems among the students studying in higher education institutes
  - ➤ Foster the use of technology in teaching and research facilities
  - ➤ Strive for excellence and emerge as top learning centres on the world stage.

NAMO DRONE DIDI YOJANA (NDDY)

Context

The **Namo Drone Didi Yojana (NDDY)** is gaining significant attention as it represents a key initiative aimed at empowering rural women, specifically those from Self-Help Groups (SHGs), through the use of drone technology.

About Namo Drone Didi Yojana (NDDY)

- The Namo Drone Didi Yojana (NDDY) is a **central sector scheme.**

◉ This innovative government initiative is aimed at empowering rural women by introducing them to drone technology for agricultural purposes.

◉ The scheme provides women from **Self-Help Groups (SHGs)** with drones to carry out tasks like precision farming, crop monitoring, soil analysis, and pesticide spraying.

◉ This initiative is designed to support rural economic growth, improve agricultural productivity, and enhance women's participation in the agricultural sector.

◉ **Key Features of the Namo Drone Didi Yojana:**

➤ **Drone Distribution:** The government plans to equip 15,000 women from SHGs with drones, allowing them to become *"Drone Didis"* (Drone Sisters). These women will be trained to use drones to increase their income and contribute to sustainable farming practices.

➤ **Income Generation:** By using drones, women can earn at least Rs 1 lakh per year, thus promoting financial independence and empowerment in rural areas.

➤ **Training and Support:** The government offers comprehensive drone pilot training, enabling women to operate drones for various agricultural tasks.

➤ **Subsidy and Financing:** The government covers 80% of the cost of drones (up to Rs 8 lakh) as a subsidy and provides low-interest loans (3% interest rate) to ease financial burdens. Additionally, women receive full access to drone pilot training.

Other Key Initiatives Related to Drone Technology

◉ **Kisan Drone Scheme**: The Scheme aims to promote the use of drones in agriculture by offering subsidies and financial assistance to farmers. The goal is to help farmers monitor crop health, apply pesticides, and improve yields using advanced drone technology.

◉ **Drone Shakti Scheme:** The Drone Shakti initiative focuses on creating opportunities for the use of drones in various sectors, including agriculture, infrastructure, and disaster management.

◉ **Make in India Initiative for Drones:** The **campaign** promotes local manufacturing, including the production of drones, to reduce dependence on imports and boost the indigenous drone industry.

◉ **Production-Linked Incentive (PLI) Scheme for Drones:** The PLI scheme for drones aims to incentivize domestic manufacturing and reduce reliance on imported drone technology and components.

◉ **Digital Sky Platform:** The Digital Sky Platform is a digital platform created by the **Directorate General of Civil Aviation (DGCA)** to facilitate the approval and registration of drones.

DANANTARA SOVEREIGN WEALTH FUND

Context

Indonesia has launched a new sovereign wealth fund named **Daya Anagata Nusantara**, also known as **Danantara**. This fund is designed to manage the country's state assets, which are valued at over **USD 900 billion**. Danantara is set to become the **largest sovereign wealth fund** in **Southeast Asia's largest economy**, marking a significant step in Indonesia's economic strategy.

What is a Sovereign Wealth Fund (SWF)?

◉ A **sovereign wealth fund** is a **state-owned investment fund**.

◉ It is used by governments to manage national savings, often derived from surplus revenues such as those from natural resources, state-owned enterprises, or other sources of public wealth.

◉ The fund is comprised of money generated by the government, often derived from a country's surplus reserves.

◉ These funds typically invest in a range of assets, including **stocks, bonds, infrastructure projects, and real estate,** to grow the nation's wealth over time.

Key Features of Danantara:

➤ **Size and Scope**: With assets worth over **USD 900 billion**, Danantara will be the largest sovereign wealth fund in Southeast Asia. It aims to pool together Indonesia's public wealth and invest it efficiently to generate long-term returns.

➤ **Purpose**: The primary goal of the fund is to manage state assets and invest in areas that contribute to **economic growth** and **national development**. It is expected to support infrastructure projects, innovation, and economic diversification in Indonesia.

➤ **Management**: Danantara will be governed by a set of policies designed to ensure transparency and the efficient use of resources. It will focus on long-term investments that align with Indonesia's economic and social priorities.

MAKHANA (FOX NUT)

Context

Following the announced of the formation of a Makhana Board in Bihar, Union Minister Shivraj Singh Chouhan interacted with Makhana producers in Darbhanga district, where he also accompanied farmers to sow seeds.

Bihar's government has advocated for measures to promote Makhana cultivation, including the minimum support price for Makhana.

About Makhana (Fox Nut):

◉ Makhana (Fox Nut) is the dried seed of the prickly water lily (Euryale ferox), found in freshwater ponds across South and East Asia.

◎ It is known for its violet and white flowers, large prickly leaves, and black to brown seeds.

◎ Makhana is often consumed as 'lava' (popped snacks) and is highly nutritious, rich in **carbohydrates, protein, and minerals.**

◎ **GI Tag:** In 2022, Mithila Makhana received a **Geographical Indication (GI) tag.** A GI tag is granted to products with qualities linked to a specific region and is valid for 10 years, renewable thereafter.

◎ Makhana Production in India:

➤ Bihar: Accounts for 90% of India's Makhana production, concentrated in 9 districts in northern and eastern Bihar **(Darbhanga, Madhubani, Purnea, Katihar, Saharsa, Supaul, Araria, Kishanganj, and Sitamarhi),** with the first four contributing 80% of the output.

➤ Also cultivated in **Assam, Manipur, West Bengal, Tripura, Odisha**, and in neighboring countries like **Nepal, Bangladesh, China, Japan, and Korea.**

◻ ### Climatic Requirements:

➤ It is grown in tropical and subtropical regions, in water bodies such as ponds and wetlands with shallow depths (4-6 feet).

➤ It requires 20-35°C temperature, 50-90% humidity, and 100-250 cm of annual rainfall for optimal growth.

◎ **Makhana Board:** In February 2025, Finance Minister Nirmala Sitharaman announced the formation of a Makhana Board in Bihar.

RBI SURVEY ON FARMER'S SHARE OF CONSUMER PRICES (2024)

Context

A recent **survey by the Reserve Bank of India (RBI)**, conducted between **May-July 2024**, analyzed the share of **consumer prices** received by **farmers** for major **rabi crops** in India.

Farmer's Share of Consumer Prices

◎ **Wheat**: Farmers received the highest share, **67%**, of the consumer price. This is largely due to government procurement systems like **Minimum Support Price (MSP)**, which gives farmers an assured market for their produce.

◎ **Rice**: Farmers earned **52%** of the consumer price, which has remained consistent in previous surveys, showing stable trends in farmers' earnings for rice.

◎ Share for Perishable Crops (Fruits & Vegetables)

➤ Farmers' share for **fruits and vegetables** is lower, ranging between **40-63%**, due to **higher trader and retailer markups**.

➤ These crops are subject to **higher supply chain uncertainties** because of:

♦ Short shelf-life cycles

♦ Seasonal production

♦ Diverse quality and demand fluctuations

♦ Special logistical requirements

➤ **Pulses and Oilseeds**

♦ **Lentils**: Farmers received **66%** of the retail price, which is beneficial as lentils are mainly grown by small-holder farmers.

♦ **Gram (Chana)**: Farmers earned **60%** of the price.

♦ **Rapeseed and Mustard (R&M)**: Farmers' share was **52%**, consistent with previous estimates.

Factors Influencing the Farmers' Share

◎ **Perishable crops** have lower farmer shares compared to non-perishables. This is due to the **unorganised supply chain**, which compresses farmer profits as multiple intermediaries are involved.

◎ The **supply chain dynamics** of perishable crops make it difficult to track the flow of products, funds, and information, leading to **lower farmer shares** and **higher markups by traders/retailers**.

🔍 FACT BOX

Rabi Crops

◎ Rabi crops are grown during the **winter** season and harvested in **spring.**

◎ They are typically sown after the monsoon rains have stopped, between mid-November to December, and harvested between April and June.

◎ **Water Requirements:** Rabi crops require less water compared to Kharif crops and are usually grown with the help of traditional irrigation methods.

◎ **Key Rabi Crops**: Wheat, Barley (Jav), Rapeseed and Mustard, Gram (Chickpea), Peas (Matar)

Kharif Crops

◎ These crops are sown at the **beginning of the monsoon season** (around June to July) and harvested at the **end of the monsoon season** (September to October).

◎ **Water Requirements**: Kharif crops are **rainfed** and heavily depend on the monsoon rains for their growth and yield.

◎ **Key Kharif Crops:**

➤ **Cereals** (Paddy, Maize, Millets, etc)

➤ **Oilseeds** (Groundnut, Soybean, Sesame, etc)

➤ **Pulses** (Blackgram, Greengram, Pigeonpea, Moth bean, Cluster bean, Horsegram, etc)

➤ **Commercial Crops** (Cotton, Sugarcane, Spices, Vegetables, and Fruits)

VIZHINJAM INTERNATIONAL SEAPORT

Context

The Vizhinjam International Seaport in Kerala is poised to become a key player in global logistics, with ambitions to transform Kerala's economy.

About Vizhinjam International Seaport

- Vizhinjam is situated in the southern part of Kerala, India, near the state capital, **Thiruvananthapuram**.

- It is developed by Adani Ports and SEZ under a public-private partnership.

- It is **India's latest international deep-water transshipment facility.**

- Its strategic position along major international shipping routes offers a significant advantage for maritime trade.

- It is located strategically on international shipping routes with a natural depth of 18-20 meters, Vizhinjam is designed to handle large mother vessels and plays a critical role in India's trans-shipment capacity.

- **Strategic Location and Global Connectivity**: Vizhinjam's location connects key global ports like Shanghai, Busan, and Rotterdam with major Indian ports, giving Kerala an edge in global logistics.

  ➢ The port's development as a sea-air transshipment hub aims to position Kerala as a prominent maritime leader in South Asia.

UPSC PYQ

Q: **Recently, which of the following States has explored the possibility of constructing an artificial inland port to be connected to the sea by a long navigational channel? (2016)**

(a) Andhra Pradesh

(b) Chhattisgarh

(c) Karnataka

(d) Rajasthan

Solution: (d)

GHARIALS (*GAVIALIS GANGETICUS*)

Context

Madhya Pradesh released 10 gharials, a critically endangered species, into the Chambal river at the **National Chambal Gharial Sanctuary in Morena.** MP's decades-long conservation efforts have earned it the title of a **"gharial state,"** hosting over 80 per cent of India's gharials.

What are Gharials?

- Gharials (*Gavialis gangeticus*) are a species of long-snouted, fish-eating crocodilians.

  ➢ Crocodilians are a group of reptiles that includes **crocodiles, alligators, caimans**, and more.

- They are known for their **distinctive bulbous snouts**, which resemble an inverted pot, a feature particularly seen in adult males.

- **Size:** Males grow between 3-6 meters, and females range from 2.6-4.5 meters.

- **Diet:** Gharials are primarily fish eaters. Their slender, sharp teeth help trap fish, which forms the bulk of their diet.

- **Breeding:** Gharials mate from November to January, and females lay eggs on sandbanks or islands from March to May. After hatching, females care for their young for a few days.

- **Ecological Importance:** Gharials are crucial for the river ecosystem, particularly in cleaning up dead fish and other carrion.

- Habitat:

  ➢ India (Chambal, Girwa, and Son Rivers)

  ➢ Nepal (Narayani River)

Conservation Status:

  ➢ **International Union for Conservation of Nature (IUCN) Red List:** Critically endangered

  ➢ **Wildlife Protection Act, 1972:** Schedule 1

Chambal Sanctuary:

- The **National Chambal Gharial Sanctuary**, spanning across **Madhya Pradesh, Uttar Pradesh, and Rajasthan**, is critical to gharial conservation.

- It protects a 435-km stretch of one of India's cleanest rivers and is home to more than 2,450 gharials.

OLIVE RIDLEY TURTLES (LEPIDOCHELYS OLIVACEA)

Context

Around 3 lakh Olive Ridley turtles have arrived on Odisha's coastline for their annual mass nesting event known as **"arribada."** This incredible natural occurrence sees the turtles traveling over 9,000 kilometers from the Pacific Ocean to lay their eggs on Odisha's pristine beaches.

About the Species

- They are the smallest and most abundant of all sea turtles found in the world.

- It gets its name from the olive green colouration of its carapace (shell).

- They are best known for their unique mass nesting, called **Arribada,** where thousands of females come together on the same beach to lay eggs.

- **Major nesting sites in India:** Rushikulya rookery coast (Odisha), Gahirmatha beach (Bhitarkanika National Park), and mouth of the Debi River.

- Features:

  - An adult typically measures between 62 and 70 cm in length and weighs about 35-45 kg.

  - They have one to two visible claws on each of their paddle-like flippers.

  - They are omnivorous, meaning they feed on both plants and animals.

  - They are solitary, preferring the open ocean.

  - These turtles spend their entire lives in the ocean, and migrate thousands of kilometers between feeding and mating grounds in a year.

- **Conservation Status:**

  - **IUCN Red List:** Vulnerable

  - **Wildlife Protection Act, 1972:** Schedule 1

  - **CITES:** Appendix I

SIMILIPAL TRIBALS' SACRED GROVES

Context

The Munda tribe, who lived in **Jamunagarh village in Similipal Tiger Reserve (STR) in Odisha** for generations, are facing challenges regarding their religious practices and rights after being relocated. Their ancestral lands, sacred groves, and burial grounds are now part of a tiger conservation effort, impacting their ability to continue age-old rituals and worship.

Background (Eviction of the Munda Tribe)

- In two phases, the Munda tribe was relocated from **Jamunagarh village** in 2015 and 2022 to make way for tiger conservation efforts.

- The village is now transformed into a **meadow**, and the tribal people were not allowed to return to their ancestral lands.

- **Sacred Sites**: The Munda tribe has deep spiritual connections to **sacred groves (Jayars) and burial grounds (Sasan Pilis)** in Jamunagarh.

  - These sites are essential to their religious practices, where the tribe performs annual rituals and worships their deities.

- The land is now being used for tiger conservation, particularly for a program to supplement the tiger population, such as the translocation of Zeenat, a tiger from Maharashtra.

- The Munda tribe believes their religious and cultural identity is under threat as they are denied access to their sacred lands and groves, which are integral to their existence.

Tribal Rights in India

- **Special Provisions for Tribal Areas (Part X), Article 244(1):** The Governor has the authority to make regulations for the peace and good governance of Scheduled Areas. The regulations can prohibit or restrict the transfer of land by or among Scheduled Tribe members in such areas.

- **Panchayats (Extension to the Scheduled Areas) Act, 1996 (PESA**): The Act extends Part IX of the Constitution (relating to Panchayats) to Scheduled Areas. It ensures that Gram Sabhas or Panchayats are consulted before land acquisition for development projects in Scheduled Areas.

- **Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (Forest Rights Act):** It recognizes the rights of forest-dwelling STs and Other Traditional Forest Dwellers (OTFDs) who have lived in forests for generations. It aims to vest forest rights and occupation of forest land in these communities.

- **Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation, and Resettlement (RFCTLARR) Act, 2013**: It ensures fair compensation and timely rehabilitation of displaced tribal populations due to land acquisition for projects.

- **Constitutional Provisions Ensuring Tribal Welfare**

  - **Article 16(4)**: Allows reservation in appointments for backward classes, including Scheduled Tribes, to ensure adequate representation in services.

  - **Article 16(4A)**: Permits states to provide reservation in promotions for SC/STs if they are underrepresented in state services.

  - **Article 16(4B)**: Ensures that backlog vacancies are not considered along with current year vacancies for determining the reservation ceiling.

  - **Article 244(1)**: Applies provisions of the Fifth Schedule for the administration and control of Scheduled Areas and Tribes in states other than Assam, Meghalaya, Mizoram, and Tripura, which are covered under the **Sixth Schedule.**

  - **Article 275**: Provides Grants-in-Aid to states under the **Fifth and Sixth Schedules** to promote the welfare of STs and SCs.

  - **Article 23**: Abolishes bonded labor and prohibits trafficking in human beings and forced labor. It makes violation a punishable offense.

  - **Article 24**: Forbids child labor, specifically preventing children under 14 years from working in factories, mines, or hazardous occupations.

  - **Article 15(4)**: Allows special provisions for the educational advancement of Scheduled Tribes.

  - **Article 46**: Mandates the state to promote the educational and economic interests of STs and SCs and protect them from social injustice and exploitation.

  - **Article 350**: Grants the right to conserve distinct languages, scripts, and cultures, ensuring the preservation of tribal heritage.

About Munda tribes

- Munda tribes have originated from Koal living in **Bindhya Parvat.**
- The Munda live primarily in the northeast Indian states of **Assam, Bihar, Jharkand, Odisha and West Bengal.**
- **Native language**: Mundari language. The **Munda people** are an Austroasiatic speaking ethnic group of India.
- **Belief system**: The Munda practice a religion called **Sarnaism,** the religion of the holy woods or Sal trees. Followers of **Sarnaism worship** the Creator God, **Dharmesh or Singbonga and the Mother Earth Goddess, Chalapachho Devi.**
- The tribe celebrates several festivals like **Mage, Phagu, Karam, Sarhul, and Sohrai etc**.
  - ➤ Sarhul (festival of flowers) is the important festival of Mundas.
  - ➤ The Munda people have elaborate rituals to celebrate birth, death, engagement and marriage.
  - ➤ Cultural life of Mundas resembles that of **Santhals.**

Simlipal National Park

- Simlipal National Park is a **national park** and a **tiger reserve** in the **Mayurbhanj district in the Indian state of Odisha**
- Simplipal was designated a tiger reserve in 1956 and in May 1973 the essential part of the **Project Tiger in May 1973.**
- Since 2009, it has been part of the **UNESCO World Network of Biosphere Reserve**.
- It is the only place in the world to house the rare black tigers.

UPSC PYQ

Q: Consider the following pairs- (2013)

Tribe	State
(1) Limboo (Limbu)	1. Sikkim
(2) Karbi	2. Himachal Pradesh
(3) Dongaria	3. Odisha
(4) Bonda	4. Tamil Nadu

Which of the above pairs are correctly matched?

(a) 1 and 3 only   (b) 2 and 4 only

(c) 1, 3 and 4 only   (d) 1, 2, 3 and 4

Solution: (a)

Q: Under which Schedule of the Constitution of India can the transfer of tribal land to private parties for mining be declared null and void? (2019)

(a) Third Schedule   (b) Fifth Schedule

(c) Ninth Schedule   (d) Twelfth Schedule

Solution: (b)

MAJORANA 1

Context

Microsoft has introduced Majorana 1, a groundbreaking quantum chip designed to bring industrial-scale quantum computing within reach in just a few years.

What is *Majorana 1?*

- *Majorana 1* is the **world's first quantum chip** to incorporate *Topological Core architecture*, designed to harness *topoconductors*.
- These are a **new class of materials** that can observe and control *Majorana particles*, exotic quantum particles that are expected to make quantum operations much more stable and less error-prone.
- The chip's design marks a significant leap forward because it addresses one of the biggest challenges in quantum computing: **error rates and the reliability of qubits.**
- By using this new technology, Microsoft hopes to scale quantum computers up to one million qubits—a necessary threshold for tackling real-world problems.
- This is especially significant because even the most powerful supercomputers today cannot handle the kinds of calculations that a one-million-qubit quantum computer could.
- With this development, Microsoft is positioning itself to lead the quantum computing race, similar to how semiconductors paved the way for modern electronics.

About Quantum Computing

- Quantum computing is a radically different way of processing information compared to traditional computing.
- While classical computers use *bits* **(which can be either 0 or 1),** quantum computers use *qubits* **(quantum bits).**
  - ➤ Unlike classical bits, qubits can represent both 0 and 1 simultaneously, thanks to a principle called *superposition*.
  - ➤ Additionally, qubits can become *entangled*, meaning the state of one qubit is directly related to the state of another, no matter the distance between them.
- These properties allow quantum computers to solve incredibly complex problems much faster than classical computers.
  - ➤ **For example**, problems in *cryptography*, *drug discovery*, and *material science* that would take traditional computers years to solve could be tackled in just minutes or hours on a quantum computer.

FIRST DETAILED GEOLOGICAL MAP OF THE MOON'S SOUTH POLAR REGION

CONTEXT

In **2023**, **India's Chandrayaan-3 mission** successfully landed on the moon's **south pole**, a region previously unexplored by any lunar mission. This mission has resulted in the **first-ever detailed geological map** of the **moon's south polar region**, created by Indian scientists. The map is shedding new light on the moon's history, its formation, and its geological makeup.

What is in the first detailed geological map?

- The **detailed geological map** was created using data from the **Pragyan rover**, which was deployed by the **Vikram lander**.
- The map shows an **undulating landscape**, including **highlands** and **flat plains**, surrounding the landing site.
- It highlights the **Schomberger crater**, which was identified as the **primary source** of debris around the landing zone.
  - This crater is part of the **lunar impact history**, and its study helps understand the moon's evolution.
- The **region's age** is estimated to be **3.7 billion years**, a time when Earth's first **microbial life** emerged. This aligns with the time when the moon began to solidify after its formation.
- The map also confirmed the presence of **primordial magma** beneath the surface, an ancient ocean of molten rock that stretches across the entire moon. This discovery adds to our understanding of the moon's geological history and supports previous evidence from past missions.

- **Key Discoveries and Their Significance:**
  - **Magma Beneath the Surface: Data from Chandrayaan-3** confirmed that **magma** lies beneath the moon's surface in the south pole region. This supports earlier data from other missions, but it is the first confirmation of this in the high-latitude area.
  - **Lunar Impact Craters:** The map identified key impact craters, including the **South Pole-Aitken Basin**, one of the largest impact craters in the solar system. Lunar craters are important for understanding the early **solar system** and can serve as **time capsules** for studying the moon's history.
  - **Common Origin of Earth and Moon:** The study revealed that Earth and the moon share a similar **geochemical history** and likely originated from the same molten cloud of material about **4.5 billion years ago**. The moon is thought to have formed from debris after a collision between Earth and a Mars-sized planet.

South Pole landing

- **Chandrayaan-3**, launched by **ISRO** (Indian Space Research Organisation), was the first mission to land in the **high-latitude south pole region** of the moon.
- This area is particularly important because it has never been studied in detail by any previous missions.
- **Key-features:**
  - The region has a **difficult terrain**, full of craters and deep trenches. It is also far from the equatorial region explored by previous lunar missions.
  - Some areas on the south pole are shrouded in darkness and have never received sunlight.
  - Temperatures are so cold there that they can plummet to as low as -230 degree Celsius. This rocky terrain, complete darkness and extremely cold weather make it more difficult for electronic instruments to function properly.
  - Situated on the edge of the Aitken basin, the largest impact basin on the Moon, the lunar south pole offers a unique opportunity to study materials from the Moon's deep crust and mantle.
- Before Russia, countries such as **Japan, Israel and the United Arab Emirates (UAE)** have tried and failed to land on the Moon's south pole.

NASA'S SPHEREX

Context

NASA's new space telescope, SPHEREx (Spectro-Photometer for the History of the Universe, Epoch of Reionization and Ices Explorer), is scheduled for launch aboard a SpaceX Falcon 9 rocket from Vandenberg Space Force Base in California.

What is SPHEREx?

- SPHEREx is a **megaphone-shaped space telescope** with the capability to observe both **optical and infrared light.**
- While traditional optical telescopes like the **Hubble Space Telescope** are limited to visible light, SPHEREx will focus on **infrared light**, which is essential for observing **distant cosmic phenomena** such as **star formation, galactic structures**, and the earliest moments of the universe.
- The telescope will map the entire sky in **102 infrared colors**, creating the most detailed and colorful cosmic map ever produced.
- **Main Objectives of SPHEREx**
  - **Mapping the Universe in 102 Infrared Colors:** SPHEREx aims to map the universe in unprecedented detail.
    - Unlike the **James Webb Space Telescope**, which observes localized regions of the cosmos, SPHEREx will map the entire sky.

- The mission will utilize **infrared light**, which is crucial for observing the farthest reaches of space, including stars being born and the detailed structures of galaxies.
- SPHEREx will create a colorful, high-resolution map of the cosmos, offering new insights into cosmic history.

➤ **Understanding Cosmic Inflation:** SPHEREx will investigate cosmic inflation, a theory explaining how the universe expanded faster than the speed of light in the moments following the **Big Bang.**

- This expansion occurred around 14 billion years ago and is believed to have shaped the structure of the universe as we know it.
- SPHEREx will measure the 3D positions of about 450 million galaxies, providing critical data to test various theories surrounding cosmic inflation.

➤ **Exploring Life-Forming Molecules in the Milky Way:** SPHEREx will also explore the Milky Way galaxy to identify biogenic molecules—the building blocks of life, such as carbon, hydrogen, and oxygen—frozen in icy particles in some of the coldest regions of the galaxy.

- These molecules are thought to be crucial for the formation of life on Earth.
- SPHEREx will help scientists determine how these molecules are distributed within the Milky Way and explore how they might have traveled to Earth, potentially providing key insights into the origins of life

◉ **Significance**: The data collected by SPHEREx will enhance our understanding of the early universe, the growth of galaxies, and the conditions necessary for life. By mapping the entire sky and studying distant cosmic phenomena, SPHEREx will complement existing missions like the James Webb Space Telescope and provide a broader, more complete picture of the universe's history.

TAMAL WARSHIP

Context

The Indian Navy is preparing to commission a new stealth frigate named **Tamal**, which is currently being built in Russia. This ship is significant because it will be the **last warship commissioned outside of India**. From now on, India plans to design and build its own warships.

About Tamal

◉ Tamal is a **stealth frigate, a modern, advanced warship** designed for stealth operations, minimizing detection by enemy radar and other sensors.

◉ **Construction:** It is being built in Russia as part of a deal between India and Russia.

◉ Tamal is the last warship India will commission from another country, marking the end of India's reliance on foreign-built warships.

◉ **Deal Background:** The ship is part of a four-ship deal signed between India and Russia in October 2016 for additional stealth frigates. Under the deal:

➤ Two ships are being built in Russia (including Tamal).
➤ Two ships are being built in India under a technology transfer arrangement with Goa Shipyard Ltd. (GSL).

◉ The commissioning of Tamal is expected to take place in early June 2025. Once commissioned, it will join the Indian Navy's fleet.

◉ **Significance:**

➤ Tamal marks the end of India's reliance on foreign-built warships, as the country has now developed the capability to design and build its own warships.

➤ It is part of a broader push for India to strengthen its defense industry and become a self-reliant "builder's navy".

Previous Ship in the Deal:

➤ The first ship under the deal, **INS Tushil**, was commissioned in December 2024 in Kaliningrad, Russia.

➤ INS Tushil sailed over 12,500 nautical miles and visited eight countries before returning to its home port in Karwar in February 2025.

BANNED EXPORT OF TAPENTADOL AND CARISOPRODOL

Context

The **Maharashtra FDA** (Food and Drug Administration) issued a **stop production order** and instructed the withdrawal of **export NoCs (No Objection Certificates)** and **manufacturing licenses** for any combination of **Tapentadol** and **Carisoprodol**.

Key Drugs Involved:

◉ **Tapentadol:** It is approved individually in India in 50 mg, 75 mg, and 100 mg tablet forms, as well as in extended-release tablets (100 mg, 150 mg, 200 mg).

➤ It is used primarily for pain management.

◉ **Carisoprodol:** It is approved individually in India for muscle spasms. While these two drugs are approved separately in India, their combination is not approved by the Central Drugs Standard Control Organisation (CDSCO), India's drug regulatory authority. While these two drugs are approved separately in India, their combination is not approved by the Central Drugs Standard Control Organisation (CDSCO), India's drug regulatory authority.

Central Drugs Standard Control Organisation (CDSCO)

◉ The **Central Drugs Standard Control Organisation (CDSCO)** is the **National Regulatory Authority (NRA)** of India.

- It operates under the **Directorate General of Health Services**, which is part of the **Ministry of Health & Family Welfare**, Government of India.
- **Legal Framework**: CDSCO operates under the **Drugs & Cosmetics Act, 1940**, and its associated **Rules of 1945**. This legal framework assigns CDSCO and state regulators the responsibility for regulating drugs and cosmetics in India, ensuring their **safety, efficacy, and quality**.
- **Key Responsibilities of CDSCO:**
  - ➤ Approval of New Drugs
  - ➤ Clinical Trials
  - ➤ Setting Standards for Drugs
- Regulation of Imported Drugs

NOROVIRUS

Context

A surge in norovirus cases is prompting hospital officials to issue urgent warnings, urging the public to restrict hospital visits to prevent further spread.
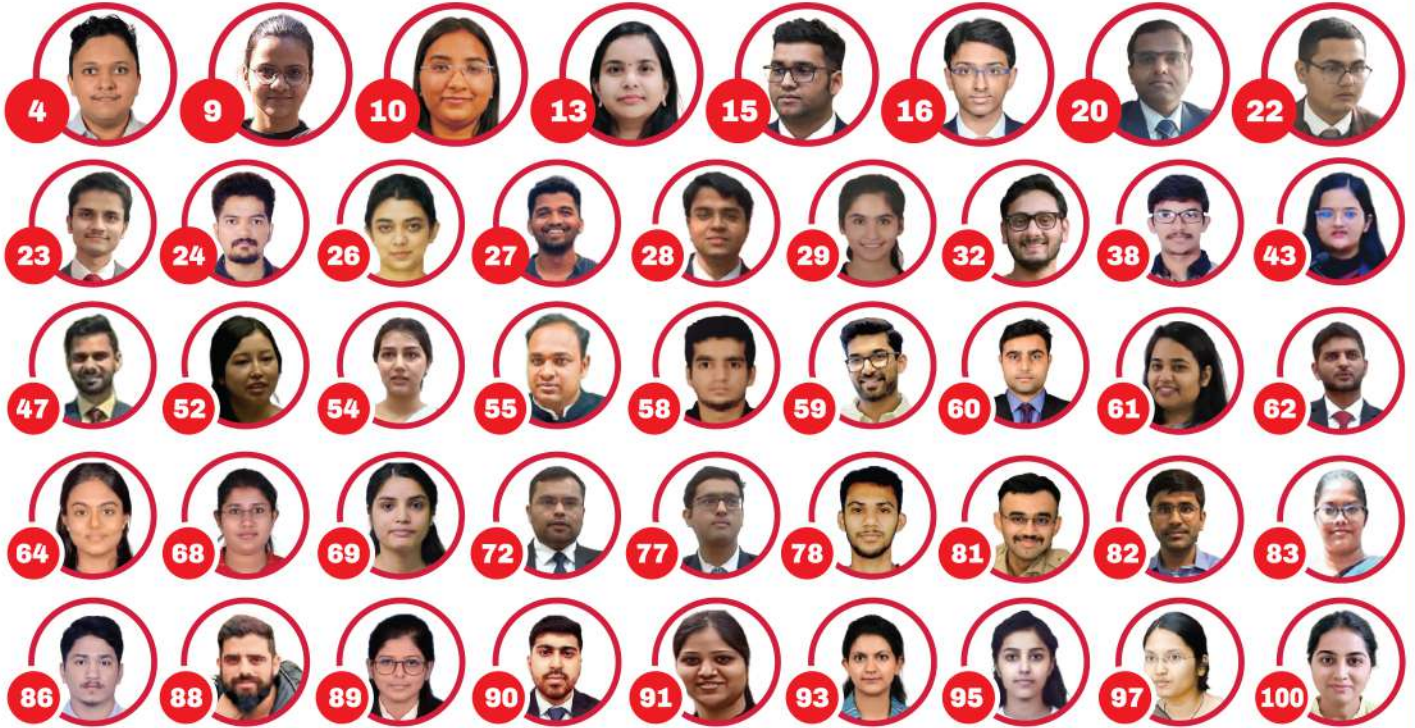
What is norovirus?

- Norovirus is a viral infection that inflames your intestines, which is why many of the symptoms relate to tummy pain.
- For many people, the illness is relatively mild and clears up after one to three days.
- But norovirus can cause young children, older people and those with compromised immune systems or underlying conditions to become severely dehydrated.
- In extremely rare cases, people sickened with norovirus require hospital treatment.
- **Symptoms of norovirus:** Nausea, Vomiting, Diarrhoea, High temperature, Headaches, Exhaustion
- **Spread:** Norovirus is highly contagious, with fewer than 100 particles enough to cause illness.

★ ★ ★ ★ ★

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