

Start Your **UPSC Journey** with **RICE IAS**

RICE IAS



Periodic Labour
Force Survey

**OPERATION
SINDOOR**



MNA

MONTHLY NEWS ANALYSIS

(JUNE 2025)

*Monthly Current Affairs Magazine
For All Civil Services Examinations*

What Will You Get ?

- Latest Judgements, Reports, Govt Scheme & Policies
- Operation Sindoor
- First Monthly Periodic Labour Force Survey (PLFS)
- The Global Pandemic Treaty
- International Booker Prize 2025
- India's First Genome-Edited Rice Varieties

Preface

In India, civil service examinations are not just a pathway to prestigious careers but also a means to contribute meaningfully to society and nation-building. Exams like UPSC and State PSCs, including WBPSC (West Bengal Public Service Commission), demand a deep understanding of subjects, analytical thinking, and a commitment to excellence.

RICE IAS, a name synonymous with quality education for over 40 years in West Bengal, is now broadening its horizons to support aspirants across the country. This magazine is designed to serve as a reliable resource for those preparing for UPSC and State PSC exams, including WBPSC.

Through this magazine, we aim to provide insightful content, detailed analysis of critical topics, and expert perspectives to help aspirants build a strong foundation. Key areas such as the Indian Constitution, economic developments, environmental challenges, and social issues are covered comprehensively, catering to the dynamic demands of both national and state-level examinations.

Our vision extends beyond merely sharing knowledge—we aim to inspire, motivate, and guide you in your preparation journey. From West Bengal to every corner of India, we are dedicated to helping aspirants achieve their dreams.

Wishing you great success,
Team RICE IAS

INDEX

1. POLITY AND GOVERNANCE	4
1.1. Office of The Deputy Speaker of Lok Sabha	4
1.2. Right To Digital Access: Part of Article 21	5
1.3. B.R. Gavai Sworn in as Chief Justice of India	6
1.4. Presidential Reference to Supreme Court on Timeline to Act on State Bills	7
1.5. Caste Census in India	9
1.6. Reform in Election Commission	11
2. INTERNATIONAL RELATIONS	13
2.1. India and Denmark Signs Renewed Memorandum of Understanding	13
2.2. UK-India Free Trade Agreement (FTA)	13
2.3. Indo-Pacific Logistics Network (IPLN)	14
2.4. India Restricts Bangladeshi Exports Via All Land Ports	15
3. ECONOMY	17
3.1. Migration To '.Bank.In' Domain	17
3.2. World Bank's Poverty and Equity Brief 2025	18
3.3. US Again Puts India on IPR Priority Watch List	19
3.4. Depot Darpan Portal	19
3.5. Enhancing Competitiveness of MSMEs In India Report	20
3.6. Vizhinjam Port	21
3.7. Credit Guarantee Scheme for Startups (CGSS)	22
3.8. RBI Board Examines Economic Capital Framework	23
3.9. First Monthly Periodic Labour Force Survey	24
3.10. Net Foreign Direct Investment in India Declines By 96.5%	26
3.11. India Considers Allowing 49% Foreign Stakes in Nuclear Power Plants	27
4. SECURITY	29
4.1. SIPRI Report on Military Expenditure	29
4.2. Operation Kagar: India's Major Anti-Naxal Offensive	30
4.3. India's First Genome-Edited Rice Varieties	31
4.4. Operation Sindoor	31
4.5. India Skirts Maritime Border Dispute with Pakistan by Fresh Continental Shelf Claim	32
5. ENVIRONMENT	34
5.1. Hindu Kush Snow Decline	34
5.2. Heavy Metal Contamination in Soils: A Global Threat to Agriculture and Health	35
5.3. India Opposes Inclusion of Chlorpyrifos at Stockholm Convention	36
5.4. Natural Hydrogen	37
5.5. 20th Session of The United Nations Forum on Forests	39
5.6. Cloud Seeding	40
5.7. Asiatic Lion Census 2025	41
5.8. Rapid Temperature 'Flips' Since 1961	42
5.9. Red-Crowned Roofed Turtle	44
6. SCIENCE AND TECHNOLOGY	46
6.1. GPS Spoofing	46
6.2. India's First Sovereign LLM With Reasoning and Voice Capabilities	48
6.3. Gut Microbiota	49
6.4. Prostate Cancer	50

6.5.	PSLV-C61 Mission: ISRO's 101st Launch Faces Setback	51
6.6.	Bharat Forecast System	52
6.7.	Regenerative Braking System	53
6.8.	Chandrayaan 5 Mission	55
6.9.	Samudrayaan': India's First Manned Deep Ocean Mission	57
7.	ART & CULTURE	59
7.1.	Ayurvedic Manuscripts	59
8.	SOCIAL ISSUES	60
8.1.	World Social Report 2025	60
8.2.	The Global Pandemic Treaty	61
8.3.	-Human Development Index	61
8.4.	India Witnesses a Steady Downward Trend in Maternal and Child Mortality	63
9.	MISCELLANEOUS	66
9.1.	Tamil Nadu Bans Egg Mayonnaise	66
9.2.	World Malaria Day 2025	66
9.3.	South Asia Press Freedom Report 2024-25	67
9.4.	International Booker Prize 2025	68
9.5.	Madden-Julian Oscillation Spurs Early Monsoon Arrival	69
10.	UPSC CSE PRELIMS – 2025 (GS PAPER – 1 & 2)	72

POLITY & GOVERNANCE

1.1. OFFICE OF THE DEPUTY SPEAKER OF LOK SABHA

Why in the News?

Despite being a constitutionally mandated post, the office of the Deputy Speaker of Lok Sabha has remained vacant throughout the 17th Lok Sabha and continues to be unfilled in the 18th Lok Sabha. While the Constitution does not specify a fixed timeline, the use of "shall" and "as soon as may be" in Article 93 implies a mandatory and timely election.

Historical Context

The post originated under British rule as "Deputy President" in the Central Legislative Assembly, with Sachidanand Sinha as its first occupant in 1921.

Post-independence, M. Ananthasayanam Ayyangar became the first elected Deputy Speaker of Lok Sabha and later served as Speaker after G.V. Mavalankar's demise in 1956.

Government Initiative

There has been **no official initiative** by the government to fill the post since 2019. The Speaker, who is responsible for fixing the date of election, has not done so in either the 17th or 18th Lok Sabha. This lack of action goes against both the letter and spirit of the Constitution and parliamentary convention.

Key Constitutional Provisions

- **Article 93:** Mandates Lok Sabha to elect Speaker and Deputy Speaker as soon as may be.
- **Article 94:** Deals with resignation and removal of the Speaker and Deputy Speaker.
- **Article 95(1):** Deputy Speaker discharges Speaker's duties in case of vacancy.
- **Election Process:** Elected by simple majority; no separate oath required; Speaker sets the date for election.
- **Tenure & Removal:** Holds office during Lok Sabha term unless removed or resigned; can be removed by an absolute majority with 14 days' notice.

Way Forward

- **Fix a Clear Timeline:** Election should be mandatory within 30 days of new Lok Sabha formation.
- **Presidential Oversight:** President may be empowered to initiate process on delay.
- **Regular Delegation of Duties:** Enhance functional relevance by regular rotation.
- **Statutory Clarity:** Powers and responsibilities must be clearly defined to prevent executive overreach.

The prolonged vacancy of the Deputy Speaker weakens the institutional robustness of Indian parliamentary democracy. Respect for constitutional posts must transcend political convenience. The immediate election of a Deputy Speaker is not just a procedural necessity, but a democratic imperative reflecting India's commitment to rule-based governance and institutional integrity.

Q. "Despite being a constitutional mandate, the prolonged vacancy in the office of the Deputy Speaker of the Lok Sabha raises concerns over institutional integrity and democratic accountability." Discuss in the context of Articles 93–95 of the Indian Constitution. Suggest reforms to ensure timely appointment.

[UPSC MAINS Practice Question]

1.2. RIGHT TO DIGITAL ACCESS: PART OF ARTICLE 21

Why in the News?

Recently, in a landmark judgment, the Supreme Court of India, in *Amar Jain v. Union of India and Others*, held that meaningful and inclusive access to digital platforms—particularly e-governance and welfare delivery systems—is an integral part of the fundamental right to life and liberty under Article 21 of the Constitution.

Key Highlights of the Judgment

- **Inclusive Digital KYC Norms:** The Court directed the Union Government to revise its digital Know-Your-Customer (KYC) protocols. The aim is to ensure that individuals with facial disfigurement (such as acid attack survivors) and those with visual impairments can equitably access banking services and digital governance systems.
- **Implementation Under the RPwD Act, 2016:** Invoking the Rights of Persons with Disabilities Act, 2016, the Court issued **20 binding directions** to make the electronic KYC process fully accessible for persons with disabilities.
- **Emphasis on Substantive Equality:** The judgment underscored that digital transformation must be inclusive and equitable, grounded in the principle of **substantive equality**, not mere formal equality.
- **Article 21: Right to Life and Liberty:** The right to digital access was recognized as a natural extension of the right to life and liberty, as it is essential for meaningful participation in society.
- **Constitutional Obligations of the State:** The Court highlighted the responsibility of the State to ensure digital inclusion for marginalized and vulnerable populations. This obligation stems from:
 - **Article 21** – Right to live with dignity
 - **Article 14** – Right to Equality
 - **Article 15** – Prohibition of discrimination
 - **Article 38** – Duty of the State to promote social justice and reduce inequalities
- **Broader Impact of Inclusive Digital Access:**
 - Facilitates access to critical government schemes
 - Narrows the rural-urban digital divide
 - Enables participation in online education and digital financial services
 - Promotes the development and empowerment of marginalized communities

Related Supreme Court Precedents on Internet and Digital Rights

- **Sabu Mathew George v. Union of India (2017):** The Court directed search engines to block content promoting pre-natal sex determination. However, it clarified that this regulation does not infringe upon the public's right to access information or freedom of expression.
- **Anuradha Bhasin v. Union of India (2020):** The Court ruled that access to the Internet is protected under:
 - **Article 19(1)(a)** – Freedom of speech and expression
 - **Article 19(1)(g)** – Right to practice any profession or carry on trade/business
 - The judgment emphasized that Internet access is integral for exercising constitutional freedoms in the digital age.

Over time, courts have also interpreted it as placing a positive duty on the state to actively uphold and ensure a life of dignity.

Q. With reference to the Supreme Court judgment in Amar Jain v. Union of India (2025), consider the following statements:

1. The Court recognized digital access as a component of the right to life under Article 21.
2. The judgment directed the government to make e-KYC processes accessible for persons with disabilities.
3. The Court held that digital access is protected only under Article 19(1)(a) and not under Article 14 or 15.

Which of the statements given above is/are correct?

[UPSC Pre. Practice Question]

- | | |
|------------------|------------------|
| (a) 1 and 2 only | (b) 2 and 3 only |
| (c) 1 and 3 only | (d) 1, 2 and 3 |

Ans. (a) 1 and 2 only

1.3. B.R. GAVAI SWORN IN AS CHIEF JUSTICE OF INDIA

Why in the News?

Justice Bhushan Ramkrishna Gavai was sworn in by President Droupadi Murmu as the 52nd Chief Justice of India on May 14, 2025. He is the first Buddhist and second Dalit to hold this position. He will serve until November 23, 2025.

First CJI: Harilal J. Kania

Constitutional Provisions

- The Constitution of India lacks specific CJI appointment procedures.
- Article 124 (1) simply establishes a Supreme Court with a Chief Justice.
- Article 124 (2) mandates Presidential appointment for all Supreme Court Judges.
- Thus, CJI appointment relies on convention, not constitutional dictate.

The Convention

- The outgoing CJI nominates their successor.
- This practice is strictly based on seniority.
- Seniority is determined by a judge's tenure in the Supreme Court, not age.

Eligibility

Beyond Indian citizenship, a candidate must meet one of the following criteria:

- Served at least five years as a Judge of a High Court of two or more such Courts in succession
- Practiced at least ten years as an advocate of a High Court (or successive High Courts),
- Be, in the opinion of the President, a distinguished jurist.

Key Roles and Duties of the CJI

The Chief Justice of India (CJI) holds several pivotal roles and responsibilities:

- **Administrative Appointments:** As per Article 146, the CJI appoints the Officers and Servants of the Supreme Court.
- **Statutory Appointments:** The CJI chairs the Search-cum-Selection-Committee, responsible for appointing Members to statutory authorities such as the National Company Law Appellate Tribunal.

- **Master of the Roster:** This exclusive power, detailed in the Handbook of Practice and Procedure and Office Procedure 2017, grants the CJI authority over the allocation of cases to various benches.
- **Other Functions:** The CJI administers the oath to the President, appoints ad hoc judges, requests retired judges to act as judges, and determines the seat of the Supreme Court, among other duties.

Tenure and Retirement

- The Constitution does not prescribe a fixed tenure for the Chief Justice.
- Supreme Court judges, including the CJI, retire at 65 years of age.

Removal of the Chief Justice of India (CJI)

The Constitution stipulates that a judge can only be removed by a Presidential order, based on a motion approved by both Houses of Parliament.

The detailed removal procedure is outlined in the Judges Inquiry Act, 1968, which sets forth the following steps for removal from office:-

- A removal motion signed by 100 members (in case of Lok Sabha) or 50 members (in case of Rajya Sabha) is to be given to the Speaker/Chairman.
- If the motion is admitted, then a three-member committee to investigate into the charges is constituted.
- If the committee finds the judge to be guilty of the charges (misbehaviour or incapacity), the House in which the motion was introduced, can take up the consideration of the motion.
- **Special majority:** Majority of total membership of the House & majority of not less than two thirds members present and voting.
- Once, the House in which removal motion was introduced passes it with special majority, it goes to the second House which also has to pass it with a special majority.
- After the motion is passed, an address is presented to the President for removal of the judge. The President then passes an order removing the judge.

Q. With reference to the Chief Justice of India (CJI), consider the following statements:

1. The Constitution of India prescribes a fixed tenure for the Chief Justice of India.
2. The appointment of the CJI is conventionally based on seniority among the Supreme Court judges.

Which of the statements given above is/are correct?

[UPSC Pre. Practice Question]

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

Ans. (b) 2 only

1.4. PRESIDENTIAL REFERENCE TO SUPREME COURT ON TIMELINE TO ACT ON STATE BILLS

Why in the News?

President Droupadi Murmu has sought the Supreme Court's advisory opinion, under Article 143 of the Constitution, on whether the President and Governors are bound by specific timelines when acting upon state bills.

Background:

- Recently, the Supreme Court established a timeline for the President and Governors regarding state bills.

- Though the Governor is not constitutionally bound by any specific time limit to act on a Bill, this has led to situations where a Bill can remain indefinitely unaddressed, a practice colloquially termed "Pocket Veto, although the term is not officially used in the Constitution
- The Supreme Court ruled that Governors cannot indefinitely delay or withhold assent from Bills once passed or re-passed by the state Assembly.
- The ruling set specific timelines for the Governor's action on Bills:
- One month for re-passed Bills.
- Three months if the Bill was withheld contrary to Cabinet advice.
- This judicial intervention raises crucial questions about the scope of judicial authority under Article 142 and the judiciary's power to enforce accountability on constitutional functionaries like Governors and the President.

Article 142 of Indian constitution:

Article 142 empowers the Supreme Court to issue any order necessary for "complete justice" in cases before it, enforceable nationwide.

This provision is crucial because:

- It allows the Supreme Court to act in executive and legislative capacities when needed, issuing guidelines or directives to the government.
- It enables the Court to safeguard public interest, human rights, and constitutional values from any violation.
- It strengthens the Supreme Court's role as the Constitution's guardian and the ultimate legal authority.

Criticism: Some argue it risks judicial overreach, potentially infringing on the separation of powers and the domains of the executive and legislature.

Article 143 – Power of President to consult Supreme Court

- Article 143(1) empowers the President to refer questions of law or fact of public importance to the Supreme Court for an advisory opinion.
- The Court retains the discretion to either answer or decline such a reference.
- The opinion rendered is not legally binding
- A similar power existed for the Federal Court of India under Section 213 of the Government of India Act, 1935.
- Article 145(3) mandates that any such reference must be heard by a bench of five judges, after which the Supreme Court returns the reference to the President with the majority opinion.

Need for the Article:

- Given that the President acts on the aid and advice of the Cabinet under the Constitution, this advisory jurisdiction provides an avenue to seek independent legal advice on critical constitutional matters.
- This power has been invoked by the President on at least 15 occasions since 1950.

Way forward:

At its core, this isn't just a legal debate; it's a profound examination of India's federal structure. The outcome will significantly impact the power dynamic between the Center and states, the extent of judicial oversight, and the very principles of constitutional morality.

The outcome could fundamentally redefine how delays in Bill assent are addressed, thereby reaffirming the judiciary's indispensable role in safeguarding democratic processes.

Q. With reference to the constitutional provisions and judicial developments regarding the assent to State Bills, consider the following statements:

1. Article 143 empowers the President to seek the Supreme Court's advisory opinion on matters of public importance, and such an opinion is binding on the executive.
2. The Supreme Court, under Article 142, can issue directives to enforce timelines for gubernatorial assent to Bills passed by State Legislatures.
3. The Constitution of India explicitly provides for a fixed timeline within which the Governor must act on a Bill passed by the State Legislature.

Which of the statements given above is/are correct?

[UPSC Pre. Practice Question]

- (a) 1 and 2 only (b) 2 only
(c) 1 and 3 only (d) 1, 2 and 3

Ans. (b) 2 only

1.5. CASTE CENSUS IN INDIA

Why in the News

The Cabinet Committee on Political Affairs (CCPA) has recently approved the inclusion of caste-based data in the upcoming national population census.

Background

India conducts a population census every ten years to gather comprehensive data on demographics, socio-economic indicators, and household information. However, caste data—except for Scheduled Castes (SCs) and Scheduled Tribes (STs)—has not been collected in the national census since 1931. The lack of updated and official caste-based data has long been criticized as a barrier to evidence-based policymaking and targeted welfare interventions.

Historical Context of Caste Census in India

British Period (1872–1931):

- The first synchronous census was held in 1881 under W.C. Plowden. From 1881 to 1931, caste data was collected regularly.

Post-Independence Era (1951–2011):

- Independent India discontinued caste enumeration from 1951 onward, limiting data collection to SCs and STs only. This omission was rooted in the belief that caste identities should gradually dissolve in a modern democratic state.

Socio-Economic and Caste Census (SECC) 2011:

- The SECC aimed to collect caste data alongside socio-economic indicators. However, the caste data was never published due to inconsistencies and classification issues. The exercise revealed 46 lakh caste names compared to 4,147 in 1931, illustrating the complexity of caste self-identification.

Caste Census 2025: What's New?

1. Digital Mode & Caste Directory

- The census will be conducted digitally using a mobile app for the first time.
- A new "Other" column with a drop-down caste code directory will be included beside the SC/ST column.

2. Standardization & Accuracy

- To avoid errors like those in SECC 2011, a standard codebook merging the Central OBC list (2,650 communities), SC list (1,170), ST list (890), and various State OBC lists is under development.

3. Pre-Testing and Retraining

- A pre-test will be conducted to address glitches in the software.
- Approximately 30 lakh officials will be retrained for the new format.

Significance of the Caste Census

A. Governance and Welfare Targeting

- Accurate caste data can enable better scheme targeting and resource allocation. It is essential for updating reservation policies and assessing the representation of marginalized communities.

B. Electoral Reforms

- Census data will play a crucial role in **delimitation** (redrawing of Lok Sabha and Assembly constituencies) and implementing **the 33% women's reservation** law in legislatures.

C. Policy Making Based on Evidence

- **Key decisions**—such as those based on the Mandal Commission's estimate of 52% OBCs—rely on outdated or estimated data. A modern caste census can correct this data vacuum.

Challenges and Criticisms

1. Data Complexity and Classification

- Caste names vary across states and often overlap.
- Sub-castes, surnames, and ambiguous self-reporting inflate numbers and complicate analysis.

2. Political Populism

- Critics argue that this move is timed to serve **electoral agendas**, especially in the context of rising caste-based mobilizations.
- Concerns also exist that instead of reducing caste consciousness, such exercises may **entrench caste identities** further.

3. Legal and Federal Hurdles

- Although the census is a **Union subject** (Entry 69, Union List, 7th Schedule), state-level surveys (e.g., Bihar 2023, Karnataka 2015) show discrepancies and raise questions about data uniformity.

Way Forward

Transparency and Methodological Rigor

- The methodology must be scientific, transparent, and accountable to prevent a repeat of SECC's data inconsistencies.

Publication and Usage of Data

- The government must commit to publishing and using the data for **policy, not politics**.

Data Protection Framework

- With digital collection comes the risk of privacy breaches. A robust data protection framework must be enforced.

Social Dialogue and Sensitization

- A caste census must be accompanied by nationwide sensitization to prevent misuse and promote social harmony.

The decision to conduct a caste census after over nine decades represents a **historic policy shift**. If executed with transparency and integrity, it could be a **powerful tool for social justice**, enabling India to move towards a more equitable society. However, if driven by short-term political gains, it risks deepening social divides and reinforcing identity politics.

Q. With reference to the caste-based census in India, consider the following statements:

1. The last official caste-based enumeration, including all castes, was carried out in the 1951 Census.
2. The upcoming caste census will be conducted in digital mode and will include a standardized caste code directory.

Which of the statements given above is/are correct?

[UPSC Pre. Practice Question]

- | | |
|------------------|---------------------|
| (a) 1 only | (b) 2 only |
| (c) Both 1 and 2 | (d) Neither 1 nor 2 |

Ans. (b) 2 only

1.6. REFORM IN ELECTION COMMISSION

Why in the News?

The Election Commission of India (ECI) has recently announced three important reforms aimed at improving the transparency, accuracy, and voter-friendliness of the electoral process. These include:

1. Electronic access to death registration data,
2. Standardised photo ID cards for Booth Level Officers (BLOs), and
3. A redesigned, more accessible Voter Information Slip (VIS).

Background

India's electoral system, while vast and robust, faces challenges such as outdated electoral rolls, low voter awareness, and difficulty in last-mile verification. BLOs are grassroots functionaries of the ECI and act as the critical link between voters and the Commission. Ensuring their identity and enhancing voter engagement tools is vital to streamline democratic participation.

Historical Context

Since its inception, the ECI has made numerous reforms to ensure free and fair elections. Key legislative provisions include:

- **Representation of the People Act, 1950 & 1951** – Governing the preparation of electoral rolls and conduct of elections.
- **Registration of Electors Rules, 1960** – Specifies processes such as updating the electoral roll, including removing deceased voters.
- **Registration of Births and Deaths Act, 1969** (amended in 2023) – Provides for electronic sharing of death registration data.

Past efforts like the introduction of the Electoral Photo Identity Card (EPIC) and online voter registration have transformed India's electoral landscape. The latest initiatives build upon this legacy.

Key Reforms Introduced

1. Electronic Access to Death Records

- ECI will now obtain death registration data directly from the Registrar General of India.

- Helps Electoral Registration Officers (EROs) update rolls efficiently without waiting for Form 7 requests.
- BLOs will verify death records via field visits, enhancing the integrity of voter lists.

2. Standard Photo ID Cards for BLOs

- As per Section 13B(2) of the Representation of the People Act, 1950, BLOs are being issued standardised ID cards.
- Aims to make BLOs easily identifiable and approachable during house-to-house verification and registration drives.

3. Revamped Voter Information Slips (VIS)

- Redesigned to display serial and part numbers more prominently.
- Improves ease of identifying polling stations and voter roll entries, especially helpful for senior citizens and first-time voters.

Way Forward

- **Integration of Real-Time Data Systems:** Synchronising voter data with civil registration databases can automate roll updates further.
- **BLO Training and Digitisation:** Capacity-building programs and mobile tools for BLOs can enhance their outreach and verification capabilities.
- **Public Awareness Campaigns:** ECI should increase visibility of reforms to ensure voter engagement and reduce misinformation.

The recent reforms mark a proactive step towards strengthening the democratic process in India. By leveraging technology, streamlining administrative processes, and enhancing voter engagement, the Election Commission of India continues to uphold its constitutional mandate of conducting free and fair elections. These initiatives will be instrumental in ensuring cleaner electoral rolls, improved voter convenience, and stronger public trust in the electoral machinery.

Q. In the context of recent initiatives undertaken by the Election Commission of India, discuss the significance of technological and administrative reforms in strengthening electoral integrity and voter confidence. What further steps can be taken to make the electoral process more inclusive and transparent?

[UPSC MAINS Practice Question]

INTERNATIONAL RELATIONS

2.1. INDIA AND DENMARK SIGNS RENEWED MEMORANDUM OF UNDERSTANDING

Why in the News?

Recently, India and Denmark today signed a renewed Memorandum of Understanding to enhance cooperation in the energy sector, supporting India's goal of achieving net-zero emissions by 2070.

Background of the Partnership

The renewed Memorandum of Understanding (MoU) builds upon **five years of successful cooperation** initiated with the original agreement signed in **June 2020**. The partnership has focused on advancing the energy sector through **knowledge sharing** and **technological collaboration**, laying a strong foundation for future initiatives.

Key Focus Areas of the Renewed MoU

- **Net-Zero Emissions Support:** Reinforces India's commitment to achieving **net-zero carbon emissions by 2070**, aligning with national climate goals.

Expanded Areas of Technical Cooperation

- The updated agreement broadens the scope of collaboration to include:
- **Power System Modeling** – for efficient energy planning and grid optimization
- **Integration of Variable Renewable Energy** – enhancing grid stability and renewable penetration
- **Cross-Border Electricity Trading** – enabling regional energy cooperation and market development
- **EV Charging Infrastructure** – supporting the transition to electric mobility

Strategic Significance

- The **proactive renewal** of the MoU ensures continuity of dialogue and cooperation beyond its original timeline.
- Denmark's global leadership in clean energy and sustainability complements India's ambitious renewable energy roadmap.
- The partnership is expected to **accelerate India's clean energy transition**, support innovation, and contribute meaningfully to national and global climate commitments.

Q. Discuss how international partnerships like the India-Denmark MoU can support India's target of achieving net-zero emissions by 2070. *[UPSC MAINS Practice Question]*

2.2. UK- INDIA FREE TRADE AGREEMENT (FTA)

Why in the News?

Recently, India and the United Kingdom have signed a landmark Free Trade Agreement (FTA) after nearly three years of negotiations.

What is a Free Trade Agreement (FTA)?

A Free Trade Agreement (FTA) is a pact between countries to reduce or eliminate tariffs and non-tariff barriers, covering goods, services, investment, and professional mobility.

Key Highlights of the FTA

- **Tariff Elimination:**
 - 99% of Indian exports to the UK will be tariff-free, benefiting sectors like textiles, leather, auto components, and organic chemicals.

- **Services Sector Boost:**
 - The UK offers its most ambitious market access for Indian service providers, with exemptions on social security contributions for Indian professionals for up to three years.
- **Mobility and Professional Access:**
 - Simplified visa and mobility norms for Indian professionals and special worker quotas in select UK sectors.

Benefits for the UK

- **Alcoholic Beverages:**
 - Immediate reduction of whisky and gin tariffs from 150% to 75%, with a long-term decrease to 40%.
- **Automobiles and Other Goods:**
 - India to reduce car import duties to 10% under a quota system, benefiting sectors like cosmetics, aerospace, and medical devices.

Trade and Economic Impact

- In 2024, India was the UK's 11th largest trading partner, accounting for 2.4% of total UK trade.
- India exported goods worth \$34 billion (£25.5 billion) to the UK, while UK exports to India stood at \$22.8 billion (£17.1 billion).

Strategic Significance

- **Post-Brexit Realignment:** The FTA helps the UK forge new trade relationships after leaving the EU.
- **China-Plus-One Strategy:** India emerges as a reliable alternative as Western nations diversify away from China.
- **India's Trade Diversification:** The deal supports India's goal to reduce dependence on China and regional blocs like RCEP.
- **Stable Trade Amid Global Uncertainty:** The FTA provides a secure, predictable trade environment amid rising global tariffs and geopolitical tensions.

Concerns and Limitations

- **Marginal Gains Questioned:**
 - The Global Trade Research Initiative (GTRI) notes that many Indian exports already enjoy low or zero tariffs, suggesting that the FTA's immediate impact may be limited.
- **Environmental Barriers:**
 - The UK's proposed carbon border tax on high-emission imports like metals could pose future challenges for Indian exporters, requiring further dialogue.

This landmark FTA not only deepens India–UK economic cooperation but also reflects a shifting global trade landscape, where diversification, resilience, and strategic alignment are increasingly critical.

Q. Examine the potential benefits and limitations of the India-UK FTA for India's trade and economy. *[UPSC MAINS Practice Question]*

2.3. INDO-PACIFIC LOGISTICS NETWORK (IPLN)

Why in the News?

Recently, the Quad nations—India, Australia, Japan, and the United States—held a Tabletop Exercise in Hawaii to simulate the operational launch of the Indo-Pacific Logistics Network (IPLN).

The Indo-Pacific Logistics Network (IPLN)

- The Indo-Pacific Logistics Network (IPLN) is a Quad-led multilateral initiative involving India, the United States, Japan, and Australia.
- Aims to establish a shared logistics framework to coordinate civilian disaster response across the Indo-Pacific region.
- **Purpose and Function:**
 - Enables faster, more efficient deployment of humanitarian aid.
 - Focuses on interoperability and shared logistics infrastructure among member countries.
- **Launch Details:**
 - Operational concept simulated through a Tabletop Exercise (TTX).
 - Hosted at the Asia-Pacific Centre for Security Studies in Honolulu, Hawaii.
- **Alignment with Other Initiatives:**
 - Complements the Indo-Pacific Partnership for Maritime Domain Awareness (IPMDA).
 - Supports the Quad Pandemic Preparedness Workshop and One Health approach.
- **Key Features:**
 - **Shared Logistics Coordination:** Streamlines supply chains for humanitarian assistance and disaster relief (HADR).
 - **Civilian-First Focus:** Prioritizes preparedness for natural disasters like cyclones, tsunamis, and health crises.
 - **Interoperability and Trust:** Promotes mutual support and seamless coordination between Quad partners.
 - **Technology-Driven:** Utilizes digital logistics mapping, real-time tracking, and joint resource planning.
 - **Flexible and Scalable:** Applicable to diverse geographic settings, including islands, coastal states, and remote zones.
- **Strategic and Humanitarian Significance:**
 - Enhances regional disaster resilience and emergency response capabilities.
 - Positions the Quad as a cooperative force for humanitarian aid and public health, beyond traditional security roles.
 - Builds synergy with broader regional health and disaster preparedness frameworks.

Q. The Indo-Pacific Logistics Network (IPLN), recently in the news, is an initiative by which group of countries? *[UPSC Pre. Practice Question]*

- | | |
|---------------------|------------------|
| (a) BRICS nations | (b) QUAD nations |
| (c) ASEAN countries | (d) G20 members |

Ans. (b) QUAD nations

2.4. INDIA RESTRICTS BANGLADESHI EXPORTS VIA ALL LAND PORTS

Why in the News?

India Restricts Entry of Select Bangladeshi Exports via Land Ports to North-East India and overseas.

- Entry of these specified commodities into India is prohibited via the land customs stations situated in Tripura, Assam, Meghalaya, and Mizoram.
- Restricted items include ready-made garments, plastic goods, wooden furniture, juices, carbonated and fruit-flavoured drinks, bakery and confectionery products, cotton yarn, and dyes.
- Entry of ready-made garments will be permitted only through the Kolkata and Mumbai seaports, subject to mandatory inspection.

Adverse Shifts in Trade Dynamics:

Bangladesh stood as India's foremost trade partner in South Asia, with bilateral trade reaching a valuation of \$18 billion in FY 2022-23. However, escalating political and economic tensions between the two nations are now evident, as reflected by:

India Ends Trans-shipment Facility for Bangladesh

- India has discontinued the transshipment facility that allowed Bangladeshi export cargo to pass through Indian Land Customs Stations en route to Indian ports and airports for onward shipment to third countries.
- Introduced in 2020, the arrangement enabled cargo movement to destinations such as Bhutan, Nepal, and Myanmar via Indian territory.

Mutual Port Restrictions Between India and Bangladesh

- Bangladesh has restricted Indian yarn exports via land ports, permitting shipment only through seaports.
- India has imposed restrictions on the import of all categories of Bangladeshi ready-made garments through land ports (LCS and ICP), allowing entry only via designated seaports.

Strategic Implications of Port Restrictions

- The move may strain India-Bangladesh relations, particularly amid Bangladesh's growing engagement with China. Notably, 93% of Bangladesh's ready-made garment exports to India transit through land ports.
- The restrictions on specified imports via all Land Customs Stations (LCS) and Integrated Check Posts (ICPs) are also aimed at promoting local manufacturing in India's North-East region.

Q. With reference to recent trade developments between India and Bangladesh, consider the following statements:

1. India has prohibited the entry of certain Bangladeshi goods via land customs stations in northeastern states to promote local manufacturing.
2. The trans-shipment facility allowing Bangladeshi export cargo to access Indian ports for third-country trade was introduced in 2015 and continues to be operational.
3. Bangladesh has imposed restrictions on Indian yarn exports via land ports, allowing them only through designated seaports.

Which of the statements given above is/are correct?

[UPSC Pre. Practice Question]

- (a) 1 and 3 only (b) 2 only
(c) 1 and 2 only (d) 1, 2 and 3

Ans. (a) 1 and 3 only

3.1. MIGRATION TO '.bank.in' DOMAIN

Why in the News?

To combat the increasing number of digital payment frauds, the Reserve Bank of India (RBI) has decided to operationalise the '.bank.in' domain for banks.

What is a Domain Name?

A **domain name** is a human-friendly address used to access websites on the internet. It serves as a unique identifier for a website, replacing the need to remember numerical IP addresses. For example, instead of typing 192.168.1.1, you can simply enter www.example.com.

A domain name consists of:

- **Second-level domain (SLD):** This is the main part (e.g., 'example' in the example.com).
- **Top-level domain (TLD):** This comes after the dot (e.g., .com, .in, .org).

In the context of India:

- **.in** is India's **Country Code Top-Level Domain (ccTLD)**.
- **.bank.in** is a newly designated domain **exclusively for Indian banks** under the .in ccTLD.

Benefits of Migrating to the '.bank.in' Domain

- **Enhanced Security & Trust:** Only **RBI-regulated banks** will be allowed to register with a .bank.in domain. This restriction helps:
 - Prevent phishing attacks (e.g., fake websites mimicking banks).
 - Ensure customers can trust emails and websites ending in .bank.in.
- **Reduced Fraud Risk:** Fraudsters often use lookalike domains (e.g., replacing "O" with zero) to deceive users. These tactics become harder with the **exclusive and regulated** .bank.in domain.
- **Better User Awareness:** Customers will know that any **authentic Indian bank website** will end in .bank.in, making it easier to spot fraudulent links or emails.
- **Support from Government Infrastructure:** The domain is managed by **IDRBT** and **NIXI** under the Ministry of Electronics and IT, ensuring robust oversight.
- **Improved National Digital Identity:** Using a nationally controlled domain under .in reinforces India's **digital sovereignty** and strengthens the domestic financial ecosystem.
- **SEO and Accessibility:** Consistency in domain naming can improve search engine visibility and **ease of access** for users across platforms.

As digital payments continue to grow, the .bank.in domain will serve as a trusted online identifier, strengthening the integrity and resilience of India's financial infrastructure.

Q. Discuss the significance of the '.bank.in' domain in enhancing the security of digital payments in India. Analyze the potential challenges in its implementation and suggest measures to ensure its effectiveness.

[UPSC MAINS Practice Question]

3.2. WORLD BANK'S POVERTY AND EQUITY BRIEF 2025

Why in the News?

Recently, the World Bank's Spring 2025 Poverty and Equity Brief recognized India's achievement in lifting 171 million people out of extreme poverty between 2011-12 and 2022-23.

Purpose of the Brief:

Published biannually, the World Bank's Poverty and Equity Briefs monitor trends in poverty, inequality, and shared prosperity across over 100 developing countries.

Key Highlights for India:

- **Extreme Poverty Reduction:** The percentage of people living below \$2.15 per day declined significantly from 16.2% in 2011-12 to 2.3% in 2022-23, lifting 171 million people out of extreme poverty.
- **Lower-Middle-Income Poverty:** Poverty under the \$3.65/day threshold dropped from 61.8% to 28.1%, meaning 378 million people moved above this poverty line.
- **Multidimensional Poverty:** The share of the population experiencing deprivation across health, education, and living standards fell from 53.8% in 2005-06 to 15.5% in 2022-23.
- **Inequality Reduction:** The Gini index, a key measure of income inequality, improved from 28.8 to 25.5, indicating a more equitable income distribution.
- **Employment Trends:** Urban unemployment decreased to 6.6%, the lowest level recorded since 2017-18, reflecting stronger job creation.

Drivers Behind Poverty Reduction:

- **Strengthened Social Safety Nets:** Government welfare programs like PM Awas Yojana (PMAY), MGNREGA, and Ujjwala Yojana played a crucial role. For example, over 110 million households gained access to clean cooking fuel through Ujjwala.
- **Pro-Growth Economic Reforms:** Structural changes such as the implementation of the Goods and Services Tax (GST) and reforms aimed at improving the business environment stimulated formal sector growth and employment.
- **Improved Access to Basic Services:** Schemes like Ayushman Bharat (health insurance) and Jan Dhan Yojana (financial inclusion) expanded access to essential services for low-income populations.
- **Rural Infrastructure Development:** Initiatives like the Pradhan Mantri Gram Sadak Yojana (PMGSY) and rural electrification projects enhanced connectivity, market access, and rural livelihoods.
- **Women's Economic Participation:** Increased rural female employment and the rise of entrepreneurship through Self-Help Groups (SHGs) contributed to higher household incomes and economic empowerment.

India's removal of 171 million people from extreme poverty is a landmark achievement. The World Bank's recognition underscores the role of inclusive policies, with sustained reforms key to maintaining progress.

Q. "India's success in lifting millions out of poverty reflects the impact of targeted welfare and economic reforms. "Examine the factors behind this progress as noted in the World Bank's 2025 Poverty and Equity Brief.
[UPSC MAINS Practice Question]

3.3 US AGAIN PUTS INDIA ON IPR PRIORITY WATCH LIST

Why in the news?

The US has placed India on its Priority Watch List in the Special 301 Report, alongside China and Russia, for inadequate intellectual property (IP) protection.

Priority Watch List in the Special 301 Report

- The **Priority Watch List** is part of the **Special 301 Report** released annually by the **U.S. Trade Representative (USTR)**. It highlights countries with serious shortcomings in protecting and enforcing **intellectual property rights (IPR)**.
- In 2025, **India** was again placed on the list, alongside **China, Russia, Argentina, Indonesia, Mexico**, and others, raising concerns about the treatment of American IP.

The USTR called India “**one of the most challenging major economies**” for IP protection.

Key issues include:

- **Patent revocations** and inconsistent application of patent laws
- **Long delays** and complex procedures for patent grants
- **Unclear interpretation** of the Indian Patents Act
- **Weak trade secret protection**
- **Rampant online piracy** and **slow copyright enforcement**
- **Widespread trademark counterfeiting**, especially in pharmaceuticals, electronics, and consumer goods

India was also one of the top sources of **counterfeit medicines** seized at U.S. borders in 2024. Although some reforms were acknowledged, the USTR deemed India’s overall IP protection **inadequate**. If issues persist, the U.S. may consider trade actions under **Section 301 of the Trade Act**, including **tariffs** or **WTO complaints**.

Q. Which of the following is a key issue highlighted by the U.S. Special 301 Report 2025 regarding India’s intellectual property rights (IPR) regime?

- (a) Strong trade secret protection
- (b) Widespread trademark counterfeiting
- (c) Efficient patent grant procedures
- (d) Robust copyright enforcement

[UPSC Pre. Practice Question]

Ans. (b) Widespread trademark counterfeiting

3.4. DEPOT DARPAN PORTAL

Why in the News?

Recently, the Ministry of Consumer Affairs, Food & Public Distribution decided to launch the Depot Darpan portal, for real-time monitoring of food storage depots.

What is Depot Darpan?

Depot Darpan is a digital monitoring portal and mobile app launched by the Ministry of Consumer Affairs, Food & Public Distribution to enable real-time tracking and oversight of food grain depots using geo-tagging, IoT, and AI-based technologies.

Objective

To modernize and digitize India’s food storage network by promoting **scientific warehousing**, improving **efficiency, transparency, and food safety**.

Key Features

- **Real-Time Monitoring:** Tracks depot infrastructure, operational efficiency, and finances through IoT sensors, CCTV, and automated dashboards.
- **Geo-Tagged Audits:** Depot managers upload geo-tagged infrastructure data, validated by supervisory officers and third-party audits.
- **Automated Ratings & Feedback:** Warehouses receive **star ratings** based on infrastructure and performance using a **composite scoring model**.
- **Smart Technology Integration:**
Includes:
 - CO₂ and phosphine gas detectors
 - Humidity and temperature sensors
 - Fire hazard detection systems
- **AI-Based Tools:**
Pilots include:
 - Bag counting systems
 - Face Recognition Systems (FRS)
 - Automatic Number Plate Recognition (ANPR) for tracking vehicles and personnel
- **Wide Coverage:** Covers **2,278 warehouses**, including those under FCI, CWC, and state/private agencies.
- **Mobile App Functionality:** Enables field officers to conduct **on-the-go inspections**, review depot performance, and generate **automated reports** for timely action.

Significance

- **Enhances Food Security:** Ensures quality storage of grains for over **80 crore beneficiaries** under the National Food Security Act (NFSA).
- **Improves Operational Efficiency:** Reduces **wastage**, boosts **turnover**, and optimizes use of **space and manpower**.
- **Advances Digital Governance:** Strengthens India's **digital public infrastructure** in logistics and the food supply chain sector.

Q. Consider the following statements about the Depot Darpan portal:

1. It is a digital platform to monitor food grain storage depots in real-time using IoT and AI technologies.
2. It is managed by the Ministry of Agriculture and Farmers Welfare.
3. It uses geo-tagging and automated star ratings for warehouse performance evaluation.

Which of the above statements is/are correct?

[UPSC Pre. Practice Question]

(a) 1 and 2 only

(b) 1 and 3 only

(c) 2 and 3 only

(d) 1, 2 and 3

Ans. (b) 1 and 3 only

3.5. ENHANCING COMPETITIVENESS OF MSMES IN INDIA REPORT

Why in the News?

Recently, NITI Aayog's released a report "*Enhancing MSME Competitiveness in India*" that emphasizes critical reforms in financing, skill development, and technology adoption to strengthen the MSME sector.

- **Released by:** NITI Aayog in collaboration with Institute for Competitiveness (IFC).
- **Objective:** Provide a blueprint for MSME growth through policy reforms in credit access, skilling, innovation, and market linkages.

Key Findings

1. Strengthening Credit Access (2020–2024)

- The proportion of micro and small enterprises accessing formal credit increased from 14% in 2020 to 20% in 2024.
- Medium enterprises saw an increase from 4% to 9% over the same period.
- Despite progress, only 19% of the total credit demand is being fulfilled, leaving a significant funding gap of ₹80 lakh crore.

2. Challenges in Skilling and Technology

- A large segment of the MSME workforce lacks access to formal vocational training.
- The report stresses the need for greater R&D investment and modernization of obsolete technologies.
- It also recommends boosting digital marketing capabilities, branding, and promoting cluster-based technology solutions.

3. Limited Awareness of Government Schemes

- Many MSMEs remain uninformed about available government initiatives and support programs.
- The report suggests improving data systems, increasing stakeholder participation, and enhancing monitoring at the state level.

4. Regional Development Priorities

- Special attention is required for MSMEs in the Northeast and Eastern regions of India.
- Targeted incentives and stronger logistics infrastructure are recommended to improve regional competitiveness.

Q. Discuss the key challenges faced by MSMEs in India in accessing finance and technology, and suggest measures to enhance their competitiveness. *[UPSC MAINS Practice Question]*

3.6. VIZHINJAM PORT

Why in the News?

Recently, the Prime Minister of India officially inaugurated the Vizhinjam International Seaport, marking a significant milestone in the nation's maritime infrastructure development.

Vizhinjam International Seaport

Vizhinjam is India's first deep-water, all-weather, fully automated transshipment port, purpose-built to handle next-generation Ultra Large Container Vessels (ULCVs). Operated under the landlord port model, it features smart technology and a scalable design.

Its located near Thiruvananthapuram, Kerala, Vizhinjam lies just 10 nautical miles from major global shipping lanes connecting the Suez Canal, Far East, and Middle East.

Development & Operations: The port is owned by the Government of Kerala and operated by Adani Ports & SEZ under a 40-year concession agreement.

Key Features:

- **Natural Depth:** 24 meters—eliminates the need for capital dredging and accommodates vessels carrying over 24,000 TEUs.
- **Advanced Systems:** Equipped with AI-powered Vessel Traffic Management System (VTMS) and radar-based tracking.
- **World-Class Infrastructure:** Includes India's deepest breakwater (28m), tallest ship-to-shore (STS) crane, cruise berth, and a soon-to-be-completed railway tunnel (India's third longest).
- **Cargo Handling Capacity:** Expected to handle 50% of India's transshipment cargo, saving over \$200 million annually by reducing reliance on foreign ports.

Strategic Significance:

- **Transshipment Hub:** Positioned to rival Colombo, Singapore, and Jebel Ali by offering cost-effective and efficient cargo operations.
- **Boost to Exports:** Minimizes double-handling and transit delays, strengthening the *Make in India* initiative.

Q. Explain the significance of Vizhinjam Port in reducing India's dependence on foreign transshipment hubs.
[UPSC MAINS Practice Question]

3.7. CREDIT GUARANTEE SCHEME FOR STARTUPS (CGSS)

Why in the News?

The Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce and Industry has notified the expansion of the CGSS.

Recent Changes in the Scheme

- **Enhanced Guarantee Limit:** The maximum guarantee cover per eligible startup has been increased from ₹10 crore to ₹20 crore.
- **Increased Guarantee Coverage:**
 - For loans up to ₹10 crore: Government will guarantee 85% of the defaulted amount.
 - For loans above ₹10 crore: Government will guarantee 75% of the defaulted amount.
- **Reduced Annual Guarantee Fee (AGF):** For startups operating in 27 identified Champion Sectors, the AGF has been lowered from 2% to 1% per annum.
- **Operational Reforms:** Based on feedback from the startup ecosystem, procedural improvements have been introduced to make the scheme more accessible for both lenders and startups.

The **Credit Guarantee Scheme for Startups (CGSS)** helps startups get **collateral-free loans** from banks, NBFCs, AIFs, and SEBI-registered AIFs. It covers funding like working capital, term loans, and venture debt. Launched under the **Startup India Action Plan**, the scheme was officially notified in **October 2022**. The **Annual Guarantee Fee (AGF)** is the yearly charge startups pay for the government's guarantee support, and it has been reduced to **1% for Champion Sectors** to lower borrowing costs and encourage growth.

Benefits of the Recent Changes

- **Improved Access to Credit:** Higher coverage encourages more financial institutions to lend to startups, expanding credit flow.
- **Boost to Innovation and R&D:** Increased funding support allows startups to invest in product development and technology.
- **Cost Reduction for Key Sectors:** Lower guarantee fees in Champion Sectors make borrowing more affordable, supporting strategic industries.

- **Enhanced Lender Confidence:** With stronger government backing, financial institutions face lower risks in lending to early-stage ventures.

Possible Challenges

- **Risk of Over-Reliance:** High guarantee coverage could lead to relaxed credit evaluations by lenders.
- **Limited Awareness:** Startups in Tier-II and Tier-III cities may not be fully aware of the scheme's benefits and application process.
- **Sectoral Imbalance:** Preference for Champion Sectors may unintentionally sideline promising startups in other industries.
- **Monitoring and Compliance:** Ensuring proper utilization of funds and adherence to eligibility norms requires robust oversight mechanisms.

The expansion of CGSS is a strategic move to strengthen India's startup ecosystem by making debt funding more accessible, affordable, and secure. Continuing engagement with stakeholders will make the scheme more responsive to the evolving needs of startups.

Q. Examine the role of the expanded Credit Guarantee Scheme for Startups (CGSS) in fostering India's startup ecosystem. Discuss the potential challenges in its implementation and propose strategies to maximize its impact.
[UPSC MAINS Practice Question]

3.8. RBI BOARD EXAMINES ECONOMIC CAPITAL FRAMEWORK

Why in the News?

The RBI's Central Board reviewed the Economic Capital Framework (ECF), ECF is a financial governance tool that guides the RBI in assessing risk provisioning and determining the quantum of surplus to be transferred to the government.

How does the RBI provide the central government its surplus?

Annual dividend payments to the government are made by the RBI in accordance with the Economic Capital Framework (ECF).

The RBI transfers its surplus to the central government as dividends after accounting for operational expenses and maintaining the Contingency Risk Buffer (CRB). This surplus forms a key component of the government's non-tax revenue.

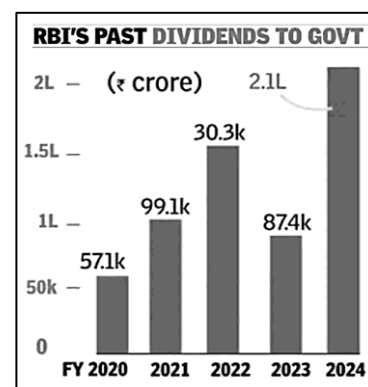
Bimal Jalan Expert Committee (2019): recommended reviewing the Economic Capital Framework (ECF) every five years and advised maintaining the Contingency Risk Buffer (CRB) at 5.5–6.5% of the RBI's balance sheet for prudent risk provisioning.

The size of the surplus transfer is directly linked to the level of the Contingency Risk Buffer (CRB)—a higher buffer reduces the transferable surplus, while a lower buffer increases it.

Current status:

For the accounting year 2024–25, the RBI will transfer ₹2,68,590 crore to the Union government as dividend. This is 27% higher than last year's record ₹2.11 lakh crore.

This decision follows a revised Economic Capital Framework and a macroeconomic review, under which the RBI has raised the Contingent Risk Buffer (CRB) to 7.5%.



The surplus transfer is estimated to range between ₹2.5 lakh crore and ₹3 lakh crore.

In FY25, the RBI's strong earnings were driven by active dollar sales to manage rupee volatility, a surge in gold prices, and higher valuations of its government securities portfolio.

Sources of RBI's Earnings:

1. Interest on government securities held
2. Interest on loans and advances
3. Earnings from Liquidity Adjustment Facility (LAF) operations
4. Interest income from foreign currency assets
5. Gains from foreign exchange swaps
6. Seigniorage (the margin between the cost of printing currency and its face value)
7. Valuation gains from gold holdings
8. Contingency Risk Buffer (CRB):

The CRB is a reserve maintained under the Economic Capital Framework (ECF) that is maintained by RBI to safeguard against potential financial shocks or systemic crises. It serves as the nation's financial safety net—a "rainy day" fund—reflecting the RBI's responsibility as the Lender of Last Resort to ensure financial stability.

Significance:

A higher dividend payout by the RBI will support the government in narrowing the fiscal deficit. The increased surplus transfer is also expected to ease liquidity conditions in the financial system.

Q. Discuss the rationale behind maintaining the contingency risk buffer (crb) and critically analyze how surplus transfers from the rbi impact the macroeconomic framework, including fiscal deficit, liquidity, and central bank independence. *[UPSC MAINS Practice Question]*

3.9. FIRST MONTHLY PERIODIC LABOUR FORCE SURVEY

Why in the News?

The Ministry of Statistics and Programme Implementation (MoSPI) has released India's first-ever monthly labour market data under the revamped Periodic Labour Force Survey (PLFS) for April 2025.

First monthly Periodic Labour Force Survey (April 2025):

India released its first monthly unemployment data under the revamped PLFS for April 2025.

Released by: the Ministry of Statistics and Programme Implementation (MoSPI).

This marks a transition from annual and quarterly reporting to more frequent and detailed monitoring of labour market trends.

Periodic Labour Force Survey: The Periodic Labour Force Survey (PLFS) is India's principal official source for employment and unemployment statistics.

Introduced in 2017 by the National Statistical Office under MoSPI, it replaced the earlier Employment-Unemployment Surveys conducted by the NSSO.

PLFS offers estimates based on two reference periods:

1. Usual Status (US): measures long-term employment over the past 365 days.
2. Current Weekly Status (CWS): captures short-term employment within the previous 7 days.

Current Weekly Status (CWS) Methodology:-

The Periodic Labour Force Survey (PLFS) uses the Current Weekly Status (CWS) to estimate labor indicators. Under CWS, a person is:

- Employed if they worked at least one hour on any day during the seven days before the survey.
- Unemployed if they didn't work but were available for or seeking work for at least one hour during that week.

CWS unemployment estimates provide a frequent, seven-day average, capturing dynamic labor market trends. This forms the basis for calculating the monthly Unemployment Rate (UR), Labor Force Participation Rate (LFPR), and Worker Population Ratio (WPR).

Key Highlights of the First PLFS monthly bulletin:

Unemployment Rate (UR): The Unemployment Rate (UR) in April stood at 5.1%. As this is the inaugural release of monthly data, no direct comparisons are available for this specific period. The previously reported UR for 2024 was 4.9%.

Disparities in Unemployment Rates:

A closer look at the data reveals notable differences across demographics:

- Gender: The UR for males was 5.2%, slightly higher than the 5.0% recorded for females.
- Location: Urban areas experienced a higher UR of 6.5%, contrasting with the rural UR of 4.5%.

Labour Force Participation Data:

The Labour Force Participation Rate (LFPR), representing the percentage of the population aged 15 years and above who are either working or actively seeking/available for work, was 55.6% under the Current Weekly Status (CWS) framework.

LFPR Disparities by Region and Gender

Significant variations in LFPR are observed across different demographics:

- Rural vs. Urban: Rural areas exhibited a higher LFPR of 58%, while urban areas recorded 50.7% for the same age group.
- Rural Gender Breakdown (Age 15+): Rural men demonstrated a robust LFPR of 79%, whereas rural women's LFPR stood at 38.2%.
- Urban Gender Breakdown (Age 15+): Urban women's LFPR was 25.7%, notably lower than the 75.3% observed for urban men.

Worker Population Ratio:

The Worker Population Ratio (WPR), which denotes the percentage of employed individuals within the total population, was 52.8% at the national level in April.

$WPR = (\text{Total number of workers} / \text{Total population}) \times 100$

Regional Variations in WPR

- Analysis of the WPR for persons aged 15 years and above reveals regional differences:
- Rural Areas: The WPR in rural areas stood at 55.4%.
- Urban Areas: In contrast, urban areas recorded a WPR of 47.4%.

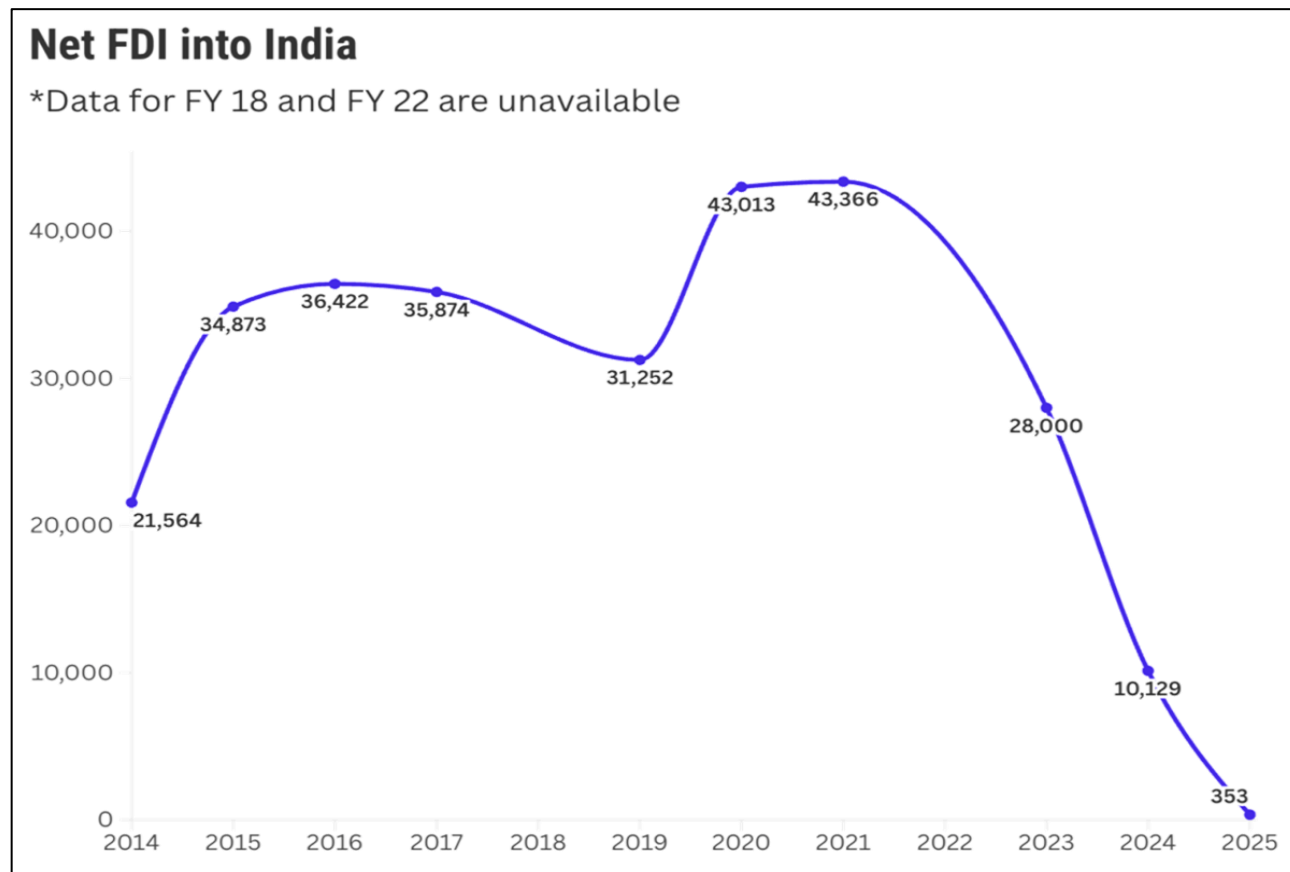
The revamped Periodic Labour Force Survey (PLFS) represents a pivotal advancement in India's labor market monitoring, facilitating the development of more responsive and evidence-based employment policies through real-time insights.

Q. Critically evaluate the implications of high-frequency labour force data on employment policymaking. Also, discuss the structural challenges revealed by recent PLFS findings, particularly in relation to gender and rural-urban disparities. *[UPSC MAINS Practice Question]*

3.10. NET FOREIGN DIRECT INVESTMENT IN INDIA DECLINES BY 96.5%.

Why in the News?

The Reserve Bank of India (RBI) has reported a steep 96.5% decline in net Foreign Direct Investment (FDI) for Fiscal Year 2025. The net FDI fell to \$353 million, the lowest on record, from \$10 billion in FY24.



Net foreign direct investment (FDI)

Net Foreign Direct Investment (FDI) is the financial outcome when FDI inflows into India are offset by FDI outflows from India (investments made by Indian residents abroad).

Net FDI = Gross FDI Inflows – (Repatriation by foreign firms + Outward FDI by Indian firms).

Components of Net FDI :-

FDI Inflow (Gross FDI) : means the total new foreign money invested in a country, minus any money foreign companies take back out.

Gross Investment encompasses fresh equity inflows (foreign purchases of shares), reinvestment of profits by foreign companies in India, and other capital inflows like inter-company loans.

- **Repatriation/Disinvestment:** Foreign companies withdrawing capital from India.
- **FDI Outflow:** Indian companies investing capital abroad.

Reason :-

The drop in net FDI is attributed to two factors: A surge in repatriation/disinvestment from existing investments, particularly through profitable IPOs, and increased outward investments by Indian firms abroad.

In Fiscal Year 2024-25, Indian companies significantly increased their overseas investments, totaling \$29.2 billion, which represents a 75% increase over the previous year.

Despite this net decline, gross FDI inflows remained heavily concentrated in core sectors like manufacturing, financial services, energy, and communications, collectively securing over 60% of total inflows.

Why Net FDI Matters:

- **Positive Net FDI:** Signifies greater foreign investment entering the country than exiting, generally indicating economic appeal.
- **Low or Negative Net FDI:** Can suggest capital withdrawal or a preference for outward investment by domestic firms over local foreign investment.
- While a low or negative net FDI might reflect capital outflow, it can also signal a country's economic maturity or increasing global ambition.

Q. Analyse the recent trends in India's Net FDI and examine the underlying causes of its decline. In this context, discuss the implications of increased outward FDI by Indian firms on domestic investment and economic growth.

[UPSC MAINS Practice Question]

3.11. INDIA CONSIDERS ALLOWING 49% FOREIGN STAKES IN NUCLEAR POWER PLANTS

Why in the News?

According to government sources, India is considering a significant shift in its nuclear energy policy by potentially allowing foreign companies to own up to **49% of its nuclear power plants**. This move, currently under discussion, aims to **expand India's nuclear energy capacity** and **reduce dependence on fossil fuels** in alignment with its **net-zero carbon goals**.

Background

India's nuclear energy sector has traditionally been **state-controlled and closed to foreign direct investment (FDI)** due to national security sensitivities and concerns around nuclear liability. Currently, India has an **installed nuclear power capacity of about 8 GW**, accounting for approximately **2% of the country's total electricity capacity**.

The government plans to **expand nuclear capacity to 100 GW by 2047**, a twelve-fold increase, to reduce the country's carbon footprint, supplement renewable sources like solar and wind, and meet growing night-time power demands.

Historical Context

- **Atomic Energy Act, 1960:** Gave the government exclusive rights over nuclear energy development and prohibited private participation.
- **Civil Liability for Nuclear Damage Act, 2010:** Introduced strict liability clauses that discouraged foreign companies from participating due to concerns over unlimited financial exposure in case of nuclear accidents.
- **India-US Civil Nuclear Agreement (2008):** Opened the door for international civil nuclear trade but did not translate into large-scale foreign investment due to liability concerns.
- **No FDI Allowed in Nuclear Power So Far:** Despite interest from global players, India's restrictive laws kept foreign capital and private players out of the nuclear power generation sector.

Proposed Policy Shift

According to sources, India plans to:

- Allow **up to 49% foreign direct investment** in nuclear power projects with **prior government approval**.

- **Amend the Atomic Energy Act, 1960** to enable private and foreign firms to **build, own, and operate nuclear plants** and engage in **mining and manufacturing of atomic fuel**.
- **Modify the Civil Liability for Nuclear Damage Act, 2010** to reduce the burden of liability on suppliers and attract global participation.

These proposals may be placed before the **federal cabinet** and Parliament during the **Monsoon Session in July 2025**.

Implications of the Shift

- **Boost to Investment:** Could attract investments from foreign nuclear giants like Westinghouse Electric, GE-Hitachi, Electricité de France, and Rosatom.
- **Private Sector Participation:** Indian corporations such as Reliance Industries, Tata Power, Adani Power, and Vedanta Ltd have shown interest, with talks of investing around **\$26 billion**.
- **Energy Security & Decarbonization:** Supports India's efforts to transition from coal to clean energy, ensuring **reliable base-load power** through nuclear energy.
- **Technological Collaboration:** Enhances access to advanced nuclear technologies and safety systems through global partnerships.

Way Forward

1. **Legislative Reforms:** Timely passage of the proposed amendments is critical to enabling private and foreign participation.
2. **Balanced Liability Regime:** Ensuring a **risk-sharing framework** that protects public safety while not deterring investors.
3. **Robust Regulatory Mechanism:** Strengthening institutions like the **Atomic Energy Regulatory Board (AERB)** to oversee the expanded private role.
4. **Public-Private Collaboration:** Establishing a **transparent licensing and monitoring system** to ensure safety and efficiency in operations.
5. **Strategic Partnerships:** Leveraging India's geopolitical relations for long-term nuclear fuel supply and technology sharing.

India's move to open its nuclear power sector to **foreign and private investment** marks a bold departure from decades of cautious policy. If implemented thoughtfully, this strategy could **unlock massive capital inflows, accelerate clean energy transition, and position India as a major nuclear power** in the coming decades. Balancing national interest, safety, and commercial viability will be key to ensuring the long-term success of this transformational initiative.

Q. Critically examine the opportunities and challenges associated with liberalizing India's nuclear power sector. How can India ensure energy security, technological advancement, and safety while balancing national and commercial interests? *[UPSC MAINS Practice Question]*

4.1. SIPRI REPORT ON MILITARY EXPENDITURE

Why in the News?

Recently, the Stockholm International Peace Research Institute (SIPRI) has published report ‘Trends in World Military Expenditure 2024’, it highlights that India’s military expenditure rose to \$86.1 billion in 2024, nearly nine times higher than Pakistan.

SIPRI Report on India's Military Expenditure (2024): Key Highlights

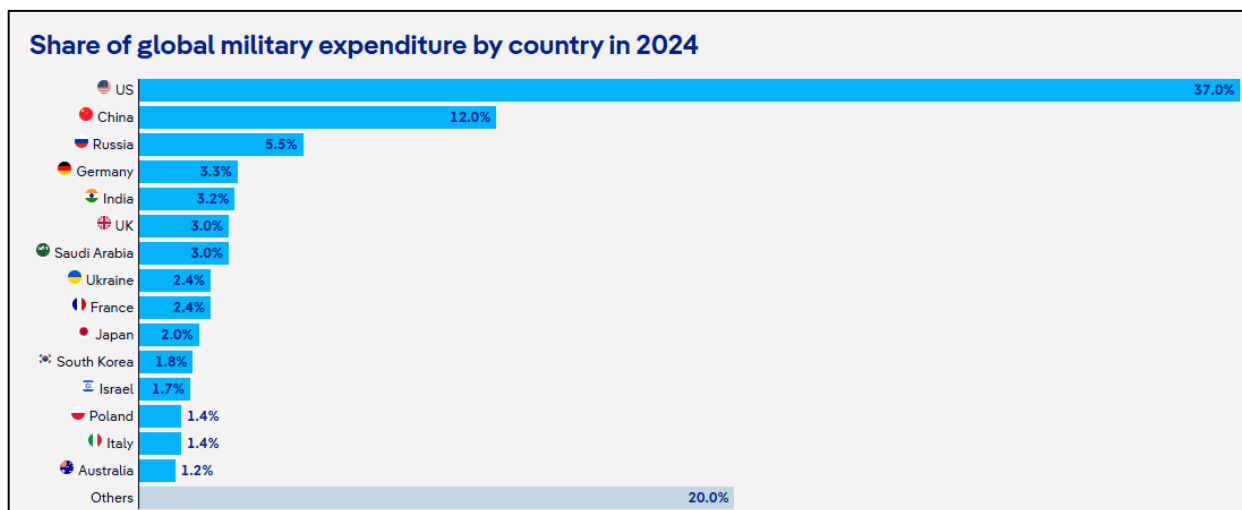
Global Standing: India ranked as the **5th largest military spender in the world**, following the United States, China, Russia, and Germany.

Expenditure Overview:

- **Total Military Spending:** \$86.1 billion in 2024, marking a **1.6% increase** compared to the previous year.
- **Comparison with Pakistan:** India's defense budget was nearly **nine times larger** than Pakistan’s, which stood at \$10.2 billion.

Regional and Global Context:

- In the **Asia and Oceania region**, both China and India were major contributors to the growth in military spending.
- Globally, India was among the **top five military spenders**, who together accounted for **60% of total global defense expenditure**.



Strategic and Policy Highlights:

- **Domestic Defense Focus:** 75% of India’s capital outlay was allocated to **domestic defense procurement**, comprising 22% of the overall military budget—highlighting a push for self-reliance.
- **Continued Import Dependence:** Despite the domestic push, India remains dependent on **imports for advanced technologies**, including combat aircraft and other critical systems.
- **Geopolitical Significance:** India’s growing defense investment underlines its role as a **strategic power in the Indo-Pacific**, amid increasing tensions with China and Pakistan.

Q. With reference to the SIPRI report “Trends in World Military Expenditure 2024”, consider the following statements:

1. India was the second-largest military spender globally in 2024.
2. India's military expenditure in 2024 was nearly nine times that of Pakistan.
3. Over 70% of India's capital outlay in defense was allocated to domestic procurement.

Which of the statements given above are correct?

[UPSC Pre. Practice Question]

- (a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

Ans. (b) 2 and 3 only

4.2. OPERATION KAGAR: INDIA'S MAJOR ANTI-NAXAL OFFENSIVE

Why in the News?

Recently, under Operation Kagar, a major counterinsurgency offensive, has cornered the remaining Naxal strongholds along the Chhattisgarh–Telangana border.

What is Operation Kagar?

It has been launched in **January 2024** by the **Union Government**, *Operation Kagar* is a high-intensity counterinsurgency campaign aimed at eliminating **Left-Wing Extremism (LWE)** in India's core Naxal-affected regions. It combines **military action**, **advanced surveillance**, and **developmental outreach** to dismantle Maoist networks and restore state authority.

Key Features

- **Core Focus Areas:**
 - **Bastar** (Chhattisgarh)
 - **Gadchiroli** (Maharashtra)
 - **West Singhbhum** (Jharkhand)
 - **Border zones of Chhattisgarh and Telangana**
- **Forces Involved:**
 - Over **1 lakh personnel** from:
 - **CRPF, CoBRA, District Reserve Guards (DRG)**
 - **State Task Forces (STF) and state police**
- **Technology and Strategy:**
 - Use of **drones, AI-based surveillance, and satellite imagery** for real-time tracking and intelligence
 - Simultaneous push for **infrastructure development** and **tribal welfare** to counter Maoist influence

Impact and Significance

- **Territorial Gains:**
 - Encircled final Naxal strongholds along the **Chhattisgarh–Telangana border**
- **Results:**
 - **287 Naxals neutralized** in 2024
 - **150+ eliminated** in early 2025
 - Reduction of **Naxal-affected districts** from **106 in 2015** to just **6 in 2025**
- **Broader Goals:**
 - Restore full **state control** over remote tribal areas
 - Promote **development, infrastructure, and security**
 - Protect tribal communities from **Maoist exploitation and violence**

Q. Examine the role of development and technology in India's approach to tackle Naxal insurgency under Operation Kagar. *[UPSC MAINS Practice Question]*

4.3. INDIA'S FIRST GENOME-EDITED RICE VARIETIES

Why in the News?

Recently, India has introduced its first genome-edited rice varieties, DRR Dhan 100 (Kamala) and Pusa DST Rice 1, developed by ICAR using CRISPR-Cas9 technology.

About DRR Dhan 100 (Kamala):

Developed by ICAR-IIRR in Hyderabad, DRR Dhan 100 (Kamala) is a newly introduced rice variety based on the widely cultivated Samba Mahsuri (BPT 5204).

Key Features:

- Delivers a 19% higher yield compared to its parent variety.
- Matures in just 130 days—around 20 days earlier than Samba Mahsuri.
- Possesses a sturdy stem, reducing the risk of lodging (falling over).
- Saves approximately 7,500 million cubic meters of irrigation water.
- Uses genome-editing to modify the CKX2 (Gn1a) gene, increasing grain production per plant.
- Its faster growth rate results in lower methane emissions, making it more environmentally friendly.

About Pusa DST Rice 1:

Pusa DST Rice 1 is a newly developed rice variety created by ICAR-IARI in New Delhi, using MTU 1010 as its base variety.

Key Features:

- Engineered through genome editing to enhance tolerance to drought and saline soils by modifying the DST gene.
- Delivers up to 30.4% higher yield under challenging soil conditions.
- Developed using the SDN1 genome-editing approach, which does not involve introducing foreign DNA.
- As a result, it is not classified under stringent GMO regulations.

Q. Critically analyse the regulatory challenges and ethical considerations associated with genome-edited crops in India.
[UPSC MAINS Practice Question]

4.4. OPERATION SINDOOR

Why in the News?

Recently, India launched 'Operation Sindoor' in Response to Pahalgam Attack: Precision Strikes on Nine Terror Camps in Pakistan and PoJK

Operation Sindoor

In a major military move, the Indian Armed Forces executed '**Operation Sindoor**', a series of **precision strikes** targeting terrorist camps in **Pakistan and Pakistan-occupied Jammu and Kashmir (PoJK)**. The operation follows the **deadly Pahalgam terror attack**, which killed **25 Indian citizens and one Nepali national**, sparking nationwide outrage and calls for strong retaliation.

Nine Terror Sites Hit with Focused Precision

As per an official statement from the **Press Information Bureau (PIB)**, the strikes were directed at **nine key locations** suspected of housing operational terrorist infrastructure responsible for cross-border attacks on India. Among the high-value targets:

- A **former Lashkar-e-Taiba base** near Muzaffarabad, PoK

- A **Jaish-e-Mohammad-affiliated seminary** in Bahawalpur, Punjab province
- A **major infiltration point** in Kotli, PoK

Measured and Non-Escalatory

The government underscored that the operation was **strategically restrained**, with **no Pakistani military assets targeted**. The strikes were designed to be **measured, focused, and non-escalatory**, reflecting India's intent to uphold regional stability while addressing security threats.

Mission Objective: Dismantle Terror Networks, Reinforce Deterrence

The primary goal of Operation Sindoor is to **neutralize terror infrastructure** and **reassert India's deterrence** posture, sending a clear message that attacks on Indian citizens will be met with firm and targeted responses.

Q. Examine how India's approach in Operation Sindoor reflects its broader security and diplomatic policies towards Pakistan and Pakistan-occupied Kashmir. *[UPSC MAINS Practice Question]*

4.5. INDIA SKIRTS MARITIME BORDER DISPUTE WITH PAKISTAN BY FRESH CONTINENTAL SHELF CLAIM

Why in the News

India has recently submitted a revised claim to the United Nations Commission on the Limits of the Continental Shelf (CLCS), increasing its claim in the Central Arabian Sea by approximately **10,000 square km**. Notably, this submission *modifies* earlier claims to avoid the contentious maritime boundary dispute with **Pakistan**, particularly near the **Sir Creek** region. This strategic move aims to secure valuable seabed resources without escalating geopolitical tensions.

Background: Maritime Boundaries and Continental Shelf

Under the **United Nations Convention on the Law of the Sea (UNCLOS)**, coastal states are entitled to:

- **12 nautical miles** of *Territorial Sea*
- **200 nautical miles** of *Exclusive Economic Zone (EEZ)* – granting rights over fishing, mineral exploration, etc.

Beyond this, countries can claim an **Extended Continental Shelf (ECS)** if they can scientifically prove that the seabed is a natural prolongation of their landmass.

Such claims must be submitted to the **CLCS**, which assesses the scientific validity. If approved, countries can **explore and exploit mineral and hydrocarbon resources** on the seabed of these extended areas.

Historical Context: India's Continental Shelf Claims

- **2009:** India made its **first ECS submission**, covering parts of the **Bay of Bengal, Indian Ocean, and Arabian Sea**.
- **2021:** **Pakistan objected** to India's claim in the Western Arabian Sea, alleging overlap of ~100 nautical miles in the disputed **Sir Creek** area.
- **March 2023:** CLCS **rejected India's earlier submission** in this region due to unresolved disputes.
- **April 2025:** India **restructured the claim** into two *partial submissions*, ensuring that the **non-disputed Central Arabian Sea region** is not affected.

Key Developments

- India has increased its continental shelf claim by **10,000 sq km** in the **Central Arabian Sea**, based on new geological data.

The **Ministry of Earth Sciences (MoES)** and **National Centre for Polar and Ocean Research**

(NCPOR) have been instrumental in providing technical inputs.

India has now proposed a **1.2 million sq km** ECS, in addition to its **~2 million sq km EEZ**, nearly equalling its **land area of 3.274 million sq km**.

- A pre-existing agreement with **Oman (2010)** avoids overlapping claims, while **Myanmar and Sri Lanka** have contested India's claims in the Bay of Bengal and Indian Ocean respectively.

Significance of the Move

1. **Resource Security:** The ECS provides rights over seabed resources such as **oil, gas, polymetallic nodules**, and **rare earth minerals**.
2. **Strategic Navigation and Influence:** Consolidation of maritime claims enhances India's influence in the **Indian Ocean Region (IOR)**.
3. **Diplomatic Prudence:** Avoiding the disputed Sir Creek region allows India to **sidestep conflict with Pakistan**, focusing instead on **consensual and scientifically supported regions**.
4. **Precedent for Modified Claims:** India's revised strategy leverages CLCS provisions that allow **multiple and partial submissions**, setting a **diplomatically pragmatic precedent**.

Way Forward

- **Bilateral Negotiations:** India should initiate diplomatic dialogue with **Pakistan, Myanmar, and Sri Lanka** to resolve overlapping claims amicably.
- **Strengthen Scientific Research:** Continued investment in **marine geosciences**, including under-sea mapping and tectonic studies, will bolster India's claim strength.
- **Institutional Strengthening:** Agencies like NCPOR and MoES should be further empowered to conduct international collaborations and scientific expeditions.
- **Geostrategic Engagement:** Enhanced cooperation with **IOR countries** and platforms like **IORA** and **QUAD** could safeguard India's maritime interests.

India's recent ECS submission reflects a **balanced blend of science, strategy, and diplomacy**. By modifying its maritime claims to avoid disputed areas while expanding its control over resource-rich seabeds, India is taking a **cautious yet assertive approach** to secure its long-term economic and strategic interests. The episode underscores the growing importance of **blue economy and maritime geopolitics** in India's foreign and resource policy.

Q. With reference to India's revised Extended Continental Shelf (ECS) claim, consider the following statements:

1. Under UNCLOS, countries can claim an ECS beyond the Exclusive Economic Zone (EEZ) if they can scientifically establish a natural extension of their landmass.
2. India's revised submission to the CLCS in 2025 increased its claim in the Bay of Bengal by 10,000 sq km while avoiding the Sir Creek region.
3. India's ECS claim, if approved, could provide rights over resources like polymetallic nodules, oil, gas, and rare earth minerals.

Which of the statements given above is/are correct?

[UPSC Pre. Practice Question]

- (a) 1 and 2 only (b) 2 and 3 only
(c) 1 and 3 only (d) 1, 2 and 3

Ans. (c) 1 and 3 only

ENVIRONMENT

5.1. HINDU KUSH SNOW DECLINE

Why in the News?

As per the **HKH Snow Update 2025**, snow cover during this winter was **23.6% below normal**, marking the **lowest level in 23 years**.

Background of the News

The **Hindu Kush Himalaya (HKH)** — often referred to as the "Third Pole" due to its massive cryospheric reserve — is facing an unprecedented environmental crisis.

Snow in the HKH region plays a pivotal role in **regulating temperature**, maintaining the **albedo effect** (Earth's reflectivity), and sustaining **major river systems** like the Ganges, Brahmaputra, and Indus. With **four out of the last five winters** showing below-normal snow persistence, scientists warn of an **accelerating collapse** of the region's cryosphere.

- **Less snow cover** means more heat absorption, contributing to **regional and global warming**.
- Ecosystems such as **wetlands, alpine grasslands, and forests** are under increasing stress due to altered river flows and snow melt patterns.

What's Driving the Decline in Snow Persistence?

The loss of snow cover in the HKH is driven by a combination of **climate change** and **anthropogenic pressures**:

1. **Accelerated Regional Warming**: HKH is warming at **nearly twice the global average**.
2. **Changing Precipitation Patterns**: Traditional snowfall is being replaced by **rainfall**, particularly in mid-elevation zones.
3. **Black Carbon Pollution**: Soot from **industrial activity and biomass burning** reduces snow reflectivity, accelerating melting.
4. **Glacier Retreat**: Exposed land and thinner ice absorb more heat, hastening further melt.
5. **Feedback Loops**: Declining snow cover reduces Earth's reflectivity, creating a **vicious cycle of warming and snow loss**.

River Basins Experiencing Widespread Snow Deficits

All **12 major river basins** in the HKH show significant snow persistence decline:

- **Mekong Basin**: ↓ 51.9% – Affecting agriculture and aquatic ecosystems.
- **Brahmaputra Basin**: ↓ 27.9% – Threatening hydropower and fisheries.
- **Tibetan Plateau**: ↓ 29.1% – Destabilizing the region known as the "*Water Tower of Asia*."
- **Indus and Amu Darya Basins**: Also recorded major losses, threatening water and food security.

Urgent Actions Recommended

The 2025 update calls for **immediate, ecosystem-based adaptive strategies**:

- **Integrate snow data into water and biodiversity policy planning**.
- **Invest in nature-based solutions** like wetland restoration and afforestation.
- **Enhance regional cooperation** among HKH countries to protect shared rivers and ecosystems.
- **Deploy early warning systems** for ecological and hydrological disruptions.

The fate of the HKH is not only a regional concern but a **global environmental alarm bell**. Protecting the snow-dependent ecosystems is **vital for long-term water security, ecological balance, and climate resilience** across South and Southeast Asia. Without coordinated, science-backed action, the collapse of the cryosphere may have cascading impacts on **human livelihoods, agriculture, and biodiversity** across the continent.

Q. "The accelerating decline in snow cover across the Hindu Kush Himalaya (HKH) region poses a severe threat to water security, ecosystems, and regional climate stability." Critically examine the drivers of this decline and suggest a multi-level strategy to address the crisis.

[UPSC MAINS Practice Question]

5.2. HEAVY METAL CONTAMINATION IN SOILS: A GLOBAL THREAT TO AGRICULTURE AND HEALTH

Why in the News?

A recent study published in *Science* has revealed that 14–17% of global agricultural soils are contaminated with toxic heavy metals, threatening food safety, human health, and ecological stability.

Background of the News

The contamination has resulted from both anthropogenic and natural factors such as mining, metal smelting, fossil fuel combustion, agrochemical use, and geological conditions. These pollutants persist in the environment, accumulating in the food chain and harming soil productivity.

Historical Context

The affected regions—Southern Europe, Middle East, South Asia, and Southern China—overlap with ancient civilizational zones. The contamination traces back to centuries of intensive mining, smelting, and agricultural activity dating back to the Greek, Roman, Persian, and early Chinese eras.

Environmental Consequences of Heavy Metal Contamination

- **Soil Degradation:** Heavy metals disrupt soil chemistry by altering pH levels and eliminating beneficial microorganisms such as nitrogen-fixing bacteria. This leads to a decline in soil fertility, reducing agricultural productivity and weakening the soil's natural capacity to neutralize other pollutants.
- **Water Pollution:** Toxic metals seep into groundwater and surface water bodies, leading to widespread contamination of rivers, lakes, and aquifers. These substances accumulate in aquatic ecosystems, adversely affecting fish and other marine life. In some regions, such as West Bengal, arsenic-laced groundwater poses a severe public health threat.
- **Air Pollution:** Industrial emissions from smelting, manufacturing units, and waste incineration release heavy metals into the atmosphere. These airborne particles can travel long distances, settling in distant regions and contributing to air quality deterioration. Inhalation of such pollutants is linked to respiratory illnesses in humans and animals.
- **Loss of Biodiversity:** Heavy metals are toxic to essential ecological species like pollinators (e.g., bees) and soil organisms (e.g., earthworms), disrupting natural ecological cycles. These metals accumulate along the food chain, leading to bioaccumulation and biomagnification, which endanger various species, particularly in contaminated habitats.
- **Disruption of Ecosystem Services:** Key ecological functions—such as nutrient recycling, water purification, and vegetation growth—are severely compromised. Prolonged exposure turns affected areas into ecologically impaired zones, as seen around heavily polluted mining regions.

Way Forward

- **Nationwide Soil Surveillance:** Establish regular monitoring systems using bio-indicators like earthworms to detect contamination early.
- **Strengthen Waste Disposal Norms:** Enforce industrial discharge and mining waste treatment protocols.
- **Phytoremediation & Bioremediation:** Promote low-cost, eco-friendly technologies to clean toxic metals from soil.
- **Farmer Awareness and Training:** Integrate soil contamination education in Krishi Vigyan Kendras and extension programs.
- **Legislative Overhaul:** Introduce a dedicated legal framework for soil pollution control and its linkage to food safety laws.
- **R&D Investment:** Encourage innovation in metal-absorbing crops and soil detox methods.

Heavy metal contamination is a slow-moving but devastating environmental crisis. Its impact on agriculture, ecosystems, and public health undermines key Sustainable Development Goals (SDGs). It is imperative that governments, scientists, and communities come together to address soil pollution as a national priority—before contaminated land turns into permanent ecological wastelands.

Q. "Heavy metal contamination of soil presents a silent yet serious challenge to food security, public health, and environmental sustainability." In light of recent global findings, discuss the causes, impacts, and suggest a multipronged strategy to mitigate soil pollution in India.

[UPSC MAINS Practice Question]

5.3. INDIA OPPOSES INCLUSION OF CHLORPYRIFOS AT STOCKHOLM CONVENTION

Why in the News?

Recently, India objected to the inclusion of the hazardous insecticide Chlorpyrifos, which was designated as a Persistent Organic Pollutant (POP) for global phase-out in 2021 under the Stockholm Convention, during meetings of the Conferences of the Parties to the Basel, Rotterdam, and Stockholm (BRS) Conventions held in Switzerland.

Chlorpyrifos

- Chlorpyrifos is an insecticide known to cause serious health risks, including impaired neurodevelopment, reduced birth weight, and increased risk of lung and prostate cancer with prolonged exposure.
- The **World Health Organization (WHO)** classifies it as a *moderately hazardous pesticide*. It works by inhibiting the enzyme **acetylcholinesterase**, leading to harmful effects on the nervous system.

Stockholm Convention on Persistent Organic Pollutants (POPs)

The **Stockholm Convention** is a global treaty adopted in **May 2001** in **Stockholm, Sweden**, and came into force on **17 May 2004** after receiving the fiftieth ratification or accession. Its primary objective is to **protect human health and the environment** from the adverse effects of **Persistent Organic Pollutants (POPs)**—toxic chemicals that remain in the environment for long periods and accumulate in living organisms.

Key Provisions

- The Convention mandates the **Conference of the Parties (COP)** to establish **arbitration and conciliation mechanisms** for resolving disputes among member nations.

- Chemicals under the Convention are categorized into three annexes:
 - Annex A:** Chemicals to be **eliminated**.
 - Annex B:** Chemicals subject to **restricted use**.
 - Annex C:** Chemicals for which **unintentional production and release must be minimized**.

Chlorpyrifos Phase-Out: Global and Indian Standpoints

Global Context

- In **2021**, the **EU** proposed Chlorpyrifos for global phase-out under the **Stockholm Convention**.
- In **2024**, the **POPRC** recommended its listing in **Annex A** (elimination), allowing limited exemptions for plant protection, cattle tick control, and wood preservation.
- During the **BRS Conventions**, member nations debated exemptions; **India** and others sought allowances for agricultural and pest control uses.

India's Position

- Registered since **1977**, Chlorpyrifos was India's most-used insecticide in **2016–17**.
- India considers it vital for agriculture, urban pest control (e.g., cockroaches, termites), and vector-borne disease management.
- A **2024 study** found residues in **33%** of food samples; the **Anupam Verma Committee (2015)** noted its toxicity to **fish and bees**.

Future Outlook

- India is promoting sustainable practices through the **National Mission on Natural Farming**.
- Other harmful chemicals like **medium-chain chlorinated paraffins** and **LC-PFCAs** are also under review at the **BRS Conventions**.

Q. With reference to the Stockholm Convention on Persistent Organic Pollutants (POPs), consider the following statements:

- It classifies harmful chemicals under three annexes: A (Elimination), B (Restricted Use), and C (Unintentional Production).
- Chlorpyrifos has been listed under Annex B of the Convention, allowing unrestricted agricultural use.
- India opposed the global phase-out of Chlorpyrifos, citing its utility in pest control and agriculture.

Which of the statements given above are correct?

[UPSC Pre. Practice Question]

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

Ans. (c) 1 and 3 only

5.4. NATURAL HYDROGEN

Why in the News?

Global interest in natural hydrogen is rising, with recent finds in France's Moselle region and growing momentum in India, as governments and firms pursue low-cost, zero-emission fuel alternatives.

What is Natural Hydrogen?

Natural hydrogen, also known as native hydrogen (H_2), is molecular hydrogen that forms naturally underground due to geological processes such as serpentinisation (reaction of water with ultramafic rocks) and radiolysis (breakdown of water by natural radioactive decay). It is increasingly being explored as a clean, renewable, and non-polluting energy source.

Key Benefits of Natural Hydrogen

- **Zero Emissions**
 - When burned, natural hydrogen produces only water vapor, resulting in no carbon dioxide emissions.
- **Cost-Effective**
 - It has an estimated production cost of around \$1/kg, making it significantly cheaper than green hydrogen.
- **Sustainable and Renewable**
 - Natural hydrogen can regenerate in certain geological environments, offering a potentially continuous energy supply.
- **High Energy Efficiency**
 - Hydrogen fuel cells are up to three times more efficient than traditional gasoline engines, making it ideal for energy conversion.

Natural Occurrence of Hydrogen

- **Geological Settings**

Natural hydrogen is found in hard rock formations, ophiolite belts, and hydrothermal systems.

- **Formation Processes**
 - **Serpentinisation:** Reaction between water and ultramafic rocks.
 - **Radiolysis:** Water decomposition due to natural radioactive decay.
 - **Organic Decomposition:** Hydrogen released from deep carbon-rich materials.
 - It is sometimes co-located with helium, indicating deep crustal origins.

How is Natural Hydrogen Extracted?

- **Exploration:** Hydrogen seeps are identified using geophysical techniques and geochemical sampling in promising geological regions.
- **Drilling:** Once identified, boreholes are drilled to access subsurface hydrogen reserves—an approach already underway in countries like Mali, France, and the U.S.
- **Capture and Processing:** Extracted hydrogen is purified, filtered, and compressed for safe storage and distribution.
- **Distribution:** Hydrogen is delivered to users such as refineries, industries, and fuel cell-based transport systems.

Challenges in Adoption

- **Limited Mapping of Reserves:** Global hydrogen deposits remain largely unexplored, creating uncertainty about resource availability.
- **Scattered Deposits:** Hydrogen pockets may be too widely dispersed, affecting economic viability.
- **Storage and Transport Issues:** Hydrogen's low energy density demands high-pressure containment, increasing handling costs.
- **Safety Concerns:** Being flammable and odorless, hydrogen leaks are hard to detect and pose safety risks.
- **Lack of Infrastructure:** There is a significant need for pipelines, refueling stations, and other distribution systems.

The Way Forward

- **Comprehensive Geological Surveys:** India should focus on mapping hydrogen-bearing regions, especially in its cratonic and ophiolitic belts.

- **Policy Development:** A Natural Hydrogen Exploration Policy should be established under India's National Hydrogen Mission.
- **International Collaboration:** India can benefit from collaboration with global leaders like the U.S. and France, and by adopting USGS models for hydrogen mapping.
- **Private Sector Involvement:** Public-private partnerships, tax incentives, and startup incubators can accelerate industry participation.
- **Infrastructure Investment:** Development of storage systems, pipelines, and hydrogen refueling stations will be critical to large-scale adoption.

Natural hydrogen offers a promising path toward clean, cost-effective, and scalable energy. With strategic exploration, sound policy frameworks, and strong infrastructure, countries like India can unlock this resource's full potential and emerge as global leaders in hydrogen-based energy solutions.

Q. Analyze the strategic steps India should undertake to harness natural hydrogen resources as part of its energy transition.
[UPSC MAINS Practice Question]

5.5. 20TH SESSION OF THE UNITED NATIONS FORUM ON FORESTS

Why in the news?

India participated in the 20th session of the United Nations Forum on Forests (UNFF20), held at the United Nations Headquarters in New York .

Key Highlights of the Session

- **India reaffirmed its commitment to the UN Strategic Plan for Forests 2017–2030**, focusing on sustainable forest management and the achievement of its Voluntary National Contributions (VNCs).
- **India reported a consistent increase in forest and tree cover**, which now stands at 25.17% of its total geographical area, as per the latest India State of Forest Report.
- **Major National Initiatives Showcased**
 - **Aravalli Green Wall:** Ongoing restoration efforts to combat desertification.
 - **Mangrove Cover:** Recorded a **7.86% increase** over the past decade.
 - **Green India Mission:** Afforestation of over **1.55 lakh hectares**.
 - **Plant4Mother Campaign (Ek Ped Maa Ke Naam):** Plantation of **1.4 billion seedlings** across the country.
- **India invited all UN Member States to join the International Big Cat Alliance (IBCA)**, a global initiative launched by India to promote conservation of the seven big cat species through research, capacity building, and knowledge sharing.
- **India emphasized the need for global action on the outcomes of the Country-Led Initiative (CLI)** held in Dehradun in October 2023, which focused on forest fire management and forest certification.
- **India acknowledged CLI contributions by other countries**, including the Republic of Congo, the Democratic People's Republic of Korea, and Austria, and called for integrating these initiatives into formal global forestry mechanisms.
- **India hosted a side event titled “Restoring Degraded Forest Landscapes: India's Approach to Sustainable Forest Management and Climate Resilience.”**
 - The event showcased India's experience in integrated forest restoration through innovative policies.
- **India participated in a high-level panel on “Valuing Forest Ecosystems in National Policy and Strategy.”**

- India shared findings from pilot studies in Uttarakhand, Rajasthan, and tiger reserves.
- These studies evaluated ecosystem services like carbon sequestration, water supply, and biodiversity.
- Frameworks such as the System of Environmental-Economic Accounting (SEEA) and Millennium Ecosystem Assessment (MEA) were used.
- India highlighted the importance of integrating ecosystem service valuation into national policy-making for better forest governance.

India's participation at UNFF20 showcased its strong commitment to sustainable forest management and global environmental cooperation. Through impactful initiatives and international partnerships, India reaffirmed its role as a leader in forest conservation and climate resilience.

Q. Discuss India's contributions to sustainable forest management as highlighted during the 20th Session of the United Nations Forum on Forests (UNFF20). Evaluate the role of such international forums in advancing global environmental cooperation.

[UPSC MAINS Practice Question]

5.6. CLOUD SEEDING

Why in the news?

In a bid to combat air pollution and water scarcity, Delhi approved five cloud seeding trials across the Capital.

Cloud seeding

- **Cloud seeding** is a method of **artificially inducing rainfall** by dispersing chemicals into clouds that stimulate precipitation.
- Common **seeding agents** include **silver iodide**, **dry ice (solid CO₂)**, and **common salt**, which help water droplets or ice crystals form in clouds.
- **Techniques used:**
 - **Hygroscopic Seeding:** Uses salts in warm clouds to grow droplets large enough to fall as rain.
 - **Glaciogenic Seeding:** Uses silver iodide in cold clouds to form ice crystals that melt into raindrops.
- **Delivery methods:** Chemicals are dispersed using **aircraft** or **ground-based generators** like rockets or flares.

Benefits

- **Enhances rainfall** in drought-prone or dry regions.
- **Improves air quality** by washing out pollutants and dust.
- **Boosts water availability** for agriculture, drinking, and groundwater recharge.
- **Helps in climate mitigation**, especially against dust storms and wildfires.

Challenges

- **Effectiveness is weather-dependent** and not guaranteed.
- **Environmental concerns** exist regarding the long-term impact of chemical agents like silver iodide.
- **High operational costs** limit its widespread use.
- **Temporary relief:** It does not replace the need for sustainable environmental solutions.

Cloud seeding can be a valuable short-term tool to fight air pollution and water stress, as seen in Delhi's recent initiative. However, it should be implemented carefully and supported by broader strategies like clean energy, afforestation, and water conservation for long-term environmental sustainability.

Q. Which of the following chemicals is commonly used as a seeding agent in cloud seeding?

(a) Calcium carbonate

(b) Silver iodide

[UPSC Pre. Practice Question]

(c) Sodium chloride

(d) Potassium nitrate

Ans. (b) Silver iodide

5.7. ASIATIC LION CENSUS 2025

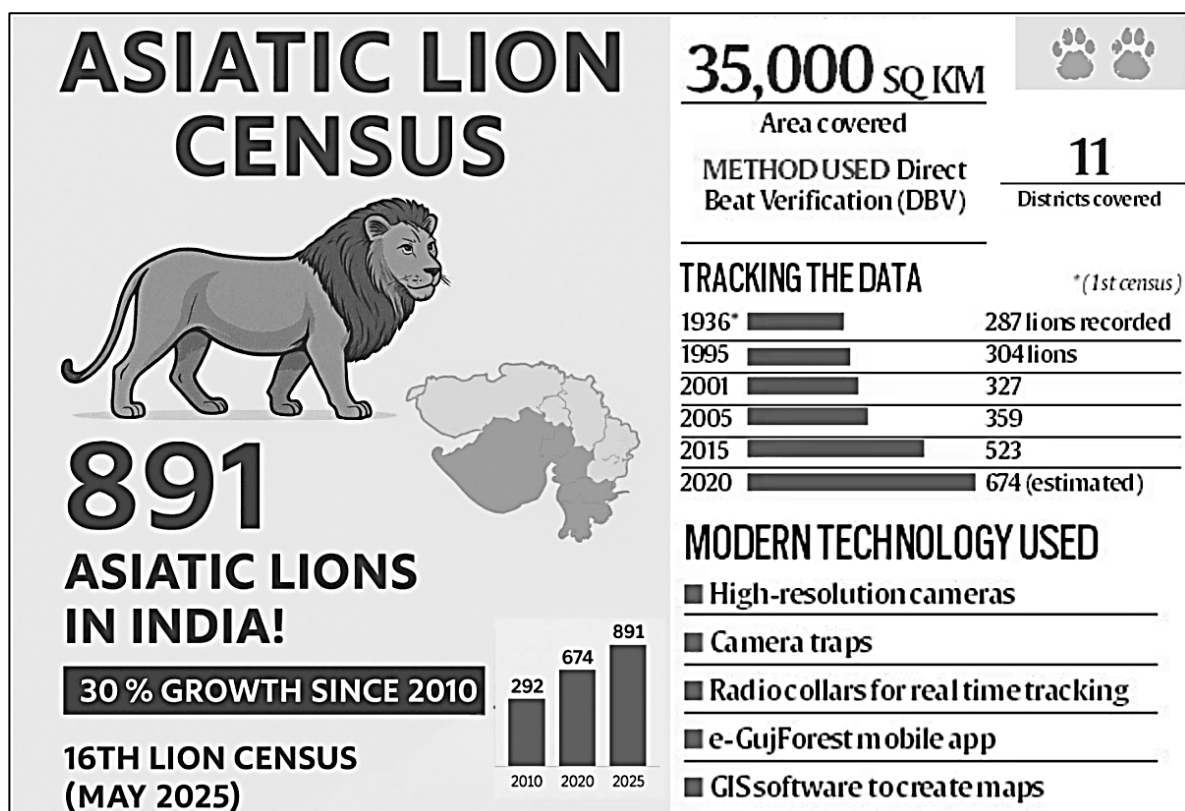
Why in the News?

According to the Asiatic Lion Census 2025, the population of Asiatic lions in Gujarat has risen significantly, reaching an estimated 891 individuals.

Asiatic Lion Census 2025

- The 16th Asiatic Lion Census reports a substantial rise in the lion population in Gujarat, with an estimated 891 individuals—up from 674 in 2020.
- Gir Forest remains the sole natural habitat of Asiatic lions.
- **Methodology:** The census employed advanced methodologies such as direct beat verification for high accuracy, supported by high-resolution cameras, camera traps, and GPS-enabled radio collars.
- **Concerns:** Notably, around 57% of the lion population now resides outside protected forest areas, heightening the risk of human-wildlife conflict.

Asiatic Lions:



- The Asiatic lion (*Panthera leo persica*) is a subspecies of the lion, distinguished by its smaller size and distinct morphological features.
- Its last surviving wild population is confined to the Gir Forest, a dry deciduous ecosystem in the Saurashtra region of Gujarat.
- **Conservation Status:**
 - IUCN: Endangered

- CITES: Appendix I
- Wildlife Protection Act, 1972: Schedule I
- **Key Concern:** The species' geographic isolation in Gir poses serious risks, including vulnerability to epidemics, prey decline, and natural disasters. For instance, in 2018, 27 lions succumbed to the canine distemper virus (CDV), highlighting the urgent need for population dispersal and habitat diversification.
- CDV is a highly contagious viral disease caused by a single-stranded RNA virus, affecting a wide range of carnivores.
- It attacks multiple body systems, including the respiratory and gastrointestinal tracts, as well as the spinal cord and brain.

Symptoms include dullness, eye discharge, coughing, diarrhea, and seizures. The disease is often fatal and poses a serious threat to vulnerable wildlife populations such as the Asiatic lion.

Conservation Initiatives :-

- **Project Lion (2020):** Aimed at strengthening infrastructure for the protection and health monitoring of Asiatic lions. Key focus areas include conflict mitigation, habitat improvement, use of radio collars and camera traps, and addressing human-wildlife conflict.
- **International Big Cats Alliance (2023):** Launched to promote global cooperation among 97 range countries for the conservation of big cats, including lions.

The rising lion population reflects the success of conservation initiatives and underscores the need for expanded and adaptive management strategies to ensure long-term sustainability.

Q. Discuss the concept of geographic isolation in wildlife conservation. With reference to the Asiatic Lion population in Gir Forest, analyze the risks posed by such isolation and suggest measures to mitigate these challenges for ensuring the species' long-term survival.

[UPSC MAINS Practice Question]

5.8. RAPID TEMPERATURE 'FLIPS' SINCE 1961

Why in the News?

A new study published in the journal *Nature Communications* has revealed that **over 60% of the global population has experienced rapid temperature 'flips'**—abrupt shifts between extreme heat and cold—since 1961. These events are **accelerating under climate change**, posing significant risks to **human health, agriculture, infrastructure, and ecosystems**, especially in **densely populated and low-income regions**.

Background

These **temperature flips** are sudden and intense transitions from **extreme warmth to cold** or vice versa, typically occurring over short durations. Unlike isolated heatwaves or cold spells, these swings provide **minimal time for adaptation**, severely impacting health, energy systems, food security, and natural habitats.

One notable example is from **April 2021**, when **Europe** witnessed a sudden drop from unseasonably warm temperatures to extreme cold, causing **massive frost damage to crops**.

Historical Context

- While independent extreme weather events (like heatwaves or cold snaps) have been widely studied, the **phenomenon of temperature flips has remained under-researched** until recently.

- The new research analyzed global climate data from **1961 to 2023**, finding that such events have **increased in frequency and intensity**, particularly since the **late 20th century**.
- Early signs of such flips were noticed in the **early 1900s**, but their **magnitude and impact** have grown significantly due to anthropogenic climate change.

Key Findings of the Study

1. Geographical Distribution:

- **Mid-latitude regions** (like East Asia, eastern North America, parts of South America, Africa, and Australia) were most affected.
- **Tropics and polar regions** experienced fewer flips.

2. Intensity and Duration:

- Flip events are becoming **more intense** and **more frequent**.
- **Transition durations** between warm and cold phases are **shorter**, making them more abrupt and harder to manage.

3. Drivers:

- A major driver is the behaviour of **Rossby waves**—large-scale atmospheric waves that redistribute heat across the globe.

4. Human Exposure:

- **Asia, especially South and Southeast Asia**, is the **most exposed** due to high population density.
- **Low-income countries** are projected to experience **4–6.5 times** higher exposure than the global average.
- **Global population exposure** is expected to **more than double** by the end of the century.

5. Future Projections (2071–2100 vs. 1961–1990 baseline):

- Frequency may rise by **7–8%**.
- Intensity may increase by **7.16–7.32%**.
- Transition durations may shorten by **2.47–3.24%**.

Implications for India and the World

- **Agriculture:** Sudden temperature swings can devastate crops, as seen in Europe in 2021. In India, such events may increase crop failure risks, affecting food security.
- **Public Health:** Flip events heighten the risks of heat stress, hypothermia, and the spread of climate-sensitive diseases.
- **Energy Systems:** Rapid shifts can lead to **unpredictable energy demands** for heating and cooling, risking **power shortages** especially in low-income regions.
- **Urban Planning and Infrastructure:** Buildings and roads are often not designed to withstand both heat and cold extremes within short periods.

Way Forward

1. Climate Mitigation:

- Accelerate reduction in **greenhouse gas emissions** through renewable energy adoption and sustainable practices.
- Fulfill and enhance commitments under the **Paris Agreement** and other global climate accords.

2. Adaptive Infrastructure:

- Invest in **climate-resilient infrastructure**, particularly in vulnerable regions.

- Encourage **climate-smart agriculture** to reduce crop loss from temperature volatility.
- 3. **Early Warning Systems:**
 - Develop and deploy **advanced meteorological tools** to detect upcoming flips and issue timely alerts.
- 4. **Policy and Governance:**
 - Incorporate **temperature flip scenarios in national climate adaptation strategies**.
 - Prioritize **funding and capacity-building** in low-income and high-exposure countries.
- 5. **Global Cooperation:**
 - Foster **international scientific collaboration** to better understand and predict temperature flip dynamics.
 - Ensure **equitable climate finance** to help poorer nations adapt and mitigate these emerging risks.

The phenomenon of **temperature flips**—once underrecognized—has now emerged as a **critical climate challenge** of the 21st century. As the world continues to warm, the **frequency, severity, and impact** of such events are likely to grow, placing immense pressure on public health, agriculture, and infrastructure. For India and other developing nations, where vulnerabilities are higher, **swift, science-based, and inclusive policies** are essential. Combating these risks requires **urgent global action**, robust **adaptation mechanisms**, and **climate justice** to safeguard lives and livelihoods in an increasingly unstable climate.

Q. Consider the following statements about the recent study on global temperature ‘flips’:

1. Temperature ‘flips’ refer to sudden and intense shifts between extreme heat and cold over short durations, posing challenges for adaptation.
2. The frequency and intensity of temperature flips have decreased since the late 20th century due to improved climate regulation measures.
3. Low-income countries, especially in South and Southeast Asia, are projected to experience significantly higher exposure to temperature flips compared to the global average.

Which of the statements given above is/are correct?

[UPSC Pre. Practice Question]

- (a) 1 and 2 only (b) 1 and 3 only
(c) 2 and 3 only (d) 1, 2 and 3

Ans. (b) 1 and 3 only

5.9. RED-CROWNED ROOFED TURTLE

Why in the News?

The endangered **Red-Crowned Roofed Turtle (Batagur kachuga)** has made a historic return to the **Ganga River** after a gap of **over three decades**, thanks to the efforts of the **Namami Gange Mission**.

Background and Ecological Significance

- Once commonly found along the Ganga, the Red-Crowned Roofed Turtle saw a **dramatic decline in population**, with no confirmed sightings in the main river channel since the 1990s. A 2020-2022 assessment under the **TSAFI project** in Haiderpur Wetland and near **Prayagraj** confirmed the **absence of viable populations**. The species was considered one of the **most endangered reptiles** in northern India.

Historic Reintroduction Efforts

- On **April 26, 2025**, **20 turtles** sourced from the **Garhaita Turtle Conservation Center** under the supervision of the **National Chambal Sanctuary** were reintroduced into the Ganga at Haiderpur Wetland (Uttar Pradesh). The turtles were **tagged with sonic devices** to track their movement and survival. Two distinct strategies—upstream and downstream releases—were employed to assess the most effective method for reintroduction.

Way Forward

- During the **monsoon**, Haiderpur Wetland will fully connect to the Ganga, enabling natural dispersal.
- A **two-year monitoring** program will track migration, survival, and adaptation.
- This effort is a **model for “soft vs hard” release** techniques in rewilding endangered species.
- Active collaboration with the **Uttar Pradesh Forest Department** will ensure long-term sustainability.

The return of the **Red-Crowned Roofed Turtle** is not just a species recovery success but a **symbol of hope** for the Ganga's **ecological revival**. It reflects the growing effectiveness of integrated conservation missions like **Namami Gange**, which combine **pollution abatement**, **ecosystem restoration**, and **community engagement**.

Q. Which of the following turtles are naturally found in India?

1. Red-Crowned Roofed Turtle (*Batagur kachuga*)
2. Olive Ridley Turtle (*Lepidochelys olivacea*)
3. Green Sea Turtle (*Chelonia mydas*)
4. Leatherback Sea Turtle (*Dermochelys coriacea*)
5. Hawksbill Turtle (*Eretmochelys imbricata*)
6. Indian Star Tortoise (*Geochelone elegans*)

Select the correct answer using the code given below: *[UPSC Pre. Practice Question]*

- (a) 1, 2, 3 and 6 only
(b) 1, 2, 3, 4 and 5 only
(c) 2, 3, 4, 5 and 6 only
(d) All of the above

Ans. (d) All of the above

* * * * *

6.1. GPS SPOOFING

Why in the News?

India faces a growing threat to its airspace, with over 465 GPS interference and spoofing incidents reported in the Amritsar and Jammu air corridors between 2023 and 2025, as confirmed by the Ministry of State for Civil Aviation in March 2025. These incidents impact commercial flights and surveillance aircraft, posing serious risks to aviation safety and national security. Previously seen in conflict zones like West Asia and Eastern Europe, GPS spoofing is now affecting India's western and northeastern borders, likely as part of grey-zone warfare by adversaries such as Pakistan and China.

What is GPS Spoofing and Why It Matters

GPS spoofing involves transmitting fake satellite signals to mislead navigation systems, causing them to display incorrect location, speed, or time data. Unlike jamming, which blocks signals, spoofing is stealthier and harder to detect. Aircraft rely on weak satellite signals from over 20,000 kilometers away, making them vulnerable to stronger fake signals that can disrupt critical systems, including:

- Flight Management System (FMS)
- Automatic Dependent Surveillance (ADS-B/ADS-C)
- Ground Proximity Warning Systems

Such disruptions can lead to off-course navigation, missed terrain warnings, or incorrect location data sent to air traffic control, endangering lives and operations.

Global Use of GPS Spoofing

GPS spoofing has become a staple in modern warfare:

- **Russia:** Utilized systems like Krasukha-4 and Tirada-2 during the Ukraine conflict.
- **Iran:** Allegedly spoofed a U.S. drone in 2011.
- **Azerbaijan:** Employed spoofing to disable Armenian air defenses, enabling drone dominance.

These cases highlight spoofing's role in electronic and asymmetric warfare, a tactic now emerging in India.

Spoofing in India: Alarming Trends

From November 2023 to February 2025, GPS spoofing incidents surged, particularly along India's sensitive borders. Key statistics include:

Metric	Details
GPS Spoofing Cases (Nov 2023 – Feb 2025)	Over 465
Main Regions Affected	Amritsar, Jammu, North-East (Manipur, Nagaland)
Air Corridors	Amritsar FIR, Jammu FIR, Delhi FIR
Delhi FIR Ranking	9th globally for GPS interference
Drones Intercepted by BSF (2023–2025)	Nearly 300 (mostly from Pakistan)
Drone Payloads	Narcotics, fake currency, small arms
Low GNSS Accuracy Zones (GPSjam data)	India-Pakistan and India-Myanmar borders
Spoofing Rate in Delhi FIR (per OPSGROUP)	Daily reports since 2024

The correlation between drone incursions and spoofing suggests a coordinated strategy to obscure illicit activities. GPSjam and OPSGROUP data indicate that spoofing affects approximately 10% of flights in the Delhi Flight Information Region daily since 2024.

Role of Non-State Actors

Beyond state actors like Pakistan and China, non-state groups such as drug traffickers, arms smugglers, and insurgents are leveraging affordable spoofing tools. Software-defined radios (SDRs) and GPS simulators enable:

- Small, battery-operated spoofers
- Drone-mounted devices

These tools allow criminals to evade detection, smuggle goods, or target sensitive areas. When backed by state actors, such as Pakistan supporting terrorist groups, spoofing becomes a hybrid threat combining terrorism, smuggling, and electronic warfare.

Global Recognition of the Threat

The 14th ICAO Air Navigation Conference in 2024 classified GNSS interference as a “significant cyber risk,” underscoring its global impact, particularly for nations facing border tensions or grey-zone tactics.

What India Should Do

To counter GPS spoofing, India must adopt a multi-layered strategy:

1. **Promote NavIC:** Expand the use of India’s regional navigation system, NavIC, for commercial and military applications as a GPS alternative.
2. **Deploy Detection Systems:** Install ground and airborne sensors for real-time spoofing detection using triangulation, alongside optical gyroscopes and satellite-free navigation.
3. **Support Indigenous Technologies:** Develop affordable NavIC receivers and anti-spoofing tools to reduce reliance on foreign hardware, particularly from hostile nations.
4. **Upgrade Aircraft Safety Systems:** Equip aircraft with Receiver Autonomous Integrity Monitoring (RAIM) and multi-sensor GNSS for enhanced accuracy.
5. **Accelerate GAGAN Adoption:** Address delays in adopting GAGAN, India’s Satellite-Based Augmentation System, through ISRO and the Airports Authority of India.
6. **Leverage Military Tools Like SAMBHAV:** Adapt SAMBHAV’s encrypted communication technology for aviation security.
7. **Crowdsourced Detection Network:** Use civilian devices like smartphones for real-time GNSS interference monitoring.
8. **Global Collaboration:** Partner with ICAO and neighboring countries to share data and adopt best practices.

GPS spoofing is a silent yet potent threat to India’s aviation safety and national security, particularly near its borders. As incidents rise, India must act swiftly with advanced technology, robust policies, and international cooperation. By modernizing its defenses and promoting systems like NavIC and GAGAN, India can safeguard its airspace and lead globally in secure navigation systems.

Q. Discuss the emerging threat of GPS spoofing to India’s aviation safety and national security. Evaluate the measures taken by the Indian government to counter this threat and suggest additional strategies to strengthen India’s airspace security. *[UPSC MAINS Practice Question]*

6.2. SARVAM AI TO BUILD INDIA'S FIRST SOVEREIGN LLM WITH REASONING AND VOICE CAPABILITIES

Why in the News:

The Indian government has selected Bengaluru-based start-up Sarvam to develop the country's first indigenous large language model (LLM) as part of the ambitious ₹10,370 crore IndiaAI Mission. This initiative comes amid global competition, notably from China's DeepSeek model.

Background of the News:

The IndiaAI Mission aims to boost India's strategic autonomy in AI by developing indigenous capabilities and reducing reliance on foreign AI systems. Sarvam AI, a Bengaluru-based start-up, was chosen after a competitive selection process involving 67 applicants. Sarvam will be tasked with building a homegrown sovereign AI large language model (LLM) with 70 billion parameters, designed to excel in reasoning, voice-based tasks, and fluency in Indian languages.

Historical Context:

The increasing reliance on artificial intelligence globally has brought attention to the need for data sovereignty and local solutions. Previous efforts in India have focused on integrating AI, but the IndiaAI Mission marks the first major government push toward creating sovereign AI systems. The selection of Sarvam AI for this project marks a significant step in India's efforts to develop domestic AI infrastructure that aligns with national needs and languages.

Government Initiative:

The IndiaAI Mission, approved by the Union Cabinet, focuses on developing AI infrastructure, including compute capacity, datasets, and trusted AI practices. Key initiatives like the IndiaAI Compute Capacity program will deploy over 10,000 GPUs to democratize AI access. The government has also eased eligibility norms for startups to access these resources at competitive rates, ensuring a broad-based participation in AI development.

Way Forward:

To ensure the success of the Sarvam AI model, it will be critical to overcome challenges related to dataset integration, engineering innovations for multilingual support, and fine-tuning the model for contextual and cultural relevance. There is also an opportunity to use AI in rural citizen services and enterprise-grade applications. The model must also focus on data privacy and security, ensuring all AI processes are managed within India's borders.

The IndiaAI Mission and Sarvam's involvement in building India's first sovereign AI LLM highlight a crucial step toward positioning India as a leader in AI innovation. The project not only fosters local talent but also ensures data sovereignty, paving the way for a more self-reliant AI ecosystem in India.

Q. Which of the following is the focus of the 'IndiaAI Mission' launched by the Indian government? *[UPSC Pre. Practice Question]*

- (a) Development of AI models for space applications
- (b) Promoting AI in defense and security sectors
- (c) Building indigenous AI infrastructure to boost India's strategic autonomy
- (d) Creating AI systems for global trade and economics

Ans. (c) Building indigenous AI infrastructure to boost India's strategic autonomy

Q. Discuss the implications of the IndiaAI Mission for India's AI ecosystem and data sovereignty. How does this initiative contribute to India's technological independence in the context of global AI developments?

[UPSC MAINS Practice Question]

6.3. GUT MICROBIOTA

Why in the news?

A recent study highlighted that climate-induced changes in the yield and nutritional quality of various foods could tip the balance of gut microbiota towards strains associated with malnutrition

Gut Microbiota

- The **gut microbiota** refers to the community of trillions of microorganisms, including bacteria, viruses, and fungi, living in the human digestive tract.
- These microbes play a vital role in **digestion, nutrient absorption, immunity regulation**, and even influence **mental health** and metabolic functions.
- A **balanced gut microbiome** is essential for overall health, while disruptions—known as **gut dysbiosis**—are linked to conditions such as **diabetes, inflammatory bowel disease (IBD), eczema**, and neurological disorders.

Climate Change and Its Impact on Gut Health

- **Nutrient Loss:** Rising CO₂ levels reduce vital nutrients (iron, zinc, protein) in crops like wheat and rice, weakening diet quality and gut health.
- **Food Diversity Decline:** Climate-related drops in plant, seafood, and livestock yields reduce dietary diversity, essential for microbial variety.
- **Malnutrition Rise:** Poor agricultural output worsens undernutrition in LMICs, disrupting gut function.
- **Heat & Infections:** More heatwaves mean more foodborne illnesses, directly harming the gut.
- **Environmental Microbe Disruption:** Changes in soil and water microbiomes affect food safety and, in turn, the human gut.
- **Vulnerable Populations:** Urban poor face a mix of heat stress, poor diet, and unsafe water—amplifying gut health risks.

Way Forward

- **Expand Metagenomic Research:** Use tools like *GutBugBD* to decode microbial functions, their interactions with drugs, and their nutritional impacts.
- **Generate Local Data:** Promote **population-specific microbiome studies** to understand climate-gut health connections in different regions.
- **Interdisciplinary Collaboration:** Encourage partnerships between **ecologists, medical researchers, nutritionists, and data scientists** to address the complexity of this issue.
- **Policy Integration:** Include **climate-microbiome-health** linkages in public health planning and nutrition programs.
- **Secure Targeted Funding:** Fill **research funding gaps** for climate-gut microbiome studies to promote integrated global solutions.

The gut microbiome is a crucial yet underrecognized part of the climate-health equation. As climate change alters food systems, nutrient availability, and environmental microbes, the resulting effects on gut health could have far-reaching public health implications. A coordinated, multidisciplinary

approach—backed by robust data and inclusive policy—is essential to protect human health in a warming world.

Q. Examine the impact of climate change on gut microbiota and its implications for public health in India. Suggest a multidisciplinary approach to address the challenges posed by climate-induced disruptions to gut health.
[UPSC MAINS Practice Question]

6.4. PROSTATE CANCER

Why in the News?

The diagnosis of Stage 4 metastatic prostate cancer in former U.S. President Joe Biden has garnered international attention.

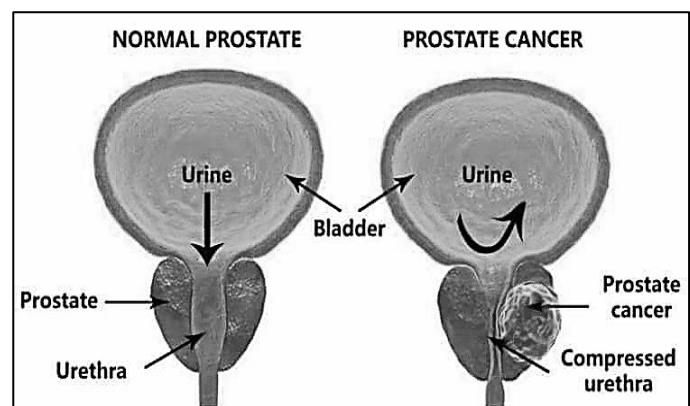
About Prostate Cancer :- Prostate cancer is a form of cancer characterized by the uncontrolled growth of cells within the prostate gland — a small gland that is part of the male reproductive system.

Symptoms :

- Increased urinary frequency or difficulty urinating
- Hematuria or hematospermia (blood in urine or semen)
- Painful ejaculation
- Discomfort or pain in the lower back, hips, or pelvic region

Risk Factors:

- Age: Predominantly affects men over 50, with peak incidence between 70–74 years.
- Family History and Lifestyle: Increased risk with a family history of prostate cancer, poor lifestyle choices, and obesity.



Treatment and Screening:

- Early prostate cancer is usually symptomless; regular screening is crucial for high-risk individuals.
- Early detection enables effective treatment via surgery or radiation.
- Other treatments include hormone therapy, immunotherapy (limited approval), and radioligand therapy.

Tests for Prostate Cancer:

Detection and Diagnosis:

- Prostate cancer is typically detected via PSA blood tests and digital rectal exams (DRE); screening is advised from age 45–50 for high-risk groups.
- Prostate-Specific Antigen (PSA Test): Detects elevated antigen levels linked to cancer.
- Digital Rectal Exam (DRE): Identifies prostate irregularities through a physical exam.
- Multiparametric MRI (mpMRI): Provides detailed imaging; MRI-targeted biopsy offers greater accuracy.
- Genomic Testing: Assesses cancer aggressiveness and guides personalized treatment.

Prevalence of Prostate Cancer:

- Global: Over 1.4 million new cases annually (2014); second most common cancer in men worldwide; approximately 375,000 deaths per year.

- India: Represents 3% of all cancers; limited screening poses a concern. Incidence is expected to double to 71,000 new cases annually by 2040.

Q. Consider the following statements about prostate cancer:

- Prostate cancer is usually symptomless in its early stages, making regular screening crucial for high-risk individuals.
- Digital Rectal Exam (DRE) and Prostate-Specific Antigen (PSA) test are common methods used for the early detection of prostate cancer.

Which of the statements given above is/are correct?

[UPSC Pre. Practice Question]

- (a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

Ans. (c) Both 1 and 2

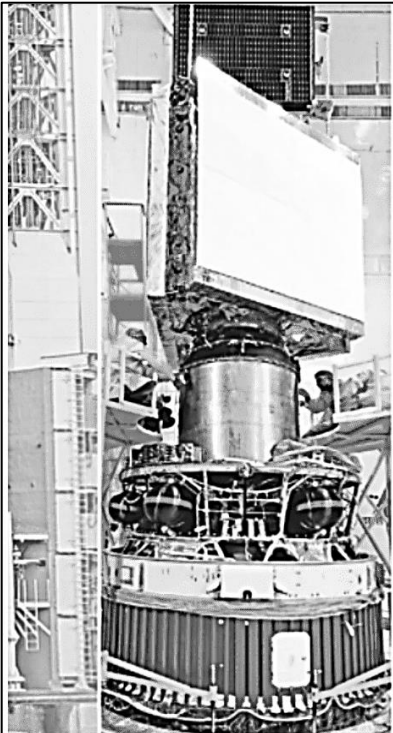




6.5. PSLV-C61 MISSION: ISRO'S 101ST LAUNCH FACES SETBACK

Why in the News?

ISRO's PSLV-C61 mission failed to deploy the Earth Observation Satellite-09 (EOS-09) into its intended sun-synchronous polar orbit due to an anomaly in the rocket's third stage.

PSLV-C61 Mission Overview and Outcome:-

- The PSLV-C61, carrying the 1,700-kg Earth Observation Satellite EOS-09, encountered a third-stage anomaly shortly after liftoff, leading to mission failure. The issue was traced to a drop in chamber pressure within the third-stage motor casing.
- EOS-09 was intended for deployment in a 597 km sun-synchronous polar orbit, enabling consistent Earth observation at the same local time daily.
- EOS-09 was equipped with a Synthetic Aperture Radar (SAR) payload, capable of capturing high-resolution images in all weather conditions for applications in land-use mapping, hydrology, and defence surveillance.

	EOS-09 satellite (RISAT-1B)	1 EOS-09 complements and supplements data from the Resourcesat, Cartosat and RISAT-2B series satellites
	Weight: 1,696.24 kg	2 The new satellite carries fuel for post-mission de-orbiting, ensuring it decays in two years and leaves no debris
Orbit: Sun Synchronous Polar Orbit (SSPO)	KEY APPLICATIONS	
Mission life: 5 years	 Agriculture & forestry monitoring	 Urban & infrastructure planning
Function: All-weather, high-resolution imaging of the Earth's surface across the country's vast territory	 National security surveillance	 Disaster management

Polar Satellite Launch Vehicle (PSLV):

- The Polar Satellite Launch Vehicle (PSLV) is an expendable launch vehicle developed by ISRO, with its first successful flight in 1994.
- It is regarded as ISRO's workhorse due to its proven reliability, versatility, and cost-efficiency.
- The PSLV operates with a four-stage propulsion system.

The PSLV's first stage is powered by a solid rocket motor using hydroxyl-terminated polybutadiene (HTPB) propellant.

- The second stage employs a liquid propulsion system with the Vikas engine, using unsymmetrical dimethylhydrazine (UDMH) as fuel and nitrogen tetroxide (N_2O_4) as oxidiser.
- The third stage features a solid rocket motor burning HTPB propellant, providing high thrust post the atmospheric phase.
- The fourth stage uses two liquid-fueled engines operating on monomethylhydrazine (MMH) and mixed oxides of nitrogen (MON).

Payload capacity:

- Up to 3,250 kg to Low Earth Orbit (LEO)
- Up to 1,600 kg to Sun-Synchronous Orbit (SSO)
- Up to 1,400 kg to Geosynchronous Transfer Orbit (GTO)

Successful launches: Landmark missions include Chandrayaan-1 (2008), Mars Orbiter Mission/Mangalyaan (2013), and a world-record launch of 104 satellites in a single flight (2017).

PSLV has been employed to launch a diverse range of payloads, including Earth observation, navigation, communication, and scientific satellites for both domestic and international clients.

PSLV has maintained a high success rate, with only three failures since the 1990s—in 1993 (maiden flight), 2017, and 2025.

Q. Consider the following statements about ISRO's Polar Satellite Launch Vehicle (PSLV):

1. The PSLV uses a four-stage propulsion system, alternating between solid and liquid propellants in consecutive stages.
2. The third stage of PSLV employs a liquid propulsion system powered by the Vikas engine.
3. PSLV has the capability to launch payloads up to 1,600 kg into Sun-Synchronous Orbit (SSO).

Which of the statements given above is/are correct?

[UPSC Pre. Practice Question]

- (a) 1 and 2 only (b) 3 only
(c) 1 and 3 only (d) 1, 2 and 3

Ans. (c) 1 and 3 only

6.6. BHARAT FORECAST SYSTEM

Why in the News?

The Ministry of Earth Sciences has unveiled the Bharat Forecast System, the world's highest-resolution numerical weather prediction model featuring a 6-kilometre grid. This advancement marks a significant leap in the forecasting capabilities of the India Meteorological Department, particularly in predicting extreme rainfall events and cyclones with greater accuracy.

Bharat Forecast System :- The Bharat Forecast System (BFS) is India's first indigenously developed numerical weather model. Developed by the Indian Institute of Tropical Meteorology (IITM), Pune.

Spatial resolution:- With a 6 km × 6 km resolution, BFS is the world's highest-resolution operational weather model, with plans to refine it to 3 km and 1 km.

Existing models like Coupled Forecasting System (CFS) and Global Forecasting System (GFS) operate at 12 km × 12 km, often missing localized weather variation in weather patterns.

BFS reduces the grid size to 36 sq km, enabling more precise and granular forecasts.

- The Bharat Forecast System (BFS) runs on the Arka supercomputer, with a computing power of 11.77 petaflops and 33 petabytes of storage.
- It integrates data from 40 Doppler Weather Radars nationwide, with plans to scale up to 100. This expanded radar network will enhance real-time data assimilation and enable accurate nowcasting (2-hour forecasts across the country.)

Significance:

- The Bharat Forecast System (BFS) offers high-resolution forecasts for localized weather events, aiding in disaster management, agriculture, and water resource planning. As a deterministic model, it delivers a single, precise forecast based on real-time data.
- Under experimental testing since 2022, BFS has improved forecast accuracy by 30–64%, depending on the event.
- This marks a major leap in India's weather forecasting, enhancing both climate resilience and disaster preparedness.

Q. Discuss the significance of the recently unveiled Bharat Forecast System (BFS) by the Ministry of Earth Sciences in enhancing India's weather forecasting capabilities. How can such high-resolution models contribute to disaster management, agriculture, and climate resilience in the country?

[UPSC MAINS Practice Question]

6.7. REGENERATIVE BRAKING SYSTEM

Why in the News?

India has launched its first 9000 HP electric freight locomotive in Dahod, Gujarat. This pioneering engine features regenerative braking, advancing the nation's railway technology.

Dahod-9000 Electric Engine:

Manufactured in Dahod, Gujarat, through a collaboration with the German engineering firm Siemens, this pioneering 9000-horsepower (HP) electric freight locomotive boasts a formidable haulage capacity of 5800 tonnes.

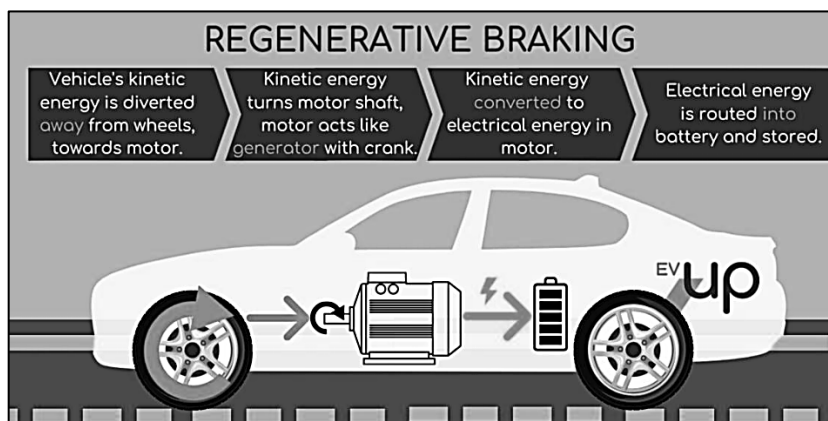
Features and Advantages:

- **Regenerative Braking:** The locomotive efficiently converts braking energy into power.
- **Performance:** This six-axle electric engine operates quietly, free from noise and vibration, achieving an average speed of 75 km/h (max 120 km/h).
- **Benefits:** Its deployment promises high quality, low operational costs, significant export potential, enhanced freight movement, and a substantial reduction in CO2 emissions.

What is a Regenerative Braking System

- A regenerative braking system is a technology in electric and hybrid vehicles designed to recover the kinetic energy typically lost during deceleration.
- In conventional braking, a moving vehicle's kinetic energy is converted into heat and dissipated.
- Regenerative braking, however, transforms this energy, which would otherwise be wasted, back into usable power.

- In contrast, regenerative braking systems convert the vehicle's kinetic energy into electrical energy. This is achieved by utilizing the electric motor as a generator during deceleration, allowing the recovered power to be stored in the vehicle's battery for subsequent use.



Understanding Regenerative Braking:

- **Kinetic Energy Conversion:** As a vehicle moves, it accumulates kinetic energy. Upon brake application, the regenerative system engages.
- **Motor as Generator:** The electric motor, typically used for propulsion, reverses its function, transforming into a generator. This process converts the vehicle's kinetic energy directly into electrical energy.
- **Energy Storage:** The newly generated electrical energy is then routed and stored within the vehicle's battery or supercapacitor.
- **Energy Reutilization:** This stored energy can subsequently be deployed to power the vehicle, thereby diminishing the reliance on external power sources and significantly enhancing overall efficiency.

Advantages of Regenerative Braking:

- **Enhanced Energy Efficiency and Emission Reduction:** By actively recovering and reusing kinetic energy, regenerative braking significantly curtails the vehicle's overall energy consumption and mitigates heat emissions.
- **Minimized Wear and Tear:** This system lessens the dependency on conventional friction brakes, consequently decreasing wear on brake components and leading to reduced maintenance expenditures.

Limitations of Regenerative Braking

- **Efficiency Variations:** The effectiveness of energy recovery diminishes proportionally with the vehicle's decrease in speed, as less kinetic energy is available for conversion and storage.
- **Supplemental Braking Required:** Regenerative braking alone is usually insufficient to bring a vehicle to a complete stop, thereby requiring the integration of conventional braking systems.

Q. Which of the following are applications or benefits of regenerative braking systems?

1. Enhancing energy efficiency by recovering kinetic energy during deceleration
2. Reducing wear and tear on conventional braking components
3. Completely replacing conventional brakes to bring the vehicle to a full stop
4. Reducing CO2 emissions by lowering overall energy consumption

Select the correct answer using the code given below:

[UPSC Pre. Practice Question]

- (a) 1, 2, and 3 only (b) 1, 2, and 4 only
(c) 2, 3, and 4 only (d) All of the above

Ans. (b) 1, 2, and 4 only

6.8. CHANDRAYAAN 5 MISSION

Why in the News?

The Chandrayaan 5 mission, a joint undertaking between the Indian Space Research Organisation (ISRO) and the Japan Aerospace Exploration Agency (JAXA), has received official approval from the Indian Government.

About:

- The Lunar Polar Exploration Mission (LUPEX), also known as Chandrayaan-5, is a collaborative Indo-Japanese endeavor aimed at conducting in-depth exploration of the Moon's polar regions. The primary objective is to investigate the presence and distribution of water and water-ice on both the lunar surface and subsurface.
- The mission will be launched from the Tanegashima Space Center in Japan aboard the H3 Launch Vehicle, a next-generation Japanese rocket.
- The H3 rocket is a three-stage launch system utilizing a combination of solid propellants and cryogenic fuels—liquid hydrogen and liquid oxygen. Standing at 63 meters in height and weighing 574 metric tons, it is engineered for high-performance space missions.
- The operational duration of the LUPEX mission is anticipated to extend slightly beyond 100 days post-lunar landing, with a possible mission lifespan of up to one year, depending on environmental and technical factors.
- The tentative launch window is scheduled for 2027–2028.

Collaboration Between ISRO and JAXA

- The LUPEX mission represents a significant joint venture between the Indian Space Research Organisation (ISRO) and the Japan Aerospace Exploration Agency (JAXA). Under this collaboration:
- ISRO is responsible for developing the lunar lander, while JAXA will design and build the rover.
- The integrated LUPEX spacecraft is projected to weigh approximately 6,500 kilograms, which includes a 350-kilogram autonomous rover.
- The rover will autonomously traverse the lunar terrain in search of regions with a high probability of water presence. Equipped with a drilling mechanism, it will extract subsurface samples, which will then be subjected to detailed in-situ analysis using advanced scientific instruments mounted on the rover.

Scientific Payloads on Board LUPEX

The LUPEX mission will carry a suite of ten sophisticated scientific payloads, contributed by leading space agencies from around the world.

The payload distribution includes:

- Five payloads from the Japan Aerospace Exploration Agency (JAXA)
- Three payloads from the Indian Space Research Organisation (ISRO)
- One payload each from NASA and the European Space Agency (ESA)

The payloads are as follows:

1. Resource Investigating Water Analyzer (REIWA)
2. Lunar Thermogravimetric Analyzer (LTGA)
3. Triple-reflection Reflectron (TRITON)
4. Aquatic Detector using Optical Resonance (ADORE)
5. International Symposium of Antennas and Propagation (ISAP)
6. Advanced Lunar Imaging Spectrometer (ALIS)
7. Neutron Spectrometer
8. Ground Penetrating Radar
9. Exospheric Mass Spectrometer for LUPEX (EMS-L)
10. Mid-Infrared Imaging Spectrometer (MIR)

Lunar Missions by ISRO:

1. Chandrayaan-1 (2008)

- India's first lunar mission, launched by the Polar Satellite Launch Vehicle (PSLV). Orbited the Moon at 100 km altitude, mapping its surface in infrared, visible, and X-ray spectra. Carried out elemental and mineralogical analysis using reflected radiation. Deployed the Moon Impact Probe (MIP) to study the tenuous lunar atmosphere before impact.
- Provided the first conclusive evidence of water ice on the Moon's surface and in its exosphere.

2. Chandrayaan-2 (2019)

- India's second lunar mission, launched aboard the LVM-3 rocket.
- Featured an orbiter, lander (Vikram), and rover (Pragyan).
- The orbiter, in a 100 km polar orbit, has a 7.5-year mission life and continues to send data. The lander crashed during descent due to a software error, but 90–95% of mission goals were still achieved.
- The mission enhanced understanding of the Moon's evolution, and mapped minerals and water molecules in the polar regions.

3. Chandrayaan-3 (2023)

- India's third Moon mission, launched on LVM3. Carried only a lander (Vikram) and rover (Pragyan).
- Landed successfully on August 23, 2023, about 600 km from the Moon's South Pole.
- India became the 4th country to land on the Moon, after the US, Russia, and China.
- The rover worked for one lunar day (14 Earth days), studying the surface and sending data back to Earth.
- The landing site was named "Statio Shiv Shakti" by the International Astronomical Union.
- The mission was closely monitored by the Vikram Sarabhai Space Centre.

4. Chandrayaan-4 (Planned for - 2027)

- India's first lunar sample return mission, aiming to bring Moon soil back to Earth.
- Planned landing near Statio Shiv Shakti, close to the Moon's south pole.
- The mission will launch aboard two LVM-3 rockets, carrying five modules.
- Modules will dock in Earth orbit, travel together to the Moon, and undock in lunar orbit.
- After collecting samples, a return module will bring them back to Earth.

Why is there significant interest in water on the Moon?

- Water can be split through electrolysis to produce rocket fuel—hydrogen and oxygen. If abundant, it would serve as a crucial resource for future crewed space missions by reducing the need to carry large amounts of fuel from Earth.

- The LUPEX mission will target a lunar region where previous remote sensing strongly suggests the presence of water ice. The LUPEX rover will perform direct, in-situ measurements to confirm and quantify this water.
- Chandrayaan-5 / LUPEX represents a key short-term milestone in India's lunar exploration journey, supporting the vision of Indian astronauts landing on the Moon by 2040.

Q. Discuss the objectives and significance of the Chandrayaan-5 (LUPEX) mission. How does the Indo-Japanese collaboration in this mission enhance India's lunar exploration capabilities? Evaluate the potential impact of this mission on India's future space exploration and resource utilisation strategies.

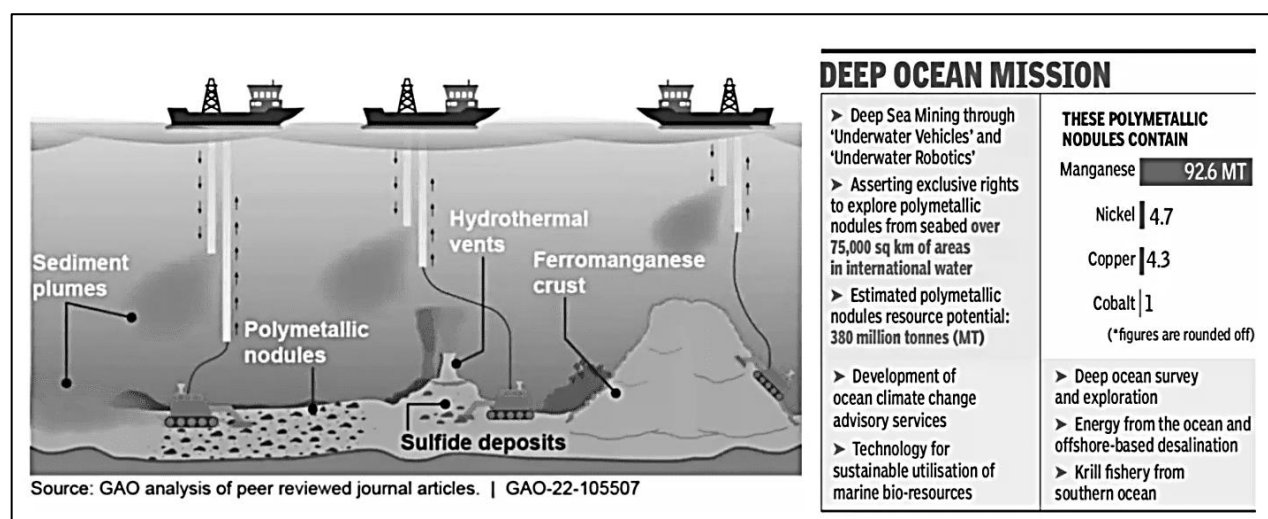
[UPSC MAINS Practice Question]

6.9. SAMUDRAYAAN': INDIA'S FIRST MANNED DEEP OCEAN MISSION

Why in the News?

India is poised to undertake its inaugural manned deep-ocean expedition, 'Samudrayaan', in 2026, with the objective of investigating marine resources at a depth of 6,000 meters, employing the indigenously engineered submersible 'Matsya'.

About Samudrayaan Mission:



The Samudrayaan Mission, an integral component of India's Deep Ocean Mission, is poised to launch by 2026, embarking on a pioneering exploration of the ocean's depths.

It features the MATSYA 6000, an indigenously designed fourth-generation manned submersible, capable of transporting three individuals to a depth of 6,000 meters.

- Developed by the National Institute of Ocean Technology in Chennai, the submersible exemplifies India's technological prowess.
- The MATSYA 6000 is equipped with an operational endurance of 12 hours and an emergency endurance of 96 hours.
- India's esteemed research vessel, Sagar Nidhi, will be employed for the deployment and recovery of the MATSYA 6000, ensuring seamless mission execution.

Significance of the Samudrayaan Mission:

- Scientific Advancement: Facilitates the collection of deep-sea samples, essential for advancing knowledge of marine biodiversity, geological structures, and chemical compositions.

- **Resource Assessment:** Enables evaluation of both living resources, such as marine biodiversity, and non-living resources, including minerals and polymetallic nodules.
- **Technological Prowess:** Demonstrates India's indigenous expertise in high-pressure deep-sea engineering.
- **Tourism Prospects:** Lays the groundwork for potential future ventures in deep-sea tourism.
- **Strategic Influence:** Strengthens India's standing in global ocean research and resource diplomacy.
- **Global Distinction:** Positions India among an elite group of nations—comprising the United States, Russia, France, Japan, and China—with the capability for manned deep-sea exploration.

Components:

- **Manned Submersible Development:** This component is dedicated to the development and deployment of the MATSYA 6000, a manned submersible engineered for operations at depths of up to 6,000 meters.
- **Deep-sea Biodiversity Exploration:** Investigates marine ecosystems to enhance understanding of oceanic life.
- **Polymetallic Nodule Mining:** Targets the extraction of valuable mineral resources from the ocean floor.
- **Ocean Climate Advisory Services:** This component involves developing observations and models to understand and predict climate change impacts
- **Marine Station for Ocean Biology:** Advances research in marine biological sciences.

Advanced Ocean Observation Systems: Employs underwater sensors and artificial intelligence for enhanced ocean monitoring.

Why has a depth of 6,000 m been chosen?

The United Nations International Seabed Authority (ISA) has designated India a 75,000 sq. km area in the central Indian Ocean, plus an additional 10,000 sq. km at 26° S, for deep-sea exploration.

Access to Deep-Ocean Resources: A depth of 6,000 meters enables exploration of the ocean's abyssal zone, where valuable resources such as polymetallic nodules, rich in manganese, nickel, cobalt, and copper, are abundant.

Challenges facing deep-ocean mission:

- **High Pressure:** At 6,000 meters, deep-ocean pressure equates to 10,000 kg per square meter, demanding robust, specially designed equipment made from durable materials.
- **Equipment Challenges:** Electronics and instruments, effective in vacuums or space, risk collapsing or imploding underwater if not meticulously engineered.
- **Limited Visibility:** Natural light penetrates only a few tens of meters underwater, unlike space observations aided by telescopes, necessitating advanced lighting and imaging systems.
- **Complex Environmental Factors:** Variations in temperature, corrosion, and salinity further complicate operations, requiring robust, specialized equipment to withstand these conditions.

Q. Discuss the objectives and significance of India's Samudrayaan Mission under the Deep Ocean Mission. How does the development of the MATSYA 6000 submersible demonstrate India's technological capabilities in deep-sea exploration?

ART & CULTURE

7.1. AYURVEDIC MANUSCRIPTS

Why in the News?

Recently, the Central Council for Research in Ayurvedic Sciences (CCRAS) under the Ministry of AYUSH revives Two Rare Ayurvedic Texts: *Dravyaratnākara Nighaṇṭu* and *Dravyanamākara Nighaṇṭu*.

Ayurvedic Manuscripts: Ayurvedic manuscripts are ancient texts preserving traditional medicinal knowledge, detailing plant identities, therapeutic uses, formulations, and pharmacological actions. *Nighaṇṭus* are specialized lexicons listing the properties of substances from plant, mineral, and animal sources.

Revived Ayurvedic Manuscripts: Key Highlights

- **Dravyaratnākara Nighaṇṭu**
 - Authored by Mudgala Paṇḍita in 1480 AD.
 - Contains 18 chapters on drug synonyms, therapeutic actions, and medicinal properties.
 - Draws from classical texts like *Dhanvantari* and *Raja Nighaṇṭu*.
 - Includes several previously undocumented substances.
 - Widely cited in Maharashtra until the 19th century.
 - Critically edited and revived by Dr. S. D. Kamat.
- **Dravyanamākara Nighaṇṭu**
 - Attributed to Bhisma Vaidya as an appendix to *Dhanvantari Nighaṇṭu*.
 - Focuses on homonyms in drug and plant names.
 - Contains 182 verses and two colophon verses.
 - Edited and annotated by Dr. S. D. Kamat.
 - Valuable for scholars of *Rasashastra*, *Bhaishajya Kalpana*, and classical pharmacology.

Q. Discuss the significance of reviving rare Ayurvedic manuscripts like *Dravyaratnākara Nighaṇṭu* and *Dravyanamākara Nighaṇṭu* for contemporary Ayurvedic research and practice.

[UPSC MAINS Practice Question]

SOCIAL ISSUES

8.1. WORLD SOCIAL REPORT 2025

Why in the News?

The recently released World Social Report 2025 by the United Nations paints a sobering picture of rising global insecurity, deepening inequality, and eroding trust in institutions. It calls for a new global policy focus on equity, economic security, and solidarity.

Key Findings from World Social Report 2025:

- **Economic Insecurity:** 60% of people face insecurity; 690 million remain in extreme poverty.
- **Inequality:** Income gaps widened in two-thirds of countries; richest 1% hold more wealth than 95%.
- **Fragile Livelihoods:** Informal, unstable jobs dominate, especially in Africa and South Asia.
- **Trust Erosion:** Over half distrust governments due to economic strain and governance issues.
- **Climate & Conflict:** 1 in 5 hit by climate shocks; 1 in 7 affected by conflict, reversing progress.
- **Positive Trends:** Over 1 billion lifted from poverty since 1995; improvements in health, literacy, and social inclusion.

Challenges and Gaps

- Despite economic growth, **income inequality persists and worsens** in many regions.
- **Job insecurity** remains high, with **60% of workers** fearing job loss.
- **Youth trust in institutions** has sharply declined, reflecting broader social disillusionment.
- **Digital misinformation** and online polarization threaten public discourse and social unity.
- **Climate change and armed conflicts** continue to undo progress, especially for the poorest communities.

Path Forward: Building a New Social Contract

To break the cycle of insecurity and inequality, the report recommends transformative action through:

1. Rebuilding Social Contracts

- Invest in **education, healthcare, decent work, and universal social protection** systems.

2. Promoting Fair Taxation

- Shift towards **progressive tax systems** to tackle extreme wealth concentration and finance public goods.

3. Strengthening Democratic Institutions

- Support **inclusive governance** to restore public trust and institutional legitimacy.

4. Enhancing Climate Resilience

- Prioritize **climate adaptation** strategies that protect vulnerable communities and promote sustainable development.

5. Advancing Global Cooperation

- Use international platforms, such as the upcoming **Second World Summit for Social Development**, to foster **renewed multilateralism** and global solidarity.

The World Social Report 2025 highlights that economic growth alone is insufficient. Rising inequality and insecurity demand a people-centered, inclusive, and resilient development approach. Bold policy reforms and strengthened global cooperation are essential for a just and secure future.

Q. Discuss the key challenges of rising insecurity and inequality highlighted in the World Social Report 2025, despite economic progress, and suggest measures India can implement to promote inclusive and secure development. *[UPSC MAINS Practice Question]*

8.2. THE GLOBAL PANDEMIC TREATY

Why in the News?

Recently, WHO Member States conclude negotiations and make significant progress on draft pandemic agreement

Draft Global Pandemic Treaty: The treaty aims to strengthen global preparedness and response to future pandemics by promoting equitable access to vaccines, treatments, and resources.

Why It's Needed: The COVID-19 pandemic exposed deep weaknesses in global health systems and international coordination. A 2022 study found that over one million lives could have been saved with fairer vaccine distribution to lower-income countries.

Key Provisions:

- **Pathogen Sharing and Benefits:** Countries will share pathogen samples and genomic data with manufacturers, who must allocate 10% of resulting vaccines, diagnostics, and treatments to the WHO, and another 10% at affordable prices.
- **Technology Transfer:** Nations are encouraged to support technology and knowledge sharing to enable drug and vaccine production in developing countries.
- **Publicly Funded Research Access:** Governments must ensure publicly funded research includes provisions for equitable and timely access to medical products during pandemics.

Limitations:

- **No Enforcement:** The treaty is non-binding, with no mechanisms to ensure compliance or impose public health measures.
- **Lack of IP Protections:** Weak intellectual property safeguards may deter pharmaceutical investment.
- **Operational Gaps:** The pathogen-sharing system lacks clear implementation protocols.
- **US Withdrawal:** The absence of the United States, a key player in global health, weakens the treaty's potential impact.

While the treaty is a significant step in global health diplomacy, its effectiveness may be limited without enforcement, clarity, and broad international commitment.

Q- “The Global Pandemic Treaty reflects progress in health diplomacy but suffers from key limitations.” Discuss its main features, shortcomings, and implications for India.

[UPSC MAINS Practice Question]

8.3. HUMAN DEVELOPMENT INDEX

Why in the news?

India continues its steady rise on the Human Development Index (HDI), ranking 130 out of 193 countries in the 2025 Human Development Report (HDR) titled ‘A matter of choice: People and possibilities in the age of Artificial Intelligence’ released by the United Nations Development Programme.

Key Highlights of the report

- India's HDI score rose from 0.644 in 2022 to 0.685 in 2023, driven by improvements in health, education, and income.
- Notably, India was the only low- or middle-income country among the top 10 in the Global AI Index, with the highest level of self-reported AI skills penetration.
- The country also showed improved retention of domestic AI talent: 20 per cent of Indian AI researchers reportedly remained in India in 2023, compared to almost none in 2019.
- The report highlighted persistent income and gender disparities as major barriers to inclusive development.
- Despite this, India remains in the medium human development category, sharing the same HDI value as Bangladesh, though key metrics differ.
- Pakistan ranks 168th with a score of 0.544 and Nepal at 145th with 0.622, while Sri Lanka holds the 89th position at 0.776.

Human Development Index

- A country's **Human Development Index value** is determined by aggregating the country's scores in a vast assortment of indicators including life expectancy, literacy rate, rural populations' access to electricity, GDP per capita, exports and imports, homicide rate, multidimensional poverty index, income inequality, internet availability, and many more.
- These indicators are compiled into a single number between 0 and 1.0, with 1.0 being the highest possible human development.
- HDI is divided into four tiers: very high human development (0.8-1.0), high human development (0.7-0.79), medium human development (0.55-.70), and low human development (below 0.55).

Table showing **India's Human Development progress** across key HDI indicators from **1990 to 2023**, based on the 2025 HDR:

HDI Parameter	1990	2023	Change / Remarks
HDI Rank	Not specified	130	Improved from rank 133 in 2022 to 130 in 2023
HDI Value Growth	Base year	+53% increase	Grew faster than global and South Asian averages
Life Expectancy (years)	58.6	72	Highest since index inception
Mean Years of Schooling	Not specified	Increased	Significant improvement (exact 2023 figure not given)
Expected Years of Schooling	8.2	13	Improved access to education
GNI per Capita (USD)	2,167.22	9,046.76	More than 4x growth in per capita income
Multidimensional Poverty	High	135 million exited	From 2015–16 to 2019–21

Key Programmes Supporting Progress	–	Health: NRHM, Ayushman Bharat, etc. Education: RTE, NEP 2020 Income: MGNREGA, Jan Dhan Yojana	Targeted social policies driving gains across all HDI dimensions
---	---	---	--

India's rise to 130th in the 2025 Human Development Index reflects steady progress in health, education, and income, driven by strong policy initiatives and digital innovation. However, persistent income and gender disparities highlight the need for more inclusive development to move beyond the medium HDI category.

Q. Analyze the factors contributing to India's improved ranking in the 2025 Human Development Index. Highlight the persistent challenges in achieving inclusive development and suggest policy measures to address them.

[UPSC MAINS Practice Question]

8.4. INDIA WITNESSES A STEADY DOWNWARD TREND IN MATERNAL AND CHILD MORTALITY

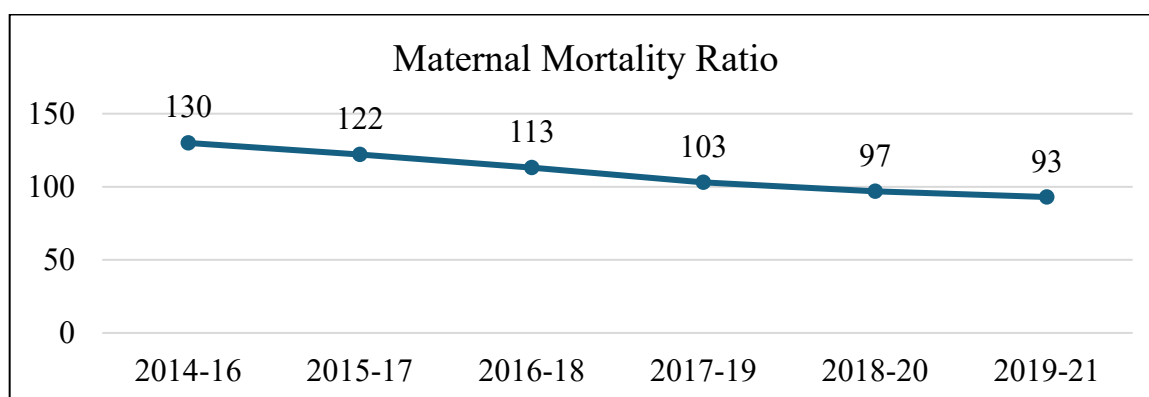
Why in the news?

As per the Sample Registration System (SRS) Report 2021 released by the Registrar General of India (RGI), India has continued to witness a significant improvement in key maternal and child health indicators.

Key Improvements in Indicators

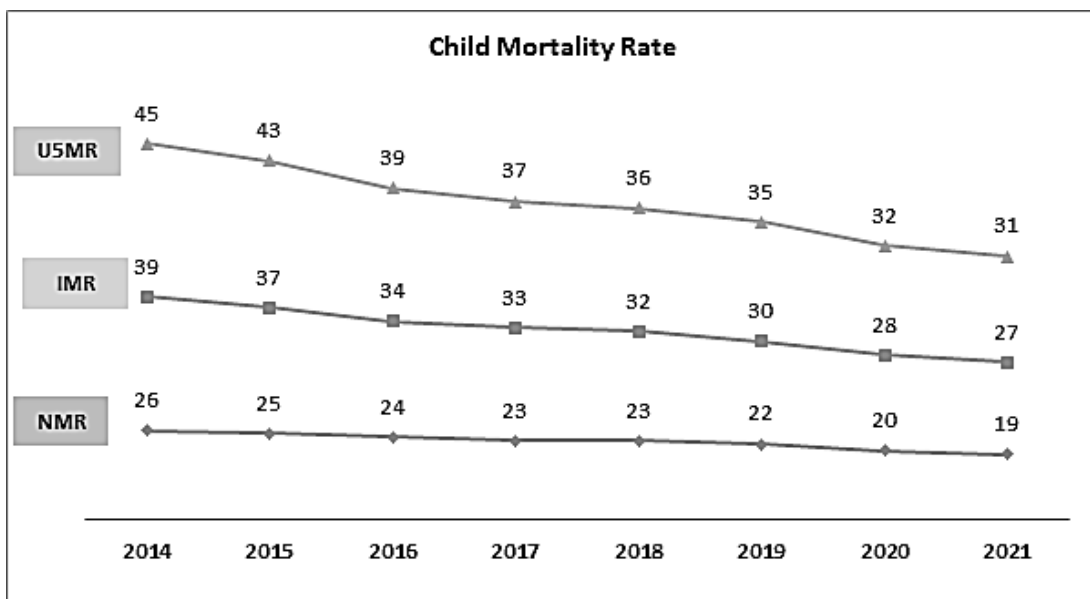
The SRS Report 2021 and related United Nations reports demonstrate India's progress in maternal and child health between 2014 and 2021, surpassing global reductions from 1990 to 2023:

- **Maternal Mortality Ratio (MMR):** Declined by 37 points from 130 per lakh live births in 2014–16 to 93 in 2019–21, an 86% reduction since 1990 compared to a global 48% reduction. Eight states, including Kerala (20) and Maharashtra (38), have already met the SDG target of $MMR \leq 70$ by 2030.



- **Infant Mortality Rate (IMR):** Dropped from 39 per 1,000 live births in 2014 to 27 in 2021, a 71% decline since 1990, surpassing the global 58% reduction.

- **Neonatal Mortality Rate (NMR):** Fell from 26 per 1,000 live births in 2014 to 19 in 2021, a 70% decline since 1990 compared to 54% globally. Six states/UTs, including Kerala (4) and Delhi (8), have achieved the SDG target of $\text{NMR} \leq 12$ by 2030.



- **Under-Five Mortality Rate (U5MR):** Reduced from 45 per 1,000 live births in 2014 to 31 in 2021, a 78% decline since 1990, outpacing the global 61% reduction. Twelve states/UTs, including Kerala (8) and Tamil Nadu (14), have met the SDG target of $\text{U5MR} \leq 25$ by 2030.
- **Total Fertility Rate (TFR):** Stabilized at 2.0 in 2021, down from 2.3 in 2014, indicating progress toward population stabilization.
- **Sex Ratio at Birth:** Improved from 899 to 913 between 2014 and 2021, reflecting better gender balance.

These improvements underscore India's commitment to reducing preventable maternal and child deaths, with several states achieving SDG targets ahead of schedule.

Definitions of Key Indicators

- **Maternal Mortality Ratio (MMR):** The number of maternal deaths per 100,000 live births due to pregnancy-related causes during pregnancy or within 42 days post-delivery. It reflects maternal healthcare quality and access.
- **Infant Mortality Rate (IMR):** The number of deaths of infants under one year per 1,000 live births, indicating overall child health and healthcare access.
- **Neonatal Mortality Rate (NMR):** The number of deaths of newborns within the first 28 days per 1,000 live births, highlighting early-life healthcare interventions.
- **Under-Five Mortality Rate (U5MR):** The number of deaths of children under five years per 1,000 live births, encompassing infant and early childhood mortality risks.
- **Total Fertility Rate (TFR):** The average number of children a woman would bear over her reproductive years, reflecting population growth trends.
- **Sex Ratio at Birth:** The number of female births per 1,000 male births, indicating gender balance and societal biases.

Key Challenges

Despite progress, challenges persist in achieving uniform health outcomes:

- **Regional Disparities:** Empowered Action Group (EAGA) states (e.g., Uttar Pradesh, Bihar) lag behind, with higher MMR (projected 78 by 2030) compared to southern states like Kerala.

- **Data Gaps:** Incomplete district-level maternal mortality data hinders targeted interventions. The last cause-of-death data release was in 2014, delaying policy updates.
- **Neonatal Mortality:** NMR declines slower than IMR, with prematurity (45.5%), birth asphyxia (15.1%), and pneumonia (12.6%) as leading causes, requiring specialized care.
- **Socioeconomic Barriers:** Rural-urban divides and economic disparities limit access to maternal and child health services, particularly for marginalized groups.
- **Health Infrastructure:** Inadequate funding, poor facilities, and workforce shortages in rural areas increase out-of-pocket expenses and reduce service quality.
- **COVID-19 Disruptions:** Interruptions in maternal services during 2020–21 may have stalled progress, requiring recovery efforts.

Way Forward

To sustain and accelerate progress, India must adopt a multi-pronged approach:

- **Targeted Interventions in EAGA States:** Prioritize high-burden regions with tailored programs, increased funding, and infrastructure upgrades to meet SDG targets.
- **Enhanced Data Systems:** Improve district-level data collection and timely release of cause-of-death statistics to inform policy.
- **Neonatal Care Focus:** Expand specialized neonatal units and train healthcare workers to address prematurity, asphyxia, and infections.
- **Equitable Access:** Bridge rural-urban and socioeconomic gaps through mobile health units, subsidized care, and community outreach.
- **Climate Resilience:** Integrate health strategies with climate adaptation to mitigate environmental impacts on maternal and child health.
- **Public Awareness:** Promote maternal education and community engagement to increase service utilization and preventive behaviors.
- **Global Learning:** Foster cross-state and international knowledge sharing to replicate successful models like Kerala's low NMR and MMR.

By addressing these challenges and building on its robust initiatives, India can achieve the SDG 2030 targets, ensuring equitable, high-quality healthcare for all mothers and children, and setting a global benchmark for public health progress.

Q. Analyze the factors driving India's significant decline in maternal and child mortality rates, as per the SRS Report 2021. Discuss the regional disparities and propose measures to achieve equitable health outcomes across all states by 2030. *[UPSC MAINS Practice Question]*

MISCELLANEOUS

9.1. TAMIL NADU BANS EGG MAYONNAISE

Why in the News?

On April 8, 2025, the Tamil Nadu government imposed a one-year ban on the manufacture, storage, distribution, and sale of mayonnaise made with raw eggs due to public health concerns, particularly the risk of foodborne illnesses in India's warm climate.

Background of the News:

The Tamil Nadu government's decision comes after concerns over the use of raw eggs in mayonnaise, which can carry harmful bacteria like Salmonella and E. coli. These bacteria pose serious health risks, particularly in India's humid conditions that facilitate their growth. The move follows similar actions in Telangana and is part of a broader effort to improve food safety standards.

Historical Context:

The issue of foodborne illnesses caused by bacteria like Salmonella has been a long-standing concern worldwide. In the past, similar concerns led to the banning or regulation of products in several countries. This ban in Tamil Nadu reflects a growing emphasis on food safety and public health across Indian states, including previous bans on gutka and paan masala.

Government Initiative:

Tamil Nadu's ban is part of its broader strategy to ensure food safety by regulating high-risk food items. The policy follows a similar action by Telangana in 2024 and continues the state's efforts to improve public health by reducing the prevalence of foodborne diseases.

Way Forward:

To minimize the impact of the ban, food businesses may shift to using eggless or pasteurized egg versions of mayonnaise. Public awareness campaigns on food safety and hygiene are needed, particularly in warmer climates, to prevent foodborne illnesses. Further studies on the health effects of other food items could be conducted to identify additional risks.

The ban on raw egg mayonnaise in Tamil Nadu is a preventive step aimed at improving public health and food safety. It reflects a growing trend of proactive food regulation across Indian states, addressing microbiological risks while encouraging safer food manufacturing practices. The move also aligns with the state's commitment to protecting vulnerable populations from foodborne diseases.

Q. Which of the following health risks is most associated with the use of raw egg in mayonnaise, as highlighted by the Tamil Nadu government's recent ban? *[UPSC Pre. Practice Question]*

- | | |
|-----------------|---------------------------------------|
| (a) Malaria | (b) Salmonella and E. coli infections |
| (c) Hepatitis A | (d) Tuberculosis |

Ans. (b) Salmonella and E. coli infections

9.2. WORLD MALARIA DAY – 2025

Why in the News?

World Malaria Day is observed annually on April 25, following its establishment by WHO Member States at the 2007 World Health Assembly.

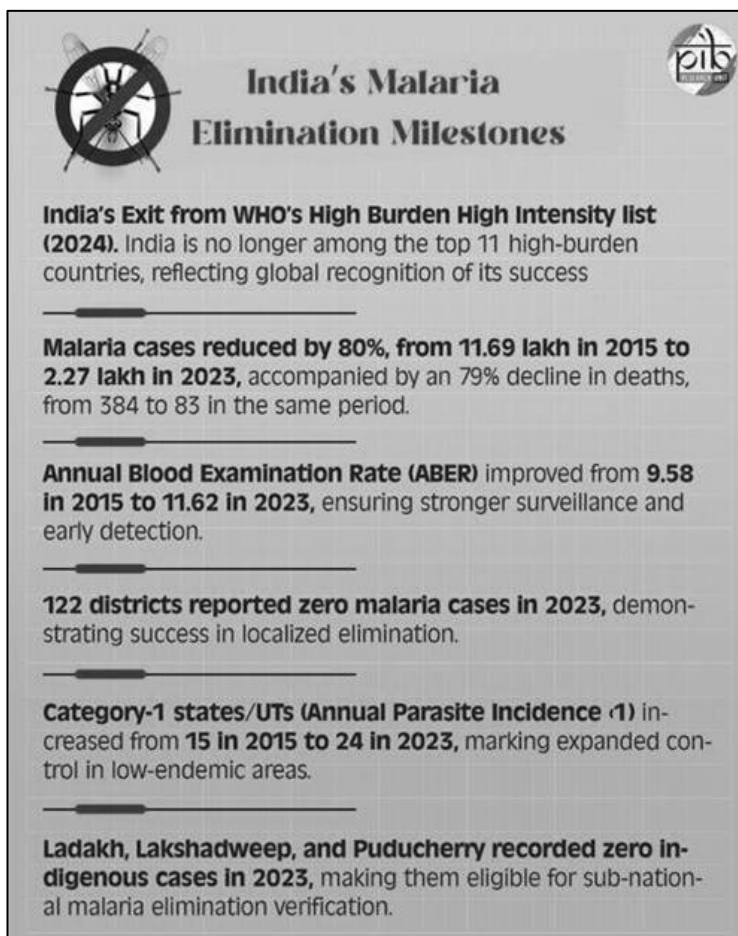
The theme for 2025, “*Malaria Ends with Us: Reinvest, Reimagine, Reignite,*” emphasizes the need for renewed global commitment, urging innovation, collaboration, and sustained efforts to eliminate malaria.

India’s Malaria Fight Gains Momentum: On Track for Elimination by 2030

Once among the world’s highest malaria-burdened nations, India has made remarkable progress through strong political will, grassroots engagement, and targeted interventions. A pivotal achievement came in 2024 when India exited the WHO’s High Burden to High Impact (HBHI) group—signaling a transformative shift in its malaria control efforts.

Under the guidance of the **National Framework for Malaria Elimination (2016–2030)** and the **National Strategic Plan (2023–2027)**, India has aligned its strategies with global standards while addressing local challenges effectively.

Between 2015 and 2023, malaria cases declined by **80.5%**, and malaria-related deaths dropped by **78.3%**. In a significant milestone, **over 122 districts reported zero cases** in the past year. With renewed determination, India is advancing toward its goal of achieving **zero indigenous cases by 2027** and full elimination by **2030**, setting a powerful example in global public health leadership.



Q. With reference to India’s malaria elimination efforts, consider the following statements:

1. India exited the WHO’s High Burden to High Impact (HBHI) group in 2024.
2. The National Framework for Malaria Elimination in India targets full elimination by 2030.
3. The theme of World Malaria Day 2025 is “Reignite and Reinvest for a Malaria-Free World.”

Which of the statements given above are correct?

[UPSC Pre. Practice Question]

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

Ans. (a) 1 and 2 only

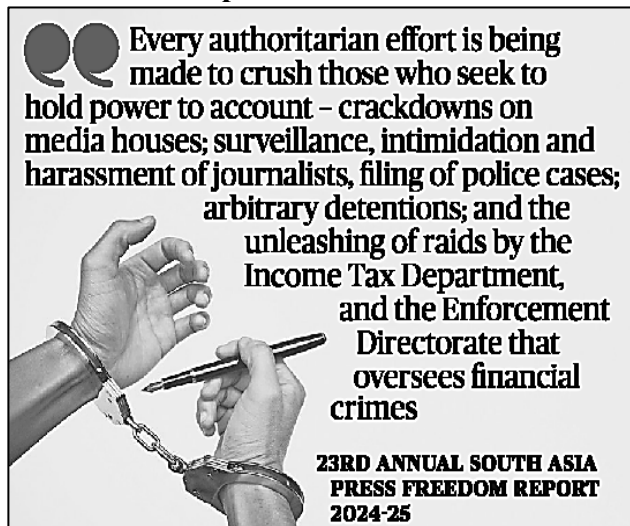
9.3. SOUTH ASIA PRESS FREEDOM REPORT 2024-25

Why in the news?

Indian media “has been shackled and subjected to a systemic strategy to cripple it”, according to the 23rd Annual South Asia Press Freedom Report 2024-25.

Key points from the 23rd Annual South Asia Press Freedom Report 2024-25:

- **Media Suppression in India:** The report highlights a systemic effort to **cripple** Indian media, including **legal challenges** (defamation, sedition, UAPA) that lead to **self-censorship** and a **growing trust deficit** in media outlets.
- **Violence Against Journalists in Pakistan:** Pakistan is noted as experiencing the **most violent year for journalists** in two decades, with **eight journalists killed**, while impunity for crimes against journalists remains high.
- **Authoritarian Tactics:** Governments in South Asia, especially India, are using measures like **surveillance**, **harassment**, and **withholding advertisements** to suppress media, often citing **national security** or **public order**.
- **Economic Pressures:** The report points out the **shrinking job market** for journalists, the rise of **gig work**, and the impact of **AI** on content creation, alongside **declining advertisement revenue**.
- **Digital Media Opportunities:** Despite challenges, the **digital transition** of the media presents new opportunities for **alternative media**, which serves as a counterbalance to traditional media.



The **South Asia Press Freedom Report 2024-25** highlights the growing suppression of media, particularly in India and Pakistan, through legal pressures, violence, and authoritarian tactics. Despite these challenges, the **digital transition** offers opportunities for alternative media. The report calls for stronger protections for journalists and greater media independence in the region.

Q. Critically evaluate the findings of the South Asia Press Freedom Report 2024-25 regarding media suppression in India. Discuss the role of digital media in fostering press freedom and suggest measures to protect journalists and ensure media independence.

[UPSC MAINS Practice Question]

9.4. INTERNATIONAL BOOKER PRIZE 2025

Why in the News?

Writer, activist, and lawyer Banu Mushtaq has been awarded the International Booker Prize 2025 for her short story collection, *Hridaya Deepa* (Heart Lamp).

About:

- *Hridaya Deepa* (Heart Lamp) is a collection of twelve short stories authored in Kannada by Banu Mushtaq.
- The work has been translated from Kannada into English by Deepa Bhashti.
- *Heart Lamp* offers narratives on the everyday lives of Muslim women, deeply influenced by their experiences of pain and suffering within a patriarchal societal structure.
- It holds the distinction of being the first Kannada literary work to be awarded the International Booker Prize.



International Booker Prize

- The International Booker Prize (formerly the Man Booker International Prize) is an international literary award administered in the United Kingdom.
- It is bestowed annually upon:
- A single work of fiction or a collection of short stories.
- The work must be originally written in a language other than English, translated into English, and published in the United Kingdom or Ireland.
- The winning title receives a £50,000 prize, which is shared equally between the author and the translator. This award serves to promote international literature within the English-speaking world.

Q. Consider the following statements about the International Booker Prize:

1. It is awarded annually to a single work of fiction originally written in English.
2. The prize is shared equally between the author and the translator.
3. The winning work must be translated into English and published in the United Kingdom or Ireland.

Which of the above statements is/are correct?

[UPSC Pre. Practice Question]

- (a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2, and 3

Ans. (b) 2 and 3 only

9.5. MADDEN-JULIAN OSCILLATION SPURS EARLY MONSOON ARRIVAL

Why in the News?

The premature arrival of the southwest monsoon over Kerala this year has caught the interest of meteorologists.

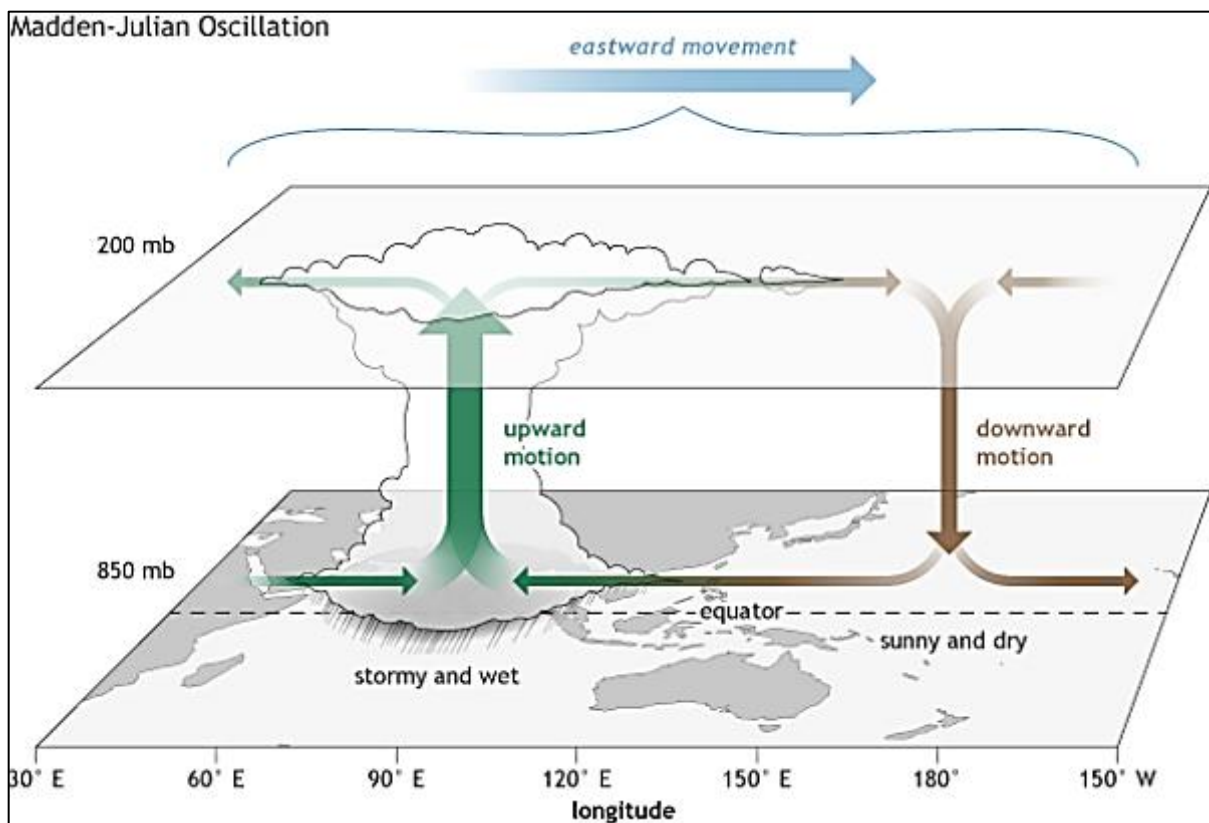
According to the India Meteorological Department (IMD), the Madden-Julian Oscillation (MJO) was a key catalyst in this early onset.

What is the Madden-Julian Oscillation (MJO)?

- The Madden-Julian Oscillation (MJO) is a transient, eastward-moving system of winds, clouds, and pressure disturbances that enhances rainfall as it travels along the equator.
- It was discovered in 1971 by atmospheric scientists Roland Madden and Paul Julian. The MJO moves eastward at a speed of 4–8 meters per second and typically completes a global circuit every 30–60 days, occasionally extending up to 90 days.
- As it propagates, the MJO often divides the tropical belt into two distinct regions—one experiencing its active phase, characterized by enhanced convection and rainfall, and the other under its suppressed phase, marked by reduced precipitation.

Geographical Influence of the Madden-Julian Oscillation (MJO)

- The MJO primarily affects the tropical belt between 30° North and 30° South of the equator, though its influence can extend into the mid-latitude regions of both hemispheres.
- This zone includes India, positioning the MJO as a vital driver of the South Asian monsoon system.
- During its active phase, areas under the MJO's influence typically witness above-average rainfall, driven by enhanced cloud formation, intensified convection, and increased cyclonic activity.



Contribution of MJO to the Early Monsoon

- Around May 22 this year, the MJO entered Phase 4 with an amplitude greater than 1, emerging over the Indian Ocean.
- Phase 4, when accompanied by a strong amplitude, signifies enhanced convective activity, favouring the development of intense rainfall and storm systems—ideal conditions for monsoon onset.

This atmospheric setup fostered frequent cyclonic activity and significant cloud accumulation over the Bay of Bengal, facilitating the premature onset of the southwest monsoon over Kerala.

Other Factors Contributing to the Early Monsoon

1. **Transition to La Niña:** In early 2025, global climate models signaled the weakening of El Niño conditions and the potential onset of La Niña—an oceanic pattern historically linked to stronger and earlier monsoon seasons over India.
2. **Stronger-than-usual Cross-Equatorial Winds:** During May, winds from the southern hemisphere cross the equator into the Arabian Sea. In 2025, these winds were notably stronger and more organized, rapidly transporting moisture-laden air toward the Indian coastline and accelerating the monsoon's arrival.
3. **Above-normal Sea Surface Temperatures:** Unusually warm sea surface temperatures in the Arabian Sea and Bay of Bengal intensified convective activity, promoting the formation of cloud bands and low-pressure systems essential for monsoon development.
4. In 2025, these temperatures were significantly above average, fostering early cloud build-up and aiding early cloud development.

Way Forward

- The early onset of the monsoon brings significant benefits, particularly for agriculture and water resource planning, offering a timely boost to kharif crop cultivation and reservoir replenishment.

- However, it also underscores growing climate-related vulnerabilities, as shifts in monsoon timing and intensity become more unpredictable.
- In this evolving climate landscape, enhancing early warning systems and refining monsoon forecasting models is imperative to protect lives, secure livelihoods, and ensure the resilience of ecosystems.

Q. Discuss the implications of the early onset of the monsoon for agriculture and water resource management in India. *[UPSC MAINS Practice Question]*

UPSC CSE PRELIMS – 2025 (GS PAPER – I)

1. Consider the following types of vehicles:

- I. Full battery electric vehicles
- II. Hydrogen fuel cell vehicles
- III. Fuel cell electric hybrid vehicles

How many of the above are considered as alternative powertrain vehicles?

- (a) Only one
- (b) Only two
- (c) All the three
- (d) None

Answer: (c)

2. With reference to Unmanned Aerial Vehicles (UAVs), consider the following statements:

- I. All types of UAVs can do vertical landing.
- II. All types of UAVs can do automated hovering.
- III. All types of UAVs can use battery only as a source of power supply.

How many of the statements given above are correct?

- (a) Only one
- (b) Only two
- (c) All the three
- (d) None

Answer: (d)

3. In the context of electric vehicle batteries, consider the following elements:

- I. Cobalt
- II. Graphite
- III. Lithium
- IV. Nickel

How many of the above usually make up battery cathodes?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All the four

Answer: (c)

4. Consider the following:

- I. Cigarette butts
- II. Eyeglass lenses
- III. Car tyres

How many of them contain plastic?

- (a) Only one
- (b) Only two
- (c) All the three
- (d) None

Answer: (c)

5. Consider the following substances:

- I. Ethanol
- II. Nitroglycerine
- III. Urea

Coal gasification technology can be used in the production of how many of them?

- (a) Only one
- (b) Only two
- (c) All the three
- (d) None

Answer: (c)

6. What is the common characteristic of the chemical substances generally known as CL-20, HMX and LLM-105, which are sometimes talked about in media?

- (a) These are alternatives to hydro-fluorocarbon refrigerants
- (b) These are explosives in military weapons
- (c) These are high-energy fuels for cruise missiles
- (d) These are fuels for rocket propulsion

Answer: (b)

7. Consider the following statements:

- I. It is expected that Majorana 1 chip will enable quantum computing.
- II. Majorana 1 chip has been introduced by Amazon Web Services (AWS).
- III. Deep learning is a subset of machine learning.

Which of the statements given above are correct?

- (a) I and II only
- (b) II and III only
- (c) I and III only
- (d) I, II and III

Answer: (c)

8. With reference to monoclonal antibodies, often mentioned in news, consider the following statements:

- I. They are man-made proteins.
- II. They stimulate immunological function due to their ability to bind to specific antigens.

III. They are used in treating viral infections like that of Nipah virus.

Which of the statements given above are correct?

- (a) I and II only (b) II and III only
(c) I and III only (d) I, II and III

Answer: (d)

9. Consider the following statements:

- I. No virus can survive in ocean waters.
II. No virus can infect bacteria.
III. No virus can change the cellular transcriptional activity in host cells.

How many of the statements given above are correct?

- (a) Only one (b) Only two
(c) All the three (d) None

Answer: (d)

10. Consider the following statements:

Statement I:

Activated carbon is a good and an attractive tool to remove pollutants from effluent streams and to remediate contaminants from various industries.

Statement II:

Activated carbon exhibits a large surface area and a strong potential for adsorbing heavy metals.

Statement III:

Activated carbon can be easily synthesized from environmental wastes with high carbon content.

Which one of the following is correct in respect of the above statements?

- (a) Both Statement II and Statement III are correct and both of them explain Statement I
(b) Both Statement II and Statement III are correct but only one of them explains Statement I
(c) Only one of the Statements II and III is correct and that explains Statement I
(d) Neither Statement II nor Statement III is correct

Answer: (a)

11. Consider the following statements:

Statement I:

Studies indicate that carbon dioxide emissions from cement industry account for more than 5% of global carbon emissions.

Statement II:

Silica-bearing clay is mixed with limestone while manufacturing cement.

Statement III:

Limestone is converted into lime during clinker production for cement manufacturing.

Which one of the following is correct in respect of the above statements?

- (a) Both Statement II and Statement III are correct and both of them explain Statement I
(b) Both Statement II and Statement III are correct but only one of them explains Statement I
(c) Only one of the Statements II and III is correct and that explains Statement I
(d) Neither Statement II nor Statement III is correct

Answer: (b)

12. Consider the following statements:

Statement I:

At the 28th United Nations Climate Change Conference (COP28), India refrained from signing the 'Declaration on Climate and Health'.

Statement II:

The COP28 Declaration on Climate and Health is a binding declaration; and if signed, it becomes mandatory to decarbonize health sector.

Statement III:

If India's health sector is decarbonized, the resilience of its health-care system may be compromised.

Which one of the following is correct in respect of the above statements?

- (a) Both Statement II and Statement III are correct and both of them explain Statement I

- (b) Both Statement II and Statement III are correct but only one of them explains Statement I
- (c) Only one of the Statements II and III is correct and that explains Statement I
- (d) Neither Statement II nor Statement III is correct

Answer: (c)

13. Consider the following statements:

Statement I:

Scientific studies suggest that a shift is taking place in the Earth's rotation and axis.

Statement II:

Solar flares and associated coronal mass ejections bombarded the Earth's outermost atmosphere with tremendous amount of energy.

Statement III:

As the Earth's polar ice melts, the water tends to move towards the equator.

Which one of the following is correct in respect of the above statements?

- (a) Both Statement II and Statement III are correct and both of them explain Statement I
- (b) Both Statement II and Statement III are correct but only one of them explains Statement I
- (c) Only one of the Statements II and III is correct and that explains Statement I
- (d) Neither Statement II nor Statement III is correct

Answer: (b)

14. Consider the following statements:

Statement I:

Article 6 of the Paris Agreement on climate change is frequently discussed in global discussions on sustainable development and climate change.

Statement II:

Article 6 of the Paris Agreement on climate change sets out the principles of carbon markets.

Statement III:

Article 6 of the Paris Agreement on climate change intends to promote inter-country non-market strategies to reach their climate targets.

Which one of the following is correct in respect of the above statements?

- (a) Both Statement II and Statement III are correct and both of them explain Statement I
- (b) Both Statement II and Statement III are correct but only one of them explains Statement I
- (c) Only one of the Statements II and III is correct and that explains Statement I
- (d) Neither Statement II nor Statement III is correct

Answer: (a)

15. Which one of the following launched the 'Nature Solutions Finance Hub for Asia and the Pacific'?

- (a) The Asian Development Bank (ADB)
- (b) The Asian Infrastructure Investment Bank (AIIB)
- (c) The New Development Bank (NDB)
- (d) The International Bank for Reconstruction and Development (IBRD)

Answer: (a)

16. With reference to 'Direct Air Capture', an emerging technology, which of the following statements is/are correct?

- I. It can be used as a way of carbon sequestration.
- II. It can be a valuable approach for plastic production and in food processing.
- III. In aviation, it can be a source of carbon for combining with hydrogen to create synthetic low-carbon fuel.

Select the correct answer using the code given below:

- (a) I and II only
- (b) III only
- (c) I, II and III
- (d) None of the above statements is correct

Answer: (c)

17. Regarding Peacock tarantula (Gooty tarantula), consider the following statements:

- I. It is an omnivorous crustacean.
- II. Its natural habitat in India is only limited to some forest areas.
- III. In its natural habitat, it is an arboreal species.

Which of the statements given above is/are correct?

- (a) I only
- (b) I and III
- (c) II only
- (d) II and III

Answer: (d)

18. Consider the following statements:

- I. Carbon dioxide (CO₂) emissions in India are less than 0.5 t CO₂ / capita.
- II. In terms of CO₂ emissions from fuel combustion, India ranks second in Asia-Pacific region.
- III. Electricity and heat producers are the largest sources of CO₂ emissions in India.

Which of the statements given above is/are correct?

- (a) I and III only
- (b) II only
- (c) II and III only
- (d) I, II and III

Answer: (c)

19. Consider the following pairs:

	Plant	Description
I.	Cassava	: Woody shrub
II.	Ginger	: Herb with pseudostem
III.	Malabar spinach	: Herbaceous climber
IV.	Mint	: Annual shrub
V.	Papaya	: Woody shrub

How many of the above pairs are correctly matched?

- (a) Only two
- (b) Only three (marked)
- (c) Only four (also marked)
- (d) All the five

Answer: (b)

20. With reference to the planet Earth, consider the following statements:

- I. Rain forests produce more oxygen than that produced by oceans.
- II. Marine phytoplankton and photosynthetic bacteria produce about 50% of world's oxygen.
- III. Well-oxygenated surface water contains several folds higher oxygen than that in atmospheric air.

Which of the statements given above is/are correct?

- (a) I and II
- (b) II only
- (c) I and III
- (d) None of the above statements is correct

Answer: (b)

21. Consider the following statements about Raja Ram Mohan Roy:

- I. He possessed great love and respect for the traditional philosophical systems of the East.
- II. He desired his countrymen to accept the rational and scientific approach and the principle of human dignity and social equality of all men and women.

Which of the statements given above is/are correct?

- (a) I only
- (b) II only
- (c) Both I and II
- (d) Neither I nor II

Answer: (c)

22. Consider the following subjects with regard to the Non-Cooperation Programme:

- I. Boycott of law-courts and foreign cloth
- II. Observance of strict non-violence
- III. Retention of titles and honours without using them in public
- IV. Establishment of Panchayats for settling disputes

How many of the above were parts of the Non-Cooperation Programme?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All the four

Answer: (b)

23. The irrigation device called ‘Araghatta’ was:

- (a) a water bag made of leather pulled over a pulley
- (b) a large wheel with earthen pots tied to the outer ends of its spokes
- (c) a larger earthen pot driven by bullocks
- (d) a large water bucket pulled up by rope directly by hand

Answer: (b)

24. Who among the following rulers in ancient India had assumed the titles ‘Mattavilasa’, ‘Vichitrachitta’ and ‘Gunabhara’?

- (a) Mahendravarman I
- (b) Simhavishnu
- (c) Narasimhavarman I
- (d) Simhavarmman

Answer: (a)

25. Fa-hien (Faxian), the Chinese pilgrim, travelled to India during the reign of:

- (a) Samudragupta
- (b) Chandragupta II
- (c) Kumaragupta I
- (d) Skandagupta

Answer: (b)

26. Who among the following led a successful military campaign against the kingdom of Srivijaya, the powerful maritime State, which ruled the Malay Peninsula, Sumatra, Java and the neighbouring islands?

- (a) Amoghavarsha (Rashtrakuta)
- (b) Prataparudra (Kakatiya)
- (c) Rajendra I (Chola)
- (d) Vishnuvardhana (Hoysala)

Answer: (c)

27. With reference to ancient India (600–322 BC), consider the following pairs:

	Territorial Region	River Flowing in the Region
I.	Asmaka	: Godavari
II.	Kamboja	: Vipasa
III.	Avanti	: Mahanadi
IV.	Kosala	: Sarayu

How many of the pairs given above are correctly matched?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All the four

Answer: (b)

28. The first Gandharva Mahavidyalaya, a music training school, was set up in 1901 by Vishnu Digambar Paluskar in:

- (a) Delhi
- (b) Gwalior
- (c) Ujjain
- (d) Lahore

Answer: (d)

29. Ashokan inscriptions suggest that the ‘Pradeshika’, ‘Rajuka’, and ‘Yukta’ were important officers at the:

- (a) village-level administration
- (b) district-level administration
- (c) provincial administration
- (d) level of the central administration

Answer: (b)

30. Consider the following statements in respect of the Non-Cooperation Movement:

- I. The Congress declared the attainment of ‘Swaraj’ by all legitimate and peaceful means to be its objective.
- II. It was to be implemented in stages with civil disobedience and non-payment of taxes for the next stage only if ‘Swaraj’ did not come within a year and the Government resorted to repression.

Which of the statements given above is/are correct?

- (a) I only
- (b) II only
- (c) Both I and II
- (d) Neither I nor II

Answer: (d)

31. With reference to investments, consider the following:

- I. Bonds
- II. Hedge Funds
- III. Stocks
- IV. Venture Capital

How many of the above are treated as Alternative Investment Funds?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All the four

Answer: (b)

32. Which of the following are the sources of income for the Reserve Bank of India?

- I. Buying and selling Government bonds
- II. Buying and selling foreign currency
- III. Pension fund management
- IV. Lending to private companies
- V. Printing and distributing currency notes

Select the correct answer using the code given below:

- (a) I and II only
- (b) II, III and IV
- (c) I, III, IV and V
- (d) I, II and V

Answer: (d)

33. With reference to the Government of India, consider the following information:

	Organization	Some of its functions	It works under
I.	Directorate of Enforcement	Enforcement of the Fugitive Economic Offenders Act, 2018	Internal Security Division-I, Ministry of Home Affairs
II.	Directorate of Revenue Intelligence	Enforces the Provisions of the Customs Act, 1962	Department of Revenue, Ministry of Finance
III.	Directorate General of Systems and Data Management	Carrying out big data analytics to assist tax officers for better policy and nabbing tax evaders	Department of Revenue, Ministry of Finance

In how many of the above rows is the information correctly matched?

- (a) Only one
- (b) Only two
- (c) All the three
- (d) None

Answer: (b)

34. Consider the following statements:

- I. The Reserve Bank of India mandates all the listed companies in India to submit a Business Responsibility and Sustainability Report (BRSR).
- II. In India, a company submitting a BRSR makes disclosure in the report that are largely non-financial in nature.

Which of the statements given above is/are correct?

- (a) I only
- (b) II only
- (c) Both I and II
- (d) Neither I nor II

Answer: (b)

35. Consider the following statements:

Statement I:

In India, income from allied agricultural activities like poultry farming is exempted from income tax.

Statement II:

Income from rural agricultural land is exempt from tax under the provisions of the Income-tax Act, 1961.

Which one of the following is correct in respect of the above statements?

- (a) Both Statement I and Statement II are correct and Statement II is the correct explanation of Statement I
- (b) Both Statement I and Statement II are correct but Statement II is not the correct explanation of Statement I
- (c) Statement I is correct but Statement II is incorrect
- (d) Statement I is incorrect but Statement II is correct

Answer: (d)

36. Consider the following statements:

- I. India has joined the Minerals Security Partnership as a member.
- II. India is a resource-rich country in all the 30 critical minerals that (It) has identified.
- III. The Parliament in 2023 has amended the Mines and Minerals (Development and Regulation) Act, 1957 empowering the Central Government to exclusively auction mining lease and composite license for certain critical minerals.

Which of the statements given above are correct?

- (a) I and II only
- (b) II and III only
- (c) I and III only
- (d) I, II and III

Answer: (c)

37. Consider the following statements:

Statement I:

As regards returns from an investment in a company, generally, bondholders are considered to be relatively at lower risk than stockholders.

Statement II:

Bondholders are lenders to a company whereas stockholders are its owners.

Statement III:

For repayment purpose, bondholders are prioritized over stockholders by a company. Which one of the following is correct in respect of the above statements?

- (a) Both Statement II and Statement III are correct and both of them explain Statement I
- (b) Both Statement I and Statement II are correct and Statement I explains Statement II
- (c) Only one of the Statements II and III is correct and that explains Statement I
- (d) Neither Statement II nor Statement III is correct

Answer: (a)

38. Consider the following statements:

- I. India accounts for a very large portion of all equity option contracts traded globally thus exhibiting a great boom.
- II. India's stock market has grown rapidly in the recent past even overtaking Hong Kong's at some point of time.
- III. There is no regulatory body either to warn the small investors about the risks of options trading or to act on unregistered financial advisors in this regard.

Which of the statements given above are correct?

- (a) I and II only
- (b) II and III only
- (c) I and III only
- (d) I, II and III

Answer: (a)

39. Consider the following statements:

Statement I:

Circular economy reduces the emissions of greenhouse gases.

Statement II:

Circular economy reduces the use of raw materials as inputs.

Statement III:

Circular economy reduces wastage in the production process.

Which one of the following is correct in respect of the above statements?

- (a) Both Statement II and Statement III are correct and both of them explain Statement I
- (b) Both Statement II and Statement III are correct but only one of them explains Statement I
- (c) Only one of the Statements II and III is correct and that explains Statement I
- (d) Neither Statement II nor Statement III is correct

Answer: (a)

40. Consider the following statements:

- I. Capital receipts create a liability or cause a reduction in the assets of the Government.

II. Borrowings and disinvestment are capital receipts.

III. Interest received on loans creates a liability of the Government.

Which of the statements given above are correct?

- (a) I and II only (b) II and III only
(c) I and III only (d) I, II and III

Answer: (a)

41. Consider the following countries:

- I. Austria
II. Bulgaria
III. Croatia
IV. Serbia
V. Sweden
VI. North Macedonia

How many of the above are members of the North Atlantic Treaty Organization?

- (a) Only three (b) Only four
(c) Only five (d) All the six

Answer: (b)

42. Consider the following countries:

- I. Bolivia
II. Brazil
III. Colombia
IV. Ecuador
V. Paraguay
VI. Venezuela

Andes mountains pass through how many of the above countries?

- (a) Only two (b) Only three
(c) Only four (d) Only five

Answer: (c)

43. Consider the following water bodies

- I. Lake Tanganyika
II. Lake Tonlé Sap
III. Patos Lagoon

Through how many of them does the equator pass?

- (a) Only one (b) Only two
(c) All the three (d) None

Answer: (d)

44. Consider the following statements about turmeric during the year 2022–23:

I. India is the largest producer and exporter of turmeric in the world.

II. More than 30 varieties of turmeric are grown in India.

III. Maharashtra, Telangana, Karnataka and Tamil Nadu are major turmeric producing States in India.

Which of the statements given above are correct?

- (a) I and II only (b) II and III only
(c) I and III only (d) I, II and III

Answer: (d)

45. Which of the following are the evidences of the phenomenon of continental drift?

I. The belt of ancient rocks from Brazil coast matches with those from Western Africa.

II. The gold deposits of Ghana are derived from the Brazil plateau when the two continents lay side by side.

III. The Gondwana system of sediments from India is known to have its counterparts in six different landmasses of the Southern Hemisphere.

Select the correct answer using the code given below.

- (a) I and III only (b) I and II only
(c) I, II and III (d) II and III only

Answer: (c)

46. Consider the following statements:

Statement I:

The amount of dust particles in the atmosphere is more in subtropical and temperate areas than in equatorial and polar regions.

Statement II:

Subtropical and temperate areas have less dry winds.

Which one of the following is correct in respect of the above statements?

- (a) Both Statement I and Statement II are correct and Statement II explains Statement I
- (b) Both Statement I and Statement II are correct but Statement II does not explain Statement I
- (c) Statement I is correct but Statement II is not correct
- (d) Statement I is not correct but Statement II is correct

Answer: (c)

47. Consider the following statements:

Statement I:

In January, in the Northern Hemisphere, the isotherms bend equatorward while crossing the landmasses, and poleward while crossing the oceans.

Statement II:

In January, the air over the oceans is warmer than that over the landmasses in the Northern Hemisphere.

Which one of the following is correct in respect of the above statements?

- (a) Both Statement I and Statement II are correct and Statement II explains Statement I
- (b) Both Statement I and Statement II are correct but Statement II does not explain Statement I
- (c) Statement I is correct but Statement II is not correct
- (d) Statement I is not correct but Statement II is correct

Answer: (a)

48. Consider the following statements:

Statement I:

In the context of effect of water on rocks, chalk is known as a very permeable rock – whereas clay is known as quite an impermeable or least permeable rock.

Statement II:

Chalk is porous and hence can absorb water.

Statement III:

Clay is not at all porous.

Which one of the following is correct in respect of the above statements?

- (a) Both Statement II and Statement III are correct and both of them explain Statement I
- (b) Both Statement II and Statement III are correct but only one of them explains Statement I
- (c) Only one of the Statements II and III is correct and that explains Statement I
- (d) Neither Statement II nor Statement III is correct

Answer: (c)

49. Consider the following statements:

- I. Without the atmosphere, temperature would be well below freezing point everywhere on the Earth's surface.
- II. Heat absorbed and trapped by the atmosphere maintains our planet's average temperature.
- III. Atmosphere's gases, like carbon dioxide, are particularly good at absorbing and trapping radiation.

Which of the statements given above are correct?

- (a) I and III only
- (b) I and II only
- (c) I, II and III
- (d) II and III only

Answer: (c)

50. Consider the following statements about the Rashtriya Gokul Mission:

- I. It is important for the upliftment of the rural poor as the majority of low-producing indigenous animals are with small and marginal farmers and landless labourers.
- II. It was initiated to promote indigenous cattle and buffalo rearing and conservation in a scientific and holistic manner.

Which of the statements given above is/are correct?

- (a) I only
- (b) II only
- (c) Both I and II
- (d) Neither I nor II

Answer: (c)

51. Consider the following statements:

- I. Panchayats at the intermediate level exist in all States.
- II. To be eligible to be a Member of a Panchayat at the intermediate level, a person should attain the age of thirty years.
- III. The Chief Minister of a State constitutes a commission to review the financial position of Panchayats at the intermediate levels and to make recommendations regarding the distribution of net proceeds of taxes and duties, leviable by the State, between the State and Panchayats at the intermediate level.

Which of the statements given above are not correct?

- (a) I and II only
- (b) II and III only
- (c) I and III only
- (d) I, II and III

Answer: (d)

52. Consider the following statements in respect of BIMSTEC:

- I. It is a (regional) organization consisting of seven member States till January 2025.
- II. It came into existence with the signing of the Dhaka Declaration, 1999.
- III. Bangladesh, India, Sri Lanka, Thailand and Nepal are founding member States of BIMSTEC.
- IV. In BIMSTEC, the subsector of 'tourism' is being led by India.

Which of the statements given above is/are correct?

- (a) I and II
- (b) II and III
- (c) I and IV
- (d) I only

Answer: (c)

53. Who amongst the following are members of the Jury to select the recipient of 'Gandhi Peace Prize'?

- I. The President of India
- II. The Prime Minister of India
- III. The Chief Justice of India

IV. The Leader of Opposition in the Lok Sabha

Select the correct answer using the code given below.

- (a) II and IV only
- (b) I, II and III
- (c) II, III and IV
- (d) I and III only

Answer: (c)

54. GPS-Aided Geo Augmented Navigation (GAGAN) uses a system of ground stations to provide necessary augmentation. Which of the following statements is/are correct in respect of GAGAN?

- I. It is designed to provide additional accuracy and integrity.
- II. It will allow more uniform and high-quality air traffic management.
- III. It will provide benefits only in aviation but not in other modes of transportation.

Select the correct answer using the code given below:

- (a) I, II and III
- (b) II and III only
- (c) I only
- (d) I and II only

Answer: (d)

55. Consider the following statements regarding AI Action Summit held in Grand Palais, Paris in February 2025:

- I. Co-chaired with India, the event builds on the advances made at the Bletchley Park Summit held in 2023 and the Seoul Summit held in 2024.
- II. Along with other countries, US and UK also signed the declaration on inclusive and sustainable AI.

Which of the statements given above is/are correct?

- (a) I only
- (b) II only
- (c) Both I and II
- (d) Neither I nor II

Answer: (a)

56. Consider the following pairs:

- I. International Year of the Woman F : 2026
- II. International Year of Sustainable and Resilient Tourism : 2027

III. International Year of Peace and Trust : 2025

IV. International Year of Asian Awareness and Planetary Defence : 2029

How many of the pairs are correctly matched?

- (a) Only one (b) Only two
(c) Only three (d) All the four

Answer: (d)

57. Consider the following statements with regard to BRICS:

- I. 16th BRICS Summit was held under the Chairship of Russia in Kazan.
II. Indonesia has become a full member of BRICS.
III. The theme of the 16th BRICS Summit was Strengthening Multiculturalism for Just Global Development and Security.

Which of the statements given above is/are correct?

- (a) I and II (b) II and III
(c) I and III (d) I only

Answer: (a)

58. Consider the following statements about Lokpal:

- I. The power of Lokpal applies to public servants of India, but not to the Indian public servants posted outside India.
II. The Chairperson or a Member shall not be a Member of the Parliament or a Member of the Legislature of any State or Union Territory, and only the Chief Justice of India, whether incumbent or retired, has to be its Chairperson.
III. The Chairperson or a Member shall not be a person of less than forty-five years of age on the date of assuming office as the Chairperson or Member, as the case may be.
IV. Lokpal cannot inquire into the allegations of corruption against a sitting Prime Minister of India.

Which of the statements given above is/are correct?

- (a) III only
(b) II and III
(c) I and IV
(d) None of the above statements is correct
Answer: (a)

59. Consider the following statements in respect of the first Kho Kho World Cup:

- I. The event was held in Delhi, India.
II. Indian men beat Nepal with a score of 78–40 in the final to become the World Champion in men's category.
III. Indian women beat Nepal with a score of 54–36 in the final to become the World Champion in women's category.

Which of the statements given above is/are correct?

- (a) I only (b) II and III only
(c) I and III only (d) I, II and III

Answer: (a)

60. Consider the following statements:

- I. In the finals of the 45th Chess Olympiad held in 2024, Gukesh Dommaraju became the world's youngest winner after defeating the Russian player Nepomniachtchi.
II. Abhimanyu Mishra, an American chess player, holds the record of becoming the world's youngest ever Grandmaster.

Which of the statements given above is/are correct?

- (a) I only (b) II only
(c) Both I and II (d) Neither I nor II

Answer: (b)

61. Consider the following statements:

Statement I:

Some rare earth elements are used in the manufacture of flat television screens and computer monitors.

Statement II:

Some rare earth elements have phosphorescent properties.

Which one of the following is correct in respect of the above statements?

- (a) Both Statement I and Statement II are correct and Statement II explains Statement I

- (b) Both Statement I and Statement II are correct but Statement II does not explain Statement I
- (c) Statement I is correct but Statement II is not correct
- (d) Statement I is not correct but Statement II is correct

Answer: (a)

62. Consider the following statements:

- I. Indian Railways have prepared a National Rail Plan (NRP) to create a “future ready” railway system by 2028.
- II. “Kavach” is an Automatic Train Protection system developed in collaboration with Germany.
- III. The “Kavach” system consists of RFID tags fitted on the track in station sections.

Which of the statements given above are not correct?

- (a) I and II only
- (b) II and III only
- (c) I and III only
- (d) I, II and III

Answer: (a)

63. Consider the following space missions:

- I. Axiom-4
- II. SpaDeX
- III. Gaganyaan

How many of the space missions given above encourage and support micro-gravity research?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

Answer: (c)

64. With reference to India’s defence, consider the following pairs:

Aircraft type	Description
I. Dornier-228	: Maritime patrol aircraft
II. IL-76	: Supersonic combat aircraft
III. C-17	: Globemaster III Military transport aircraft

How many of the pairs given above are correctly matched?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

Answer: (b)

65. Artificial way of causing rainfall to reduce air pollution makes use of

- (a) Silver iodide and potassium iodide
- (b) Silver nitrate and potassium iodide
- (c) Silver iodide and potassium nitrate
- (d) Silver nitrate and potassium chloride

Answer: (a)

66. Consider the following statements with regard to pardoning power of the President of India:

- I. The exercise of this power by the President can be subjected to limited judicial review.
- II. The President can exercise this power without the advice of the Central Government.

Which of the statements given above is/are correct?

- (a) I only
- (b) II only
- (c) Both I and II
- (d) Neither I nor II

Answer: (a)

67. Consider the following statements:

- I. On the dissolution of the House of the People, the Speaker shall not vacate his/her office until immediately before the first meeting of the House of the People after the dissolution.
- II. According to the provisions of the Constitution of India, a Member of the House of the People on being elected as Speaker shall resign from his/her political party immediately.
- III. The Speaker of the House of the People may be removed from his/her office by a resolution of the House of the People passed by a majority of all the then Members of the House, provided that no

resolution shall be moved unless at least fourteen days' notice has been given of the intention to move the resolution.

Which of the statements given above are correct?

- (a) I and II only (b) II and III only
(c) I and III only (d) I, II and III

Answer: (a)

68. Consider the following statements:

- I. If any question arises as to whether a Member of the House of the People has become subject to disqualification under the 10th Schedule, the President's decision in accordance with the opinion of the Council of Union Ministers shall be final.
II. There is no mention of the word 'political party' in the Constitution of India.

Which of the statements given above is/are correct?

- (a) I only (b) II only
(c) Both I and II (d) Neither I nor II

Answer: (d)

69. Consider the following statements:

Statement I:

In India, State Governments have no power for making rules for grant of concessions in respect of extraction of minor minerals even though such minerals are located in their territories.

Statement II:

In India, the Central Government has the power to notify minor minerals under the relevant law.

Which one of the following is correct in respect of the above statements?

- (a) Both Statement I and Statement II are correct and Statement II explains Statement I
(b) Both Statement I and Statement II are correct but Statement II does not explain Statement I

(c) Statement I is correct but Statement II is not correct

(d) Statement I is not correct but Statement II is correct

Answer: (d)

70. Which organization has enacted the Nature Restoration Law (NRL) to tackle climate change and biodiversity loss?

- (a) The European Union
(b) The World Bank
(c) The Organization for Economic Cooperation and Development
(d) The Food and Agriculture Organization

Answer: (a)

71. Suppose the revenue expenditure is ₹80,000 crores and the revenue receipts of the Government are ₹60,000 crores.

The Government budget also shows borrowings of ₹10,000 crores and interest payments of ₹6,000 crores.

Which of the following statements are correct?

- I. Revenue deficit is ₹20,000 crores.
II. Fiscal deficit is ₹10,000 crores.
III. Primary deficit is ₹4,000 crores.

Select the correct answer using the code given below:

- (a) I and II only (b) II and III only
(c) I and III only (d) I, II and III

Answer: (d)

72. India is one of the founding members of the International North-South Transport Corridor (INSTC), a multimodal transportation corridor, which will connect

- (a) India to Central Asia to Europe via Iran
(b) India to Central Asia via China
(c) India to South-East Asia through Bangladesh and Myanmar
(d) India to Europe through Azerbaijan

Answer: (a)

73. Consider the following statements:

Statement I:

Of the two major ethanol producers in the world, i.e., Brazil and the United States of America, the former produces more ethanol than the latter.

Statement II:

Unlike in the United States of America where corn is the principal feedstock for ethanol production, sugarcane is the principal feedstock for ethanol production in Brazil.

Which one of the following is correct in respect of the above statements?

- (a) Both Statement I and Statement II are correct and Statement II explains Statement I
- (b) Both Statement I and Statement II are correct but Statement II does not explain Statement I
- (c) Statement I is correct but Statement II is not correct
- (d) Statement I is not correct but Statement II is correct

Answer: (d)

74. The World Bank warned that India could become one of the first places where wet-bulb temperatures routinely exceed 35°C. Which of the following statements best reflect(s) the implication of the above-said report?

- I. Peninsular India will most likely suffer from flooding, tropical cyclones and droughts.
- II. The survival of animals including humans will be affected as shedding of their body heat through perspiration becomes difficult.

Select the correct answer using the code given below.

- (a) I only
- (b) II only
- (c) Both I and II
- (d) Neither I nor II

Answer: (c)

75. A country's fiscal deficit stands at ₹50,000 crores. It is receiving ₹10,000 crores through non-debt creating capital receipts. The country's interest liabilities are ₹1,500 crores.

What is the gross primary deficit?

- (a) ₹48,500 crores
- (b) ₹51,500 crores
- (c) ₹58,500 crores
- (d) None of the above

Answer: (a)

76. Which of the following statements with regard to recommendations of the 15th Finance Commission of India are correct?

- I. It has recommended grants of ₹ 4,800 crores from the year 2022-23 to the year 2025-26 for incentivizing States to enhance educational outcomes.
- II. 45% of the net proceeds of Union taxes are to be shared with States.
- III. ₹45,000 crores are to be kept as performance-based incentive for all States for carrying out agricultural reforms.
- IV. It reintroduced tax effort criteria to reward fiscal performance.

Select the correct answer using the code given below.

- (a) I, II and III
- (b) I, II and IV
- (c) I, III and IV
- (d) II, III and IV

Answer: (c)

77. Consider the following statements in respect of the International Bank for Reconstruction and Development (IBRD):

- I. It provides loans and guarantees to middle income countries.
- II. It works single-handedly to help developing countries to reduce poverty.
- III. It was established to help Europe rebuild after the World War II.

Which of the statements given above are correct?

- (a) I and II only (b) II and III only
(c) I and III only (d) I, II and III

Answer: (c)

78. Consider the following statements in respect of RTGS and NEFT :

- I. In RTGS, the settlement time is instantaneous while in case of NEFT, it takes some time to settle payments.
II. In RTGS, the customer is charged for inward transactions while that is not the case for NEFT.
III. Operating hours for RTGS are restricted on certain days while this is not true for NEFT.

Which of the statements given above is/are correct?

- (a) I only (b) I and II
(c) I and III (d) III only

Answer: (a)

79. Consider the following countries:

- I. United Arab Emirates
II. France
III. Germany
IV. Singapore
V. Bangladesh

How many countries amongst the above are there other than India where international merchant payments are accepted under UPI?

- (a) Only two (b) Only three
(c) Only four (d) All the five

Answer: (b)

80. Consider the following statements about PM Surya Ghar Muft Bijli Yojana:

- I. It targets installation of one crore solar rooftop panels in the residential sector.
II. The Ministry of New and Renewable Energy aims to impart training on installation, operation, maintenance, and repairs of solar rooftop systems at grassroots levels.

- III. It aims to create more than three lakhs skilled manpower through fresh skilling, and up-skilling, under scheme component of capacity building.

Which of the statements given above are correct?

- (a) I and II only (b) I and III only
(c) II and III only (d) I, II and III

Answer: (d)

81. With reference to the Indian polity, consider the following statements:

- I. An Ordinance can amend any Central Act.
II. An Ordinance can abridge a Fundamental Right.
III. An Ordinance can come into effect from a back date.

Which of the statements given above are correct?

- (a) I and II only (b) II and III only
(c) I and III only (d) I, II and III

Answer: (c)

82. Consider the following pairs:

State	Description
I. Arunachal Pradesh	: The capital is named after a fort, and the State has two National Parks
II. Nagaland	: The State came into existence on the basis of a Constitutional Amendment Act
III. Tripura	: Initially a Part 'C' State, it became a centrally administered territory with the reorganization of States in 1956 and later attained the status of a full-fledged State

How many of the above pairs are correctly matched?

- (a) Only one (b) Only two
(c) All the three (d) None

Answer: (c)

83. With reference to India, consider the following:

- I. The Inter-State Council
- II. The National Security Council
- III. Zonal Councils

How many of the above were established as per the provisions of the Constitution of India?

- (a) Only one
- (b) Only two
- (c) All the three
- (d) None

Answer: (a)

84. Consider the following statements:

- I. The Constitution of India explicitly mentions that in certain spheres the Governor of a State acts in his/her own discretion.
- II. The President of India can, of his/her own, reserve a bill passed by a State Legislature for his/her consideration without it being forwarded by the Governor of the State concerned.

Which of the statements given above is/are correct?

- (a) I only
- (b) II only
- (c) Both I and II
- (d) Neither I nor II

Answer: (a)

85. Consider the following pairs:

	Provision in the Constitution of India	Stated under
I.	Separation of Judiciary from the Executive in the public services of the State	The Directive Principles of the State Policy
II.	Valuing and preserving the rich heritage of our composite culture	The Fundamental Duties
III.	Prohibition of employment of children below the age of 14 years in factories	The Fundamental Rights

How many of the above pairs are correctly matched?

- (a) Only one
- (b) Only two
- (c) All the three
- (d) None

Answer: (c)

86. Consider the following statements:

With reference to the Constitution of India, if an area in a State is declared as Scheduled Area under the Fifth Schedule:

- I. The State Government loses its executive power in such areas and a local body assumes total administration.
- II. The Union Government can take over the total administration of such areas under certain circumstances on the recommendations of the Governor.

Which of the statements given above is/are correct?

- (a) I only
- (b) II only
- (c) Both I and II
- (d) Neither I nor II

Answer: (d)

87. With reference to India, consider the following pairs:

	Organization	Union Ministry
I.	The National Automotive Board	Ministry of Commerce and Industry
II.	The Coir Board	Ministry of Heavy Industries
III.	The National Centre for Trade Information	Ministry of Micro, Small and Medium Enterprises

How many of the above pairs are correctly matched?

- (a) Only one
- (b) Only two
- (c) All the three
- (d) None

Answer: (d)

88. Consider the following subjects under the Constitution of India:

- I. List I – Union List, in the Seventh Schedule
- II. Extent of the executive power of a State
- III. Conditions of the Governor's office

For a constitutional amendment with respect to which of the above, ratification by the Legislatures of not less than one-half of the States is required before presenting the bill to the President of India for assent?

- (a) I and II only (b) II and III only
(c) I and III only (d) I, II and III

Answer: (a)

89. With reference to the Indian polity, consider the following statements:

- I. The Governor of a State is not answerable to any court for the exercise and performance of the powers and duties of his/her office.
II. No criminal proceedings shall be instituted or continued against the Governor during his/her term of office.
III. Members of a State Legislature are not liable to any proceedings in any court in respect of anything said within the House.

Which of the statements given above are correct?

- (a) I and II only (b) II and III only
(c) I and III only (d) I, II and III

Answer: (d)

90. Consider the following activities:

- I. Production of crude oil
II. Refining, storage and distribution of petroleum
III. Marketing and sale of petroleum products
IV. Production of natural gas

How many of the above activities are regulated by the Petroleum and Natural Gas Regulatory Board in our country?

- (a) Only one (b) Only two
(c) Only three (d) All the four

Answer: (b)

91. Sedition has become my religion” was the famous statement given by Gandhiji at the time of:

- (a) the Champaran Satyagraha

- (b) publicly violating Salt Law at Dandi
(c) attending the Second Round Table Conference in London
(d) the launch of the Quit India Movement

Answer: (b)

92. The famous female figurine known as “Dancing Girl,” found at Mohenjo-daro, is made of:

- (a) carnelian (b) clay
(c) bronze (d) gold

Answer: (c)

93. Who provided legal defence to the people arrested in the aftermath of Chauri Chaura incident?

- (a) C. R. Das
(b) Madan Mohan Malaviya and Krishna Kant
(c) Dr. Saifuddin Kitchlew and Khwaja Hasan Nizami
(d) M. A. Jinnah

Answer: (b)

94. Subsequent to which one of the following events, Gandhiji, who consistently opposed untouchability and appealed for its eradication from all spheres, decided to include the upliftment of ‘Harijans’ in his political and social programme?

- (a) The Poona Pact
(b) The Gandhi-Irwin Agreement (Delhi Pact)
(c) Arrest of Congress leadership at the time of the Quit India Movement
(d) Promulgation of the Government of India Act, 1935

Answer: (a)

95. Consider the following fruits:

- I. Papaya
II. Pineapple
III. Guava

How many of the above were introduced in India by the Portuguese in the sixteenth and seventeenth centuries?

- (a) Only one (b) Only two
(c) All the three (d) None

Answer: (c)

96. Consider the following countries:

- I. United Kingdom
II. Denmark
III. New Zealand
IV. Australia
V. Brazil

How many of the above countries have more than four time zones?

- (a) All the five (b) Only four
(c) Only three (d) Only two

Answer: (b)

97. Consider the following statements:

- I. Anadyr in Siberia and Nome in Alaska are a few kilometers from each other, but when people are waking up and getting set for breakfast in these cities, it would be different days.
II. When it is Monday in Anadyr, it is Tuesday in Nome.

Which of the statements given above is/are correct?

- (a) I only (b) II only
(c) Both I and II (d) Neither I nor II

Answer: (a)

98. Who among the following was the founder of the 'Self-Respect Movement'?

- (a) 'Periyar' E. V. Ramaswamy Naicker
(b) Dr. B. R. Ambedkar
(c) Bhaskarrao Jadhav
(d) Dinkarrao Javalkar

Answer: (a)

99. Consider the following pairs:

	Country	Resource-rich in
I.	Botswana	: Diamond
II.	Chile	: Lithium
III.	Indonesia	: Nickel

In how many of the above rows is the given information correctly matched?

- (a) Only one (b) Only two
(c) All the three (d) None

Answer: (c)

100. Consider the following pairs:

	Region	Country
I.	Mallorca	: Italy
II.	Normandy	: Spain
III.	Sardinia	: France

In how many of the above rows is the given information correctly matched?

- (a) Only one (b) Only two
(c) All the three (d) None

Answer: (d)

Directions for the following 4 (four) items:

Read the following two passages and answer the items that follow the passages. Your answers to these items should be based on the passages only.

Passage – 1

Maintaining an ecosystem just to conserve biodiversity will affect its commercial potential as well as the livelihoods dependent on the ecosystem. There is also a conflict between using an ecosystem only for livelihoods, for commercial exploitation, or strictly for conservation. Deforestation caused due to commercial exploitation will lead to indirect harm like floods, siltation problems and microclimatic instability, apart from adversely affecting livelihoods dependent on forests. These conflicts are particularly acute in developing countries where the dependence of people on the ecosystem is significant, and commercial exploitation has the potential to boost national income.

1. Which one of the following statements best reflects the critical message conveyed by the author of the passage?

- (a) Conservation of biodiversity is not an issue to be worried about when some people depend on ecosystems for their livelihoods.
- (b) Commercial exploitation of forests goes against the fundamental rights of the people dependent on forests for food and shelter.
- (c) Sustenance of livelihood and degradation of ecosystem while being together exacerbate one another, leading to conflicts and imbalance.
- (d) Commercial exploitation of ecosystems should be completely stopped.

Answer: (c)

2. With reference to the above passage, the following assumptions have been made:

- I. No country needs to depend on ecosystems to boost national income.
- II. Resource-rich countries need to share their resources with those of scant resources so as to prevent the degradation of ecosystems.

Which of the above assumptions is/are valid?

- (a) I only
- (b) II only
- (c) Both I and II
- (d) Neither I nor II

Answer: (d)

Passage – 2

The history of renewable energy suggests there is a steep learning curve, meaning that, as more is produced, costs fall rapidly because of economies of scale and learning by doing. The firms' green innovation is path-dependent: the more a firm does, the more it is likely to do in the future. The strongest evidence for this is the collapse in the price of solar energy, which became about 90% cheaper during the 2010s, repeatedly beating forecasts. Moving early and gradually gives economies more time to adjust, allowing them to reap the benefits of path-dependent green investment without much disruption.

A late, more chaotic transition is costlier.

3. Which one of the following statements best reflects the central idea of the passage?

- (a) Economies of scale is essential for transition to green growth.
- (b) Modern technological progress is intensely linked to path-dependent innovations.
- (c) Countries with large economies are in a better position to adopt green technologies.
- (d) Timing plays a crucial role in the case of green technology development.

Answer: (d)

4. With reference to the above passage, the following assumptions have been made:

- I. Path-dependent green investments will eventually most likely benefit growth as well as public finances in a country like India.
- II. If other green technologies follow the same pattern as that of solar energy, there will most likely be an easy green transition.

Which of the above assumptions is/are valid?

- (a) I only
- (b) II only
- (c) Both I and II
- (d) Neither I nor II

Answer: (a)

5. A natural number N is such that it can be expressed as $N = p + q + r$, where p , q , and r are distinct factors of N . How many numbers below 50 have this property?

- (a) 6
- (b) 7
- (c) 8
- (d) 9

Answer: (c)

6. Three prime numbers p , q , and r , each less than 20, are such that $p - q = q - r$. How many distinct possible values can we get for $(p + q + r)$?

- (a) 4
- (b) 5
- (c) 6
- (d) More than 6

Answer: (a)

7. How many possible values of $(p + q + r)$ are there satisfying $\frac{1}{p} + \frac{1}{q} + \frac{1}{r} = 1$, where p , q , and r are natural numbers (not necessarily distinct)?

- (a) None
- (b) One
- (c) Three
- (d) More than three

Answer: (c)

8. What comes at X and Y respectively in the following sequence?

January, January, December, October, X, March, October, Y, September

(a) July, May

(b) July, April

(c) June, May

(d) June, April

Answer: (b)

9. Team X scored a total of N runs in 20 overs. Team Y tied the score in 10% less overs. Had Team Y's average run rate (runs per over) been 50% higher, the scores would have been tied in 12 overs. How many runs were scored by Team X?

- (a) 72
- (b) 144
- (c) 216
- (d) Cannot be determined

Answer: (d)

10. The price (p) of a commodity is first increased by $k\%$, then decreased by $k\%$; again increased by $k\%$, and again decreased by $k\%$. If the new price is q , then what is the relation between p and q ?

- (a) $p(10^4 - k^2)^2 = q \times 10^8$
- (b) $p(10^4 - k^2)^2 = q \times 10^4$
- (c) $p(10^4 - k^2) = q \times 10^4$
- (d) $p(10^4 - k^2) = q \times 10^8$

Answer: (a)

Directions for the following 4 (four) items:

Read the following two passages and answer the items that follow the passages. Your answers to these items should be based on the passages only.

Passage – 1

Each State in India faces a distinctive set of challenges regarding the impact of warming, but also offers its own set of opportunities for reducing emissions depending on its natural resources. For example, coastal States need to take action to protect their shores from sea level rise, districts that are drier need to prepare for variable monsoon precipitation. Himalayan regions have their own unique challenges, and selected parts of peninsular India and offshore areas offer great opportunities for harnessing wind power. These various aspects need to be considered for developing clear and sustainable goals for the future.

11. Which one of the following statements best reflects the most logical, rational and pragmatic message conveyed by the author of the passage?

- (a) The mitigation and adaptation strategies to address/tackle the climate change is essentially the responsibility of each State.
- (b) India is too diverse to implement any effective strategy or programme to address/tackle the climate change.
- (c) It is basically the responsibility of the Union Government to implement the climate action plans and ensure net zero emissions.
- (d) India needs to formulate effective climate change mitigation and adaptation strategies at the State/region level.

Answer: (d)

12. With reference to the passage, the following assumptions have been made:

- I. Green energy production can be linked to/integrated with the climate change mitigation and adaptation strategies.
- II. Effects of climate change are much more severe in coastal and mountainous regions.

Which of the above assumptions is/are valid?

- (a) I only
- (b) II only
- (c) Both I and II
- (d) Neither I nor II

Answer: (a)

Passage – 2

If the social inequality is the most acutely felt social problem in India, insecurity, more than poverty, is the most acutely felt economic problem. Besides those below the official poverty line, even those just over the poverty line are subject to multiple economic insecurities of various kinds (due to wealth and/or health risks, market fluctuations, job-related uncertainties). Many Government policies are actually intended towards mitigating these insecurities.

13. Which one of the following statements best reflects the critical message conveyed by the passage?

- (a) India's political executive should be aware that poverty and social inequality and the consequent sense of insecurity is the main social problem.
- (b) In India, poverty is the primary reason for social inequality and insecurity.
- (c) Poverty and social inequality are so intricately linked that they pose an unmanageable crisis for India.
- (d) Insecurity, more than poverty, is the main economic issue that Government policies must address.

Answer: (d)

14. With reference to the above passage, the following assumptions have been made:

- I. People above the poverty line also are prone to suffer from anxiety about economic insecurity.
- II. Eradication of poverty can result in peace and social equality in the country.

Which of the above assumptions is/are valid?

- (a) I only
- (b) II only
- (c) Both I and II
- (d) Neither I nor II

Answer: (a)

15. A solid cube is painted yellow on all its faces. The cube is then cut into 60 smaller but equal pieces by making the minimum number of cuts. Which of the following statements is/are correct?

- I. The minimum number of cuts is 9.
- II. The number of smaller pieces which are not painted on any face is 6.

Select the correct answer using the code below:

- (a) I only
- (b) II only
- (c) Both I and II
- (d) Neither I nor II

Answer: (c)

16. If $7 * 24 = 25$ and $12 * 16 = 20$, then what is $16 * 63$ equal to?

- (a) 70 (b) 66
(c) 65 (d) 64

Answer: (c)

17. The petrol price shot up by 10% as a result of the hike in crude oil prices. The price of petrol before the hike was ₹90 per litre. A person travels 2200 km every month and his car gives a mileage of 16 km per litre. By how many km should he reduce his travel if he wants to maintain his expenditure at the previous level?

- (a) 180 km (b) 200 km
(c) 220 km (d) 240 km

Answer: (b)

18. A 4-digit number N is such that when divided by 3, 5, 6, 9 it leaves a remainder of 1, 3, 4, 7 respectively. What is the smallest value of N?

- (a) 1068 (b) 1072
(c) 1078 (d) 1082

Answer: (c)

19. Consider the following statements:

- I. If $A \leq B > C < D > E > F \geq G = H$; then B is always greater than E.
II. If $P > Q = R \geq S = T \leq U = V > W$; then S is always less than V.

Which of the statements above is/are correct?

- (a) I only (b) II only
(c) Both I and II (d) Neither I nor II

Answer: (d)

20. What is the unit digit in the multiplication of

$$1 \times 3 \times 5 \times 7 \times 9 \times \dots \times 999?$$

- (a) 1 (b) 3
(c) 5 (d) 9

Answer: (c)

Directions for the following 4 (Four) items:

Read the following two passages and answer the items that follow the passages. Your answer to these items should be based on the passages only.

Passage – 1

One of the dismal realities of the agricultural sector in independent India has been that it never experienced a high-growth phase, unlike the non-agricultural economy. The highest decadal growth (compound annual growth rate or CAGR) for agriculture has been just 3.5% in the 1980s. Also, after experiencing a spurt in decadal growth during the 1980s, agricultural growth suffered relative stagnation thereafter. This is in sharp contrast to non-agricultural growth, which consistently increased from the 1980s to 2000s.

21. Which one of the following statements best reflects the corollary to the above passage?

- (a) The benefit of economic reforms percolates down more slowly to the agriculture sector than in other sectors of the economy.
(b) For India, the green revolution was not as useful as it was expected to be.
(c) India lagged behind other countries in adapting mechanized and modern farming.
(d) Rural-to-urban migration resulted in the stagnant agriculture sector.

Answer: (a)

22. With reference to the passage, the following assumptions have been made:

The growing divergence between the fortunes of the agricultural and non-agricultural economy in India could have been reduced/contained by:

- I. adapting large-scale cultivation of commercial crops and viable corporate farming.

- II. providing free insurance for all crops and heavily subsidizing seeds, fertilizers, electricity and farm machinery at par with developed countries.

Which of the above assumptions is/are valid?

- (a) I only (b) II only
(c) Both I and II (d) Neither I nor II

Answer: (d)

Passage – 2

In our country, handlooms are equated with a culture that ensures a continuity of tradition. This idea has become part of the public policy-framing and provides a legitimate basis for the State to support the sector. But the notion of tradition as a single, linear entity is being strongly contested today. The narratives dominant in defining culture/tradition in a particular way are seen to have emerged as the identities and histories of large sections. The discounted and, at times, forcibly stifled identities are fighting for their rightful place in history. Against this backdrop, when we promote handloom as a traditional industry, it is not surprising that large sections of our population choose to ignore it.

23. Which one of the following statements best reflects the most logical and rational message conveyed by the author of the passage?

- (a) We need to free the handloom industry from the limited narrative linked to preserving cultural heritage.
(b) Continued State support to the handloom industry ensures the preservation of some of our glorious art forms and old traditions.
(c) Household units of the handloom sector should be modernized and made an economically viable organized industry.
(d) Handloom products need to be converted to machine-made designer products so as to make them more popular.

Answer: (a)

24. With reference to the above passage, the following assumptions have been made:

- I. There is no need for the State to be involved in any manner in the handloom sector.
II. Handloom products are no longer appealing and attractive in the rapidly changing modern world.

Which of the above assumptions is/are valid?

- (a) I only (b) II only
(c) Both I and II (d) Neither I nor II

Answer: (d)

25. Consider the first 100 natural numbers. How many of them are not divisible by any one of 2, 3, 5, 7 and 9?

- (a) 20 (b) 21
(c) 22 (d) 23

Answer: (c)

26. If $4 \leq x \leq 8$ and $2 \leq y \leq 7$, then what is the ratio of maximum value of $(x + y)$ to minimum value of $(x - y)$?

- (a) 6 (b) $15/2$
(c) $-15/2$ (d) None of the above

Answer: (d)

27. Let both p and k be prime numbers such that $(p^2 + k)$ is also a prime number less than 30. What is the number of possible values of k?

- (a) 4 (b) 5
(c) 6 (d) 7

Answer: (b)

28. There are n sets of numbers each having only three positive integers with LCM equal to 1001 and HCF equal to 1. What is the value of n?

- (a) 6 (b) 7
(c) 8 (d) More than 8

Answer: (a)

29. Let PQR be a 3-digit number, PPT be a 3-digit number and PS be a 2-digit number, where P, Q, R, S, T are distinct non-zero digits. Further, $PQR - PS = PPT$. If $Q = 3$ and $T < 6$, then what is the number of possible values of (R, S)?

- (a) 2 (b) 3
(c) 4 (d) More than 4

Answer: (b)

30. Consider the sequence

AB_CC_A_BCCC_BBC_C that follows a certain pattern. Which one of the following completes the sequence?

- (a) B, C, B, C, A (b) A, C, B, C, A
(c) B, C, B, A, C (d) C, B, B, A, C

Answer: (c)

Directions for the following 4 (Four) Items:

Read the following two passages and answer the items that follow the passages. Your answer to these items should be based on the passages only.

Passage – 1

In our country, regrettably, teaching and learning for the examination have been our forte but the new demands of society and the future of work require critical and independent thinking, learning through doing, asking questions from multiple disciplinary perspectives on the same issue, using evidence for building arguments, and reflecting and articulation. Higher education should not "either be a mere servant of the government policy or a passive respondent to public mood." Higher learning is all about how to think rather than what to think. Teaching has to be re-invented.

31. Which one of the following statements best reflects the central idea conveyed by the passage?

- (a) India does not have enough resources for promoting quality education in its universities.

- (b) The institutions of higher learning in the country should not be under the control of the Government.
(c) Classroom approach to higher education should be done away with.
(d) Classroom needs to be reimagined and teaching to be re-invented.

Answer: (d)

32. With reference to the above passage, the following assumptions have been made:

- I. Higher education is a constantly evolving subject that needs to align towards new developments in all spheres of society.
II. In our country, sufficient funds are not allocated for promoting higher education.

Which of the above assumptions is/are valid?

- (a) I only (b) II only
(c) Both I and II (d) Neither I nor II

Answer: (a)

Passage – 2

If there is inequality in the pattern of population growth, there is greater inequality in food production and utilization. As societies become wealthier, their consumption of animal products increases. This means that a greater proportion of such basic foodstuff as grains and legumes that could feed humans directly is instead being converted into feed for poultry and large farm animals. Yet this conversion of plant-based food into animal food for humans is far from efficient. Only 16% of the calories fed to chickens are recovered by us when we eat them. This conversion rate goes down to five to seven per cent in large animals that are fed grain to add fat and some protein before slaughter.

33. Which one of the following statements best reflects the crux of the passage?

- (a) There is an urgent need for a public

policy to promote the consumption of cereal-based foods in wealthier societies.

- (b) Animal-based food is far less efficient than grain/plant-based food in terms of production and utilization.
- (c) Plant-based protein should replace the animal-based protein in our daily diets.
- (d) Inequality in food production and consumption is inevitable in any fast changing society.

Answer: (b)

34. With reference to the above passage, the following assumptions have been made:

- I. The food manufacturing and processing industries in every country should align their objectives and processes in accordance with the changing needs of the societies.
- II. Wealthier societies tend to incur great loss of calories of food materials due to indirect utilization of their agricultural produce.

Which of the above assumptions is/are valid?

- (a) I only
- (b) II only
- (c) Both I and II
- (d) Neither I nor II

Answer: (b)

35. What is the maximum value of n such that $7 \times 343 \times 385 \times 1000 \times 2401 \times 77777$ is divisible by 35^n ?

- (a) 3
- (b) 4
- (c) 5
- (d) 7

Answer: (b)

36. What is X in the sequence

24, X, 12, 18, 36, 90?

- (a) 18
- (b) 12
- (c) 9
- (d) 6

Answer: (b)

37. P and Q walk along a circular track. They start at 5:00 am. from the same point in opposite directions. P walks at an average speed of 5 rounds per hour and Q walks at an average speed of 3 rounds per hour. How many times will they cross each other between 5:20 a.m. and 7:00 a.m.?

- (a) 12
- (b) 13
- (c) 14
- (d) 15

Answer: (b)

38. If $P = +$, $Q = -$, $R = \times$, $S = +$, then insert the proper notations between the successive numbers in the equation $60_15_3_20_4=20$:

- (a) SPRQ
- (b) QRPS
- (c) QRSP
- (d) SPQR

Answer: (b)

39. A tram overtakes 2 persons X and Y walking at an average speed of 3 km/hr and 4 km/hr in the same direction and completely passes them in 8 seconds and 9 seconds respectively. What is the length of the tram?

- (a) 15 m
- (b) 18 m
- (c) 20 m
- (d) 24 m

Answer: (c)

40. If $N^2 = 12345678987654321$, then how many digits does the number N have?

- (a) 8
- (b) 9
- (c) 10
- (d) 11

Answer: (b)

Directions for the following 4 (four) items:

Read the following two passages and answer the items that follow the passages. Your answers to these items should be based on the passages only.

Passage – 1

Over the next 30 years, many countries are promising to move to net-zero carbon, implying that household emissions will have to be cut to close to nothing. A leading climate scientist

reckons that, at best, half the reduction might be achieved through demand-side measures, such as behavioural changes by individuals and households. And even that would require companies and governments to provide more incentives to change through supply-side investments to make low-carbon options cheaper and more widely available.

41. Which one of the following statements best reflects the central idea conveyed by the passage?

- (a) Moving to net-zero carbon is possible only by the reduction in household emissions.
- (b) Low-carbon behaviour in people can be brought about by incentivising them.
- (c) Cheaper goods and services can be made available to people by using low-carbon technologies.
- (d) Manufacturing industries that use low-carbon technologies should be provided with subsidies.

Answer: (b)

42. With reference to the above passage, the following assumptions have been made:

- I. Supply-side investments in companies can result in low-carbon behaviour in people.
- II. People are not capable of adapting low-carbon behaviour without the involvement of Government and Companies.

Which of the above assumptions is/are valid?

- (a) I only
- (b) II only
- (c) Both I and II
- (d) Neither I nor II

Answer: (a)

Passage – 2

In only 50 years, the world's consumption of raw materials has nearly quadrupled, to more than 100 billion tons. Less than 9% of this is reused. Batteries of old vehicles contain materials such as lithium, cobalt, manganese and nickel that are

pricey and can be hard to obtain. Supply chains are long and complicated. Buyers' risks are being aggravated by their suppliers' poor environmental and labour standards. Reusing materials makes sense. Once batteries reach the ends of their lives, they should go back to a factory where their ingredients can be recovered and put into new batteries.

43. Which one of the following statements best reflects the most logical, rational and pragmatic message conveyed by the passage?

- (a) Green economy is not possible without reusing critical minerals.
- (b) Every sector of economy should adapt the reuse of material resources immediately.
- (c) Circular economy can be beneficial for sustainable growth.
- (d) Circular use of material resources is the only option for some industries for their survival.

Answer: (c)

44. With reference to the above passage, the following assumptions have been made :

- I. Automobile factories are examples of the circular economy.
- II. Economic growth is compatible with circular use of mineral resources.

Which of the above assumptions is/are valid?

- (a) I only
- (b) II only
- (c) Both I and II
- (d) Neither I nor II

Answer: (b)

45. A set (X) of 20 pipes can fill 70% of a tank in 14 minutes. Another set (Y) of 10 pipes fills 3/8th of the tank in 6 minutes. A third set (Z) of 16 pipes can empty half of the tank in 20 minutes. If half of the pipes of set X are closed and only half of the pipes of set Y are open, and all pipes of the set (Z) are open, then how long will it take to fill 50% of the tank?

- (a) 8 minutes (b) 10 minutes
(c) 12 minutes (d) 16 minutes

Answer: (d)

46. If n is a natural number, then what is the number of distinct remainders of $(1^n + 2^n)$ when divided by 4?

- (a) 0 (b) 1
(c) 2 (d) 3

Answer: (c)

47. Let $P = \overline{QQQ}$ be a 3-digit number. What is the HCF of P and 481?

- (a) 1 (b) 13
(c) 37 (d) 481

Answer: (c)

48. What is the 489th digit in the number 123456789101112...?

- (a) 0 (b) 3
(c) 6 (d) 9

Answer: (d)

49. A mobile phone has been stolen. There are 3 suspects P, Q and R. They were questioned knowing that only one of them is guilty. Their responses are as follows:

P: I did not steal. Q stole it.

Q: R did not steal. I did not steal.

R: I did not steal. I do not know who did it.

Who stole the mobile phone?

- (a) P (b) R
(c) Q (d) Cannot be concluded

Answer: (a)

50. Three teams P, Q, R participated in a tournament in which the teams play with one another exactly once. A win fetches a team 2 points and a draw 1 point. A team gets no point for a loss. Each team scored exactly one goal in the tournament. The team P got 3 points, Q got 2 points and R got 1 point.

Which of the following statements is/are correct?

- I. The result of the match between P and Q is a draw with the score 0 -0.

- II. The number of goals scored by R against Q is 1.

Which of the statements given above is/are correct?

- (a) I only (b) II only
(c) Both I and II (d) Neither I nor II

Answer: (c)

Directions for the following 4 (Four) Items:

Read the following two passages and answer the items that follow the passages. Your answer to these items should be based on the passages only.

Passage – 1

It is hard to predict how changes in the climate and the atmosphere's chemistry will affect the prevalence and virulence agricultural diseases. But there is a risk that such changes will make some plant infections more common in all climatic zones, perhaps catastrophically so. Part of the problem is that centuries of selective breeding have refined the genomes of most high-value crops. They are spectacular at growing in today's conditions but genetic variations that are not immediately useful to them have been bred out. This is good for yields but bad for coping with changes. A minor disease or even an unknown one could suddenly rampage through a genetically honed crop.

51. Which one of the following statements best reflects the central idea conveyed by the passage?

- (a) Global climate change adversely affects the productivity of crops.
(b) Our total dependence on genetically honed crops entails possible food insecurity.
(c) Our food security should not depend on agricultural productivity alone.
(d) Genetically honed crops should be replaced with their wild varieties in our present cultivation practices.

Answer: (b)

52. With reference to the above passage, the following assumptions have been made:

- I. Global climate change can result in the migration of several plant diseases to new areas.
- II. Scientific understanding of the wild relatives of our present crops would enable us to strengthen food security.

Which of the above assumptions is/are valid?

- (a) I only
- (b) II only
- (c) Both I and II
- (d) Neither I nor II

Answer: (c)

Passage – 2

“A good statesman, like any other sensible human being, learns more from his opponents than from his fervent supporters. For his supporters will push him to disaster unless his opponents show him where the dangers are. So if he is wise he will often pray to be delivered from his friends, because they will ruin him. But, though it hurts, he ought also to pray never to be left without opponents; for they keep him on the path of reason and good sense. The national unity of free people depends upon a sufficiently even balance of political power to make it impracticable for the administration to be arbitrary and for opposition to be revolutionary and irreconcilable.”

53. Which one of the following statements best reflects the critical message conveyed by the author of the passage?

- (a) Without opposition parties, the administration in a democracy gets to become more responsible.
- (b) Democracy needs to have revolutionaries in opposition to keep the government alert.
- (c) Rulers in a democracy need the support of opposition for their political survival.
- (d) In a democracy, the opposition is indispensable for the balance of political power and good governance.

Answer: (d)

54. With reference to the above passage, the following assumptions have been made :

- I. In a democracy, a strong opposition is required only if the Head of Government is indifferent.
 - II. The more aggressive the opposition, the better is the governance in a democracy.
- Which of the above assumptions is/are valid?

- (a) I only
- (b) II only
- (c) Both I and II
- (d) Neither I nor II

Answer: (d)

55. P is the brother of Q and R. S is R's mother. T is P's father. How many of the following statements are definitely true?

- I. S and T are a couple.
- II. Q is T's son.
- III. T is Q's father.
- IV. S is P's mother.
- V. R is T's daughter.
- VI. P is S's son.

Select the correct answer using the code given below:

- (a) Only two
- (b) Only three
- (c) Only four
- (d) Only five

Answer: (c)

56. If NO is coded as 210, NOT is coded as 4200 and NOTE is coded as 21000, then how is NOTES coded?

- (a) 399000
- (b) 420000
- (c) 440000
- (d) 630000

Answer: (a)

57. If FRANCE is coded as 654321 and GERMANY is coded as 9158437, then how is YEMEN coded?

- (a) 54321
- (b) 81913
- (c) 71913
- (d) 71813

Answer: (d)

58. The 5-digit number PQRST (all distinct digits) is such that T is not equal to 0. P is thrice T. S is greater than Q by 4, while Q is greater than R by 3. How many such 5-

digit numbers are possible?

- (a) 3 (b) 4
(c) 5 (d) 6

Answer: (b)

59. X can complete one-third of a certain work in 6 days, Y can complete one-third of the same work in 8 days and Z can complete three-fourth of the same work in 12 days. All of them work together for n days and then X and Z quit and Y alone finishes the remaining work in 8 % & days. What is n equal to?

- (a) 3 (b) 4
(c) 5 (d) 6

Answer: (b)

60. What is X in the sequence

1, 3, 6, 11, 18, X, 42 ?

- (a) 26 (b) 27
(c) 29 (d) 30

Answer: (c)

Directions for the following 3 (three) items:

Read the following two passages and answer the items that follow the passages. Your answers to these items should be based on the passages only.

Passage – 1

There has been no democracy that has grown economically without corporate capitalism. It helps in modernizing the economy and enabling the transition from rural to urban, and agriculture to industry and services, which are inevitable with growth. It generates jobs — and there is no other way to fix a country's unemployment challenge without a further impetus to private business. Big companies can operate on a large scale and become competitive both domestically and externally. A vibrant corporate capitalist base also leads to additional revenues for the State — which in turn, can be used for greater welfare for the marginalized and creating a more level playing field in terms of opportunities.

61. Which one of the following statements best reflects the critical message conveyed by the author of the passage?

- (a) Corporate capitalism is important for economic growth of a State and also for democracy.
(b) Corporate capitalism is imperative for a modern State to achieve its political objectives.
(c) No State can ensure its economic survival for long without the role of corporate capitalism.
(d) Corporate capitalism and democracy have mutual dependence for their continued existence.

Answer: (a)

62. With reference to the above passage, the following assumptions have been made:

- I. Corporate capitalism promotes the growth of labour force and provides more employment opportunities.
II. Poor and marginalized sections of population are benefited by corporate capitalism due to trickle-down effect.

Which of the above assumptions is/are valid?

- (a) I only (b) II only
(c) Both I and II (d) Neither I nor II

Answer: (c)

Passage – 2

"A network of voluntary associations stands as a buffer between the relatively powerless individual and the potentially powerful State."

63. Which one of the following statements reflects the best explanation of the above passage?

- (a) It emphasizes the inability of the State to enforce its will in practice against the opposition of certain groups within it.
(b) It is a cooperative organization for the promotion of the well-being and development of the personality of its members.

- (c) It takes individuals out of a state of isolation and gives them a chance to participate in the common endeavour.
- (d) It permits citizens to have a variety of loyalties and allegiance.

Answer: (c)

64. Consider the following statements:

- I. There exists a natural number which when increased by 50% can have its number of factors unchanged.
- II. There exists a natural number which when increased by 150% can have its number of factors unchanged.

Which of the statements given above is/are correct?

- (a) I only (b) II only
(c) Both I and II (d) Neither I nor II

Answer: (c)

65. There are 7 places A, B, C, D, E, F and G in a city connected by various roads AB, AC, CD, DE, BF, EG and FG. A is 6 km south of B. A is 10 km west of C. D is 5 km east of E. C is 6 km north of D. F is 9 km west of B. F is 12 km north of G. A person travels from D to F through these roads. What is the distance covered by the person?

- (a) 20 km (b) 25 km
(c) 31 km (d) 37 km

Answer: (c)

66. In a certain code if 64 is written as 343 and 216 is written as 729, then how is 512 written in that code?

- (a) 1000 (b) 1331
(c) 1728 (d) 2197

Answer: (b)

67. What is the remainder when $9^3 + 9^4 + 9^5 + 9^6 + \dots + 9^{100}$ is divided by 6?

- (a) 0 (b) 1
(c) 2 (d) 3

Answer: (a)

68. A question is given followed by two Statements I and II. Consider the Question and the Statements and mark the correct option.

Question:

What is the smallest 1-digit number having exactly 4 distinct factors?

Statement I: 2 is one of the factors.

Statement II: 3 is one of the factors.

Which one of the following is correct in respect of the above Question and the Statements?

- (a) The Question can be answered by using one of the Statements alone, but cannot be answered using the other statement alone.
- (b) The Question can be answered by using either Statement alone.
- (c) The Question can be answered by using both the Statements together, but cannot be answered using either Statement alone.
- (d) The Question can be answered even without using any of the Statements.

Answer: (d)

69. A question is given followed by two Statements I and II. Consider the Question and the Statements and mark the correct option.

Question:

Let P, Q, R, S be distinct non-zero digits. If $PP \times PQ = RRSS$, where $P \leq 3$ and $Q \leq 4$, then what is Q equal to?

Statement I: $R = 1$.

Statement II: $S = 2$.

Which one of the following is correct in respect of the above Question and the Statements?

- (a) The Question can be answered by using one of the Statements alone, but cannot be answered using the other statement alone.
- (b) The Question can be answered by using either Statement alone.
- (c) The Question can be answered by using both the Statements together, but cannot

be answered using either Statement alone.

- (d) The Question can be answered even without using any of the Statements.

Answer: (d)

70. A question is given followed by two Statements I and II. Consider the Question and the Statements and mark the correct option.

Question:

How is Q related to P?

Statement I: P has two sisters, R and S.

Statement II: R's father is the brother of Q.

Which one of the following is correct in respect of the above Question and the Statements?

- (a) The Question can be answered by using one of the Statements alone, but cannot be answered using the other statement alone.
- (b) The Question can be answered by using either Statement alone.
- (c) The Question can be answered by using both the Statements together, but cannot be answered using either Statement alone.
- (d) The Question cannot be answered even using any of the Statements.

Answer: (d)

Directions for the following 2 (two) items:

Read the following two passages and answer the items that follow the passages. Your answers to these items should be based on the passages only.

Passage – 1

A single number for inflation is an aggregate across different commodities and services- the price rise differs for different services - the price rise differs for different items of consumption. So, the single number is arrived at by assigning weights to different commodities and services. For WPI, the weights in production are used; for CPI, the consumption basket is used. But people are not homogeneous. The consumption basket

MNA – Monthly News Analysis

is vastly different for the poor, the middle classes, and the rich. Hence, the CPI is different for each of these classes and a composite index requires averaging the baskets.

71. Which one of the following statements best reflects the most logical, rational and crucial message conveyed by the passage?

- (a) We must use WPI exclusively in measuring price rise and CPI should be done away with.
- (b) The present calculation of inflation rate does not correctly measure price rise of individual item/commodity.
- (c) Inflation data under-presents services in the consumption basket.
- (d) Knowledge of inflation rate is not really of any use to anybody in the country.

Answer: (b)

Passage – 2

Trust stands commonly defined as being vulnerable to others. Entrepreneurship implies trust in others and willingness to expose oneself to betrayal. Trust in expert systems is the essence of globalizing behaviors; trust itself emerges as a super-commodity in the social market and defines the characteristics of goods and services in a global market. Trusting conduct also means holding others in good esteem, and an optimism that they are, or will be, competent in certain respects.

72. Which one of the following statements best reflects the crux of the passage?

- (a) Trustworthiness cannot be expected in entrepreneurship.
- (b) Trustworthy people are the most vulnerable people.
- (c) No economic activity is possible without being exposed to betrayal.
- (d) Trust is important though it entails risk.

Answer: (d)

73. A question is given followed by two Statements I and II. Consider the Question and the Statements and mark the correct option.

Question:

In a football match, team P playing against Q was behind by 3 goals with 10 minutes remaining. Does team P win the match?

Statement I: Team P scored 4 goals in the last 10 minutes.

Statement II: Team Q scored a total of 4 goals in the match.

Which one of the following is correct in respect of the above Question and the Statements?

- (a) The Question can be answered by using one of the Statements alone, but cannot be answered using the other statement alone.
- (b) The Question can be answered by using either Statement alone.
- (c) The Question can be answered by using both the Statements together, but cannot be answered using either Statement alone.
- (d) The Question cannot be answered even using any of the Statements.

Answer: (d)

74. A question is given followed by two Statements I and II. Consider the Question and the Statements and mark the correct option.

Question:

Is $(p + q)^2 - 4pq$, where p, q are natural numbers, positive?

Statement I: $p < q$.

Statement II: $p > q$.

Which one of the following is correct in respect of the above Question and the Statements?

- (a) The Question can be answered by using one of the Statements alone, but cannot be answered using the other statement alone.
- (b) The Question can be answered by using either Statement alone.

(c) The Question can be answered by using both the Statements together, but cannot be answered using either Statement alone.

(d) The Question can be answered even without using any of the Statements.

Answer: (b)

75. In a T20 cricket match, three players X, Y and Z scored a total of 37 runs. The ratio of number of runs scored by X to the number of runs scored by Y is equal to the ratio of number of runs scored by Y to number of runs scored by Z.

Value-I = Runs scored by X

Value-II = Runs scored by Y

Value-III = Runs scored by Z

Which one of the following is correct?

- (a) Value-I < Value-II < Value-III
- (b) Value-III < Value-II < Value-I
- (c) Value-I < Value-III < Value-II
- (d) Cannot be determined due to insufficient data

Answer: (d)

76. Let $p + q = 10$, where p, q are integers.

Value-I = Maximum value of $p \times q$ when p, q are positive integers.

Value-II = Maximum value of $p \times q$ when $p \geq -6, q \geq -4$.

Which one of the following is correct?

- (a) Value-I < Value-II
- (b) Value-II < Value-I
- (c) Value-I = Value-II
- (d) Cannot be determined due to insufficient data

Answer: (c)

77. Consider a set of 11 numbers:

Value-I = Minimum value of the average of the numbers of the set when they are consecutive integers ≥ -5 .

Value-II = Minimum value of the product of the numbers of the set when they are consecutive non-negative integers.

Which one of the following is correct?

- (a) Value-I < Value-II
- (b) Value-II < Value-I
- (c) Value-I = Value-II
- (d) Cannot be determined due to insufficient data

Answer: (c)

78. The average of three numbers p, q and r is k. p is as much more than the average as q is less than the average. What is the value of r?

- (a) k
- (b) $k - 1$
- (c) $k + 1$
- (d) $k/2$

Answer: (a)

79. Let x be a real number between 0 and 1.

Which of the following statements is/are correct?

I. $x^2 > x^3$

II. $x > \sqrt{x}$

Select the correct answer using the code given below:

- (a) I only
- (b) II only
- (c) Both I and II
- (d) Neither I nor II

Answer: (a)

80. The difference between any two natural numbers is 10. What can be said about the natural numbers which are divisible by 5 and lie between these two numbers?

- (a) There is only one such number.
- (b) There are only two such numbers.
- (c) There can be more than one such number.
- (d) No such number exists.

Answer: (c)

OUR COURSES

COMPREHENSIVE MAINS PROGRAM (ETHICS)

- 30+ Classes
- Focus on conceptual clarity
- 6 Mock Tests: 4 Sec.+ 2 FLT
- Evaluation by Faculty
- 1-on-1 mentorship
- Comprehensive Class Notes

ESSAY WRITING PROGRAM

- 10+ Classes
- Brainstorming Sessions
- 5 Mock Tests
- 1-on-1 Mentorship
- Value addition material



For Our Courses
Scan This QR Code



GS FOUNDATION BATCH

- Daily 4-hour sessions
- Comprehensive Study Material
- Journey-Prelims to Interview
- Concept-building mocks
- Regular assessments
- Doubt-clearing sessions

MAINS MENTORSHIP PROGRAM

- Intensive Mains support
- 5 Essay Test+ 8 GS Tests
- Personal 1-on-1 mentorship
- Regular assessments
- MNA magazine
- Answer writing sessions

MNA: Through the Eyes of Aspirants



Monthly Current affairs magazine of Rice IAS is really helping me alot. It is comprehensively covering current events with segregation of topics in subject wise.

P.V Surendra



The topics are comprehensively covered in each magazine content was crisp, clear & to the point that are very much important for the preparation & the current is also covered with the static part. Keep up the good work:

Kishore Muddada



By reading current affairs, it has become easy to conclude the important news at the end of monthly magazine.

Shreya Mondal



The monthly magazines for current affairs are exam-oriented and written in a very concise manner suitable for performing well in the examinations.

Aindrila saha



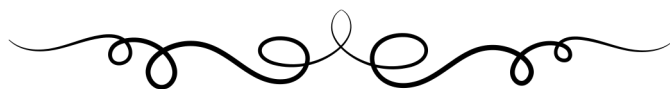
By reading Current Affairs it has become easy to conclude the important news at the end of the month.

Kashish Kapoor



Provides gainful insights about the current relevant news. Really beneficial.

Sulagna Roy



GET CLOSER TO YOUR **IAS & IPS DREAMS**



WHY RICE IAS?

At RICE IAS, our course structure is meticulously crafted to offer a well-rounded, strategic learning experience that covers every aspect essential for success. With a team of expert faculty from Delhi, students receive top-tier guidance and insights into the competitive landscape. Our program includes a 24x7 intensive residential bootcamp, designed for final preparation, where students immerse themselves in studies with regular assessments, a dedicated library, and reading room access. Test series, performance analysis, and personalized mentoring help students track their progress and address individual needs through feedback and doubt-clearing sessions. Our comprehensive study materials further ensure that each concept is thoroughly understood. For working professionals and college-goers, we offer flexible weekend classes, allowing them to balance studies alongside other commitments. With a proven track record of success, RICE IAS is dedicated to paving the way for our students to excel.



Rishita Das
UPSC CSE 2024
AIR 840



Pemba Narbu Sherpa
UPSC CAPF (AC) 2022
AIR 140



Tamali Saha
IFoS 2021
AIR 94



Follow Us On



Prof. (Dr.) Samit Ray

CHAIRMAN OF RICE GROUP
& CHANCELLOR OF ADAMAS UNIVERSITY