



UPSC MONTHLY MAGAZINE

AI Powered Magazine for Smarter UPSC Prep'



From the Editor's Desk

Welcome to the February Issue of PadhAI — an AI-powered magazine designed by UPSC experts to make your preparation smarter, faster, and deeply exam-oriented.

Why This Magazine Exists

Dear Aspirant,

PadhAI Magazine was created from a simple observation: most failures occur not due to lack of effort, but due to three critical gaps—delayed content, scattered resources, and weak exam linkage.

We built this magazine to solve those exact problems.

Most current affairs resources reach you 15–30 days late. By then, exam relevance has already faded. Relevance is everything in UPSC preparation. A topic that matters today becomes a sideshow in a month.

What Makes This Magazine Different

At PadhAI, we operate differently:

Speed & Relevance

- We publish within a week—so you learn while the topic is still relevant for exams
- You grasp concepts before they become old news, giving you a real head start
- Early understanding means better retention and confidence when these topics appear in questions

Exam-Aligned Restructuring

- We don't report news. We extract exam-aligned concepts.
- Every article is built around three core questions:
 - What will Prelims ask?
 - How will Mains expect you to analyze it?
 - What concepts build from this topic?

Complete Integration

- Every article links to previous year questions, practice MCQs, and structured answers
- Alongside this magazine: daily PIB summaries, Current Affairs & GS topics explained, and AI tutor chat support
- One integrated system instead of scattered resources that are wasting your time

What's Inside This Edition

This December edition brings you the most relevant national and international updates, rewritten into crisp, high-retention smart notes. Each topic is restructured to focus on:

- **Concept clarity** – What you need to understand
- **Governance relevance** – Why it matters to India's systems
- **Analytical value** – How to think about it for both Prelims and Mains

Our Core Philosophy

Learn only what matters.

Learn it the right way.

Learn it at the right time.

Let's make learning intelligent – not overwhelming.

—The PadhAI Team

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5.Ndma's first-ever guidelines for identification of disaster victims

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PERSON IN NEWS

- 1) Sarojini Naidu
- 2) Chhatrapati Shivaji Maharaj
- 3) Swami Dayananda Saraswati
- 4) Ramkrishna Paramhansa
- 5) Vinayak Damodar Savarkar
- 6) Rajendra Prasad
- 7) Morarji Desai
- 8) Subhas Chandra Bose
- 9) C V Raman



POLITY



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I.META, WHATSAPP FACE JUDICIAL ULTIMATUM

Why in the news?

- Indian courts have questioned Meta and WhatsApp over their stance on traceability of encrypted messages and compliance with IT Rules, 2021.
- The companies argue that breaking end-to-end encryption would violate users' privacy rights.
- The matter brings into focus the balance between national security, law enforcement, and the fundamental right to privacy.

BACKGROUND / CONTEXT

- I. The **Information Technology Act, 2000** governs digital platforms in India.
- II. In 2021, the Centre notified the **IT Rules, 2021**, mandating "significant social media intermediaries" to enable identification of the first originator of messages in certain cases.
- III. WhatsApp challenged this provision in court, arguing that traceability undermines end-to-end encryption.
- IV. The issue intersects with the Supreme Court's landmark judgment in **Justice K.S. Puttaswamy v. Union of India**, which recognized privacy as a Fundamental Right under Article 21.

KEY HIGHLIGHTS

• **Traceability Clause** – IT Rules require platforms to identify the "first originator" of messages linked to offences related to sovereignty, public order, rape, etc.

• **Encryption Debate** – WhatsApp claims that breaking encryption would weaken cybersecurity and violate global privacy standards.

• **Government's Stand** – The Centre argues traceability is essential to combat fake news, terrorism, child sexual abuse material (CSAM), and misinformation.

• **Judicial Oversight** – Courts are examining whether the traceability mandate passes the proportionality test laid down in Puttaswamy.

• **Global Implications** – The case could set precedent for other democracies balancing digital rights and state security.

PRELIMS BOOSTER BOX

IT Act, 2000

- Section 69A: Blocking of public access to information.
- Section 79: Safe harbour to intermediaries (conditional immunity).

IT Rules, 2021

- Define "Significant Social Media Intermediary" (SSMI) – >50 lakh users.
- Mandatory grievance redressal mechanism.
- Chief Compliance Officer (India-based).

Privacy Judgment (2017)

- Declared privacy as intrinsic to Article 21.
- Introduced proportionality test.

Encryption

- End-to-End Encryption (E2EE) ensures only sender and receiver can read messages.



- WhatsApp uses Signal Protocol.

Static + Current Linkage

- Article 19(1)(a): Freedom of speech.
- Reasonable restrictions under Article 19(2).
- Article 21: Right to life and personal liberty.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to Section 69A of the IT Act, 2000, consider the following statements:

1. It empowers the government to block public access to information under certain conditions.
2. The blocking order must be reviewed by a committee.

Which of the statements given above is/are correct?

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

Answer: (c)

Mains PYQ

“Examine the scope of Fundamental Rights in the light of the latest judgment of the Supreme Court on the Right to Privacy.” (UPSC GS-II)

PadhAI MAINS PRACTICE QUESTION

“The debate over traceability of encrypted communication reflects the tension between individual privacy and national security.” Examine in the context of IT Rules, 2021. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to the IT Rules, 2021 and digital intermediaries in India, consider the following statements:

1. Significant Social Media Intermediaries are required to enable identification of the first originator of information under certain conditions.
2. Section 79 of the IT Act provides absolute immunity to intermediaries from third-party content.
3. The Right to Privacy is recognized as part of Article 21 of the Constitution.

Which of the statements given above is/are correct?

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

Answer: (a)

2.ISSUES SURROUNDING UGC REGULATIONS

Why in the news?

- The UGC’s evolving regulatory framework—covering appointments, online education, accreditation linkage, and minimum standards—has led to friction with State governments and universities.



- Critics argue that certain provisions centralize control and dilute university autonomy, while supporters claim they standardize quality and improve accountability in higher education.

BACKGROUND / CONTEXT

- I. The UGC was established under the **UGC Act, 1956** to coordinate and maintain standards in higher education.
- II. Education falls under the **Concurrent List (42nd Amendment, 1976)**, enabling both Centre and States to legislate.
- III. The **National Education Policy (NEP) 2020** envisions restructuring higher education governance and eventually replacing UGC with the Higher Education Commission of India (HECI).
- IV. Recent draft regulations have addressed:
 - A. Appointment of Vice-Chancellors.
 - B. Recognition of online and distance learning programmes.
 - C. Linking funding to accreditation (NAAC/NIRF).

KEY HIGHLIGHTS

• **Federal Concerns** – States argue that UGC regulations interfere with their power over State universities, especially in VC appointments.

• **Autonomy vs Regulation** – Universities fear excessive central oversight may curtail academic freedom and institutional innovation.

• **Quality Standardization** – UGC justifies regulations as necessary to ensure uniform academic benchmarks across institutions.

• **Accreditation Linkage** – Funding and recognition increasingly tied to NAAC grades and NIRF rankings.

• **Digital Push** – Expansion of Online and ODL (Open and Distance Learning) modes under strict regulatory norms.

PRELIMS BOOSTER BOX

UGC Act, 1956

- Section 12: Coordination and determination of standards.
- Section 22: Right to confer degrees.

Constitutional Provisions

- Entry 66, Union List: Coordination and determination of standards in higher education.
- Entry 25, Concurrent List: Education.

Important Bodies

- National Assessment and Accreditation Council (NAAC) – Accreditation.
- All India Council for Technical Education (AICTE) – Technical education.
- National Education Policy 2020 – Structural reforms in higher education.

Static + Current Linkage

- Doctrine of Cooperative Federalism.
- Institutional autonomy under Article 19(1)(a) (academic expression dimension).
- Role of Governor as Chancellor in State universities (varies by state law).



PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to the 'National Education Policy 2020', consider the following statements:

1. It proposes replacing UGC with a single higher education regulator.
2. It recommends multidisciplinary universities and phasing out single-stream institutions.

Which of the statements given above is/are correct?

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

Answer: (c)

Mains PYQ

“Education is listed in the Concurrent List of the Constitution of India. Examine the implications of this for Centre–State relations.” (GS-II)

PadhAI MAINS PRACTICE QUESTION

Critically examine the issues surrounding the recent UGC regulations in the light of federalism, institutional autonomy, and quality assurance in higher education. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to higher education regulation in India, consider the following statements:

1. Entry 66 of the Union List empowers Parliament to determine standards in institutions of higher education.
2. The UGC derives its statutory authority from the UGC Act, 1956.
3. State legislatures have no role in regulating universities within their territory.

Which of the statements given above is/are correct?

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

Answer: (a)

3.LADAKH LEADERS SEEK STATEHOOD; TALKS INCONCLUSIVE

Why in the news?

- After the bifurcation of the erstwhile Jammu and Kashmir through the Jammu and Kashmir Reorganisation Act, Ladakh became a Union Territory without a legislature.
- Civil society groups and political leaders now demand statehood, constitutional safeguards under the Sixth Schedule, and greater local representation in governance and land protection.

BACKGROUND / CONTEXT

1. On **5 August 2019**, Article 370 provisions were effectively abrogated.



- II. Ladakh was carved out as a separate Union Territory **without a legislative assembly**.
- III. Governance is currently administered by a Lieutenant Governor.
- IV. Two Autonomous Hill Development Councils exist:
 - A. Leh
 - B. Kargil
- V. Civil society platforms such as the **Apex Body Leh and Kargil Democratic Alliance** have spearheaded the movement.

KEY HIGHLIGHTS

- **Statehood Demand** – Leaders argue that statehood would ensure democratic accountability and legislative powers over land, jobs, and culture.
- **Sixth Schedule Protection** – Demand to include Ladakh under the Sixth Schedule to safeguard tribal land and identity (similar to Northeast Autonomous Councils).
- **Representation Concerns** – Lack of legislative assembly limits local political participation.
- **Strategic Significance** – Ladakh's geopolitical location near China and Pakistan adds a national security dimension to governance decisions.
- **Inconclusive Talks** – Recent dialogue with the Centre did not yield firm assurances, prolonging uncertainty.

PRELIMS BOOSTER BOX

Article 370

- Provided special status to J&K (now effectively abrogated).

- Enabled separate Constitution and autonomy (prior to 2019).

Union Territory

- Administered by President through Administrator/LG.
- May or may not have a legislature (e.g., Delhi has; Ladakh does not).

Sixth Schedule (Article 244(2))

- Applies to Assam, Meghalaya, Tripura, Mizoram.
- Provides Autonomous District Councils.
- Powers over land, forests (except reserved forests), customs, local governance.

Key Constitutional Articles

- Article 3: Formation of new States and alteration of areas.
- Article 239: Administration of Union Territories.

Static + Current Linkage

- Federalism and asymmetric arrangements.
- Tribal autonomy framework.
- Strategic border governance.

PadhAI PYQ BOOSTER

SECTION Prelims PYQ

Consider the following statements:

1. The Sixth Schedule of the Constitution relates to the administration of tribal areas in certain northeastern states.
2. It provides for Autonomous District Councils with legislative and judicial powers.



Which of the statements given above is/are correct?

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

Answer: (c)

Mains PYQ

Discuss the significance of the Sixth Schedule in protecting tribal autonomy in India. (GS-II)

PadhAI MAINS PRACTICE QUESTION

Examine the constitutional and federal implications of the demand for statehood and Sixth Schedule status for Ladakh. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to Ladakh and constitutional provisions, consider the following statements:

1. Ladakh is a Union Territory without a legislative assembly.
2. The Sixth Schedule currently applies to tribal areas in Ladakh.
3. Parliament has the power under Article 3 to create a new state.

Which of the statements given above is/are correct?

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

Answer: (a)

4. 'SEVA TEERTH', THE NEW PMO

Why in the news?

- The expression "Seva Teerth" symbolically frames the PMO as an institution dedicated to national service rather than mere administrative functioning.
- The articulation aligns with broader themes of good governance, transparency, digital transformation, and mission-oriented delivery of welfare schemes.

BACKGROUND / CONTEXT

- I. The **Prime Minister's Office (PMO)** functions as the principal administrative support system to the Prime Minister.
- II. Located in **South Block, Raisina Hill, New Delhi**.
- III. Headed by the Principal Secretary to the Prime Minister.
- IV. Plays a central role in:
 - A. Policy coordination
 - B. Monitoring flagship schemes
 - C. Inter-ministerial coordination
 - D. Strategic governance

KEY HIGHLIGHTS

- **Symbolism of Service** – "Seva Teerth" reflects governance as public service.
- **Mission-Mode Governance** – Focus on time-bound delivery of schemes.
- **Digital Governance** – Emphasis on data-driven monitoring and e-governance.



- **Central Coordination Role** – Ensures alignment between ministries.
- **Accountability Mechanism** – Real-time review of projects and grievance redressal.
- **Political Messaging** – Reinforces narrative of people-centric administration.

PRELIMS BOOSTER BOX

Prime Minister's Office (PMO)

- Extra-constitutional body.
- Assists PM in discharge of duties.
- Not mentioned explicitly in the Constitution.

Constitutional Position of PM

- Article 74 – Council of Ministers to aid and advise the President.
- Article 75 – PM appointed by President.

Cabinet Secretariat vs PMO

- Cabinet Secretariat coordinates between ministries.
- PMO directly assists the Prime Minister.

Location

- South Block, New Delhi.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to the Prime Minister of India, consider the following statements:

1. The Prime Minister is appointed by the President of India.
2. The Prime Minister must necessarily be a member of the Lok Sabha at the time of appointment.

Which of the statements given above is/are correct?

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

Answer: (a)

Mains PYQ

“The Prime Minister's Office has emerged as a powerful instrument of governance in India.” Discuss its role and implications for cabinet government. (GS-II)

PadhAI MAINS PRACTICE QUESTION

Examine the evolving role of the Prime Minister's Office in India's governance framework. How does the concept of 'Seva Teerth' reflect changes in administrative philosophy? (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to the Prime Minister's Office (PMO), consider the following statements:

1. The PMO is a constitutional body explicitly mentioned in the Constitution.
2. It assists the Prime Minister in policy coordination and administration.
3. It is located in South Block, New Delhi.

Which of the statements given above is/are correct?

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



Answer: (a)

5.SC TO HEAR PLEA ON DATA LAW 'WEAPONISING' PRIVACY

Why in the news?

- Petitioners argue that specific clauses of the Digital Personal Data Protection (DPDP) Act, 2023 provide excessive discretionary powers to the government, potentially diluting citizens' right to privacy.
- The case raises constitutional questions about balancing data protection, national security, and individual liberties under Article 21.

BACKGROUND / CONTEXT

- I. The DPDP Act, 2023 provides a framework for processing digital personal data.
- II. It establishes obligations for **Data Fiduciaries** and rights for **Data Principals**.
- III. The Act empowers the Central Government to exempt certain agencies on grounds such as sovereignty, security, and public order.
- IV. The right to privacy was recognised as a fundamental right in **Justice K.S. Puttaswamy (2017)** judgment.

KEY HIGHLIGHTS

- **Constitutional Challenge** – Petition questions compatibility with Article 14 and Article 21.
- **State Exemptions Clause** – Concern over broad executive discretion.
- **Data Protection Board** – Statutory body under the Act to enforce compliance.

• **Privacy vs Security Debate** – Tension between individual rights and national interest.

• **Digital Governance Expansion** – Growing state reliance on digital databases.

• **Judicial Oversight** – SC's interpretation may shape India's data protection jurisprudence.

PRELIMS BOOSTER BOX

Digital Personal Data Protection Act, 2023

- Applies to digital personal data.
- Defines Data Principal & Data Fiduciary.
- Provides consent-based processing model.

Key Rights

- Right to access information.
- Right to correction and erasure.
- Right to grievance redressal.

Landmark Case

- Justice K.S. Puttaswamy vs Union of India (2017) – Right to Privacy under Article 21.

Global Context

- EU's GDPR as benchmark data protection framework.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to the Right to Privacy in India, consider the following statements:



1. It has been recognised as part of Article 21 by the Supreme Court.
2. It is explicitly mentioned as a Fundamental Right in the Constitution.

Which of the statements given above is/are correct?

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

Answer: (a)

Mains PYQ

“Discuss the constitutional and governance challenges involved in balancing data protection with national security concerns in India.” (GS-II)

PadhAI MAINS PRACTICE QUESTION

Examine the key provisions of the Digital Personal Data Protection Act, 2023. Critically analyse the constitutional concerns raised regarding state exemptions. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to the Digital Personal Data Protection Act, 2023, consider the following statements:

1. The Act applies only to non-digital personal data.
2. The Central Government can exempt certain agencies on specified grounds.
3. The right to privacy has been recognised by the Supreme Court as part of Article 21.

Which of the statements given above is/are correct?

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

Answer: (a)

6.INDIA'S FEDERALISM NEEDS STRUCTURAL RESET

Why in the news?

- India's quasi-federal model, designed with a strong Centre, is facing stress due to fiscal centralisation, institutional overlaps, and political asymmetry.
- Experts argue for recalibrating fiscal, administrative, and political arrangements to restore trust between Union and States while preserving national unity.

BACKGROUND / CONTEXT

- I. India is described as a **“Union of States”** under Article 1.
- II. Federal features include:
 - A. Division of powers (Seventh Schedule – Union, State, Concurrent Lists)
 - B. Bicameralism (Rajya Sabha)
 - C. Independent Judiciary
- III. Unitary tilt:
 - A. Residuary powers with Centre
 - B. Emergency provisions (Articles 352, 356, 360)
 - C. All-India Services

Institutions shaping federalism:

- Finance Commission of India
- GST Council



- Inter-State Council

KEY HIGHLIGHTS

- **Fiscal Centralisation** – Growing reliance on cesses and surcharges reduces the divisible pool for States.
- **GST Compensation Issue** – Expiry of guaranteed compensation altered State revenue security.
- **Governor–State Frictions** – Delays in assent to Bills raise constitutional concerns.
- **Centrally Sponsored Schemes (CSS)** – Reduced flexibility for States in implementation.
- **Asymmetrical Federalism** – Special provisions (e.g., Sixth Schedule areas) reflect differentiated autonomy.
- **Need for Institutional Strengthening** – Revitalising Inter-State Council and enhancing fiscal autonomy.

PRELIMS BOOSTER BOX

Key Constitutional Provisions

- Article 1 – Union of States
- Article 246 – Distribution of legislative powers
- Seventh Schedule – Three Lists
- Article 280 – Finance Commission
- Article 263 – Inter-State Council

Fiscal Federalism

- The 15th Finance Commission recommended 41% tax devolution to States.
- Cesses & surcharges not shareable with States.

Emergency Provisions

- Article 356 – President’s Rule in States.

Comparative Insight

- India = Quasi-federal with unitary bias (K.C. Wheare).

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

Which of the following are the features of Indian federalism?

1. Distribution of legislative powers between Centre and States
2. Written Constitution
3. Independent Judiciary

Select the correct answer using the code below:

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

Answer: (c)

Mains PYQ

“While the Indian Constitution provides for federalism, it also strengthens the Centre.” Discuss with suitable examples. (GS-II)

PadhAI MAINS PRACTICE QUESTION

India’s federal structure is often described as ‘quasi-federal with a unitary bias.’ In light of recent Centre–State tensions, examine the need for a structural reset of cooperative federalism. (150 words)



PadhAI-GENERATED UPSC MCQ

With reference to Indian federalism, consider the following statements:

1. Residuary legislative powers lie with the States.
2. Cesses and surcharges are part of the divisible pool of taxes.
3. The Inter-State Council is provided under Article 263 of the Constitution.

Which of the statements given above is/are correct?

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

Answer: (a)

7. THE NEED FOR DIVERSITY IN THE JUDICIARY

Why in the news?

- Judicial diversity is crucial for enhancing legitimacy, public trust, and representational fairness in constitutional governance.
- While judicial independence is paramount, the absence of social diversity may limit experiential perspectives in adjudication, particularly in rights-based and social justice cases.

BACKGROUND / CONTEXT

- I. Constitutional provisions governing judiciary:
 - A. Article 124 – Supreme Court

- B. Article 217 – High Courts
- II. Judges appointed through the Collegium system (judicial interpretation).
 - III. No formal constitutional quota for representation in higher judiciary.
 - IV. India has had few women judges in the Supreme Court relative to total strength.

KEY HIGHLIGHTS

- **Legitimacy & Trust** – Diverse benches strengthen democratic credibility.
- **Substantive Justice** – Varied lived experiences improve sensitivity in cases involving gender, caste, disability, and minorities.
- **Gender Gap** – Women remain underrepresented in higher judiciary.
- **Social Inclusion** – SC/ST/OBC representation remains limited.
- **Collegium Critique** – Opaque selection process lacks diversity benchmarks.
- **Global Practices** – Countries like the UK and South Africa incorporate diversity goals in judicial appointments.

PRELIMS BOOSTER BOX

Judicial Appointments

- Article 124(2): SC judges appointed by President.
- Article 217: HC judges appointed by President after consultation.

Collegium System

- Emerged from Second Judges Case (1993).



- Reinforced in Third Judges Case (1998).

NJAC

- 99th Constitutional Amendment & NJAC Act (2014).
- Struck down by the Supreme Court (2015).

Judicial Independence

- Basic Structure doctrine (Kesavananda Bharati, 1973).

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to the appointment of judges of the Supreme Court of India, consider the following statements:

1. The President of India appoints the judges of the Supreme Court.
2. The Constitution explicitly provides for the Collegium system.

Which of the statements given above is/are correct?

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

Answer: (a)

Mains PYQ

“Judicial independence is a part of the basic structure of the Constitution.” Discuss the challenges in balancing independence with accountability in judicial appointments. (GS-II)

PadhAI MAINS PRACTICE QUESTION

Discuss the importance of diversity in the higher judiciary in India. How can institutional reforms improve representational inclusivity without compromising judicial independence? (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to the higher judiciary in India, consider the following statements:

1. The Collegium system is explicitly mentioned in the Constitution.
2. Judges of the Supreme Court are appointed by the President of India.
3. Judicial independence has been recognised as part of the Basic Structure doctrine.

Which of the statements given above is/are correct?

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

Answer: (a)

8.TREATISE FOR FEDERALISM

Why in the news?

- India’s federalism, often described as quasi-federal with a unitary bias, requires doctrinal clarity and institutional strengthening.
- A modern treatise would revisit constitutional principles, judicial



interpretations, fiscal arrangements, and cooperative mechanisms to recalibrate Centre–State relations.

BACKGROUND / CONTEXT

- I. Article 1: India as a “Union of States”.
- II. Division of powers: Seventh Schedule (Union, State, Concurrent Lists).
- III. Residuary powers vested in Centre (Article 248).
- IV. Key federal institutions:
 - A. Finance Commission of India
 - B. GST Council
 - C. Inter-State Council
- V. Judicial interpretation:
 - A. S.R. Bommai v. Union of India – Federalism part of Basic Structure.

KEY HIGHLIGHTS

- **Conceptual Clarity** – Define cooperative vs competitive federalism.
- **Fiscal Federalism Reform** – Address concerns over cesses, GST compensation, vertical & horizontal imbalance.
- **Strengthening Institutions** – Revitalise Inter-State Council as dispute-resolution platform.
- **Role of Governors** – Clarify constitutional boundaries under Articles 153–161.
- **Decentralisation to Local Bodies** – Deepen 73rd & 74th Amendment implementation.
- **Judicial Doctrine** – Reaffirm federalism as part of Basic Structure.

PRELIMS BOOSTER BOX

Key Articles

- Article 246 – Legislative competence.
- Article 248 – Residuary powers.
- Article 263 – Inter-State Council.
- Article 280 – Finance Commission.
- Article 356 – President’s Rule.

Important Case

- S.R. Bommai (1994): Limited arbitrary use of Article 356.

Finance Commission

- Recommends tax devolution (currently 41%).

GST Council

- Article 279A.
- Decisions by weighted voting (Centre 1/3rd, States 2/3rd).

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

Which of the following provisions strengthen the federal character of the Indian Constitution?

1. Distribution of legislative powers.
2. Written Constitution.
3. Single citizenship.

Select the correct answer:

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

Answer: (b)

Mains PYQ



“The Indian Constitution establishes a federal system with a strong Centre.” Critically examine. (GS-II)

PadhAI MAINS PRACTICE QUESTION

Discuss the need for a comprehensive doctrinal and institutional reset of Indian federalism. Suggest reforms to strengthen cooperative federalism while preserving national unity. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to Indian federalism, consider the following statements:

1. The Inter-State Council is a constitutional body under Article 263.
2. Residuary legislative powers lie with the States.
3. Federalism has been recognised as part of the Basic Structure of the Constitution.

Which of the statements given above is/are correct?

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

Answer: (a)

9.SC RULING ON USE OF STEM CELLS FOR AUTISM SETS A PRECEDENT FOR HEALTHCARE REGULATION

Why in the news?

- The Court held that stem cell interventions for autism cannot be administered outside approved clinical trials and established medical protocols.
- The judgment strengthens patient safety norms and clarifies the regulatory framework governing advanced therapies in India.

BACKGROUND / CONTEXT

- I. Stem cell therapy is considered experimental for many neurological conditions, including autism.
- II. In India, stem cell use is regulated through:
 - A. National Guidelines for Stem Cell Research (NGSCR).
 - B. Oversight by the Indian Council of Medical Research (ICMR).
- III. Autism Spectrum Disorder (ASD) is a neurodevelopmental condition requiring evidence-based therapeutic approaches.
- IV. Concerns were raised about private clinics offering unproven therapies.

KEY HIGHLIGHTS

- **Evidence-Based Medicine** – Court emphasised scientific validation before clinical use.
- **Regulatory Oversight** – Reinforced authority of ICMR and statutory regulators.
- **Patient Protection** – Prevents exploitation of vulnerable families.
- **Clinical Trial Mandate** – Therapies must follow ethical and research standards.
- **Public Health Governance** – Strengthens accountability in the private healthcare sector.



- **Judicial Precedent** – May influence regulation of gene therapy and regenerative medicine.

PRELIMS BOOSTER BOX

Stem Cells

- Undifferentiated cells capable of self-renewal and differentiation.
- Types: Embryonic, Adult (Somatic), Induced Pluripotent Stem Cells (iPSCs).

Regulatory Framework in India

- National Guidelines for Stem Cell Research (latest revision by ICMR).
- Clinical trials regulated under Drugs and Cosmetics Act, 1940.

Ethical Principles

- Informed consent.
- Institutional Ethics Committee approval.
- Clinical Trial Registry of India (CTRI).

Autism Spectrum Disorder

- Neurodevelopmental disorder affecting communication and behaviour.
- No established cure; management through therapy and support.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to stem cells, consider the following statements:

1. Stem cells can differentiate into specialised cell types.

2. All stem cell therapies are approved and standardised for clinical use in India.

Which of the statements given above is/are correct?

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

Answer: (a)

Mains PYQ

Discuss the ethical and regulatory challenges in the use of emerging biotechnologies such as stem cell therapy in India. (GS-III)

PadhAI MAINS PRACTICE QUESTION

Examine the regulatory and ethical issues associated with stem cell therapy in India. How does judicial intervention strengthen healthcare governance? (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to stem cell therapy in India, consider the following statements:

1. Stem cell therapy for autism is universally recognised as a standard treatment.
2. Clinical use of stem cells in India must adhere to national research guidelines.
3. The Supreme Court has emphasised the need for evidence-based medical practice.

Which of the statements given above is/are correct?



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

Answer: (a)

10. DOES DATA ACT WEAKEN RTI ACT?

Why in the news?

- The DPDP Act amends Section 8(1)(j) of the RTI Act, which earlier allowed disclosure of personal information if it served a larger public interest.
- Critics argue that the amendment strengthens privacy protections but may reduce transparency, thereby affecting accountability mechanisms in governance.

BACKGROUND / CONTEXT

- I. RTI Act, 2005: Empowers citizens to access information from public authorities.
- II. Section 8 lists exemptions from disclosure.
- III. DPDP Act, 2023: Comprehensive data protection framework governing digital personal data.
- IV. The right to privacy was recognised as a fundamental right in **Justice K.S. Puttaswamy (2017)** judgment.

KEY HIGHLIGHTS

- **Amendment to Section 8(1)(j)** – Personal information exemption widened.
- **Public Interest Test Removed?** – Earlier balancing clauses are seen as diluted.

• **Privacy vs Transparency Debate** – Tension between Article 21 (privacy) and democratic accountability.

• **Impact on RTI Activism** – Potential reduction in access to information on public officials.

• **Legal Challenge Possible** – Constitutional scrutiny likely under Articles 14 and 19(1)(a).

• **Governance Implications** – Raises questions about proportionality doctrine.

PRELIMS BOOSTER BOX

RTI Act, 2005

- Enacted under Article 19(1)(a) (Freedom of Speech & Expression).
- Section 8: Exemptions from disclosure.
- Central & State Information Commissions established.

DPDP Act, 2023

- Regulates digital personal data processing.
- Provides rights to Data Principals.
- Allows government exemptions on specified grounds.

Landmark Case

- Justice K.S. Puttaswamy (2017): Privacy under Article 21.

Doctrine of Proportionality

- State action must be lawful, necessary, and proportionate.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ



The Right to Information Act, 2005 is primarily based on which of the following constitutional provisions?

- (a) Article 14
- (b) Article 19(1)(a)
- (c) Article 21
- (d) Article 32

Answer: (b)

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

Answer: (a)

Mains PYQ

“Transparency and accountability are the cornerstones of democracy.” Discuss the challenges in balancing the right to privacy with the right to information in India. (GS-II)

PadhAI MAINS PRACTICE QUESTION

Critically examine whether the Digital Personal Data Protection Act, 2023 weakens the effectiveness of the RTI Act, 2005. Discuss in the context of privacy and transparency in governance. (150 words)

PadhAI-GENERATED UPSC MCQ

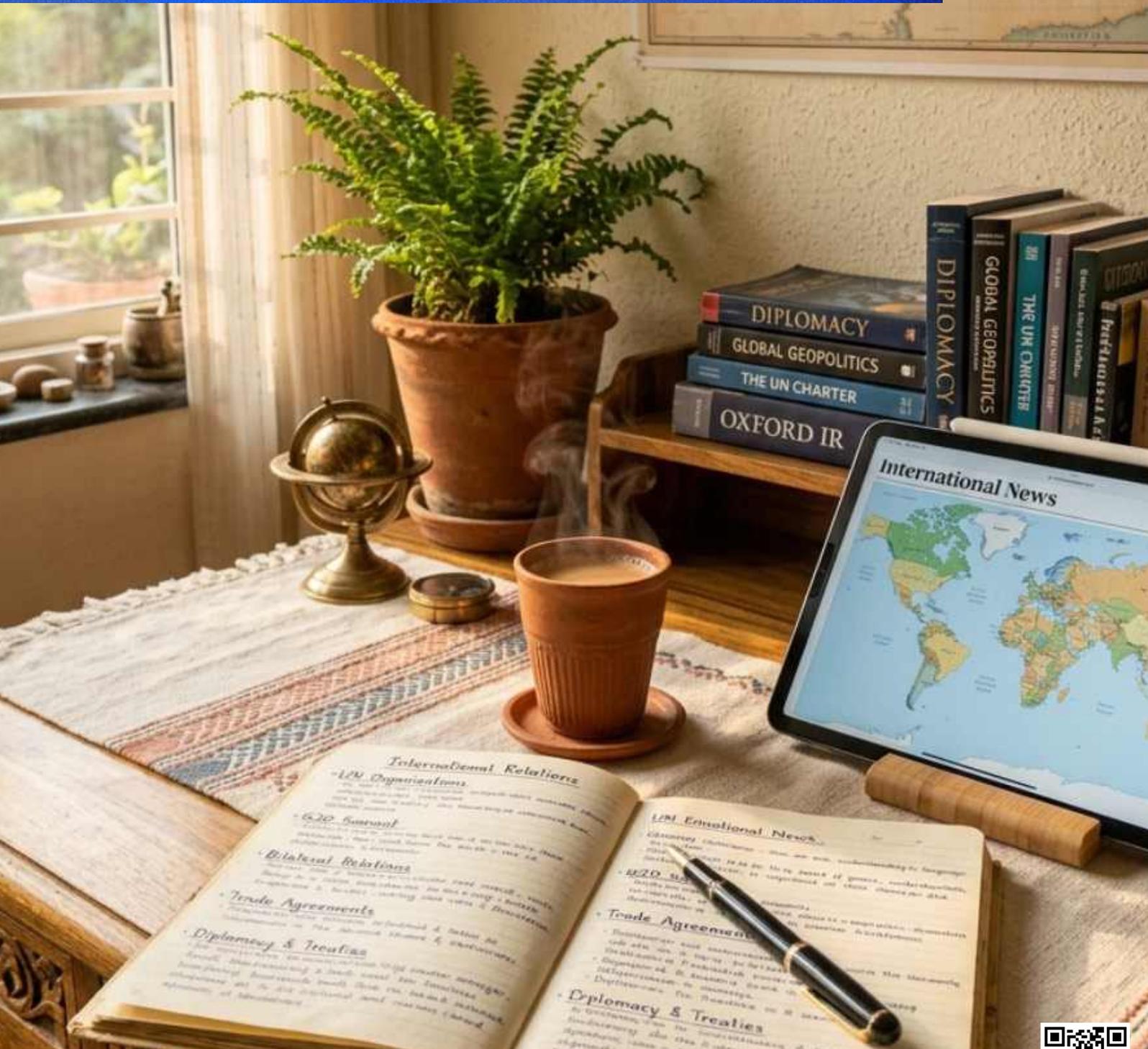
With reference to the Digital Personal Data Protection Act, 2023 and the Right to Information Act, 2005, consider the following statements:

1. The RTI Act derives its constitutional basis from Article 19(1)(a).
2. The DPDP Act amended Section 8(1)(j) of the RTI Act.
3. The RTI Act contains no exemptions for disclosure of information.

Which of the statements given above is/are correct?



INTERNATIONAL RELATIONS



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1. WHY IS INDIA–EU TRADE AGREEMENT SIGNIFICANT?

Why in the news?

- The proposed India–EU trade agreement aims to enhance bilateral trade in goods and services, facilitate investment flows, and strengthen strategic ties.
- As the EU is among India’s largest trading partners, the agreement is significant for market access, technology collaboration, green transition, and supply–chain resilience.

BACKGROUND / CONTEXT

- I. Negotiations for the BTIA began in **2007** but stalled in 2013 due to disagreements over tariffs, services, data protection, and mobility of professionals.
- II. Talks resumed in 2022 during the India–EU Leaders’ Meeting.
- III. The EU is India’s **largest trading partner in goods** (in recent years), overtaking the US in certain periods.
- IV. The agreement also covers:
 - A. Trade and Investment
 - B. Geographical Indications (GIs)
 - C. Sustainability standards

KEY HIGHLIGHTS

- **Market Access Expansion** – Indian exporters (textiles, pharmaceuticals, engineering goods) could gain preferential access to a 27–country market.
- **Services & Mobility** – India seeks easier visa norms for skilled professionals and recognition of qualifications.

- **Investment Boost** – EU is a major source of FDI; agreement may enhance investor confidence.

- **Strategic Diversification** – Supports India’s China+1 strategy and reduces overdependence on limited supply chains.

- **Green & Digital Cooperation** – Alignment on climate standards, carbon border measures (CBAM), and digital trade norms.

- **Geopolitical Significance** – Strengthens India’s position in the Indo–Pacific and counters protectionist trends.

PRELIMS BOOSTER BOX

European Union (EU)

- 27 member states.
- Single Market + Customs Union.
- Common trade policy.

Trade Facts

- The EU accounts for ~14–15% of India’s total trade (approximate recent figures).
- Key exports: Petroleum products, machinery, chemicals, textiles.
- Key imports: Machinery, transport equipment, chemicals.

Important Concepts

- FTA vs BTIA (Broader scope including services & investment).
- Carbon Border Adjustment Mechanism (CBAM).
- Geographical Indications (GI protection).

Static + Current Linkage

- Article 51: Promotion of international peace and security.



- WTO compatibility.
- Atmanirbhar Bharat vs Free Trade debate.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to the European Union, consider the following statements:

1. All member countries of the EU are part of the Eurozone.
2. The EU has a common trade policy.

Which of the statements given above is/are correct?

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

Answer: (b)

Mains PYQ

“What are the key areas of India–European Union cooperation? Discuss the significance of this partnership in the current global order.” (GS-II / GS-III)

PadhAI MAINS PRACTICE QUESTION

Discuss the economic and geopolitical significance of the proposed India–EU trade agreement. What challenges could hinder its successful conclusion? (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to the proposed India–EU trade agreement, consider the following statements:

1. The European Union follows a common trade policy for all its member states.
2. The Carbon Border Adjustment Mechanism (CBAM) may impact Indian exports to the EU.
3. The India–EU BTIA negotiations began after 2015.

Which of the statements given above is/are correct?

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

Answer: (a)

2.ADVANCING GAZA CONFLICT PLAN A SHARED PRIORITY

Why in the news?

- The Gaza conflict has triggered a humanitarian crisis and regional instability.
- International actors are working toward a shared roadmap focusing on ceasefire, hostage release, humanitarian aid, reconstruction, and a renewed push for a two-state solution.
- However, disagreements over governance of Gaza, security guarantees, and long-term political arrangements persist.

BACKGROUND / CONTEXT

- I. Gaza is a narrow coastal enclave along the Mediterranean Sea.



- II. The conflict escalated after attacks by Hamas inside Israel in October 2023.
- III. Israel launched military operations in Gaza aiming to dismantle Hamas.
- IV. The humanitarian situation has involved large-scale displacement and aid shortages.
- V. The United Nations Security Council has debated multiple ceasefire resolutions.

KEY HIGHLIGHTS

- **Ceasefire Diplomacy** – Negotiations mediated by regional players seek phased ceasefire agreements and hostage exchanges.
- **Humanitarian Crisis** – Acute shortages of food, water, and medical supplies; global calls for humanitarian corridors.
- **Post-Conflict Governance** – Debate over who will administer Gaza: Palestinian Authority, international trusteeship, or interim arrangement.
- **Two-State Solution Revival** – Renewed diplomatic emphasis on an independent Palestinian state alongside Israel.
- **Regional Spillover Risks** – Involvement of actors like Hezbollah and tensions in the Red Sea elevate geopolitical stakes.
- **Global Power Alignment** – US, EU, and Arab states coordinating reconstruction frameworks to prevent prolonged instability.

PRELIMS BOOSTER BOX

Gaza Strip

- Bordered by Israel and Egypt.
- Controlled by Hamas since 2007.

Key International Concepts

- Two-State Solution.
- International Humanitarian Law (Geneva Conventions).
- Responsibility to Protect (R2P) – normative principle.

Important Bodies

- United Nations Relief and Works Agency (UNRWA) – Palestinian refugee support.
- International Court of Justice (ICJ) – Advisory and contentious jurisdiction.

Static + Current Linkage

- Article 51, UN Charter – Self-defense.
- Chapter VI & VII of the UN Charter – Peaceful settlement & enforcement.
- West Asia's strategic importance (energy routes, Suez Canal proximity).

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to the United Nations Security Council (UNSC), consider the following statements:

1. It has five permanent members with veto power.
2. It can impose economic sanctions and authorize use of force.

Which of the statements given above is/are correct?

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

Answer: (c)



Mains PYQ

“Discuss the role of the United Nations in conflict resolution in West Asia.” (GS-II)

PadhAI MAINS PRACTICE QUESTION

Examine the geopolitical and humanitarian dimensions of the Gaza conflict. How can coordinated international diplomacy contribute to sustainable peace in the region? (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to the Gaza conflict and international law, consider the following statements:

1. The Gaza Strip shares borders with both Israel and Egypt.
2. UNRWA is responsible for refugee assistance specifically for Palestinians.
3. The International Court of Justice can directly enforce its judgments using military force.

Which of the statements given above is/are correct?

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

Answer: (a)

3.KREMLIN: NO INDIA OIL PURCHASE HALT

Why in the news?

- Despite geopolitical tensions and sanctions imposed by the US and EU on Russia, India continues to import discounted Russian crude oil.
- Moscow has publicly stated that energy supplies to India remain stable.
- The development highlights India's strategic autonomy in energy security and the evolving global oil trade dynamics.

BACKGROUND / CONTEXT

- I. After the 2022 Russia–Ukraine conflict, Western countries imposed sanctions on Russian oil exports.
- II. The G7 introduced a **price cap mechanism** on Russian crude.
- III. India increased imports of discounted Russian crude to stabilize domestic fuel prices.
- IV. Russia has emerged as one of India's top crude suppliers in recent years.

KEY HIGHLIGHTS

- **Energy Security Priority** – India emphasizes affordable and uninterrupted crude supply to meet growing energy demand.
- **Strategic Autonomy** – India has avoided aligning fully with Western sanctions, maintaining balanced diplomacy.
- **Discounted Crude Advantage** – Russian oil offered at competitive prices helps control inflation and current account deficit.
- **Payment Mechanisms** – Exploration of rupee–rouble trade and alternative settlement systems amid SWIFT restrictions.
- **Global Oil Market Shift** – Trade flows have realigned, with Europe reducing Russian imports while Asia increased purchases.



PRELIMS BOOSTER BOX

Key Concepts

- **OPEC+** – Coalition of OPEC members and allies including Russia.
- **Brent Crude** – International oil benchmark.
- **Urals Crude** – Russian export blend.
- **Price Cap Mechanism** – Limits price at which Russian oil can be sold using Western shipping/insurance services.

India's Energy Profile

- Imports ~85% of its crude oil requirement.
- Major suppliers: Russia, Iraq, Saudi Arabia (varies by year).

Static + Current Linkage

- Doctrine of Strategic Autonomy.
- Current Account Deficit (CAD).
- Energy Transition vs Fossil Fuel Dependence.
- Role of Organization of the Petroleum Exporting Countries (OPEC).

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to 'OPEC+', consider the following statements:

1. It includes member countries of OPEC along with Russia.
2. It coordinates oil production policies among participating countries.

Which of the statements given above is/are correct?

(a) 1 only

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

Answer: (c)

Mains PYQ

"India's energy security strategy reflects its pursuit of strategic autonomy in foreign policy." Discuss. (GS-II/GS-III)

PadhAI MAINS PRACTICE QUESTION

Examine the geopolitical and economic implications of India's continued crude oil imports from Russia amid Western sanctions. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to global oil trade dynamics, consider the following statements:

1. India imports the majority of its crude oil requirements.
2. The G7 price cap mechanism completely bans Russian oil exports worldwide.
3. OPEC+ includes both OPEC members and Russia.

Which of the statements given above is/are correct?

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

Answer: (a)



4.INDIA, MALAYSIA INK PACTS TO EXPAND STRATEGIC TIES

Why in the news?

- The bilateral pacts aim to strengthen strategic, economic, and security cooperation between India and Malaysia.
- The agreements reflect growing convergence in the Indo-Pacific, maritime security collaboration, and supply chain resilience.

BACKGROUND / CONTEXT

- I. Malaysia is a key ASEAN member located along the Strait of Malacca.
- II. India–Malaysia relations upgraded to **Enhanced Strategic Partnership** in recent years.
- III. Malaysia plays a crucial role in maritime trade routes linking the Indian Ocean and Pacific.
- IV. Both countries are part of ASEAN-led regional mechanisms.

KEY HIGHLIGHTS

- **Strategic Partnership Expansion** – Broader defence and maritime cooperation.
- **Trade & Investment Push** – Focus on palm oil, electronics, and services.
- **Digital & Technology Collaboration** – Cooperation in fintech, digital public infrastructure.
- **Indo-Pacific Alignment** – Shared interest in freedom of navigation.
- **Counter-Terrorism Cooperation** – Intelligence sharing and capacity building.

- **People-to-People Ties** – Large Indian diaspora in Malaysia strengthens cultural links.

PRELIMS BOOSTER BOX

India–Malaysia Trade

- Malaysia among India’s top ASEAN trading partners.
- Major imports: Palm oil, electronics.
- Major exports: Petroleum products, pharmaceuticals.

Strait of Malacca

- One of the busiest maritime chokepoints globally.
- Critical for India’s energy security.

Regional Frameworks

- ASEAN.
- East Asia Summit (EAS).
- ASEAN Regional Forum (ARF).

Act East Policy

- Launched in 2014.
- Focus on economic, cultural, and strategic ties with Southeast Asia.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to the ‘Act East Policy’ of India, consider the following statements:

1. It aims to strengthen economic and strategic relations with Southeast Asian countries.
2. It replaced India’s earlier ‘Look East Policy’.



Which of the statements given above is/are correct?

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

Answer: (c)

Mains PYQ

“The Indo-Pacific has become central to India’s foreign policy.” Discuss the importance of ASEAN countries in this context. (GS-II)

PadhAI MAINS PRACTICE QUESTION

Examine the strategic and economic significance of India–Malaysia relations in the context of India’s Act East Policy and Indo-Pacific strategy. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to India–Malaysia relations, consider the following statements:

1. Malaysia is located along the Strait of Malacca.
2. Malaysia is not a member of ASEAN.
3. The Act East Policy emphasises strategic engagement with Southeast Asia.

Which of the statements given above is/are correct?

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

Answer: (a)

5.INDIA AND FRANCE UPGRADE TIES TO STRATEGIC PARTNERSHIP

Why in the news?

- India–France relations, rooted in trust and strategic autonomy, have evolved into a comprehensive partnership covering defence manufacturing, maritime security, climate action, civil nuclear cooperation, and advanced technologies.
- The upgrade reflects deep convergence in multipolar global governance and Indo-Pacific stability.

BACKGROUND / CONTEXT

- I. India–France Strategic Partnership was originally established in 1998.
- II. France has been a consistent supporter of India in multilateral forums.
- III. Key pillars:
 - A. Defence (e.g., Rafale aircraft)
 - B. Civil nuclear cooperation
 - C. Space collaboration (ISRO–CNES)
 - D. Climate diplomacy

France is also a resident power in the Indo-Pacific with territories in the Indian Ocean.

KEY HIGHLIGHTS

- **Defence Cooperation** – Joint exercises (Varuna), defence procurement, technology transfer.
- **Indo-Pacific Synergy** – Maritime domain awareness and naval cooperation.



- **Civil Nuclear Energy** – Collaboration on peaceful uses of nuclear power.
- **Space Collaboration** – ISRO–CNES satellite missions.
- **Climate Leadership** – Founding members of the International Solar Alliance.
- **Strategic Autonomy** – Shared emphasis on multipolar world order.

PRELIMS BOOSTER BOX

India–France Strategic Partnership

- Established: 1998.
- Covers defence, nuclear, space, counter-terrorism.

Key Military Exercise

- Exercise Varuna (naval).

International Solar Alliance (ISA)

- Launched in 2015 (Paris COP21).
- Headquarters: Gurugram, India.

Indo-Pacific

- Region spanning Indian and Pacific Oceans.
- Focus on freedom of navigation and rule-based order.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to the International Solar Alliance (ISA), consider the following statements:

1. It was launched during the Paris Climate Conference (COP21).

2. Its headquarters is located in India.

Which of the statements given above is/are correct?

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

Answer: (c)

Mains PYQ

Discuss the significance of the Indo-Pacific region in India's foreign policy. How does India's partnership with France contribute to this strategy? (GS-II)

PadhAI MAINS PRACTICE QUESTION

Analyse the strategic significance of India–France relations in the context of defence cooperation, Indo-Pacific geopolitics, and climate diplomacy. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to India–France relations, consider the following statements:

1. The India–France Strategic Partnership was established in 1998.
2. France is not an Indo-Pacific power.
3. India and France jointly launched the International Solar Alliance.

Which of the statements given above is/are correct?

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



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

Answer: (a)

6. EU, U.S. DEALS CONNECT INDIA TO WORLD'S LARGEST MARKETS, OPEN NEW TRADE VISTAS

Why in the news?

- Ongoing India–EU FTA negotiations and India–U.S. initiatives such as critical and emerging technology cooperation are reshaping India's trade diplomacy.
- These engagements aim to diversify markets, reduce dependency risks, and position India as a trusted manufacturing and digital hub.

BACKGROUND / CONTEXT

- I. The EU collectively represents one of India's largest trading partners.
- II. The U.S. is India's largest single-country trading partner.
- III. India–EU negotiations include:
 - A. Free Trade Agreement (FTA)
 - B. Investment Protection Agreement
 - C. Geographical Indications (GIs)
- IV. India–U.S. cooperation extends to:
 - A. Critical & Emerging Technologies
 - B. Semiconductor supply chains
 - C. Defence and digital trade

KEY HIGHLIGHTS

- **Market Access Expansion** – Reduced tariffs and regulatory barriers.

- **Supply Chain Diversification** – Alternative to concentrated manufacturing hubs.
- **Technology Partnerships** – Cooperation in AI, semiconductors, clean energy.
- **Strategic Autonomy** – Balanced engagement with Western economies.
- **Services Trade Boost** – IT, pharmaceuticals, skilled mobility.
- **Standards & Compliance** – Alignment with EU sustainability and digital norms.

PRELIMS BOOSTER BOX

India–EU Trade

- The EU is among India's top trading partners.
- Key exports: Engineering goods, pharma, textiles.
- Key imports: Machinery, chemicals, transport equipment.

India–U.S. Trade

- U.S. = India's largest export destination.
- Major sectors: IT services, defence, energy.

FTA (Free Trade Agreement)

- Eliminates/reduces tariffs.
- Addresses non-tariff barriers.

Geopolitical Context

- "Friend-shoring" & "China+1" strategy.
- Indo-Pacific economic alignment.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ



Which of the following best describes a Free Trade Agreement (FTA)?

- (a) Complete elimination of tariffs on all goods
- (b) Agreement to reduce or eliminate tariffs and trade barriers between participating countries
- (c) Customs union with common external tariff
- (d) Monetary union with shared currency

Answer: (b)

Mains PYQ

“India’s trade policy must balance market access with strategic autonomy.” Discuss in the context of India’s engagement with the EU and the United States. (GS-II/III)

PadhAI MAINS PRACTICE QUESTION

Evaluate the economic and strategic significance of India’s expanding trade agreements with the European Union and the United States. How can these deals reshape India’s global trade position? (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to India’s trade engagements with the EU and the U.S., consider the following statements:

1. The European Union collectively represents one of India’s largest trading partners.
2. A Free Trade Agreement necessarily involves adoption of a common currency.

3. Supply chain diversification is a strategic objective behind recent trade negotiations.

Which of the statements given above is/are correct?

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

Answer: (a)

7.TAKAICHI’S WIN COULD MEAN MORE TENSIONS WITH CHINA

Why in the news?

- Takaichi’s landslide win in Japan’s Lower House elections has consolidated her leadership and empowered her to more confidently pursue a conservative security agenda, including defence enhancements and clearer stances on Taiwan.
- These moves are likely to heighten strategic competition with China, potentially extending diplomatic strain, economic friction, and heightened regional security tensions.

BACKGROUND / CONTEXT

- I. Takaichi’s Liberal Democratic Party secured a strong majority, giving her a stable political mandate.
- II. Her government has articulated a security-focused foreign policy, including increased defence spending and clearer thresholds for Japan’s Self-Defense Forces involvement in regional crises.



- III. Taiwan remains a central flashpoint in China–Japan strategic relations; Tokyo’s stance on the island has been a source of diplomatic tension.

KEY HIGHLIGHTS

- **Stronger Defence Posture** – Takaichi is expected to accelerate defence spending and security reforms. This could include deeper cooperation with allies and modernisation of Japan’s Self-Defense Forces.
- **Taiwan Sensitivity** – Her past remarks linking a Chinese attack on Taiwan to Japan’s security have drawn strong responses from Beijing and remain a sensitive issue.
- **Bilateral Strain Already Visible** – China has restricted exports of critical inputs to Japanese firms in response to tensions, indicating growing economic friction tied to strategic disputes.
- **Mixed Regional Views** – While many East Asian nations see a stronger Japan as a stabilising force, China views assertive Japanese defence policy with suspicion and concern.
- **Diplomatic Chill** – High-level engagements have been limited with Beijing in recent months, reflecting reduced bilateral diplomatic traction.

PRELIMS BOOSTER BOX

Japan–China Relations

- A complex relationship shaped by history, territorial disputes (e.g., Senkaku/Diaoyu Islands), and economic interdependence.
- Japan’s defence policy is constrained by its post-war constitution but has

gradually expanded the role of its Self-Defense Forces.

Taiwan Issue

- China asserts sovereignty over Taiwan; Japan, while adhering to the One China policy, maintains robust informal ties and strategic interest in regional stability.

Security Partnerships

- Japan’s alliance with the United States underpins its security strategy in East Asia.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to Japan’s foreign policy, consider the following statements:

1. Japan’s Self-Defense Forces can only be deployed in strictly defensive scenarios.
2. Japan–China relations are influenced by strategic concerns in the Taiwan Strait.

Which of the statements given above is/are correct?

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

Answer: (b)

Mains PYQ

“Analyse the impact of recent electoral outcomes in Japan on Indo-Pacific security dynamics.” (GS-II)



PadhAI MAINS PRACTICE

QUESTION

Discuss how Prime Minister Takaichi's election win could influence Japan's foreign and security policy, particularly in regard to China and the Taiwan issue. (150 words)

PadhAI-GENERATED UPSC

MCQ

With reference to Japan–China strategic dynamics, consider the following statements:

1. Japan's election results have strengthened the mandate for security reforms.
2. Taiwan is a contentious issue affecting China–Japan relations.
3. China has responded to recent Japanese policy positions with export restrictions.

Which of the statements given above is/are correct?

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

Answer: (c)

8.GEOPOLITICAL SHIFTS MAY BOOST GCC RESILIENCE

Why in the news?

- Recent geopolitical realignments – including supply-chain rewiring, diplomatic engagements beyond traditional Western partners, and renewed trade negotiations – are

contributing to economic resilience in GCC states.

- These shifts are helping the GCC diversify trade, strengthen non-oil sectors, and expand strategic ties across Asia, Africa, and beyond.

BACKGROUND / CONTEXT

- I. The **Gulf Cooperation Council (GCC)** comprises six Middle Eastern monarchies: Saudi Arabia, United Arab Emirates (UAE), Qatar, Kuwait, Oman and Bahrain.
- II. Traditionally reliant on **hydrocarbon exports**, the GCC economies have been vulnerable to oil price volatility.
- III. Global geopolitical developments – trade fragmentation, supply-chain disruptions, and new multilateral partnerships – are prompting Gulf states to adapt economically and strategically.
- IV. India and the GCC recently relaunched **Free Trade Agreement (FTA)** negotiations, highlighting shifting priorities toward broader economic integration.

KEY HIGHLIGHTS

- **Trade Diversification** – GCC states are expanding beyond oil exports by deepening trade networks across Asia, Africa and Europe, mitigating risks from global volatility.
- **Economic Diversification Drives** – Strategic reforms in tourism, tech, AI adoption, logistics and finance bolster economic resilience.
- **Resilience via Digital & AI Investment** – Capital deployment into advanced sectors like AI, cloud infrastructure and data centres demonstrates long-term economic adaptation.



• **Supply-Chain Realignment** – Geopolitical shifts have reshaped global trade routes and supply chains, offering GCC states openings to become logistic hubs linking East–West flows.

• **Strategic Partnerships Beyond the West** – Rising South–South cooperation with Asia and Africa strengthens non–oil ties and reduces dependency on traditional partners.

• **Economic Stability** – Strong financial systems and robust banking liquidity in the GCC underpin stability even amid regional geopolitical risks.

PRELIMS BOOSTER BOX

Gulf Cooperation Council (GCC)

- Regional political and economic bloc formed in 1981.
- Member States: Saudi Arabia, UAE, Qatar, Kuwait, Oman, Bahrain.

Economic Diversification

- National visions (e.g., UAE Vision 2031, Saudi Vision 2030) focus on reducing oil dependence.

Strategic Partnerships

- Increasing cooperation with India (GCC–India FTA), China, ASEAN, and Africa through trade and investment frameworks.

Advanced Sectors

- Investment in AI, biotech, data centres reflects a shift toward innovation–based resilience.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to the Gulf Cooperation Council (GCC), which of the following statements is/are correct?

1. The GCC was established to enhance political and economic cooperation among its member states.
2. The GDP of GCC economies is driven exclusively by oil exports.

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

Answer: (a)

Mains PYQ

“Discuss the significance of economic diversification and geopolitical partnerships in strengthening the resilience of oil-exporting regions such as the Gulf Cooperation Council.” (GS-II/III)

PadhAI MAINS PRACTICE QUESTION

Analyse how global geopolitical shifts are shaping the resilience and future economic prospects of GCC countries. Discuss the role of diversification, strategic partnerships, and trade realignment. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to the Gulf Cooperation Council (GCC), consider the following statements:

1. GCC economies are diversifying into non–oil sectors for resilience.



2. Strategic partnerships with regions like South Asia and Africa can enhance economic stability.
3. Oil price volatility is no longer a concern for GCC countries due to complete economic diversification.

- III. Reflects multipolar diplomacy in the region.

Which of the statements given above is/are correct?

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

Answer: (a)

9. HEXAGON ALLIANCE: A NEW STRATEGIC COALITION IN WEST ASIA

Why in the news?

- The proposed Hexagon Alliance envisions closer security, economic, and technological cooperation among select West Asian and global partners.
- It is seen as an extension of recent normalization trends and strategic realignments triggered by concerns over regional instability, energy security, and counter-terror cooperation.

BACKGROUND / CONTEXT

- I. Builds upon:
 - A. Abraham Accords (normalisation between Israel and UAE, Bahrain, etc.).
- II. Occurs amid:
 - A. Israel–Palestine tensions.
 - B. Iran’s regional influence.
 - C. US strategic recalibration in West Asia.

KEY HIGHLIGHTS

- **Strategic Realignment** – Aims to create a coordinated bloc for security and economic cooperation.
- **Counter-Regional Threats** – Focus on balancing Iran’s influence and extremist groups.
- **Economic Connectivity** – Energy corridors, trade partnerships, and technology exchange.
- **Defence Cooperation** – Intelligence sharing and joint military coordination.
- **Normalization Continuum** – Extension of post-Abraham Accords diplomacy.
- **Geopolitical Significance** – May alter power balance in West Asia.
- **Impact on Palestine Issue** – Raises concerns over sidelining Palestinian statehood negotiations.

PRELIMS BOOSTER BOX

West Asia

- Region including Middle Eastern countries; strategically vital for energy supplies.

Abraham Accords (2020)

- Normalization agreements between Israel and certain Arab states.

Strategic Alliance

- Formal or informal coalition for mutual defence and cooperation.



Geopolitical Realignment

- Shifts in alliances due to changing power dynamics.

Energy Security

- Reliable and affordable access to energy resources.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to the Abraham Accords, consider the following statements:

1. They were signed in 2020.
2. They aimed at normalizing relations between Israel and certain Arab states.

Which of the statements given above is/are correct?

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

Answer: (c)

Mains PYQ

Discuss the evolving geopolitical dynamics of West Asia and their implications for regional stability. (GS-II)

PadhAI MAINS PRACTICE QUESTION

Examine how emerging strategic coalitions like the proposed Hexagon Alliance could reshape geopolitical alignments in West Asia. (150 words)

PadhAI-GENERATED UPSC

MCQ

With reference to strategic alliances in West Asia, consider the following statements:

1. The Abraham Accords marked normalization between Israel and certain Arab nations.
2. Strategic coalitions in West Asia often focus on energy security and defence cooperation.
3. Such alliances have no impact on the Palestinian issue.

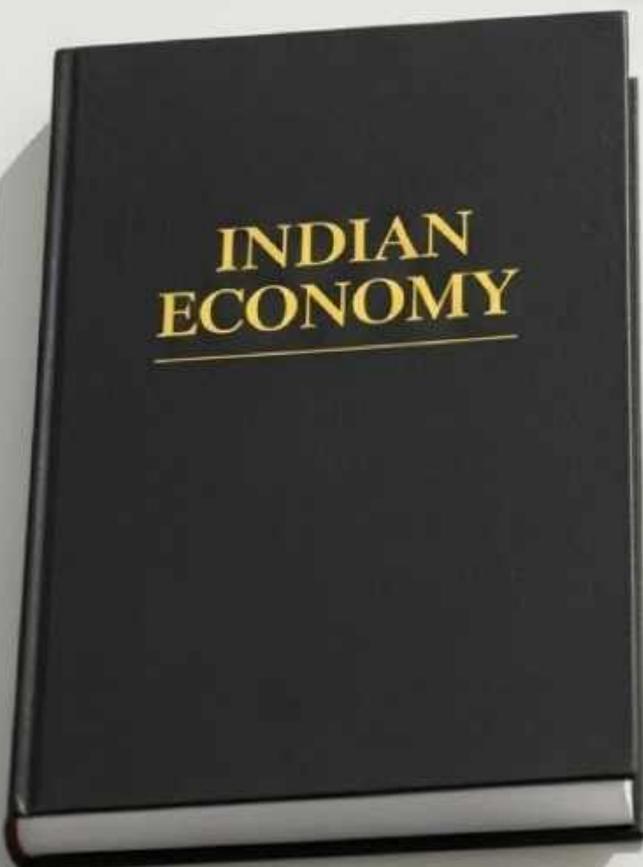
Which of the statements given above is/are correct?

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

Answer: (a)



ECONOMY



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I. WHAT'S AILING INDIA'S BATTERY SCHEME FOR EVs

Why in the news?

- India launched a battery manufacturing PLI scheme to build domestic capacity for lithium-ion cells – a key input for EVs – with targets of 50 GWh capacity and significant investment.
- However, actual implementation has lagged, with **minimal production** commissioned, **no incentive payouts**, and **structural bottlenecks** slowing progress.

BACKGROUND / CONTEXT

- I. India's EV push relies heavily on **local production of advanced battery cells** to reduce import dependence and cost.
- II. The **ACC-PLI (Advanced Chemistry Cell Production-Linked Incentive)** scheme was designed to attract investment into battery cell manufacturing with performance-linked payouts.
- III. The aim is to supply the fast-growing EV market and strengthen energy storage capabilities.
- IV. However, gaps between policy goals and on-ground execution have raised questions about scheme design and readiness of the ecosystem.

KEY HIGHLIGHTS

- **Implementation Lag** – Only ~1.4 GWh capacity commissioned vs a 50 GWh target; most facilities delayed.

- **No Incentive Disbursement** – Zero payouts made so far because production targets aren't met.

- **Investment Gap** – Actual investment is a fraction of planned capital infusion, weakening economic impact.

- **Tech & Skills Bottlenecks** – Heavy reliance on imported technology and skilled technicians; visa delays for key specialists slow commissioning.

- **Stringent Localisation Rules** – Domestic value-addition requirements and tight timelines strain companies, especially those new to advanced battery production.

- **Supply Chain Dependence** – Critical inputs like refined lithium, cathodes, and electrolytes are largely imported, especially from China.

PRELIMS BOOSTER BOX

ACC-PLI Scheme

- Focus: Advanced Chemistry Cell (lithium-ion) manufacturing.
- Target: 50 GWh battery capacity + ₹2,900 crore incentives.
- Performance-linked: Incentives tied to actual battery output.

Key Challenges

- Domestic ecosystem immaturity.
- Dependence on foreign technology/components.
- Workforce & skill shortages in precision manufacturing.
- Complex regulatory and logistics clearances.

EV Adoption Linkage

- EV battery cost constitutes a major part of vehicle pricing.



- Local production can bring down costs and promote demand.

Global Context

- China dominates battery supply chains; India's reliance poses strategic and economic risks.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to Battery Manufacturing in India, consider the following statements:

1. Performance-linked incentive schemes disburse payments only on achievement of output targets.
2. Domestic Value Addition (DVA) mandates require increasing local sourcing over time.

Which of the statements given above is/are correct?

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

Answer: (c)

Mains PYQ

“Explain the role of performance-linked incentive schemes in India’s industrial policy. What are the advantages and limitations of such schemes?” (GS-III)

PadhAI MAINS PRACTICE QUESTION

Analyse the key structural and implementation challenges facing India’s EV battery manufacturing scheme. How can policy design be strengthened to address these issues? (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to India’s EV battery scheme, consider the following statements:

1. ACC-PLI incentives are paid only after actual battery cell production is achieved.
2. India currently has a fully-mature domestic ecosystem for battery cell component manufacturing.
3. Stricter domestic value-addition requirements are a challenge under the scheme.

Which of the statements given above is/are correct?

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

Answer: (c)

Key takeaway: While India continues its EV push, **battery manufacturing performance has fallen behind targets**, demanding greater policy refinement and closer alignment of ecosystem readiness with incentive design.

2.ECONOMY CRISIS: WILL BUDGET OFFER SOLUTIONS?

Why in the news?



- India's economy faces multiple headwinds – weakening demand, tight credit flows, inflation persistence, and global macroeconomic challenges.
- The upcoming Union Budget is expected to provide fiscal policy responses aimed at stimulating growth, supporting key sectors, and strengthening macro-economic stability.
- Economists and stakeholders are seeking clear policy directives on taxation, capital expenditure, reforms, and incentives for investment and consumption.

BACKGROUND / CONTEXT

- I. India has maintained relatively high growth compared to many peers but recent data suggests **deceleration in GDP expansion**.
- II. Private investment remains subdued due to debt stress in financial institutions and cautious corporate sentiment.
- III. Inflation – particularly food inflation – continues to affect household purchasing power.
- IV. Exports face global demand weakness.
- V. The **Union Budget** is a key tool to balance growth stimulus with fiscal prudence.

KEY HIGHLIGHTS

- **Growth Revival Measures** – Expectations include demand support through fiscal incentives for consumption and infrastructure investment.
- **Tax Reforms** – Possible rationalisation of personal and corporate tax slabs to boost

disposable income and enterprise investment.

- **Credit Flow Enhancement** – Budget may propose measures to strengthen credit availability for MSMEs and stressed sectors.
- **Capital Expenditure Commitment** – Continued focus on capital expenditure to drive multiplier effects in the economy.
- **Targeted Social Support** – Enhanced allocations to welfare schemes to support low-income households and cushion inflation impacts.
- **Structural Reforms** – Proposals may include land and labour reforms, ease of doing business, and FDI facilitation.

PRELIMS BOOSTER BOX

Core Macro Concepts

- **GDP Growth Rate** – Indicator of economic momentum.
- **Fiscal Deficit** – Gap between government expenditure and revenue.
- **Inflation** – Rise in price levels; measured by CPI & WPI.

Union Budget Components

- **Revenue Receipts:** Tax + Non-Tax Revenues.
- **Capital Receipts:** Borrowings + Disinvestment.
- **Expenditure:** Plan + Non-Plan (now re-classified).

Current Challenges

- **Investment Slump** – Risk aversion curtails expansion projects.
- **Credit Crunch** – Banks cautious post NPA stress.



- **Global Headwinds** – Geopolitical shocks and supply chain disruptions.

Policy Tools

- **Fiscal Policy** – Government spending and taxation.
- **Monetary Policy** – Controlled by Reserve Bank of India (interest rates & liquidity).

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to the Union Budget, consider the following statements:

1. The Finance Bill contains the proposals for taxation changes.
2. The Appropriation Bill seeks Parliament's approval for government expenditure.

Which of the statements given above is/are correct?

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

Answer: (c)

Mains PYQ

Discuss the role of the Union Budget in addressing economic slowdowns. (GS-III)

PadhAI MAINS PRACTICE QUESTION

Evaluate the key economic challenges facing India and discuss how the Union

Budget can offer solutions without compromising fiscal sustainability. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to fiscal policy, consider the following statements:

1. Fiscal deficit represents the excess of revenue receipts over capital receipts.
2. Expansionary fiscal policy can stimulate aggregate demand during an economic slowdown.
3. Budgetary support to infrastructure projects is part of capital expenditure.

Which of the statements given above is/are correct?

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

Answer: (b)

3.TAX DEVOLUTION SHARE FOR STATES STAYS AT 41%

Why in the news?

- The vertical devolution of central taxes to States will continue at **41%**, instead of the earlier 42% recommended by the Fourteenth Finance Commission.
- The 1% reduction accounts for the creation of the Union Territories of J&K and Ladakh in 2019.
- The move ensures fiscal predictability for States amid rising expenditure pressures.



BACKGROUND / CONTEXT

- I. Article 280 provides for the establishment of a Finance Commission every five years.
- II. The Fourteenth FC (2015–20) raised States' share from 32% to 42%.
- III. After the reorganization of Jammu and Kashmir, the Fifteenth FC recommended **41%** for 2020–25.
- IV. The Commission also introduced criteria such as demographic performance and tax effort for horizontal distribution among States.

KEY HIGHLIGHTS

- **Vertical Devolution** – Refers to sharing of central taxes between Centre and States (currently 41%).
- **Horizontal Distribution Criteria** – Based on income distance, population (2011), area, forest cover, demographic performance, and tax effort.
- **Fiscal Federalism Strengthened** – Predictable tax transfers enhance cooperative federalism.
- **Revenue Stress on States** – States face rising welfare, infrastructure, and debt servicing burdens.
- **GST Compensation Context** – Post-GST regime reduced States' taxation autonomy; compensation period ended in 2022.
- **Debate on 42% vs 41%** – Reduction justified due to change in status of J&K, not rollback of federal commitment.

PRELIMS BOOSTER BOX

Article 280

- The President constitutes the Finance Commission.
- Recommends tax devolution, grants-in-aid, and fiscal consolidation roadmap.

Divisible Pool

- Consists of net proceeds of all central taxes (excluding cesses & surcharges).

Key Terms

- **Vertical Devolution** – Centre–State sharing.
- **Horizontal Devolution** – Inter–State distribution.
- **Grants-in-Aid** – Article 275.

Important Facts

- Cesses and surcharges are not shareable with States.
- Finance Commission recommendations are advisory but generally accepted.

Static + Current Linkage

- Cooperative Federalism.
- Fiscal Responsibility and Budget Management (FRBM).
- Centre–State financial relations (Part XII of Constitution).

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

Which of the following are the constitutional provisions regarding the Finance Commission?

1. It is constituted under Article 280.



2. It recommends the distribution of net proceeds of taxes between the Centre and the States.
3. Its recommendations are binding on the Government.

Which of the statements given above is/are correct?

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

Answer: (a)

Mains PYQ

“Discuss the role of the Finance Commission in strengthening fiscal federalism in India.” (GS-II)

PadhAI MAINS PRACTICE QUESTION

Examine the significance of maintaining the 41% tax devolution to States in the context of cooperative federalism and fiscal sustainability. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to tax devolution in India, consider the following statements:

1. The divisible pool includes cesses and surcharges levied by the Centre.
2. The Fifteenth Finance Commission recommended a 41% share of central taxes for States.
3. Article 280 deals with the constitution of the Finance Commission.

Which of the statements given above is/are correct?

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

Answer: (a)

4.CENTRE TARGETS 4.3% FISCAL DEFICIT BY 2026-27

Why in the news?

- The fiscal deficit – the gap between the government’s total expenditure and its total receipts (excluding borrowings) – is projected at **4.3% of GDP** in 2026-27, slightly lower than the **4.4%** estimated for the current year (FY26).
- This reflects a calibrated effort to balance growth-oriented spending with fiscal prudence amid global uncertainties.

BACKGROUND / CONTEXT

- I. **Fiscal deficit** indicates the government’s borrowings required to meet expenditure beyond revenue.
- II. It is a critical marker of fiscal health and influences interest rates, inflation, and investment.
- III. The current deficit path shows a gradual reduction from earlier years: the budget for 2025-26 projected **4.4%**, now moving to **4.3%** for 2026-27.
- IV. The strategy aligns with India’s broader **fiscal rationalisation** goals while maintaining support for capital expenditure and growth measures.



KEY HIGHLIGHTS

- **Fiscal Discipline** – A modest reduction in fiscal deficit amidst significant public investment commitments reflects commitment to fiscal consolidation.
- **Debt Management** – This target is part of a broader plan to reduce the Centre's debt-to-GDP ratio, projected at around **55.6% in FY27**.
- **Growth Support** – While reducing the deficit, the government has sustained high **capital expenditure (~₹12.2 lakh crore)** to drive infrastructure and economic growth.
- **Operational Target** – The fiscal deficit will act as an **operational anchor** while working toward the medium-term debt target of ~50% of GDP by 2031.
- **Borrowing Plans** – Net market borrowings are planned at around **₹11.7 lakh crore** to finance the deficit.

PRELIMS BOOSTER BOX

Fiscal Deficit

- The difference between government expenditure and its revenues (excluding borrowings).
- Indicates the government's total borrowing requirement.

GDP

- *Gross Domestic Product* – total value of goods and services produced in a year.

Debt-to-GDP Ratio

- A key sustainability metric showing total government debt relative to GDP.

Budget Strategy

- The Government is transitioning from simple deficit targeting to a **debt-to-GDP glide path**, using fiscal deficit as a key operational tool.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

Which of the following indicators measures the gap between government spending and revenue (excluding borrowings)?

- (a) Fiscal surplus
- (b) Revenue surplus
- (c) Fiscal deficit
- (d) Primary surplus

Answer: (c)

Mains PYQ

“Examine the role of fiscal discipline in India’s macroeconomic stability and growth strategy.” (GS-III)

PadhAI MAINS PRACTICE QUESTION

Discuss the significance of targeting a 4.3% fiscal deficit in the 2026–27 Union Budget. Analyse how this target balances fiscal consolidation with growth-oriented public investment. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to India’s 2026–27 Union Budget, consider the following statements:



1. The fiscal deficit target for 2026–27 has been set at 4.3% of GDP.
2. A lower fiscal deficit automatically leads to higher inflation.
3. Fiscal deficit forms part of the government's macroeconomic management tools.

- B. Prevention of Corruption Act, 1988
- C. Prevention of Money Laundering Act (PMLA), 2002

Which of the statements given above is/are correct?

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

Answer: (a)

5.SC: PAYING WON'T SAVE BANK SCAM COLLUDERS

Why in the news?

- The Court clarified that repayment of funds does not absolve accused persons of criminal prosecution in banking fraud cases.
- The judgment underscores that economic offences are crimes against society at large, not just private disputes between borrower and bank.

BACKGROUND / CONTEXT

- I. Banking fraud cases often involve:
 - A. Criminal breach of trust
 - B. Cheating
 - C. Conspiracy
- II. Investigations typically conducted by agencies like:
 - A. Central Bureau of Investigation
 - B. Enforcement Directorate
- III. Relevant legal provisions:
 - A. Indian Penal Code (IPC)

The Court has consistently held that economic offences undermine financial stability and public trust.

KEY HIGHLIGHTS

- **No Automatic Immunity** – Repayment does not nullify criminal proceedings.
- **Public Interest Dimension** – Bank fraud affects depositors and financial system integrity.
- **Deterrence Principle** – Strong judicial stance discourages white-collar crimes.
- **Distinction Clarified** – Civil liability (loan recovery) ≠ Criminal liability (fraud prosecution).
- **Strengthened Prosecution** – Supports investigative agencies in pursuing cases.
- **Judicial Consistency** – Aligns with earlier rulings treating economic offences as grave crimes.

PRELIMS BOOSTER BOX

Economic Offences

- Include fraud, money laundering, embezzlement.
- Treated as serious crimes due to systemic impact.

PMLA, 2002

- Targets money laundering linked to scheduled offences.
- Provides for attachment of property.



CBI

- Investigates corruption and major fraud cases.

Difference: Civil vs Criminal Liability

- Civil: Recovery of dues.
- Criminal: Punishment for wrongdoing.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

Which of the following agencies is primarily responsible for investigating corruption cases involving public servants at the central level?

- (a) Enforcement Directorate
- (b) Central Bureau of Investigation
- (c) National Investigation Agency
- (d) Serious Fraud Investigation Office

Answer: (b)

Mains PYQ

“Economic offences pose a serious threat to financial stability and governance.” Discuss the need for strict legal enforcement and judicial oversight in such cases. (GS-III)

PadhAI MAINS PRACTICE QUESTION

Examine the distinction between civil and criminal liability in cases of bank fraud. Why has the Supreme Court emphasised that repayment cannot absolve criminal responsibility? (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to economic offences in India, consider the following statements:

1. Repayment of defrauded money automatically ends criminal prosecution.
2. The Prevention of Money Laundering Act, 2002 deals with proceeds of crime.
3. The Supreme Court has treated economic offences as crimes against society.

Which of the statements given above is/are correct?

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

Answer: (a)

6.DISCOMs AND THE ROAD AHEAD

Why in the news?

- DISCOMs (Distribution Companies) form the last-mile link in India's power sector but remain financially stressed due to high Aggregate Technical & Commercial (AT&C) losses, tariff gaps, and subsidy delays.
- Structural reforms are essential to ensure reliable electricity supply and achieve India's clean energy targets.

BACKGROUND / CONTEXT

- I. Power sector value chain:
 - A. Generation → Transmission → Distribution.



- II. Distribution is largely handled by State-owned DISCOMs.
- III. Persistent issues:
 - A. AT&C losses.
 - B. Under-recovery due to politically sensitive tariffs.
 - C. Cross-subsidisation (industrial consumers subsidising residential/agriculture).

Reform initiatives:

- UDAY (Ujwal DISCOM Assurance Yojana).
- Revamped Distribution Sector Scheme (RDSS).

- Includes transmission loss + theft + billing inefficiency.

Cross-Subsidy

- Industrial consumers pay higher tariffs to subsidise domestic/agricultural users.

Revamped Distribution Sector Scheme (RDSS)

- Aims to reduce AT&C losses to 12–15%.
- Promote prepaid smart metering.

Regulatory Body

- Central Electricity Regulatory Commission (CERC).

Electricity Act, 2003

- Provides framework for generation, transmission, distribution reforms.

KEY HIGHLIGHTS

- **Financial Stress** – High debt and payment delays affect the entire power sector.
- **AT&C Losses** – Technical losses and electricity theft reduce revenue.
- **Tariff Gap** – Difference between cost of supply and average revenue realised.
- **Subsidy Delays** – State governments often delay compensation.
- **Smart Metering Push** – Digital meters to reduce billing inefficiencies.
- **Energy Transition Link** – Financially viable DISCOMs are crucial for renewable energy integration.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to electricity distribution in India, consider the following statements:

1. Distribution of electricity is primarily a State subject.
2. The Electricity Act, 2003 allows private participation in power distribution.

Which of the statements given above is/are correct?

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

Answer: (c)

PRELIMS BOOSTER BOX

AT&C Loss

- Aggregate Technical & Commercial losses.



Mains PYQ

Discuss the structural challenges facing power distribution companies (DISCOMs) in India. Suggest reforms to improve their financial sustainability. (GS-III)

PadhAI MAINS PRACTICE QUESTION

Analyse the key structural issues affecting India's DISCOMs. How can reforms in tariff rationalisation, smart metering, and governance improve the viability of the power distribution sector? (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to DISCOMs in India, consider the following statements:

1. AT&C losses include both technical and commercial losses.
2. Cross-subsidisation reduces the financial burden on industrial consumers.
3. Financially stressed DISCOMs can affect renewable energy integration.

Which of the statements given above is/are correct?

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

Answer: (a)

7.RBI OFFERS ₹25,000 FOR CYBERFRAUD VICTIMS

Why in the news?

- RBI's customer protection framework mandates limited or zero liability for bank customers in cases of unauthorised digital transactions, subject to prompt reporting.
- The move strengthens consumer confidence in digital payments and enhances accountability of banks amid rising cyber fraud incidents.

BACKGROUND / CONTEXT

- I. Rapid growth of UPI, mobile banking, and digital wallets has increased exposure to cyber risks.
- II. RBI's circular on **Customer Protection – Limiting Liability of Customers in Unauthorised Electronic Banking Transactions (2017)** provides compensation rules.
- III. Liability depends on:
 - A. Reporting timeline.
 - B. Nature of negligence (bank, customer, or third party).
- IV. The framework applies to scheduled commercial banks, small finance banks, and payments banks.

KEY HIGHLIGHTS

- **Zero Liability Clause** – If fraud occurs due to bank negligence, the customer bears no loss.
- **Limited Liability** – If third-party breach and reported within 3 days, no liability.
- **Capped Compensation** – Up to ₹25,000 (or higher category-based limits).
- **Timely Reporting Crucial** – Delay in reporting increases customer liability.
- **Digital Trust Enhancement** – Boosts public confidence in digital payments.



• **Bank Accountability** – Banks must reverse the disputed amount within 10 working days.

PRELIMS BOOSTER BOX

Unauthorised Electronic Transaction

- Transaction executed without customer's consent.

RBI Framework (2017)

- 0 liability: If bank fault.
- Limited liability: If reported within 3–7 days.
- Full liability: If customer negligence.

Digital Payment Ecosystem

- UPI, IMPS, NEFT, RTGS.

Ombudsman Mechanism

- RBI Integrated Ombudsman Scheme, 2021 for grievance redressal.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

Which of the following is the regulator of banking institutions in India?

- (a) Securities and Exchange Board of India
- (b) Reserve Bank of India
- (c) Ministry of Finance
- (d) National Payments Corporation of India

Answer: (b)

Mains PYQ

“With the expansion of digital payments in India, consumer protection has become critical.” Discuss the role of regulatory

mechanisms in safeguarding users against cyber fraud. (GS-III)

PadhAI MAINS PRACTICE QUESTION

Examine the RBI's framework on limiting customer liability in unauthorised electronic transactions. How does it strengthen consumer protection in India's digital economy? (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to RBI's guidelines on cyber fraud, consider the following statements:

1. A customer has zero liability if the fraud occurs due to bank negligence.
2. Delay in reporting unauthorised transactions may increase customer liability.
3. The RBI Integrated Ombudsman Scheme provides grievance redressal for banking complaints.

Which of the statements given above is/are correct?

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

Answer: (c)

8. INDIANS' LOVE FOR GOLD IS WEIGHING ON THE ECONOMY

Why in the news?

- India is one of the world's largest gold consumers and importers.



- While culturally and financially valued as a hedge against inflation, excessive gold imports strain foreign exchange reserves, widen the trade deficit, and divert household savings away from productive investments.

BACKGROUND / CONTEXT

- I. India imports ~800–1,000 tonnes of gold annually (varies by year).
- II. Gold accounts for a significant share of merchandise imports after crude oil.
- III. Demand drivers:
 - A. Weddings and festivals (Dhanteras, Diwali).
 - B. Inflation hedge.
 - C. Informal savings instrument in rural areas.
- IV. Limited domestic gold production → heavy reliance on imports.

KEY HIGHLIGHTS

- **Trade Deficit Pressure** – High gold imports widen merchandise trade deficit.
- **Current Account Impact** – Leads to higher CAD, affecting rupee stability.
- **Unproductive Savings** – Household savings locked in physical gold instead of financial instruments.
- **Price Sensitivity** – Gold demand fluctuates with global prices and import duties.
- **Policy Measures** – Gold Monetisation Scheme (GMS), Sovereign Gold Bonds (SGBs), import duty adjustments.
- **Inflation Hedge Behaviour** – Gold seen as a safe haven during uncertainty.

PRELIMS BOOSTER BOX

Current Account Deficit (CAD)

- Difference between imports and exports of goods & services + net income.

Sovereign Gold Bond (SGB)

- Issued by Government of India.
- Denominated in grams of gold.
- Offers fixed interest + price appreciation.

Gold Monetisation Scheme (2015)

- Mobilises idle gold lying with households/institutions.

Rupee Depreciation Link

- Higher imports → Increased dollar demand → Pressure on rupee.

WTO Context

- Import duties used as policy lever but must comply with WTO commitments.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

Which of the following can be considered as components of India's Current Account?

1. Merchandise trade
2. Services trade
3. Remittances

Select the correct answer:

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

Answer: (d)



Mains PYQ

Discuss the factors responsible for India's current account deficit. Suggest measures to contain it. (GS-III)

PadhAI MAINS PRACTICE

QUESTION

Examine how high gold imports affect India's macroeconomic stability. Evaluate the effectiveness of policy measures such as Sovereign Gold Bonds and the Gold Monetisation Scheme. (150 words)

PadhAI-GENERATED UPSC

MCQ

With reference to gold imports in India, consider the following statements:

1. Gold imports directly increase the merchandise trade deficit.
2. Sovereign Gold Bonds help reduce physical gold demand.
3. Gold imports have no impact on exchange rate stability.

Which of the statements given above is/are correct?

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

Answer: (a)

9.KEY TAKEAWAYS FROM THE AI SUMMIT

Why in the news?

- The AI Summit brought together policymakers, global tech firms, startups, and multilateral institutions to deliberate on AI governance, sovereign AI capacity, ethical standards, digital public infrastructure (DPI), and investment commitments.
- The summit emphasized inclusive, human-centric, and development-oriented AI aligned with India's digital transformation goals.

BACKGROUND / CONTEXT

- I. AI is increasingly seen as a strategic technology shaping geopolitics, economy, and security.
- II. India has launched initiatives such as the IndiaAI Mission to build domestic AI capabilities.
- III. Growing global debate on:
 - A. AI regulation vs innovation.
 - B. Data sovereignty.
 - C. Ethical AI deployment.

KEY HIGHLIGHTS

- **Sovereign AI Push** – Emphasis on building indigenous AI models and compute infrastructure.
- **Infrastructure Investment** – Commitments toward data centres, semiconductor supply chains, and cloud capacity.
- **Ethical Governance Framework** – Call for responsible AI development focusing on transparency, fairness, and accountability.
- **AI for Social Good** – Applications in healthcare, agriculture, education, and governance highlighted.
- **Global Cooperation** – Support for multilateral coordination to avoid fragmented AI regulations.



• **Startup Ecosystem Boost** – Focus on nurturing AI startups through funding and research collaboration.

• **Skill Development** – Push for AI-ready workforce through skilling initiatives.

PRELIMS BOOSTER BOX

IndiaAI Mission

- ₹10,000+ crore initiative (approved 2024).
- Focus on compute infrastructure, datasets, and innovation ecosystem.

AI Governance Debate

- Balance between innovation and regulation.
- Issues: Bias, privacy, misinformation.

Digital Public Infrastructure (DPI)

- UPI, Aadhaar, DigiLocker as scalable digital frameworks.

Geopolitical Context

- AI is increasingly linked to national security and strategic autonomy.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to Artificial Intelligence, consider the following statements:

1. Artificial Intelligence can be used for predictive analytics in agriculture.
2. AI development raises concerns regarding data privacy and algorithmic bias.

Which of the statements given above is/are correct?

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

Answer: (c)

Mains PYQ

Discuss the need for a global framework on Artificial Intelligence governance. How can India balance innovation with regulation? (GS-III)

PadhAI MAINS PRACTICE QUESTION

Examine the strategic and developmental significance of AI for India. In light of recent AI summit deliberations, suggest measures to ensure ethical and inclusive AI growth. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to the recent AI Summit, consider the following statements:

1. Sovereign AI refers to developing domestic AI capabilities independent of foreign technological dominance.
2. AI governance debates primarily concern ethical risks such as bias and privacy.
3. Digital Public Infrastructure has no role in AI deployment.

Which of the statements given above is/are correct?

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



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

Answer: (a)

10.A NEW CPI BASE, A CLEARER INFLATION SIGNAL

Why in the news?

- Revising the CPI base year aims to improve the accuracy of inflation measurement by updating the consumption basket, weights, and price collection methods.
- A new base would provide clearer signals for monetary policy decisions taken by the Reserve Bank of India under the flexible inflation targeting (FIT) framework.

BACKGROUND / CONTEXT

- I. CPI (Combined) current base year: **2012=100.**
- II. Inflation targeting framework (since 2016):
 - A. Target: $4\% \pm 2\%$.
 - B. RBI Monetary Policy Committee (MPC) uses CPI as nominal anchor.
- III. Consumption patterns have changed due to:
 - A. Urbanisation.
 - B. Digital services growth.
 - C. Changing food expenditure shares.
- IV. Outdated weights may distort actual inflation trends.

KEY HIGHLIGHTS

• **Base Year Revision** – Likely shift from 2012 base to a more recent year.

• **Updated Consumption Basket** – Reflects new goods/services (digital, telecom, healthcare).

• **Weight Recalibration** – Adjusts share of food, fuel, housing, services.

• **Improved Policy Signalling** – Helps RBI calibrate repo rate decisions accurately.

• **Statistical Credibility** – Aligns with international best practices (periodic rebasing).

• **Food Inflation Impact** – High food weight in CPI significantly affects headline inflation.

PRELIMS BOOSTER BOX

Consumer Price Index (CPI)

- Measures retail inflation.
- Compiled by NSO.
- Categories: Food & beverages, housing, fuel & light, clothing, miscellaneous.

Wholesale Price Index (WPI)

- Measures inflation at producer/wholesale level.
- Does not include services.

Core Inflation

- CPI excluding food and fuel.

Flexible Inflation Targeting (FIT)

- Introduced via amendment to RBI Act (2016).
- Target: $4\% \pm 2\%$.

Base Year Importance

- Serves as a benchmark for price comparison.



- Must represent normal economic conditions.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to inflation in India, consider the following statements:

1. The Reserve Bank of India uses CPI as the primary measure for inflation targeting.
2. WPI includes services in its calculation.

Which of the statements given above is/are correct?

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

Answer: (a)

Mains PYQ

What are the causes of persistent inflation in India? Discuss the role of monetary policy in controlling inflation. (GS-III)

PadhAI MAINS PRACTICE QUESTION

Examine the significance of revising the base year of the Consumer Price Index (CPI). How can an updated CPI improve the effectiveness of India's inflation targeting framework? (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to Consumer Price Index (CPI) in India, consider the following statements:

1. CPI is compiled by the National Statistical Office.
2. CPI is used by the RBI for inflation targeting.
3. CPI and WPI assign equal weight to services.

Which of the statements given above is/are correct?

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

Answer: (a)

11.INDIA-US iCET 3.0: SEMICONDUCTOR MISSION 2.0 ROADMAP

Why in the news?

- iCET 3.0 signals a strategic push to align India's semiconductor ambitions with U.S. technological leadership.
- The roadmap focuses on resilient supply chains, joint R&D, talent mobility, and scaling up fabrication, testing, and packaging ecosystems under India's semiconductor policy framework.

BACKGROUND / CONTEXT

1. iCET launched in 2023 to expand India-U.S. collaboration in:
 - A. Semiconductors
 - B. Artificial Intelligence
 - C. Quantum computing
 - D. Defence innovation



- II. India's domestic push:
 - A. India Semiconductor Mission (ISM)
 - B. Production-Linked Incentive (PLI) schemes.
- III. Global backdrop:
 - A. Supply chain disruptions post-COVID.
 - B. U.S.–China technology competition.
 - C. Chip shortages impacting auto and electronics sectors.

- Material with conductivity between conductor and insulator (e.g., silicon).

Fab (Fabrication Plant)

- Facility where semiconductor wafers are manufactured.

ATMP

- Assembly, Testing, Marking and Packaging units in chip value chain.

Critical and Emerging Technologies

- AI, quantum, semiconductors, 5G/6G, biotechnology.

Supply Chain Resilience

- Diversifying sources to reduce geopolitical risk.

KEY HIGHLIGHTS

- **Strategic Technology Partnership** – Elevates India–US ties beyond trade into high-end technology collaboration.
- **Semiconductor Mission 2.0** – Focus on fabrication units (fabs), ATMP (Assembly, Testing, Marking, Packaging), and chip design ecosystem.
- **Supply Chain Diversification** – Reducing over-dependence on East Asian hubs.
- **R&D Collaboration** – Joint research centres, talent exchange, and university partnerships.
- **Critical Minerals Linkage** – Ensuring access to lithium, cobalt, and rare earths for chip and electronics manufacturing.
- **National Security Dimension** – Semiconductors as strategic assets in defence and AI systems.
- **Economic Multiplier** – Boost to electronics manufacturing, exports, and skilled employment.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to semiconductor manufacturing, consider the following statements:

1. Silicon is the most widely used material for semiconductor chips.
2. Assembly and testing form part of the semiconductor value chain.

Which of the statements given above is/are correct?

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

Answer: (c)

Mains PYQ

PRELIMS BOOSTER BOX

Semiconductor



Discuss the importance of critical and emerging technologies in strengthening India's strategic autonomy. (GS-II/GS-III)

PadhAI MAINS PRACTICE QUESTION

Examine the strategic and economic implications of India-US semiconductor collaboration under iCET. How can Semiconductor Mission 2.0 enhance India's technological sovereignty? (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to India-US cooperation in semiconductors, consider the following statements:

1. Semiconductors are critical for defence and artificial intelligence systems.
2. Assembly and packaging are downstream activities in the semiconductor value chain.
3. Semiconductor manufacturing has no linkage with critical mineral supply chains.

Which of the statements given above is/are correct?

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

Answer: (a)

12.BOOSTING INDIA'S ORANGE ECONOMY: CREATIVE INDUSTRY IN UNION BUDGET

Why in the news?

- The "Orange Economy" refers to economic activities rooted in creativity, culture, intellectual property, and digital content.
- Budget announcements aim to strengthen India's creative sectors such as film, animation, gaming, design, crafts, and digital media, positioning them as drivers of employment, exports, and soft power.

BACKGROUND / CONTEXT

- I. The term "Orange Economy" was popularised by the Inter-American Development Bank.
- II. Encompasses:
 - A. Film & OTT
 - B. Animation, VFX & Gaming
 - C. Music & Performing Arts
 - D. Publishing & Design
 - E. Handicrafts & Cultural Tourism
- III. India's strengths:
 - A. Large youth population
 - B. Digital penetration
 - C. Growing global content footprint

KEY HIGHLIGHTS

- **Creative Economy Recognition** – Formal policy acknowledgment in Union Budget.
- **Employment Generator** – High potential for youth employment and gig economy participation.
- **Export Potential** – Gaming, films, music, and digital content expanding globally.
- **IP-Centric Growth** – Focus on intellectual property creation and monetisation.



• **Digital Ecosystem Push** – Boost to animation, VFX, AR/VR, and gaming industries.

• **Soft Power Enhancement** – Strengthens India’s cultural diplomacy and global influence.

• **MSME Linkages** – Handicrafts and design sectors support rural and artisan livelihoods.

PRELIMS BOOSTER BOX

Orange Economy

- Economic activities based on creativity, culture, and intellectual property.

Intellectual Property Rights (IPR)

- Legal rights granted to creators for inventions, artistic works, designs, etc.

AVGC–XR Sector

- Animation, Visual Effects, Gaming, Comics, and Extended Reality.

Soft Power

- Ability to influence through culture, values, and diplomacy rather than coercion.

Gig Economy

- Labour market characterised by short-term contracts and freelance work.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to Intellectual Property Rights (IPR), consider the following statements:

1. Copyright protects original literary and artistic works.
2. Patents are granted for inventions that are novel and industrially applicable.

Which of the statements given above is/are correct?

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

Answer: (c)

Mains PYQ

How can the creative economy contribute to inclusive growth and employment generation in India? Discuss. (GS–III)

PadhAI MAINS PRACTICE QUESTION

Examine the role of the Orange Economy in enhancing India’s economic diversification and global cultural footprint. (150 words)

PadhAI–GENERATED UPSC MCQ

With reference to the Orange Economy, consider the following statements:

1. It includes sectors such as film, gaming, and performing arts.
2. It primarily depends on intellectual property creation.
3. It has no relevance to soft power diplomacy.



Which of the statements given above is/are correct?

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

Answer: (a)

13. CABINET CLEARS INDIA'S FIRST UNDERWATER TWIN TUBE ROAD-CUM-RAIL TUNNEL

Why in the news?

- The project involves building an underwater tunnel with twin tubes — one for road and one for rail — to enhance connectivity, reduce travel time, and improve logistics efficiency.
- It represents a leap in India's tunnelling engineering capabilities and multimodal infrastructure planning.

BACKGROUND / CONTEXT

- I. India has prior experience with:
 - A. Mountain tunnels (e.g., Atal Tunnel).
 - B. Metro underground tunnels.
- II. Underwater tunnels are technically complex due to:
 - A. Water pressure.
 - B. Seismic and soil conditions.
 - C. Ventilation and safety requirements.
- III. Globally, such tunnels exist in Europe and East Asia for road and rail integration.

KEY HIGHLIGHTS

- **Twin-Tube Design** – Separate parallel tubes for road and rail enhance safety and traffic management.
- **Multimodal Integration** – Seamless movement of passengers and freight.
- **Engineering Advancement** – Adoption of advanced tunnelling techniques such as TBMs (Tunnel Boring Machines) or immersed tube technology.
- **Reduced Travel Time** – Direct connectivity bypassing congested surface routes.
- **Economic Multiplier** – Boost to logistics, tourism, trade, and regional development.
- **Disaster-Resilient Design** – Safety systems for fire, flooding, and seismic events.
- **Strategic Importance** – May enhance coastal security and defence logistics.

PRELIMS BOOSTER BOX

Twin-Tube Tunnel

- Two parallel tunnels, often with cross-passages for emergency evacuation.

Immersed Tube Tunnel (IMT)

- Prefabricated tunnel sections submerged and connected underwater.

Tunnel Boring Machine (TBM)

- Mechanized equipment used for underground tunnel excavation.

Multimodal Transport

- Integration of multiple modes (road, rail, sea, air) for seamless logistics.



CCEA

- Cabinet body that approves major economic and infrastructure projects.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to infrastructure projects in India, consider the following statements:

1. Tunnel Boring Machines are used for underground excavation.
2. Multimodal transport integration improves logistics efficiency.

Which of the statements given above is/are correct?

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

Answer: (c)

Mains PYQ

Discuss the role of large-scale infrastructure projects in accelerating economic growth and regional development in India. (GS-III)

PadhAI MAINS PRACTICE QUESTION

Examine the technological, economic, and strategic significance of India's first underwater twin-tube road-cum-rail tunnel project. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to underwater tunnel infrastructure, consider the following statements:

1. Twin-tube tunnels enhance operational safety through separation of traffic streams.
2. Immersed tube technology is one method of constructing underwater tunnels.
3. Underwater tunnels eliminate the need for ventilation systems.

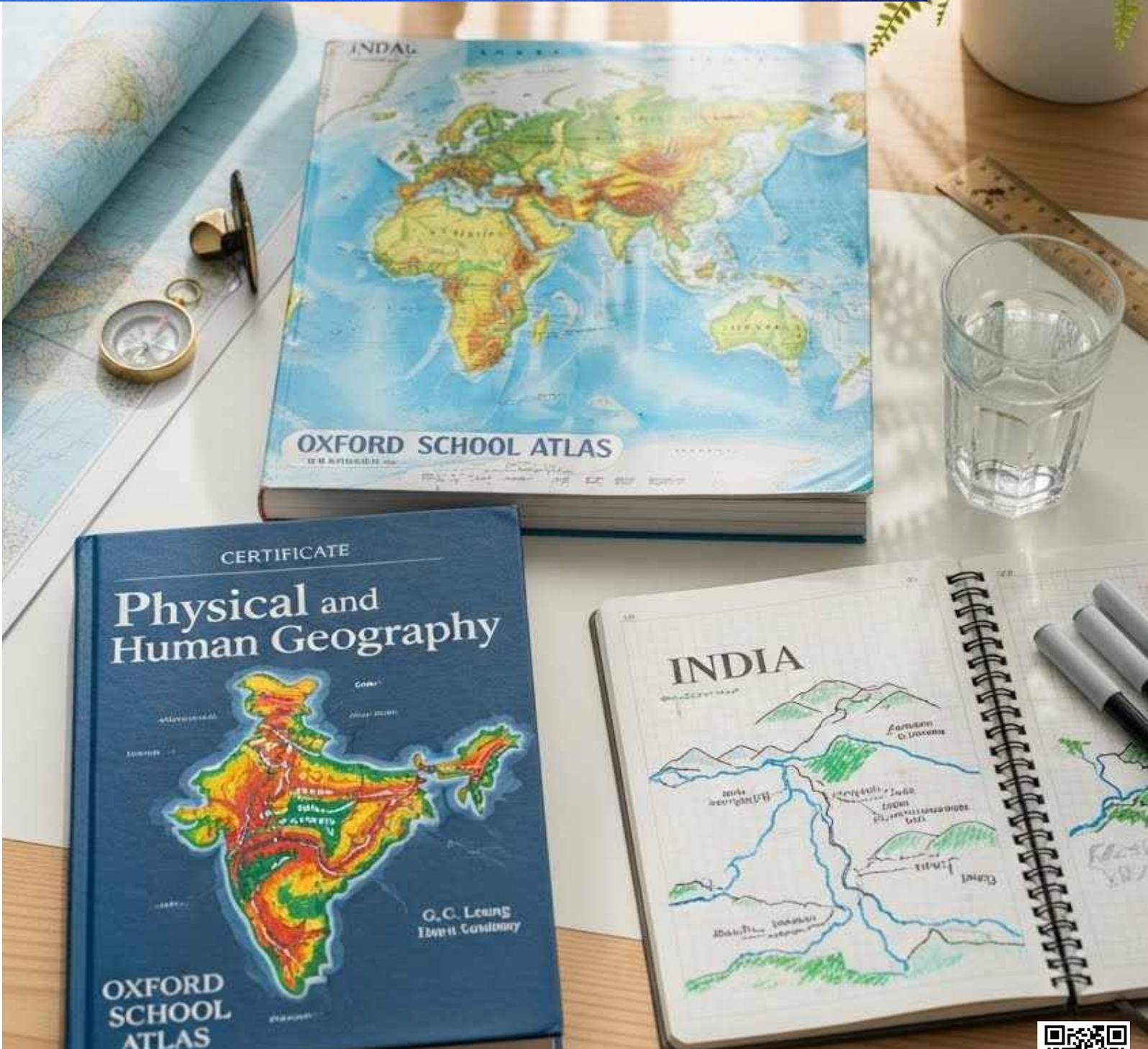
Which of the statements given above is/are correct?

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

Answer: (a)



GEOGRAPHY



Scan the QR to access the PadhAI app or click here



I. EL NIÑO LIKELY POST-JULY, CLARITY BY APRIL: IMD

Why in the news?

- IMD's early signals suggest a rising probability of El Niño formation in the Pacific Ocean later in the year.
- Since El Niño events are often associated with **below-normal monsoon rainfall in India**, policymakers and farmers are closely monitoring updates.
- However, IMD has emphasized that a definitive monsoon forecast will depend on evolving ocean-atmospheric indicators.

BACKGROUND / CONTEXT

- I. **El Niño** refers to the abnormal warming of surface waters in the central and eastern equatorial Pacific Ocean.
- II. It is part of the **El Niño–Southern Oscillation (ENSO)** cycle.
- III. El Niño often weakens the **Walker Circulation**, reducing monsoon rainfall over India.
- IV. Not all El Niño years lead to drought; impact depends on intensity and timing.

KEY HIGHLIGHTS

- **Post-July Development** – IMD suggests El Niño may evolve during the latter half of the monsoon season.
- **Monsoon Sensitivity** – Southwest monsoon (June–September) contributes ~75% of India's annual rainfall.

• **Agricultural Impact** – A weak monsoon can affect kharif crops, rural incomes, and food inflation.

• **Forecast Uncertainty** – ENSO predictions become more reliable by April due to reduced “spring predictability barrier.”

• **Other Influences** – Indian Ocean Dipole (IOD) and Madden–Julian Oscillation (MJO) also influence monsoon outcomes.

PRELIMS BOOSTER BOX

El Niño

- Warm phase of ENSO.
- Causes suppressed rainfall in India (generally).
- Associated with drought in parts of Asia & Australia.

La Niña

- Cool phase of ENSO.
- Often linked to above-normal monsoon rainfall in India.

Walker Circulation

- East-west atmospheric circulation over equatorial Pacific.
- Weakens during El Niño.

Indian Ocean Dipole (IOD)

- Positive IOD can offset El Niño's adverse impact.

Static + Current Linkage

- Monsoon & GDP linkage (agriculture ~15% of GDP).
- Food inflation & MSP implications.
- Climate variability vs Climate change.



PadhAI PYQ BOOSTER

SECTION

Prelims PYQ

With reference to 'El Niño', consider the following statements:

1. It is associated with the warming of surface waters in the equatorial Pacific Ocean.
2. It generally leads to deficient monsoon rainfall in India.

Which of the statements given above is/are correct?

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

Answer: (c)

Mains PYQ

“How far do you agree that the Indian monsoon is no longer predictable due to climate change?” Discuss. (GS-I / GS-III)

PadhAI MAINS PRACTICE QUESTION

Examine the impact of El Niño on the Indian monsoon and its broader economic implications. How can India enhance resilience against monsoon variability? (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to ENSO and Indian monsoon, consider the following statements:

1. El Niño refers to abnormal warming of equatorial Pacific waters.
2. La Niña conditions generally enhance monsoon rainfall in India.
3. The Indian Ocean Dipole has no influence on Indian monsoon variability.

Which of the statements given above is/are correct?

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

Answer: (a)

2. SEISMIC STUDY COMPLETED FOR OALP-X BIDDING

Why in the news?

- Seismic data acquisition for OALP-X blocks has been finalized, improving geological clarity for investors.
- The move aims to attract domestic and global players into India's upstream oil and gas sector, reduce import dependence, and enhance energy security through transparent and investor-friendly licensing.

BACKGROUND / CONTEXT

- I. OALP was introduced under HELP in 2016.
- II. It replaced the earlier **New Exploration Licensing Policy (NELP)**.
- III. Companies can now select exploration blocks of their choice through an



Expression of Interest (Eoi)

mechanism.

- IV. The Directorate General of Hydrocarbons (DGH) oversees technical aspects of exploration.

KEY HIGHLIGHTS

- **Seismic Data Availability** – Completion of 2D/3D seismic surveys reduces geological uncertainty and investor risk.
- **Transparent Bidding** – OALP allows continuous bidding cycles instead of periodic rounds under NELP.
- **Revenue Sharing Model** – HELP introduced a uniform revenue-sharing mechanism, replacing profit-sharing disputes.
- **Exploration Push** – Focus on untapped sedimentary basins to enhance domestic crude and gas production.
- **Energy Security Imperative** – India imports ~85% of crude oil and ~50% of natural gas requirements.
- **Ease of Doing Business** – Simplified licensing, marketing freedom for gas, and reduced regulatory hurdles.

PRELIMS BOOSTER BOX

HELP (2016)

- Uniform license for all hydrocarbons.
- Open Acreage Licensing.
- Revenue-sharing model.
- Marketing & pricing freedom for natural gas (with conditions).

OALP Features

- Investor-driven block selection.
- Continuous bidding.

- National Data Repository (NDR) for geological data access.

Key Institutions

- Directorate General of Hydrocarbons (DGH).
- Ministry of Petroleum & Natural Gas.

Static + Current Linkage

- Sedimentary Basins of India (~3.36 million sq km).
- Atmanirbhar Bharat in energy.
- Strategic Petroleum Reserves (SPR).

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to the Hydrocarbon Exploration and Licensing Policy (HELP), consider the following statements:

1. It introduced a uniform license for exploration of all types of hydrocarbons.
2. It replaced the profit-sharing model with a revenue-sharing model.

Which of the statements given above is/are correct?

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

Answer: (c)

Mains PYQ

Discuss the significance of hydrocarbon exploration reforms in achieving India's energy security objectives. (GS-III)



PadhAI MAINS PRACTICE

QUESTION

Evaluate the role of OALP and HELP in strengthening India's upstream hydrocarbon sector. What challenges remain in reducing import dependence? (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to the Open Acreage Licensing Policy (OALP), consider the following statements:

1. It allows companies to select blocks for bidding based on their interest.
2. It operates under the Hydrocarbon Exploration and Licensing Policy (HELP).
3. It follows a profit-sharing mechanism between government and contractor.

Which of the statements given above is/are correct?

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

Answer: (a)

3.INDUS WATER RISES, GANGA DECLINES: STUDY

Why in the news?

- The study points to glacier melt-driven rise in water flows in the Indus system, while the Ganga basin faces declining discharge due to erratic monsoon patterns, groundwater over-extraction, and changing precipitation trends.

- These shifts have implications for agriculture, drinking water, hydropower, and transboundary water cooperation.

BACKGROUND / CONTEXT

- I. The **Indus River system** originates in the Tibetan Plateau and is heavily glacier-fed.
- II. The **Ganga River system** is monsoon-dominated with partial glacier contribution.
- III. Climate change effects:
 - A. Accelerated Himalayan glacier melt.
 - B. Altered monsoon variability.
- IV. Transboundary dimension under the Indus Waters Treaty between India and Pakistan.

KEY HIGHLIGHTS

- **Glacier Melt Effect** – Short-term increase in Indus discharge due to accelerated melting.
- **Monsoon Dependence** – Ganga flows sensitive to monsoon variability.
- **Groundwater Stress** – Over-extraction in Indo-Gangetic plains affecting base flows.
- **Agricultural Implications** – Impacts irrigation-dependent regions.
- **Hydropower Risks** – Variability affects energy planning.
- **Climate Uncertainty** – Long-term risk of glacier retreat reducing Indus flows eventually.

PRELIMS BOOSTER BOX

Indus Basin



- Glacier-fed river system.
- Major tributaries: Jhelum, Chenab, Ravi, Beas, Sutlej.

Ganga Basin

- Largest river basin in India.
- Tributaries: Yamuna, Ghaghara, Gandak, Kosi.

Glacial Lake Outburst Flood (GLOF)

- Sudden release of water from glacial lakes.

National Mission for Clean Ganga (NMCG)

- Under the Namami Gange Programme.

Climate Link

- IPCC reports highlight Himalayan region as a climate hotspot.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to the Indus River system, consider the following statements:

1. The Indus Waters Treaty allocates eastern rivers to India.
2. The Ganga River is primarily glacier-fed.

Which of the statements given above is/are correct?

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

Answer: (a)

Mains PYQ

Discuss the impact of climate change on Himalayan river systems and its implications for water security in India. (GS-III)

PadhAI MAINS PRACTICE QUESTION

Examine the contrasting hydrological trends in the Indus and Ganga river basins. How do climate change and human activities influence river discharge patterns in India? (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to Himalayan river systems, consider the following statements:

1. The Indus River system is more glacier-dependent than the Ganga system.
2. Groundwater depletion can reduce river base flows.
3. Accelerated glacier melt guarantees long-term water security.

Which of the statements given above is/are correct?

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

Answer: (a)

4.IIT-KANPUR DEVELOPS SOLAR CYCLE PREDICTION METHOD

Why in the news?



- The new prediction technique developed at IIT-Kanpur uses advanced analysis of solar magnetic field patterns and sunspot dynamics to anticipate the **intensity and timing of upcoming solar cycle peaks**.
- Accurate prediction of solar activity is crucial for planning satellite operations, navigation systems, and power infrastructure that are susceptible to space weather disruptions.

BACKGROUND / CONTEXT

- I. The **solar cycle** is an ~11-year cycle marked by rising and falling sunspot numbers.
- II. Solar activity (sunspots, flares, coronal mass ejections) affects Earth's magnetic field and space environment.
- III. **Solar Cycle 25** began around 2019 and reached its peak around 2024–25.
- IV. Predicting future cycles (e.g., Solar Cycle 26) is important for infrastructure planning and space missions.

KEY HIGHLIGHTS

- **Magnetic Field Modelling** – Uses solar magnetic data to generate earlier signals of cycle development.
- **Improved Forecast Accuracy** – Better prediction of cycle strength (intensity) and timing compared to previous models.
- **Space Weather Preparedness** – Helps protect satellites, power grids, GPS, and communication networks from disruptions.

- **Scientific Advancement** – Enhances understanding of solar dynamo processes that drive cyclic behaviour of the Sun.

- **Applications in Planning** – Useful for space agencies, telecom networks, energy utilities, aviation, and navigation systems.

PRELIMS BOOSTER BOX

Solar Cycle

- Approximate duration: 11 years.
- Alternating solar minimum and maximum.

Sunspots

- Dark, cooler regions on the Sun's surface are caused by magnetic activity.
- Used as an indicator of solar activity levels.

Space Weather Impacts

- Geomagnetic storms can:
 - Disrupt satellites and GPS signals.
 - Affect power transmission systems.
 - Create auroras.

Solar Dynamo

- Mechanism involving the Sun's rotating magnetic field that drives the cycle.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

Which of the following are true about the solar cycle?



1. It lasts about 11 years on average.
2. It is associated with variation in sunspot numbers.

Answer: (a)

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

Answer: (c)

Mains PYQ

Discuss why accurate prediction of solar cycles is important for modern technological societies. (GS-III)

PadhAI MAINS PRACTICE QUESTION

Explain the concept of the solar cycle and evaluate the significance of improved prediction methods. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to solar activity and its prediction, consider the following statements:

1. Sunspots indicate solar magnetic activity.
2. Solar cycle prediction helps in planning satellite and power systems.
3. Solar cycle duration is fixed exactly at 10 years.

Which of the statements given above is/are correct?

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



ENVIRONMENT & ECOLOGY



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1. AHEAD OF WORLD WETLANDS DAY, KUTCH & ETAH SITES GET RAMSAR TAG



Why in the news?

- The inclusion of Khijadia Wetland and Saman Bird Sanctuary in the Ramsar list enhances international recognition of India's ecologically significant wetlands.
- The designation promotes biodiversity conservation, sustainable use, and climate resilience while supporting local livelihoods.

BACKGROUND / CONTEXT

1 Khijadia Wetland – Gujarat

- Located near Jamnagar in Gujarat.
- Unique mix of freshwater and marine ecosystems.
- Important habitat for migratory birds along the Central Asian Flyway.
- Supports diverse avifauna including flamingos and pelicans.

2 Saman Bird Sanctuary – Uttar Pradesh

- It is situated in Etah district.
- Seasonal oxbow lake ecosystem.
- Key wintering ground for waterfowl and migratory birds.

- Supports ecological balance and local biodiversity.

KEY HIGHLIGHTS

- **Global Recognition** – Ramsar designation under 1971 Convention.
- **Ecological Significance** – Critical habitats for migratory birds and aquatic species.
- **Ecosystem Services** – Flood control, groundwater recharge, nutrient cycling.
- **Climate Mitigation Role** – Wetlands act as carbon sinks.
- **Livelihood Linkages** – Support fisheries, agriculture, eco-tourism.
- **Policy Alignment** – Integrated with Wetlands (Conservation and Management) Rules, 2017.

PRELIMS BOOSTER BOX

Ramsar Convention

- Adopted in 1971 at Ramsar, Iran.
- India became a Contracting Party in 1982.
- Secretariat located in Gland, Switzerland.

Definition of Wetlands

- Includes natural and artificial, permanent or temporary water bodies.

Important Flyway

- The Central Asian Flyway passes through India.

Constitutional Provisions

- Article 48A – State's duty to protect the environment.



- Article 51A(g) – Citizen’s duty to protect the natural environment.

India’s Ramsar Network

- India has 75+ Ramsar Sites (number updated periodically).

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to the Ramsar Convention, consider the following statements:

1. It is an intergovernmental treaty for the conservation of wetlands.
2. Only freshwater wetlands can be designated as Ramsar Sites.

Which of the statements given above is/are correct?

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

Answer: (a)

Mains PYQ

“Wetlands are critical for ecological security.” Discuss the significance of Ramsar Sites in strengthening India’s environmental governance framework. (GS-III)

PadhAI MAINS PRACTICE QUESTION

Examine the ecological and socio-economic importance of wetlands in India. How does Ramsar designation contribute to their sustainable management? (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to Ramsar Sites in India, consider the following statements:

1. Ramsar designation is granted under a treaty adopted in 1971.
2. Both natural and artificial wetlands may qualify for Ramsar status.
3. India became a signatory to the Ramsar Convention after 1990.

Which of the statements given above is/are correct?

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

Answer: (a)

2.TO TACKLE INDIA’S WASTE PROBLEM, NEW RULES TURN FOCUS TO SOURCE



Why in the news?

- India’s mounting solid waste crisis has prompted regulatory changes focusing on segregation at household and institutional levels, decentralised processing, and stricter compliance for producers.
- The updated rules aim to reduce landfill dependency, promote recycling, and encourage a circular economy.



BACKGROUND / CONTEXT

- I. India generates over 1.5 lakh tonnes of municipal solid waste daily.
- II. Legacy landfills pose environmental and health risks.
- III. Waste management is governed under:
 - A. Solid Waste Management Rules, 2016
 - B. Plastic Waste Management Rules, 2016
 - C. E-Waste and Biomedical Waste Rules.
- IV. Urban Local Bodies (ULBs) are responsible for implementation.

KEY HIGHLIGHTS

- **Segregation at Source** – Mandatory separation into wet, dry, and hazardous waste categories.
- **Extended Producer Responsibility (EPR)** – Producers accountable for post-consumer waste collection and recycling.
- **Decentralised Processing** – Promotion of composting and material recovery facilities.
- **Reduced Landfill Dependency** – Scientific closure and remediation of legacy dumpsites.
- **Citizen Responsibility** – Penalties for non-segregation and littering.
- **Circular Economy Push** – Encourages reuse, recycling, and waste-to-energy initiatives.

PRELIMS BOOSTER BOX

Solid Waste Management Rules, 2016

- Applicable to urban and rural areas.

- Mandates segregation at source.
- Introduces bulk waste generator responsibility.

EPR (Extended Producer Responsibility)

- Producers responsible for end-of-life disposal of products.
- Prominent in plastic and e-waste management.

Swachh Bharat Mission (Urban)

- Phase II focuses on “Garbage Free Cities”.
- Emphasis on scientific landfill remediation.

Environmental Link

- Article 48A – Protection of environment.
- Article 21 – Right to clean environment (judicial interpretation).

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to Extended Producer Responsibility (EPR), consider the following statements:

1. It makes producers responsible for collection and disposal of post-consumer waste.
2. It is applicable only to biodegradable waste.

Which of the statements given above is/are correct?

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

Answer: (a)



Mains PYQ

“Solid waste management remains a critical urban governance challenge in India.” Discuss the role of regulatory reforms in addressing this issue. (GS-III)

PadhAI MAINS PRACTICE QUESTION

Examine how source segregation and Extended Producer Responsibility can transform India’s waste management system. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to waste management in India, consider the following statements:

1. Segregation at source is mandatory under the Solid Waste Management Rules, 2016.
2. Extended Producer Responsibility shifts part of waste management burden to manufacturers.
3. Urban Local Bodies have no role in implementation of waste management rules.

Which of the statements given above is/are correct?

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

Answer: (a)

3.ASIATIC CHEETAH REWILDING IN SAUDI ARABIA?



Why in the news?

- Caves near Arar in Saudi Arabia have yielded remains of cheetahs, some dating back centuries.
- Genetic analysis suggests that the Arabian Peninsula once supported breeding populations of cheetahs.
- This evidence is being used to explore the feasibility of **reintroducing the species or close subspecies** as part of broader ecosystem restoration efforts.

BACKGROUND / CONTEXT

- I. Cheetahs were once found across much of Africa and western/central Asia, including the Arabian Peninsula.
- II. They became locally extinct in Saudi Arabia around the **1970s** due to hunting and habitat loss.
- III. A 2026 study found **naturally preserved cheetah remains** – including juveniles – indicating that breeding populations once existed in the region.
- IV. Saudi wildlife authorities and researchers are now considering reintroduction plans as part of **rewilding and biodiversity restoration** programmes.



KEY HIGHLIGHTS

- **Historical Evidence** – Mummified and skeletal cheetah remains show the species once lived and bred in Arabia.
- **Genetic Insights** – DNA from ancient remains helps identify which subspecies are ecologically appropriate for reintroduction planning.
- **Rewilding Context** – Reintroduction would form part of larger efforts to restore desert ecosystems and reestablish apex predators.
- **Subspecies Consideration** – With the Asiatic cheetah (*Acinonyx jubatus venaticus*) critically endangered and largely restricted to Iran, **closest living candidates** might be genetically compatible subpopulations (e.g., North-west African cheetah).
- **Ecosystem Challenges** – Long-term success depends on habitat suitability, prey base restoration, protected areas, and human-wildlife coexistence planning.
- **Conservation Synergy** – Saudi Arabia has reintroduced other native species like Arabian oryx and Persian onagers, laying groundwork for broader wildlife restoration.

PRELIMS BOOSTER BOX

Cheetahs (*Acinonyx jubatus*)

- Fastest land animal.
- Historically ranged across Africa and parts of Asia.
- Five recognized subspecies; *A. j. venaticus* (Asiatic cheetah) now critically endangered, mostly in Iran.

Rewilding

- The ecological process of reintroducing a species to a former range to restore natural functions.

Saudi Wildlife Conservation

- Saudi Arabia's National Centre for Wildlife leads surveys and restoration planning.

Ecosystem Roles

- Cheetahs help regulate prey populations and maintain biodiversity balance.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to wildlife conservation, consider the following statements:

1. Rewilding involves restoring species to areas where they were previously extinct.
2. All reintroduction projects must use the same subspecies that was originally present.

Which of the statements given above is/are correct?

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

Answer: (a)

Mains PYQ

“Discuss the ecological rationale and challenges of reintroducing locally extinct predators in restored ecosystems.” (GS-III / GS-I)



PadhAI MAINS PRACTICE QUESTION

Examine the potential and challenges of rewilding cheetahs in Saudi Arabia based on recent scientific findings. Discuss ecological, genetic, and socio-management considerations. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to cheetah conservation, consider the following statements:

1. Cheetahs once lived in the Arabian Peninsula but became locally extinct around the 1970s.
2. Rewilding a species requires only genetic similarity, not habitat restoration.
3. DNA evidence from ancient specimens can help guide reintroduction planning.

Which of the statements given above is/are correct?

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

Answer: (a)

4. INDIAN CITIES FACE HIGHER TEMP RISE: STUDY



Why in the news?

- Rapid urbanisation, changes in land use, and heat-absorbing surfaces have intensified warming in Indian cities.
- The study highlights that urban heat islands, combined with broader climate change trends, are driving pronounced temperature rises.
- These findings underline the need for climate-adaptive urban planning and mitigation strategies to safeguard populations and ecosystems.

BACKGROUND / CONTEXT

- I. **Urban Heat Island (UHI) effect:** Cities retain more heat than surrounding rural areas due to concrete surfaces, reduced vegetation, and waste heat from vehicles and industries.
- II. India's urban population is growing rapidly, driven by economic development and internal migration.



- III. Rising urban temperatures exacerbate heat stress, energy use (e.g., cooling demand), and health risks – especially for vulnerable populations.
- IV. Climate change contributes to a baseline rise in temperatures globally, but local factors amplify warming in cities.

KEY HIGHLIGHTS

- **Higher Urban Warming** – Indian cities show a larger temperature rise than nearby rural regions.
- **Urban Heat Island Effect** – Built-up surfaces absorb and retain heat, especially at night.
- **Population & Health Impacts** – Increased heat waves lead to heat-related illnesses and mortality.
- **Infrastructure Stress** – Higher cooling demand strains power grids and increases emissions.
- **Socio-Economic Inequality** – Vulnerable communities with limited access to cooling bear disproportionate risk.
- **Adaptation Need** – Urban greening, cool roofs, and planning reforms can lower heat exposure.

PRELIMS BOOSTER BOX

Urban Heat Island (UHI)

- Phenomenon where cities are hotter than surrounding areas due to built environment effects.

Key Drivers

- Concrete and asphalt surfaces.
- Reduced green cover.
- Waste heat from vehicles and industry.

Heat Wave

- Abnormal increase in temperature above normal seasonal values.

Climate Change Link

- Increased greenhouse gas concentrations raise baseline global temperatures.

Mitigation Tools

- Urban greening and reflective surfaces.
- Heat-resilient infrastructure.
- Early warning systems.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

Which of the following contribute to the Urban Heat Island effect?

1. High density of concrete surfaces
2. Increased vegetation cover
3. Waste heat from vehicles

Select the correct answer using the code below:

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

Answer: (b)

Mains PYQ

“Discuss the impact of rapid urbanisation on the environment and human health in Indian cities.” (GS-III)

PadhAI MAINS PRACTICE QUESTION



Analyse the factors contributing to higher temperature rise in Indian cities compared to rural areas. Suggest policy measures to enhance urban heat resilience. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to urban climate effects, consider the following statements:

1. Urban areas can be warmer than rural areas due to the Urban Heat Island effect.
2. Increased vegetation in cities tends to raise local temperatures.
3. Heat waves are unrelated to climate change.

Which of the statements given above is/are correct?

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

Answer: (a)

5.ECOLOGY RESEARCH: FIELD TO SCREEN SHIFT



Why in the news?

- Ecology research is increasingly relying on remote sensing, satellite imagery, AI models, and big data analytics rather than long-term fieldwork.

- While technological tools enhance scale and efficiency, experts caution that reduced field engagement may limit understanding of species behaviour, ecosystem complexity, and ground realities.

BACKGROUND / CONTEXT

- I. Traditional ecology relied heavily on:
 - A. Field surveys
 - B. Species identification
 - C. Long-term ecological monitoring
- II. Technological advances include:
 - A. Satellite imagery
 - B. GIS mapping
 - C. AI-based biodiversity modelling
 - D. Drone-based surveys
- III. Growing datasets from global biodiversity platforms are enabling large-scale analysis.

KEY HIGHLIGHTS

- **Digital Transformation** – Use of remote sensing and AI in ecological monitoring.
- **Scalability Advantage** – Large geographic coverage with reduced time and cost.
- **Loss of Field Depth** – Reduced direct observation may weaken ecological insights.
- **Skill Shift** – Emphasis on data analytics over taxonomic expertise.
- **Policy Implications** – Decisions based on model outputs require ground validation.
- **Balanced Approach Needed** – Integration of field ecology with technological tools.



PRELIMS BOOSTER BOX

Remote Sensing

- Collection of data about Earth's surface via satellites or aircraft.
- Used in forest cover assessment and land-use mapping.

GIS (Geographic Information System)

- Tool for spatial data analysis and mapping.

Citizen Science

- Public participation in biodiversity data collection (e.g., bird counts).

Important Indian Institutions

- Indian Council of Forestry Research and Education
- Wildlife Institute of India

Static + Current Linkage

- India State of Forest Report (ISFR).
- National Biodiversity Action Plan.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to remote sensing technology, consider the following statements:

1. It can be used to assess forest cover changes.
2. It requires physical presence in the field for data collection.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only

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

Answer: (a)

Mains PYQ

“Technology-driven environmental governance must be complemented by ground-level ecological understanding.” Discuss. (GS-III)

PadhAI MAINS PRACTICE QUESTION

Examine the implications of the shift from field-based ecological research to data-driven, screen-based approaches. Suggest how a balanced research model can be achieved. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to modern ecological research, consider the following statements:

1. Remote sensing allows large-scale environmental monitoring.
2. Field-based ecological studies are no longer necessary due to AI advancements.
3. GIS is used for spatial data analysis.

Which of the statements given above is/are correct?

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

Answer: (a)



6. WHY CARBON CAPTURE IS KEY TO ACHIEVING NET-ZERO GOAL



Why in the news?

- Carbon Capture, Utilisation and Storage (CCUS) involves capturing carbon dioxide (CO₂) emissions from industrial sources or directly from the atmosphere and either storing it underground or using it in industrial processes.
- It is considered crucial for sectors like steel, cement, and power generation, where complete decarbonisation through renewables alone is challenging.

BACKGROUND / CONTEXT

- I. India has pledged to achieve **net-zero by 2070**.
- II. Net-zero means balancing greenhouse gas emissions with removal.
- III. Global climate models (IPCC scenarios) indicate CCUS is necessary to limit warming to 1.5°C.
- IV. Hard-to-abate sectors:
 - A. Cement (process emissions).
 - B. Steel.
 - C. Chemicals.
 - D. Thermal power.

KEY HIGHLIGHTS

- **Emission Reduction Tool** – Captures CO₂ before it enters the atmosphere.
- **Hard-to-Abate Sectors** – Essential for industries where electrification is difficult.
- **Negative Emissions Potential** – When combined with bioenergy (BECCS) or Direct Air Capture.
- **Energy Transition Bridge** – Allows phased transition from fossil fuels.
- **Storage Options** – Geological storage in depleted oil & gas fields, saline aquifers.
- **Challenges** – High cost, energy intensity, storage safety concerns.

PRELIMS BOOSTER BOX

Carbon Capture and Storage (CCS)

- Capture → Transport → Store.

Carbon Capture, Utilisation and Storage (CCUS)

- Captured CO₂ used in chemicals, fuels, enhanced oil recovery.

Direct Air Capture (DAC)

- Removes CO₂ directly from ambient air.

IPCC

- Intergovernmental Panel on Climate Change.
- Recommends rapid emission cuts + carbon removal.

India's Climate Targets

- Net-zero by 2070.



- 50% cumulative electric power installed capacity from non-fossil fuel sources (updated NDC).

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to carbon capture and storage (CCS), consider the following statements:

1. CCS can be used to reduce emissions from coal-based power plants.
2. CCS eliminates the need for renewable energy expansion.

Which of the statements given above is/are correct?

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

Answer: (a)

Mains PYQ

Discuss the role of carbon capture technologies in achieving climate change mitigation goals. What are the challenges associated with their large-scale deployment? (GS-III)

PadhAI MAINS PRACTICE QUESTION

“Carbon capture technologies are not an alternative to renewable energy but a complementary strategy.” Examine this statement in the context of India’s net-zero commitment. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to Carbon Capture and Storage (CCS), consider the following statements:

1. CCS can help reduce emissions from industrial processes.
2. Direct Air Capture removes CO₂ directly from the atmosphere.
3. CCS alone is sufficient to achieve net-zero emissions.

Which of the statements given above is/are correct?

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

Answer: (a)

7.GLOBAL WARMING, POLLUTION DULL NATURE’S COLORS



Why in the news?

- Global warming, rising CO₂ levels, and atmospheric pollutants are impacting plant physiology, soil chemistry, and marine ecosystems.
- These changes are leading to fading flower colors, coral bleaching, reduced autumn intensity, and altered visual signalling in wildlife.



- The phenomenon reflects deeper ecological stress linked to anthropogenic climate change.

BACKGROUND / CONTEXT

- I. Global average temperature has risen by $\sim 1.1^\circ\text{C}$ since pre-industrial times.
- II. Increased CO_2 affects plant pigment production (anthocyanins).
- III. Air pollutants (ozone, nitrogen oxides) damage leaf tissues.
- IV. Coral reefs are highly sensitive to temperature rise.

KEY HIGHLIGHTS

- **Coral Bleaching** – Rising sea temperatures expel symbiotic algae, turning corals white.
- **Plant Pigment Changes** – Heat and CO_2 influence anthocyanin production, dulling flower and leaf colors.
- **Autumn Foliage Impact** – Warmer temperatures shorten and reduce intensity of fall colors.
- **Pollution Stress** – Ozone and particulate matter damage chlorophyll.
- **Ecological Significance** – Color changes affect pollination and species interaction.
- **Indicator of Stress** – Visual dullness reflects ecosystem imbalance.

PRELIMS BOOSTER BOX

Anthocyanins

- Pigments responsible for red, purple, and blue hues in plants.

Coral Reefs

- Built by coral polyps with symbiotic zooxanthellae algae.

Ocean Warming

- Leads to coral bleaching and marine biodiversity loss.

Air Pollutants

- Ground-level ozone (O_3) damages vegetation.
- Particulate matter reduces sunlight penetration.

IPCC

- Intergovernmental Panel on Climate Change.
- Highlights biodiversity loss as climate impact.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

Which of the following is/are consequences of increased atmospheric CO_2 concentration?

1. Ocean acidification
2. Coral bleaching
3. Enhanced photosynthesis in some plants

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

Answer: (d)

Mains PYQ

Discuss the impact of climate change on biodiversity and ecosystem services. (GS-III)



PadhAI MAINS PRACTICE

QUESTION

How do global warming and air pollution alter ecosystem functions and biodiversity? Illustrate with suitable examples. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to climate change and ecosystem color changes, consider the following statements:

1. Coral bleaching occurs due to rising sea temperatures.
2. Air pollution can damage chlorophyll in plants.
3. Increased CO₂ always enhances plant pigment vibrancy.

Which of the statements given above is/are correct?

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

Answer: (a)

8.ARTIC WARMING SPURS INVASIVE PLANT THREAT



Why in the news?

- The Arctic is warming nearly four times faster than the global average – a

phenomenon known as Arctic amplification.

- Rising temperatures, longer growing seasons, and melting permafrost are creating favorable conditions for non-native plant species to colonize the tundra.
- This could disrupt local ecosystems, alter carbon cycles, and intensify climate feedback loops.

BACKGROUND / CONTEXT

- I. The Arctic region includes parts of Canada, Russia, Greenland, Norway, and Alaska.
- II. Dominant vegetation: mosses, lichens, dwarf shrubs.
- III. Permafrost stores vast quantities of frozen carbon.
- IV. Global warming impacts:
 - A. Thawing permafrost.
 - B. Shrub expansion.
 - C. Increased human activity (shipping, mining).

KEY HIGHLIGHTS

- **Arctic Amplification** – Arctic warming rate far exceeds global average.
- **Longer Growing Seasons** – Warmer summers enable invasive species establishment.
- **Permafrost Thaw** – Releases nutrients and carbon, aiding plant growth.
- **Biodiversity Disruption** – Native tundra species outcompeted.
- **Carbon Feedback Loop** – Vegetation changes may alter albedo and carbon storage.



• **Human Linkages** – Shipping and tourism increase accidental introduction of seeds.

PRELIMS BOOSTER BOX

Arctic Amplification

- Enhanced warming in the Arctic due to ice-albedo feedback.

Permafrost

- Permanently frozen ground.
- Stores large amounts of organic carbon.

Invasive Species

- Non-native organisms that spread and harm ecosystems.

Albedo Effect

- Ice reflects sunlight; melting reduces reflectivity → more warming.

Global Significance

- The Arctic influences global climate systems and sea-level rise.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to the Arctic region, consider the following statements:

1. The Arctic is warming faster than the global average.
2. Permafrost thaw can release greenhouse gases.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only

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

Answer: (c)

Mains PYQ

Explain the phenomenon of Arctic amplification. Discuss its global environmental consequences. (GS-III)

PadhAI MAINS PRACTICE QUESTION

Examine how Arctic warming contributes to the spread of invasive plant species. What are the ecological and climate implications of such changes? (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to Arctic ecosystems, consider the following statements:

1. Arctic amplification is linked to the ice-albedo feedback mechanism.
2. Invasive species can alter native biodiversity in tundra ecosystems.
3. Permafrost thaw reduces greenhouse gas emissions.

Which of the statements given above is/are correct?

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

Answer: (a)



9. WHAT ARE BIO-BASED CHEMICALS AND ENZYMES?



Why in the news?

- Bio-based chemicals are derived from renewable biological sources such as plants, agricultural residues, algae, and microorganisms.
- Enzymes are biological catalysts (proteins) that accelerate chemical reactions and are widely used in industries like food processing, textiles, pharmaceuticals, and biofuels.
- Together, they reduce carbon footprint, enhance energy efficiency, and promote sustainable industrial processes.

BACKGROUND / CONTEXT

- I. Conventional chemicals are largely petroleum-based.
- II. Bioeconomy aims to:
 - A. Replace fossil inputs with biomass.
 - B. Reduce greenhouse gas emissions.
 - C. Promote biodegradable materials.
- III. India promotes bio-based innovation through biotechnology missions and ethanol blending programmes.

KEY HIGHLIGHTS

- **Renewable Feedstock** – Derived from biomass (sugarcane, corn, lignocellulosic waste).
- **Lower Carbon Emissions** – Reduced lifecycle emissions compared to petrochemicals.
- **Industrial Enzymes** – Used in detergents, food processing, paper & pulp, and pharmaceuticals.
- **Energy Efficiency** – Enzymatic reactions occur under mild temperatures and pressures.
- **Biodegradability** – Many bio-based products are environmentally friendly.
- **Biofuel Linkage** – Enzymes critical in bioethanol production (cellulases break down cellulose).

PRELIMS BOOSTER BOX

Biorefinery

- Facility that converts biomass into fuels, chemicals, and materials.

Industrial Enzymes

- Examples: Amylases, Proteases, Lipases, Cellulases.

Bioethanol

- Produced via fermentation of sugars using yeast.
- Used in ethanol blending programme (E20 target).

Circular Economy

- Resource efficiency, recycling, reuse, and waste minimisation.

Bioplastics



- Examples: PLA (Polylactic Acid), PHA (Polyhydroxyalkanoates).

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to biofuels, consider the following statements:

1. Bioethanol is produced through fermentation of biomass.
2. Enzymes can be used to break down cellulose in plant matter.

Which of the statements given above is/are correct?

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

Answer: (c)

Mains PYQ

Discuss the role of bio-based technologies in achieving sustainable industrial development. (GS-III)

PadhAI MAINS PRACTICE QUESTION

Explain the concept of bio-based chemicals and industrial enzymes. How can they contribute to India's low-carbon and circular economy transition? (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to bio-based chemicals and enzymes, consider the following statements:

1. Bio-based chemicals are derived from renewable biological sources.

2. Industrial enzymes function as biological catalysts.
3. Enzymes typically require extremely high temperatures to function effectively.

Which of the statements given above is/are correct?

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

Answer: (a)

10. TRANSITIONING TO GREEN STEEL



Why in the news?

- Green steel refers to steel produced with significantly lower carbon emissions, primarily by replacing coal-based blast furnaces with cleaner technologies such as hydrogen-based direct reduced iron (DRI), electric arc furnaces (EAFs), and renewable energy integration.
- The transition is vital because the steel sector accounts for nearly 7–8% of global CO₂ emissions.

BACKGROUND / CONTEXT



- I. Conventional method: Blast Furnace–Basic Oxygen Furnace (BF–BOF) using coking coal.
- II. Steel production is energy-intensive and carbon-heavy.
- III. India's growing infrastructure demand increases steel consumption.
- IV. Carbon Border Adjustment Mechanism (CBAM) by the EU may impact exports.

KEY HIGHLIGHTS

- **Hydrogen-Based DRI** – Replaces coal with green hydrogen to reduce iron ore.
- **Electric Arc Furnaces (EAFs)** – Use scrap steel and electricity, lowering emissions.
- **Renewable Integration** – Solar and wind energy for industrial processes.
- **Carbon Capture Linkage** – CCUS can reduce emissions from existing plants.
- **Policy Push** – Production-Linked Incentives (PLI) and green hydrogen mission support transition.
- **Global Trade Dimension** – Low-carbon steel may gain export advantage under carbon regulations.

PRELIMS BOOSTER BOX

Green Hydrogen

- Produced via electrolysis using renewable electricity.
- Emits no CO₂ during production.

Steel Production Methods

- BF-BOF: High emissions.
- DRI-EAF: Lower emissions.

Carbon Border Adjustment Mechanism (CBAM)

- EU mechanism to tax carbon-intensive imports.

India's National Green Hydrogen Mission

- Aims to make India a global hub for green hydrogen production.

Hard-to-Abate Sector

- A sector where decarbonisation is technologically difficult.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to hydrogen as an energy source, consider the following statements:

1. Green hydrogen is produced using renewable energy.
2. Hydrogen combustion produces carbon dioxide.

Which of the statements given above is/are correct?

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

Answer: (a)

Mains PYQ

Discuss the challenges and opportunities in decarbonising India's heavy industries such as steel. (GS-III)

PadhAI MAINS PRACTICE QUESTION

Why is the transition to green steel crucial for India's climate commitments? Examine the technological and economic challenges involved. (150 words)



PadhAI-GENERATED UPSC MCQ

With reference to green steel production, consider the following statements:

1. Hydrogen-based DRI reduces carbon emissions compared to coal-based blast furnaces.
2. Electric Arc Furnaces primarily use scrap steel and electricity.
3. Steel production has negligible contribution to global CO₂ emissions.

Which of the statements given above is/are correct?

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

Answer: (a)

11. CHEETAH CUBS BORN AT KUNO NATIONAL PARK

- The birth of cheetah cubs at Kuno signals progress in India's efforts to reintroduce the species, which became extinct in the country in 1952.
- The project aims to restore ecological balance, enhance grassland conservation, and re-establish India as part of the global cheetah habitat network.

BACKGROUND / CONTEXT

- I. India declared the cheetah extinct in 1952.
- II. Under Project Cheetah, African cheetahs were translocated from Namibia and South Africa in 2022.
- III. Kuno National Park was selected for:

- A. Suitable grassland habitat.
- B. Adequate prey base.
- C. Low human disturbance.

KEY HIGHLIGHTS

- **Successful Breeding** – Indicates adaptation to Indian habitat conditions.
- **Species Restoration** – First intercontinental large carnivore translocation project.
- **Grassland Conservation** – Focus shifts to neglected ecosystems.
- **Ecological Role** – Cheetahs act as flagship species for open forest and savanna habitats.
- **Monitoring Mechanism** – GPS collars and scientific tracking ensure protection.
- **Challenges** – Mortality concerns, habitat expansion, human-wildlife interface.

PRELIMS BOOSTER BOX

Cheetah (*Acinonyx jubatus*)

- Fastest land animal.
- IUCN Status: Vulnerable (African cheetah).

Asiatic Cheetah

- Critically Endangered.
- Currently survives only in Iran.

Kuno National Park

- Located in Madhya Pradesh.
- Originally prepared for Asiatic lion relocation.

Translocation

- Intentional movement of species from one habitat to another.



Flagship Species

- Species chosen to represent environmental causes.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

Consider the following statements about species translocation:

1. It is used for conservation of endangered species.
2. It may help restore ecological balance in degraded ecosystems.

Which of the statements given above is/are correct?

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

Answer: (c)

Mains PYQ

Discuss the ecological and conservation significance of species reintroduction programmes in India. (GS-III)

PadhAI MAINS PRACTICE QUESTION

Evaluate the ecological significance and challenges of the cheetah reintroduction programme in India. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to Project Cheetah, consider the following statements:

1. The cheetah was declared extinct in India in 1952.
2. Kuno National Park was selected due to suitable grassland habitat.
3. The Asiatic cheetah is currently abundant in India.

Which of the statements given above is/are correct?

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

Answer: (a)



SPECIES IN NEWS



FIELD NOTES: SPECIES IN THE NEWS



1. Snow Leopard (*Panthera uncia*)
- Himalayan habitat, conservation status: vulnerable, endangered, critically endangered, reintroduction programs.
- The conservation status, conservation.
Key areas: Rajasthan, grasslands, nuts

2. Great Indian Bustard (*Ardeotis nigripennis*)
- CRITICALLY ENDANGERED
- Key areas: Rajasthan, grasslands, scrubland, semi-arid, mountainous, semi-arid, Rajasthan, India, conservation.
- Key areas: Rajasthan, semi-arid, mountainous, scrubland, semi-arid, Rajasthan, India, conservation.
- Key areas: Rajasthan, semi-arid, mountainous, scrubland, semi-arid, Rajasthan, India, conservation.



BIODIVERSITY HOTSPOTS
- Western Ghats, Eastern Himalaya

Indian Flora & Fauna



1) Malabar Pied Hornbill, *Anthracoceros coronatus*



1 Taxonomy & Identity

- Family: Bucerotidae
- Large pied hornbill with casque; strong sexual dimorphism

2 IUCN & Legal Status

- **IUCN:** Near Threatened
- **WPA 1972:** Schedule I
- **CITES:** Appendix II

3 Geographic Range

- Western Ghats, Central India forests
- Riverine & moist deciduous belts

4 Eco-Behavioral Traits

- Diurnal frugivore
- Keystone seed disperser

- Female seals inside tree cavity during nesting

5 Threat Matrix

- Loss of large nesting trees
- Habitat fragmentation
- Hunting pressure

2) Indian Grey Hornbill, *Ocyrceros birostris*



IUCN & Legal Status

- **IUCN:** Least Concern
- **WPA:** Schedule I
- **CITES:** Not specifically listed

Geographic Range

- Indian plains, urban & dry deciduous zones

Eco Traits

- Urban-adapted
- Cavity nester
- Frugivore + opportunistic omnivore

Threats

- Urban tree loss
- Nest cavity decline



3) White-bellied Sea Eagle, *Haliaeetus leucogaster*



IUCN & Legal Status

- **IUCN:** Least Concern
- **WPA:** Protected raptor
- **CITES:** Appendix II

Geographic Range

- Indian coastline, large reservoirs
- Estuarine ecosystems

Eco Traits

- Fish specialist
- Builds massive stick nests
- Indicator of coastal ecosystem health

Threats

- Disturbance at nesting sites
- Electrocution on pylons

4) White-rumped Vulture, *Gyps bengalensis*



IUCN & Legal Status

- **IUCN:** Critically Endangered
- **WPA:** Schedule I
- **CITES:** Appendix II

Geographic Range

- Gangetic plains, central India pockets

Eco Traits

- Obligate scavenger
- Colonial breeder
- Disease control role

Threats

- Diclofenac toxicity
- Food scarcity
- Habitat decline



5) Army Ants ,Genus *Aenictus*



IUCN & Legal Status

- Not assessed (new species reported)
- No WPA listing

Geographic Range

- Eastern Ghats (Andhra Pradesh)

Eco Traits

- Nomadic swarm hunters
- No permanent nest
- Apex invertebrate predators

Threats

- Forest degradation
- Microhabitat loss

6) Smew , *Mergellus albellus*



IUCN

- Least Concern

Range

- Rare winter visitor (Kaziranga – Feb sighting)

Traits

- Diving duck
- Fish eater
- Migratory

Threats

- Wetland loss

7) Greater Flamingo , *Phoenicopterus roseus*



IUCN

- Least Concern (local decline concerns)

Range

- Sambhar, Pulicat, Tamil Nadu wetlands

Traits

- Filter feeder
- Colonial breeder

Threats

- Wetland diversion
- Pollution

8) White-throated Bushchat, *Saxicola insignis*



IUCN

- Vulnerable

Range

- Terai grasslands (winter visitor)

Traits

- Insectivore
- Grassland specialist

Threats

- Grassland conversion

9) Cheetah, *Acinonyx jubatus*



IUCN

- Vulnerable
- CITES Appendix I

Range

- Reintroduced in Kuno NP (MP)

Traits

- Fastest land mammal
- Open grassland predator

Threats

- Habitat suitability
- Human conflict

10) King Cobra, *Ophiophagus hannah*



IUCN

- Vulnerable



Range

- Western Ghats, Northeast India

Traits

- Feeds on snakes
- Only snake that builds nest

Threats

- Habitat loss
- Persecution

11) Baikal Teal, *Sibirionetta formosa*



IUCN

- Near Threatened

Range

- Rare winter visitor (Delhi Big Bird Day)

Traits

- Dabbling duck
- Migratory

Threats

- Flyway wetland degradation

12) Smoky Warbler *Phylloscopus fulgiventer*



IUCN

- Least Concern

Range

- Himalayan foothills; winter sightings
NCR

Traits

- Insectivore
- Understorey specialist

Threats

- Forest fragmentation



1) Malabar Pied Hornbill, *Anthracoceros coronatus*



1 Taxonomy & Identity

- Family: Bucerotidae
- Large pied hornbill with casque; strong sexual dimorphism

2 IUCN & Legal Status

- **IUCN:** Near Threatened
- **WPA 1972:** Schedule I
- **CITES:** Appendix II

3 Geographic Range

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- Riverine & moist deciduous belts

4 Eco-Behavioral Traits

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- Keystone seed disperser

- Female seals inside tree cavity during nesting

5 Threat Matrix

- Loss of large nesting trees
- Habitat fragmentation
- Hunting pressure

2) Indian Grey Hornbill, *Ocyrceros birostris*



IUCN & Legal Status

- **IUCN:** Least Concern
- **WPA:** Schedule I
- **CITES:** Not specifically listed

Geographic Range

- Indian plains, urban & dry deciduous zones

Eco Traits

- Urban-adapted
- Cavity nester
- Frugivore + opportunistic omnivore

Threats

- Urban tree loss
- Nest cavity decline



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- Urban tree loss
- Nest cavity decline



SCIENCE & TECHNOLOGY



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I. INDIAN ARMY SHOWCASES HOMEGROWN AI SYSTEMS



Why in the news?

- The Indian Army demonstrated multiple homegrown AI-based solutions, including autonomous surveillance platforms, predictive logistics tools, and AI-enabled threat detection systems.
- These technologies aim to modernize warfare capabilities, reduce dependence on imports, and strengthen India's readiness for future multi-domain conflicts.

BACKGROUND / CONTEXT

- I. AI integration is a global military trend, with major powers investing in autonomous and semi-autonomous systems.
- II. India set up the **Defence AI Council (DAIC)** and **Defence AI Project Agency (DAIPA)** under the Ministry of Defence.
- III. AI in defence aligns with the broader Digital India and Make in India initiatives.
- IV. The Army is focusing on AI for border surveillance, predictive maintenance, cyber defence, and battlefield analytics.

KEY HIGHLIGHTS

- **Enhanced Surveillance** – AI-powered drones and image-recognition systems improve monitoring along sensitive borders.
- **Predictive Logistics** – AI models optimize supply chains, ammunition stock management, and equipment maintenance.
- **Autonomous Systems** – Deployment of unmanned ground vehicles (UGVs) and robotic platforms reduces soldier risk.
- **Cyber & Information Warfare** – AI aids in detecting cyber threats and misinformation campaigns.
- **Indigenisation Push** – Collaboration with Indian startups and defence PSUs to reduce import dependency.
- **Ethical & Strategic Considerations** – Ensuring compliance with international humanitarian law in autonomous weapons deployment.

PRELIMS BOOSTER BOX

Defence AI Framework

- Defence AI Council (DAIC) – Policy-level body.
- Defence AI Project Agency (DAIPA) – Implementation arm.

Key Applications of AI in Defence

- Image recognition & pattern detection.
- Autonomous drones & robotics.
- Decision-support systems.

Global Context

- AI militarisation debates at the UN (Lethal Autonomous Weapons Systems – LAWS).



- Cyber warfare as an emerging domain.

Static + Current Linkage

- Article 355: Duty of Union to protect States.
- National Security Strategy (proposed).
- Atmanirbhar Bharat in Defence Production.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to Artificial Intelligence (AI), consider the following statements:

1. AI can be used for pattern recognition in surveillance systems.
2. AI applications are limited to civilian uses and cannot be deployed in defence systems.

Which of the statements given above is/are correct?

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

Answer: (a)

Mains PYQ

“Discuss the role of emerging technologies such as Artificial Intelligence in transforming national security architecture.” (GS-III)

PadhAI MAINS PRACTICE QUESTION

Evaluate the strategic significance of integrating Artificial Intelligence into India’s defence forces. What challenges must be addressed to ensure responsible deployment? (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to AI in defence, consider the following statements:

1. AI can enhance predictive maintenance of military equipment.
2. Lethal Autonomous Weapons Systems (LAWS) are being debated at international forums.
3. AI deployment in defence has no ethical or legal implications.

Which of the statements given above is/are correct?

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

Answer: (a)

2.CAN NSIL OFFSET FLAT SPACE BUDGET?



Why in the news?



- India's space ambitions – including human spaceflight, satellite launches, deep space missions, and space-based services – require sustained funding.
- However, budgetary allocations have remained relatively flat in real terms.
- NSIL, as ISRO's commercial arm, is expected to enhance revenue generation through satellite launches, technology transfer, and global partnerships to bridge funding gaps.

BACKGROUND / CONTEXT

- I. NSIL was incorporated in 2019 under the Department of Space.
- II. It replaced Antrix Corporation as ISRO's primary commercial interface.
- III. India's space reforms (2020 onwards) opened the sector to private players.
- IV. The establishment of Indian National Space Promotion and Authorization Center (IN-SPACe) enabled private sector participation.

KEY HIGHLIGHTS

- **Flat Budget Concern** – Nominal increase in space allocation may not match inflation and expanding mission profile.
- **Commercialisation Role** – NSIL markets launch services (PSLV, LVM3), satellites, and space-based applications globally.
- **Private Sector Push** – Space reforms encourage startups and private firms to build rockets, satellites, and services.
- **Revenue Diversification** – Potential income from satellite broadband, earth observation data, and international collaborations.

- **Global Competition** – India competes with SpaceX, Arianespace, and other global launch providers.

- **Strategic Missions** – Gaganyaan, planetary missions, and navigation systems require long-term stable funding.

PRELIMS BOOSTER BOX

NSIL (2019)

- Wholly owned Government of India company.
- Commercial arm of ISRO.
- Responsible for operational launch vehicle production.

Key Institutions

- ISRO – Research & development.
- IN-SPACe – Regulatory & promotional body.
- Department of Space – Policy oversight.

Important Missions

- PSLV (Polar Satellite Launch Vehicle).
- LVM3 (Launch Vehicle Mark-3).
- Gaganyaan (Human Spaceflight Programme).

Static + Current Linkage

- Space sector reforms (2020).
- FDI liberalisation in space.
- Space economy potential (~\$40+ billion global share aspiration).

PadhAI PYQ BOOSTER SECTION

Prelims PYQ



With reference to India's space sector reforms, consider the following statements:

1. IN-SPACe is responsible for authorising private sector participation in space activities.
2. NSIL functions as the commercial arm of ISRO.

Which of the statements given above is/are correct?

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

Answer: (c)

Mains PYQ

“Discuss the significance of space sector reforms in enhancing India's position in the global space economy.” (GS-III)

PadhAI MAINS PRACTICE QUESTION

Examine whether commercialisation through NSIL can sustainably offset limitations in India's space budget. Discuss the opportunities and challenges involved. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to India's space sector, consider the following statements:

1. NSIL was established to commercially exploit ISRO's technologies and launch services.
2. IN-SPACe acts as a regulator and facilitator for private space companies.

3. ISRO directly handles all commercial launch contracts without any intermediary.

Which of the statements given above is/are correct?

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

Answer: (a)

3.IIT-KANPUR DEVELOPS SOLAR CYCLE PREDICTION METHOD



Why in the news?

- The IIT-Kanpur team has proposed an advanced model to forecast solar cycle variations by analysing solar magnetic field dynamics and sunspot activity.
- Accurate prediction of solar cycles is critical for safeguarding satellites, power grids, navigation systems, and communication infrastructure from space weather disturbances.

BACKGROUND / CONTEXT

1. The Sun follows an approximately **11-year solar cycle**, marked by variations in sunspot numbers.



- II. Higher sunspot activity corresponds to increased solar flares and coronal mass ejections (CMEs).
- III. These solar events can disrupt satellites, GPS signals, aviation routes, and power grids.
- IV. The current cycle, Solar Cycle 25, began in 2019 and is expected to peak around 2024–25.

KEY HIGHLIGHTS

• **Improved Predictive Model** – Incorporates solar magnetic field precursors to anticipate cycle intensity.

• **Space Weather Preparedness** – Helps mitigate risks to satellites, astronaut safety, and communication networks.

• **Scientific Contribution** – Enhances understanding of solar dynamo processes governing magnetic field reversals.

• **Strategic Relevance** – Critical for spacefaring nations like India with growing satellite constellations.

• **Power Grid Protection** – Early warnings reduce vulnerability to geomagnetic storms.

PRELIMS BOOSTER BOX

Solar Cycle

- Average duration: ~11 years.
- Alternates between solar minimum and solar maximum.
- The Sun's magnetic polarity reverses every cycle (~22-year magnetic cycle).

Sunspots

- Dark, cooler areas caused by magnetic flux concentrations.
- Indicator of solar activity level.

Space Weather Impacts

- Geomagnetic storms.
- Disruption of radio communications.
- Satellite damage.

Indian Context

- Growing satellite assets (NAVIC, communication satellites).
- Role of Indian Space Research Organisation in monitoring solar activity.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to the Sun, consider the following statements:

1. Sunspots are relatively cooler areas on the Sun's surface.
2. The number of sunspots remains constant throughout the solar cycle.

Which of the statements given above is/are correct?

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

Answer: (a)

Mains PYQ

Discuss the significance of space weather forecasting for modern technological societies. (GS-III)

PadhAI MAINS PRACTICE QUESTION



Explain the concept of the solar cycle and examine the importance of improved prediction models for India's space and communication infrastructure. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to solar activity, consider the following statements:

1. The solar cycle is associated with periodic changes in sunspot numbers.
2. Solar flares and coronal mass ejections can disrupt satellite communications.
3. The solar magnetic polarity reverses approximately every 11 years.

Which of the statements given above is/are correct?

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

Answer: (a)

4.INDIA JOINS ELITE WITH MISSILE TECH SUCCESS

Why in the news?

- India's recent successful missile test – involving advanced propulsion, precision targeting, and improved interception capability – marks a significant milestone in indigenous defence research.
- The development strengthens deterrence posture, enhances air and missile defence capability, and reflects progress under the Atmanirbhar Bharat initiative in the defence sector.

BACKGROUND / CONTEXT

- I. India has progressively developed missile systems under its Integrated Guided Missile Development Programme (IGMDP).
- II. Strategic systems include Agni (ballistic missiles), Prithvi, Akash, and BrahMos.
- III. Recent advancements focus on hypersonic glide vehicles, ballistic missile defence (BMD), and next-generation interceptors.
- IV. India is also a member of the Missile Technology Control Regime (MTCR), which regulates missile proliferation.

KEY HIGHLIGHTS

- **Technological Leap** – Demonstration of advanced propulsion and guidance systems.
- **Strategic Deterrence** – Strengthens credible minimum deterrence doctrine.
- **Ballistic Missile Defence (BMD)** – Enhances ability to intercept incoming hostile missiles.
- **Hypersonic Capability** – Potential entry into an elite group with hypersonic technology.
- **Indigenisation Drive** – Reduces dependency on foreign defence imports.
- **Global Standing** – Positions India among technologically advanced defence nations.

PRELIMS BOOSTER BOX

Key Missile Types

- **Ballistic Missiles** – Follow parabolic trajectory (e.g., Agni series).
- **Cruise Missiles** – Fly at low altitude with guided navigation (e.g., BrahMos).
- **Hypersonic Missiles** – Speed > Mach 5.



Important Regimes

- MTCR (India joined in 2016).
- Wassenaar Arrangement.
- Australia Group.

Strategic Doctrines

- Credible Minimum Deterrence.
- No First Use (NFU) policy (as declared).

Static + Current Linkage

- Article 51: Promotion of international peace.
- Defence indigenisation & Strategic autonomy.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to ballistic and cruise missiles, consider the following statements:

1. Ballistic missiles follow a high-arching trajectory after launch.
2. Cruise missiles are guided throughout their flight path.

Which of the statements given above is/are correct?

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

Answer: (c)

Mains PYQ

“Discuss the significance of indigenous missile development for India’s strategic autonomy and deterrence capability.” (GS-III)

PadhAI MAINS PRACTICE QUESTION

Examine how recent advancements in missile technology strengthen India’s defence preparedness and geopolitical standing. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to missile technology, consider the following statements:

1. Hypersonic missiles travel at speeds greater than Mach 5.
2. India is a member of the Missile Technology Control Regime (MTCR).
3. Cruise missiles follow an unguided ballistic trajectory after launch.

Which of the statements given above is/are correct?

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

Answer: (a)

5.RULES ON FROZEN EMBRYO DONATION, NOW UNDER LEGAL CHALLENGE

Why in the news?

- Rules framed under the Assisted Reproductive Technology regime impose conditions on embryo donation, storage limits, and eligibility criteria for recipients and donors.



- Petitioners argue that these restrictions affect reproductive autonomy, privacy, and equality.
- The legal challenge brings into focus the balance between ethical safeguards and individual rights in assisted reproduction.

BACKGROUND / CONTEXT

- I. India enacted the Assisted Reproductive Technology (Regulation) Act, 2021 to regulate fertility clinics and ART procedures.
- II. The Surrogacy (Regulation) Act, 2021 complements ART regulations.
- III. Frozen embryos are preserved through **cryopreservation** for future implantation.
- IV. The law prescribes:
 - A. Registration of ART clinics.
 - B. Defined eligibility criteria for donors and intending couples.
 - C. Limits on gamete/embryo storage duration.

KEY HIGHLIGHTS

- **Regulatory Oversight** – Mandatory registration and monitoring of ART clinics to prevent exploitation.
- **Eligibility Restrictions** – Conditions regarding marital status, age limits, and consent requirements.
- **Storage Limits** – Specified time limits for embryo preservation.
- **Rights vs Regulation Debate** – Tension between reproductive autonomy and state oversight.
- **Constitutional Dimensions** – Invokes Article 21 (Right to Life & Personal Liberty) including privacy and reproductive choice.

- **Ethical Concerns** – Prevention of commercialization, trafficking, and misuse of genetic material.

PRELIMS BOOSTER BOX

Cryopreservation

- Freezing of embryos at sub-zero temperatures using liquid nitrogen.
- Used in IVF procedures.

ART Act, 2021

- Establishes National & State ART Boards.
- Prohibits sex selection.
- Regulates donation of gametes and embryos.

Constitutional Linkages

- Article 21 – Right to privacy (Justice K.S. Puttaswamy case).
- Article 14 – Equality before law.

Related Institutions

- Indian Council of Medical Research (ICMR) – Earlier ART guidelines.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to Assisted Reproductive Technology (ART) in India, consider the following statements:

1. The ART Act provides for mandatory registration of fertility clinics.
2. Sex selection through ART procedures is permitted under the law.



Which of the statements given above is/are correct?

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

Answer: (a)

Mains PYQ

“Discuss the ethical and legal issues surrounding assisted reproductive technologies in India.” (GS-II)

PadhAI MAINS PRACTICE QUESTION

Examine the constitutional and ethical challenges posed by regulations governing frozen embryo donation in India. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to embryo donation and ART regulations in India, consider the following statements:

1. The ART (Regulation) Act, 2021 mandates registration of ART clinics.
2. Cryopreservation involves preserving embryos at extremely low temperatures.
3. The Constitution explicitly mentions reproductive rights as a Fundamental Right.

Which of the statements given above is/are correct?

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

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

Answer: (a)

6.INDIA'S BATTERY STRATEGY: SODIUM-ION FOCUS

Why in the news?

- Sodium-ion batteries are emerging as a promising alternative to lithium-ion batteries for stationary storage and certain EV applications.
- Given India's limited lithium reserves but relatively abundant sodium resources, a shift toward sodium-ion technology could enhance energy security, lower costs, and support the renewable energy transition.

BACKGROUND / CONTEXT

- I. Lithium-ion batteries dominate EV and storage markets.
- II. India imports most lithium from Australia, Chile, and Argentina.
- III. Sodium is abundant and widely available (common salt sources).
- IV. Global push to diversify battery chemistries beyond lithium.

KEY HIGHLIGHTS

- **Resource Advantage** – Sodium is cheaper and more abundant than lithium.
- **Cost Efficiency** – Potentially lower production costs for grid-scale storage.
- **Safety Edge** – Lower risk of thermal runaway compared to lithium-ion.



- **Energy Density Trade-off** – Generally lower energy density than lithium-ion.
- **Strategic Autonomy** – Reduces import dependence and geopolitical risks.
- **Renewable Integration** – Supports large-scale storage for solar and wind energy.

PRELIMS BOOSTER BOX

Sodium-Ion Battery

- Uses sodium ions as charge carriers.
- Suitable for stationary storage.

Lithium-Ion Battery

- Higher energy density.
- Widely used in EVs and electronics.

Advanced Chemistry Cell (ACC)

- Next-generation battery technologies supported under PLI scheme.

Critical Minerals

- Lithium, cobalt, nickel are classified as strategic resources.

Energy Density

- Amount of energy stored per unit mass or volume.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to lithium-ion batteries, consider the following statements:

1. They are widely used in electric vehicles.
2. They require rare earth elements for operation.

Which of the statements given above is/are correct?

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

Answer: (a)

Mains PYQ

Discuss the importance of battery storage technologies in India's renewable energy transition. (GS-III)

PadhAI MAINS PRACTICE QUESTION

Evaluate the strategic and economic significance of sodium-ion batteries in India's energy transition. Compare their advantages and limitations vis-à-vis lithium-ion batteries. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to sodium-ion batteries, consider the following statements:

1. Sodium is more abundant than lithium.
2. Sodium-ion batteries generally have higher energy density than lithium-ion batteries.
3. Battery storage is essential for renewable energy integration.

Which of the statements given above is/are correct?



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

Answer: (a)

7.DEATH BY CYBERCHONDRIA

Why in the news?

- Cyberchondria refers to the escalation of health anxiety due to repetitive online searches about medical symptoms.
- Easy access to unverified or alarming health content can lead to stress, panic, unnecessary medical testing, and even self-medication.
- In the digital age, this phenomenon raises concerns about misinformation, mental health, and responsible digital health governance.

BACKGROUND / CONTEXT

- I. Increased smartphone penetration and telemedicine access.
- II. Growth of health-related content on search engines and social media.
- III. Post-pandemic heightened health awareness.
- IV. Lack of digital health literacy among users.

KEY HIGHLIGHTS

- **Definition** – Cyberchondria combines “cyber” (internet) and “hypochondria.”
- **Anxiety Amplification** – Minor symptoms interpreted as severe illnesses.
- **Algorithmic Bias** – Search engines may prioritise serious conditions.

• **Self-Diagnosis Risks** – Leads to panic, unnecessary tests, or self-medication.

• **Mental Health Impact** – Triggers stress disorders and obsessive behavior.

• **Need for Regulation** – Emphasis on verified medical portals and digital literacy.

PRELIMS BOOSTER BOX

Hypochondria (Illness Anxiety Disorder)

- Excessive worry about having a serious illness.

Digital Health Literacy

- Ability to evaluate reliability of online medical information.

Telemedicine

- Remote diagnosis and treatment via digital platforms.

Information Asymmetry

- Gap between expert medical knowledge and public understanding.

WHO Infodemic Concept

- Overabundance of information, including misinformation during health crises.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

Which of the following factors can contribute to health misinformation?

1. Lack of digital literacy



2. Algorithm-driven content amplification
3. Peer-reviewed medical journals

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

Answer: (a)

Mains PYQ

Discuss the impact of digital misinformation on public health. Suggest measures to strengthen digital health governance. (GS-II/III)

PadhAI MAINS PRACTICE QUESTION

What is cyberchondria? Analyse its psychological and societal implications in the age of digital health information. Suggest measures to address this emerging challenge. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to cyberchondria, consider the following statements:

1. It refers to anxiety caused by excessive online medical searches.
2. Algorithm-driven content can amplify worst-case health scenarios.
3. Digital health literacy reduces the risk of cyberchondria.

Which of the statements given above is/are correct?

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

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

Answer: (b)

8.IIT-B RESEARCHERS OVERCOME A KEY CANCER THERAPY BOTTLENECK

Why in the news?

- One of the major challenges in advanced cancer treatment is the efficient delivery of therapeutic agents directly to tumor cells without damaging healthy tissues.
- IIT-B researchers have developed a novel delivery platform (such as improved nanocarriers/biomaterial systems) that enhances precision targeting, reduces toxicity, and improves treatment outcomes.

BACKGROUND / CONTEXT

- I. Conventional treatments:
 - A. Chemotherapy
 - B. Radiation therapy
- II. Challenges:
 - A. Non-specific drug targeting.
 - B. Severe side effects.
 - C. Drug resistance.
- III. Advanced therapies:
 - A. Targeted therapy
 - B. Immunotherapy
 - C. Nanomedicine-based drug delivery

KEY HIGHLIGHTS

- **Delivery Bottleneck Addressed** – Enhances precision of drug delivery to tumor cells.
- **Nanotechnology Application** – Uses engineered nanoparticles/biomaterials for controlled release.



• **Reduced Toxicity** – Minimizes damage to healthy cells.

• **Improved Efficacy** – Increases concentration of drug at tumor site.

• **Scalability Potential** – May support cost-effective cancer care in India.

• **Research–Clinical Link** – Bridges laboratory innovation and translational medicine.

PRELIMS BOOSTER BOX

Targeted Therapy

- Drugs designed to target specific cancer cell molecules.

Nanomedicine

- Application of nanotechnology in medical diagnosis and treatment.

Drug Delivery System

- Method/formulation to transport pharmaceutical compounds to target site.

Tumor Microenvironment

- Surrounding blood vessels, immune cells, and molecules influencing tumor growth.

Immunotherapy

- Boosts the body's immune system to fight cancer.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to nanotechnology in medicine, consider the following statements:

1. Nanoparticles can be used for targeted drug delivery.
2. Nanomedicine reduces side effects by improving drug specificity.

Which of the statements given above is/are correct?

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

Answer: (c)

Mains PYQ

Discuss the role of nanotechnology in modern healthcare. Highlight its applications and challenges. (GS-III)

PadhAI MAINS PRACTICE QUESTION

Explain how advancements in drug delivery systems can transform cancer therapy. Discuss the role of nanotechnology in overcoming treatment bottlenecks. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to targeted cancer therapy, consider the following statements:

1. Targeted therapy aims to selectively attack cancer cells.
2. Nanoparticle-based delivery systems can enhance drug concentration at tumor sites.



3. Conventional chemotherapy exclusively affects cancer cells.

Which of the statements given above is/are correct?

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

Answer: (a)

9. ANAEMIA, BLOOD DISORDERS AFFECT HbA1c TEST

Why in the news?

- HbA1c (Glycated Hemoglobin) is a standard test used to monitor long-term blood glucose levels in diabetic patients.
- However, conditions affecting red blood cells – such as anaemia, haemoglobinopathies, and other blood disorders – can produce misleading HbA1c values, potentially leading to misdiagnosis or inappropriate treatment.

BACKGROUND / CONTEXT

- I. India has one of the highest burdens of:
 - A. Anaemia (especially among women and children)
 - B. Diabetes mellitus
- II. HbA1c reflects average blood glucose over ~3 months.
- III. It measures glucose bound to haemoglobin in red blood cells (RBCs).

KEY HIGHLIGHTS

• **HbA1c Mechanism** – Measures percentage of glycated haemoglobin in blood.

• **RBC Lifespan Impact** – Since HbA1c depends on RBC lifespan (~120 days), disorders altering RBC survival affect readings.

• **Iron Deficiency Anaemia** – Can falsely elevate HbA1c levels.

• **Hemolytic Anaemia** – Can falsely lower HbA1c due to reduced RBC lifespan.

• **Haemoglobin Variants** – Conditions like thalassemia or sickle-cell disease may interfere with test accuracy.

• **Clinical Implication** – Risk of overtreatment or undertreatment of diabetes.

• **Need for Alternate Tests** – Fasting plasma glucose or oral glucose tolerance test (OGTT) may be required in suspected cases.

PRELIMS BOOSTER BOX

HbA1c (Glycated Hemoglobin)

- Reflects average plasma glucose over the previous 8–12 weeks.
- Diagnostic cut-off for diabetes: $\geq 6.5\%$.

Anaemia

- Reduced haemoglobin concentration or RBC count.
- Major causes: Iron deficiency, Vitamin B12 deficiency.

Hemolysis

- Premature destruction of red blood cells.

Haemoglobinopathies



- Genetic disorders affecting structure of haemoglobin (e.g., sickle-cell disease, thalassemia).

OGTT (Oral Glucose Tolerance Test)

- Measures body's response to glucose load.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to diabetes diagnosis, consider the following tests:

1. Fasting Plasma Glucose
2. Oral Glucose Tolerance Test
3. HbA1c

Which of the above are used for diagnosing diabetes?

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

Answer: (d)

Mains PYQ

Discuss the dual burden of communicable and non-communicable diseases in India. Suggest measures to improve early diagnosis and management. (GS-II/III)

PadhAI MAINS PRACTICE QUESTION

Explain how anaemia and blood disorders can affect the reliability of HbA1c testing. Discuss its implications for diabetes management in India. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to HbA1c testing, consider the following statements:

1. HbA1c reflects average blood glucose over the past three months.
2. Iron deficiency anaemia can falsely increase HbA1c levels.
3. Hemolytic anaemia may lead to falsely low HbA1c values.

Which of the statements given above is/are correct?

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

Answer: (c)

10.INDIA'S NEW TELESCOPES ARE SET TO BE A GAME-CHANGER FOR ASTRONOMY

Why in the news?

- New astronomical facilities — including advanced optical and radio telescopes — will allow Indian scientists to observe distant galaxies, transient cosmic events, and exoplanets with higher precision.
- These instruments improve sensitivity, resolution, and data-processing capacity, enabling breakthroughs in understanding dark matter, black holes, gravitational waves, and stellar evolution.

BACKGROUND / CONTEXT



- I. India has steadily expanded its astronomical infrastructure.
- II. Major facilities include:
 - A. Aryabhata Research Institute of Observational Sciences (ARIES), Uttarakhand.
 - B. National Centre for Radio Astrophysics (NCRA), Pune.
- III. Flagship telescopes:
 - A. Devasthal Optical Telescope (DOT).
 - B. Giant Metrewave Radio Telescope (GMRT).

- Typically located at high-altitude sites to reduce atmospheric distortion.

Radio Telescope

- Detects radio waves emitted by celestial objects.

Light-Year

- Distance light travels in one year (~9.46 trillion km).

Exoplanet

- A planet outside the Solar System.

Time-Domain Astronomy

- Study of dynamic cosmic events over time.

KEY HIGHLIGHTS

- **Enhanced Sensitivity** – Ability to detect faint celestial objects billions of light-years away.
- **Time-Domain Astronomy** – Study of transient phenomena like supernovae, gamma-ray bursts.
- **Multi-Wavelength Capability** – Combines optical, infrared, and radio observations.
- **Exoplanet Research** – Detection of planetary systems beyond the Solar System.
- **Global Collaboration** – Integration with international observatories and data networks.
- **Data-Driven Astronomy** – High-performance computing for processing massive datasets.
- **Strategic Scientific Boost** – Strengthens India's role in frontier astrophysics.

PRELIMS BOOSTER BOX

Optical Telescope

- Uses visible light for observation.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to astronomical observatories in India, consider the following statements:

1. The Giant Metrewave Radio Telescope is located near Pune.
2. Optical telescopes are generally placed at high altitudes to reduce atmospheric interference.

Which of the statements given above is/are correct?

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

Answer: (c)

Mains PYQ



Discuss the importance of astronomical research for scientific advancement and technological innovation in India. (GS-III)

PadhAI MAINS PRACTICE QUESTION

How can the expansion of India's astronomical infrastructure contribute to both scientific discovery and strategic technological development? Discuss. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to astronomical telescopes, consider the following statements:

1. Radio telescopes detect electromagnetic radiation in the radio frequency range.
2. Optical telescopes primarily observe visible light.
3. Time-domain astronomy studies static cosmic structures only.

Which of the statements given above is/are correct?

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

Answer: (a)

II. GENOME EDITING STRATEGY TREATS MULTIPLE DISORDERS

Why in the news?

- Genome editing technologies allow scientists to precisely modify DNA sequences within living cells.
- Emerging strategies are now targeting multiple genetic disorders by correcting faulty genes at their source.
- These advances promise long-term or even permanent cures, especially for monogenic diseases such as sickle-cell anaemia and certain inherited immune disorders.

BACKGROUND / CONTEXT

- I. Traditional treatments manage symptoms rather than cure genetic causes.
- II. Gene therapy and genome editing aim to:
 - A. Replace defective genes
 - B. Disable harmful genes
 - C. Insert therapeutic genetic material
- III. Most widely used technology:
 - A. CRISPR-Cas9 (Clustered Regularly Interspaced Short Palindromic Repeats).

KEY HIGHLIGHTS

- **Precision Medicine Tool** – Targets specific DNA sequences with high accuracy.
- **Monogenic Disease Focus** – Effective in diseases caused by single-gene mutations.
- **Ex Vivo & In Vivo Approaches** – Editing done outside body cells or directly within patients.
- **Permanent Correction** – Potential one-time treatment rather than lifelong therapy.
- **Broad Applicability** – Used in blood disorders, immune deficiencies, and rare metabolic diseases.



• **Ethical Concerns** – Germline editing raises intergenerational implications.

• **Regulatory Oversight** – Requires stringent bioethical and clinical approval frameworks.

PRELIMS BOOSTER BOX

Genome

- Complete set of genetic material in an organism.

CRISPR-Cas9

- Molecular tool that cuts DNA at specific locations for modification.

Gene Therapy

- Technique to treat disease by modifying genetic material.

Somatic vs Germline Editing

- Somatic: Affects only treated individuals.
- Germline: Heritable changes passed to offspring.

Monogenic Disorder

- Disease caused by mutation in a single gene (e.g., sickle-cell anaemia).

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to CRISPR-Cas9 technology, consider the following statements:

1. It can be used to edit specific DNA sequences.
2. It has applications in treating genetic disorders.

Which of the statements given above is/are correct?

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

Answer: (c)

Mains PYQ

Discuss the potential benefits and ethical challenges associated with genome editing technologies. (GS-III)

PadhAI MAINS PRACTICE QUESTION

Examine how genome editing can revolutionise treatment of genetic disorders. Discuss associated ethical and regulatory challenges. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to genome editing, consider the following statements:

1. CRISPR-Cas9 allows targeted modification of DNA sequences.
2. Germline editing changes are inheritable.
3. Genome editing can only be used for research and has no therapeutic applications.

Which of the statements given above is/are correct?

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



Answer: (a)

12. BODHAN AI: CENTRE'S NEW BID TO INTEGRATE AI TOOLS IN SCHOOLS

Why in the news?

- Bodhan AI seeks to embed AI-powered educational tools within school ecosystems to support teachers, improve learning outcomes, and promote digital inclusion.
- The initiative aligns with India's broader goals under the National Education Policy and Digital India mission to modernise education and prepare students for an AI-driven economy.

BACKGROUND / CONTEXT

- I. NEP 2020 emphasises:
 - A. Experiential learning
 - B. Digital integration
 - C. Skill-based education
- II. Growing focus on:
 - A. Coding and computational thinking
 - B. AI literacy in secondary education
- III. Need to bridge:
 - A. Urban-rural digital divide
 - B. Teacher capacity gaps

KEY HIGHLIGHTS

• **AI-Powered Learning Tools** – Adaptive platforms that personalise lessons based on student performance.

• **Teacher Support Systems** – AI-based analytics to track progress and identify learning gaps.

• **Foundational AI Literacy** – Introducing students to basics of machine learning, data, and algorithms.

• **Equity Focus** – Designed to support government and underserved schools.

• **Data-Driven Governance** – Real-time dashboards for educational monitoring.

• **Skill Development Push** – Aligns with future workforce demands in AI and emerging technologies.

PRELIMS BOOSTER BOX

Artificial Intelligence (AI)

- Simulation of human intelligence by machines.

Adaptive Learning

- Educational method using AI to tailor content to individual learners.

Machine Learning

- Subset of AI where systems learn from data patterns.

Digital Divide

- Gap between those with and without access to digital technologies.

NEP 2020

- Policy aiming to transform India's education system with focus on technology integration.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ



With reference to Artificial Intelligence (AI), consider the following statements:

1. Machine learning is a subset of AI.
2. AI systems can analyse patterns in large datasets.

Which of the statements given above is/are correct?

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

Answer: (c)

Mains PYQ

Discuss the role of emerging technologies such as Artificial Intelligence in transforming India's education system. (GS-II/III)

PadhAI MAINS PRACTICE QUESTION

Evaluate the potential benefits and challenges of integrating AI-based tools in India's school education system. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to AI integration in school education, consider the following statements:

1. Adaptive learning platforms personalise content based on student performance.
2. AI-based educational tools can assist teachers in identifying learning gaps.
3. AI integration automatically eliminates the digital divide.

Which of the statements given above is/are correct?

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

Answer: (a)

13.IIT-M DEVELOPS BLOOD CLOTTING TIME TECHNIQUE

Why in the news?

- The newly developed technique provides a faster and more precise method to assess blood coagulation.
- It may help in early detection of clotting abnormalities, guide anticoagulant therapy, and improve patient outcomes in conditions such as haemophilia, thrombosis, and cardiovascular diseases.

BACKGROUND / CONTEXT

- I. Blood clotting (coagulation) is a vital physiological process that prevents excessive bleeding.
- II. Imbalance can lead to:
 - A. Excess bleeding (e.g., haemophilia)
 - B. Excess clot formation (e.g., deep vein thrombosis)
- III. Conventional tests include:
 - A. Prothrombin Time (PT)
 - B. Activated Partial Thromboplastin Time (aPTT)
 - C. INR (International Normalized Ratio)

KEY HIGHLIGHTS



- **Improved Precision** – Enhances sensitivity in detecting clotting abnormalities.
- **Faster Results** – Reduces turnaround time in clinical diagnostics.
- **Point-of-Care Potential** – May enable portable or bedside testing.
- **Therapy Monitoring** – Useful for patients on anticoagulant drugs.
- **Cost-Effective Innovation** – Could improve accessibility in resource-limited settings.
- **Public Health Relevance** – Important for India's rising cardiovascular disease burden.

PRELIMS BOOSTER BOX

Blood Coagulation

- Multi-step cascade involving platelets and clotting factors.

Platelets

- Blood components responsible for initiating clot formation.

Prothrombin Time (PT)

- Measures extrinsic pathway of coagulation.

aPTT

- Assesses intrinsic pathways.

Thrombosis

- Formation of abnormal blood clot within vessels.

Anticoagulants

- Drugs that prevent or reduce clot formation (e.g., warfarin, heparin).

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to blood clotting, consider the following statements:

1. Platelets play a key role in initiating clot formation.
2. Prothrombin Time is used to assess blood coagulation.

Which of the statements given above is/are correct?

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

Answer: (c)

Mains PYQ

Discuss the importance of affordable medical innovations in strengthening India's public healthcare system. (GS-II/III)

PadhAI MAINS PRACTICE QUESTION

Explain the physiological process of blood coagulation and discuss how advancements in diagnostic techniques can improve management of clotting disorders. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to blood clotting and diagnostic testing, consider the following statements:



1. Platelets are essential for initiating blood clot formation.
2. Prothrombin Time measures a pathway of the coagulation cascade.
3. Anticoagulants increase the rate of clot formation.

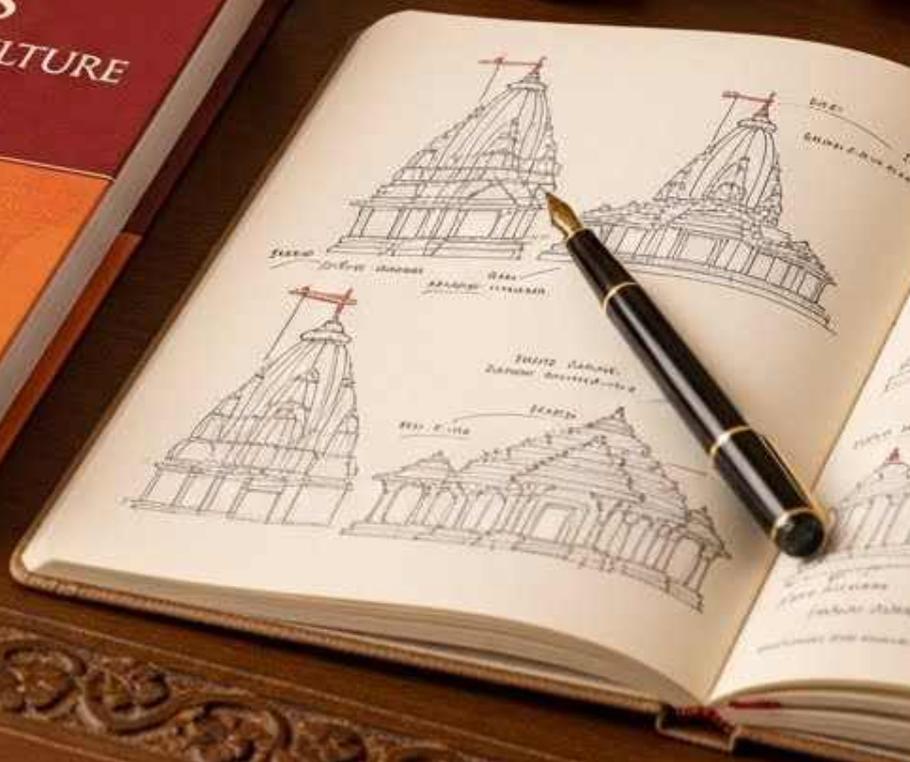
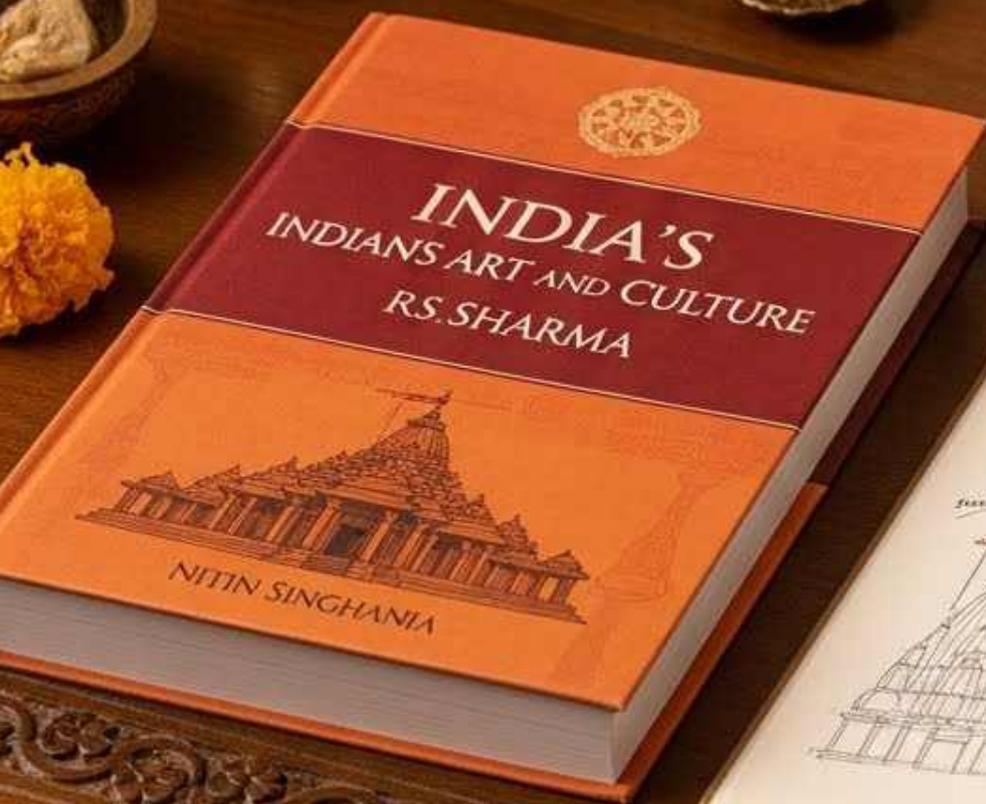
Which of the statements given above is/are correct?

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

Answer: (a)



HISTORY & CULTURE



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1. ARMY RENAMES 246 SITES TO SHED COLONIAL LEGACY

Why in the news?

- As part of a nationwide initiative to shed colonial legacy, the Army has replaced British-era names of cantonment roads, buildings, and military landmarks with names of Indian freedom fighters, military heroes, and cultural icons.
- The move aligns with symbolic decolonisation efforts aimed at reclaiming historical narrative and national identity.

BACKGROUND / CONTEXT

- I. Colonial-era military establishments retained British officers' names post-Independence.
- II. Similar renaming initiatives:
 - A. Rajpath was renamed as Kartavya Path.
 - B. Victoria Terminus renamed as Chhatrapati Shivaji Maharaj Terminus.
- III. Reflects broader trends of cultural reclamation and historical reinterpretation.

KEY HIGHLIGHTS

- **Decolonisation Drive** – Removal of British-era military nomenclature.
- **National Icons Honoured** – Names now reflect Indian freedom fighters and war heroes.
- **Symbolic Assertion** – Reinforces sovereignty and post-colonial identity.
- **Cultural Reclamation** – Aligns with efforts to revisit colonial narratives.

- **Administrative Implementation** – Undertaken across multiple cantonments nationwide.

- **Public Debate** – Raises questions about symbolism versus substantive reform.

PRELIMS BOOSTER BOX

Cantonment

- Permanent military station established for troops.

Decolonisation

- Process of removing colonial influences from political and cultural institutions.

Kartavya Path

- Ceremonial boulevard in New Delhi, formerly Rajpath.

Chhatrapati Shivaji Maharaj Terminus

- UNESCO World Heritage Site in Mumbai.

Symbolic Politics

- Use of symbols and narratives in shaping political identity.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to cantonments in India, consider the following statements:

1. Cantonments are permanent military stations.
2. They are governed under a specific Cantonments Act.

Which of the statements given above is/are correct?



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

Answer: (c)

Mains PYQ

Discuss the significance of decolonisation in shaping India's national identity. Evaluate whether symbolic measures contribute to substantive transformation. (GS-I/II)

PadhAI MAINS PRACTICE QUESTION

Examine the rationale behind renaming colonial-era institutions in India. To what extent do symbolic changes contribute to nation-building? (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to decolonisation efforts in India, consider the following statements:

1. Decolonisation includes removal of colonial-era names from public institutions.
2. Cantonments function as permanent military establishments.
3. Renaming initiatives automatically alter the constitutional structure of governance.

Which of the statements given above is/are correct?

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

Answer: (a)

2.1946 ROYAL NAVY REVOLT: SOLIDARITY & POLARISATION

Why in the news?

- The 1946 revolt by ratings (sailors) of the Royal Indian Navy marked one of the last major uprisings against British authority before Independence.
- Beginning in Bombay (now Mumbai), it spread to multiple ports and involved thousands of naval personnel.
- The revolt reflected both cross-community solidarity among Indians and emerging political polarisation during the tumultuous pre-Partition period.

BACKGROUND / CONTEXT

- I. Took place in February 1946.
- II. Triggered by:
 - A. Poor working conditions.
 - B. Racial discrimination by British officers.
 - C. Inspired by nationalist movements.
- III. Key location:
 - A. HMIS Talwar in Bombay.
- IV. Occurred alongside:
 - A. INA trials.
 - B. Growing communal tensions before Partition.

KEY HIGHLIGHTS

- **Immediate Cause** – Protests over food quality, discrimination, and mistreatment.
- **Mass Participation** – Over 20,000 sailors across 70+ ships and shore establishments joined.
- **Civilian Support** – Workers and students in Bombay supported the strike.
- **Nationalist Impact** – Demonstrated weakening British control over armed forces.



• **Political Divide** – Indian National Congress and Muslim League did not fully endorse the revolt.

• **Communal Unity Moment** – Sailors initially raised flags of Congress, Muslim League, and Communist Party together.

• **Aftermath** – British authorities suppressed the revolt; contributed to the urgency of British withdrawal.

PRELIMS BOOSTER BOX

Royal Indian Navy (RIN)

- Pre-Independence naval force under British rule.

HMIS Talwar

- Signal training establishment in Bombay; epicentre of revolt.

INA Trials (1945–46)

- Trials of Indian National Army officers sparked nationalist sentiments.

Cabinet Mission (1946)

- British delegation proposing constitutional framework for India.

Ratings

- Enlisted sailors below officer rank.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to the Royal Indian Navy Revolt of 1946, consider the following statements:

1. It began in Bombay.
2. It was fully supported by all major political parties in India.

Which of the statements given above is/are correct?

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

Answer: (a)

Mains PYQ

Discuss the significance of the Royal Indian Navy Revolt of 1946 in accelerating the end of British rule in India. (GS-I)

PadhAI MAINS PRACTICE QUESTION

Examine the causes and consequences of the 1946 Royal Indian Navy Revolt. How did it reflect both solidarity and political polarisation in late colonial India?(150 words)

PadhAI-GENERATED UPSC MCQ

With reference to the Royal Indian Navy Revolt (1946), consider the following statements:

1. It was triggered partly by racial discrimination and poor service conditions.
2. It demonstrated complete unity among all political parties in India.
3. It contributed to British reassessment of their hold over India.

Which of the statements given above is/are correct?

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

Answer: (a)



3. INSCRIPTIONS IN TAMIL BRAHMI FOUND IN EGYPT

Why in the news?

- Fragments bearing Tamil-Brahmi script have reportedly been discovered at ancient Egyptian port sites, reinforcing the historical narrative of Indo-Roman trade.
- The inscriptions suggest the presence of Tamil merchants engaged in transoceanic commerce, particularly during the Sangam Age.

BACKGROUND / CONTEXT

- I. Tamil-Brahmi:
 - A. Early script used to write Old Tamil.
 - B. Dated roughly between 3rd century BCE – 3rd century CE.
- II. Key trade hubs:
 - A. Berenike (Red Sea coast).
- III. Sangam-era ports in India:
 - A. Muziris.
 - B. Korkai.
- IV. Textual reference:
 - A. Periplus of the Erythraean Sea mentions trade with Indian ports.

KEY HIGHLIGHTS

- **Script Identification** – Tamil-Brahmi characters etched on pottery or trade objects.
- **Maritime Trade Evidence** – Supports strong Indo-Roman commercial exchanges.
- **Sangam Age Link** – Reflects flourishing trade during early historic Tamil kingdoms.
- **Commodity Exchange** – Pepper, pearls, ivory exported; gold and wine imported.

• **Cultural Contact** – Indicates movement of merchants and cultural interaction.

• **Indian Ocean Network** – Demonstrates early globalisation via monsoon-based navigation.

PRELIMS BOOSTER BOX

Tamil-Brahmi Script

- Adaptation of Brahmi to write Tamil language.

Sangam Age

- Early historic period in South India (approx. 300 BCE–300 CE).

Monsoon Winds

- Seasonal wind patterns enabling maritime trade across the Indian Ocean.

Indo-Roman Trade

- Flourished during early centuries CE under the Roman Empire.

Archaeological Evidence

- Amphorae, Roman coins, pottery fragments found in Tamil Nadu.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to ancient trade in India, consider the following statements:

1. The Periplus of the Erythraean Sea provides details about Indian Ocean trade.
2. Muziris was an important port during the Sangam Age.



Which of the statements given above is/are correct?

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

Answer: (c)

Mains PYQ

Discuss the significance of archaeological and literary evidence in reconstructing India's ancient maritime trade networks. (GS-I)

PadhAI MAINS PRACTICE QUESTION

Examine how recent discoveries of Tamil-Brahmi inscriptions in Egypt strengthen our understanding of ancient Indo-Mediterranean trade relations. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to Tamil-Brahmi inscriptions, consider the following statements:

1. Tamil-Brahmi was used to write the early Tamil language.
2. Discoveries in Egypt suggest maritime trade between South India and the Roman world.
3. Sangam literature contains references to overseas trade.

Which of the statements given above is/are correct?

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

Answer: (d)

4. REDISCOVERING BAMBOO'S ANCIENT VIRTUES

Why in the news?

- Bamboo, traditionally used in housing, crafts, and agriculture, is being re-evaluated as a sustainable alternative to timber, steel, and plastic.
- With rapid growth rates and high carbon sequestration capacity, bamboo supports climate mitigation, rural employment, and circular economy practices.

BACKGROUND / CONTEXT

- I. India is the second-largest bamboo-producing country after China.
- II. Major bamboo-rich states:
 - A. Northeast India
 - B. Madhya Pradesh
 - C. Chhattisgarh
- III. Policy support:
 - A. National Bamboo Mission
 - B. Amendment to Indian Forest Act (2017) removing bamboo grown outside forests from tree definition.

KEY HIGHLIGHTS

- **Fast Growth** – One of the fastest-growing plants; matures within 3–5 years.
- **Carbon Sink Potential** – Absorbs significant CO₂, aiding climate mitigation.
- **Rural Livelihoods** – Supports artisans, farmers, and tribal communities.
- **Eco-Friendly Alternative** – Substitute for plastic, timber, and steel.



- **Soil Conservation** – Prevents erosion and restores degraded land.
- **Export Potential** – Growing global demand for bamboo products.
- **Bioeconomy Role** – Used in biofuels, textiles, and construction materials.

PRELIMS BOOSTER BOX

Bamboo

- Botanically a grass, not a tree.

National Bamboo Mission

- Launched to promote holistic development of the bamboo sector.

Carbon Sequestration

- Process of capturing and storing atmospheric CO₂.

Agroforestry

- Integration of trees and crops on the same land.

Sustainable Development Goals (SDGs)

- Bamboo aligns with SDG 13 (Climate Action) and SDG 15 (Life on Land).

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to bamboo in India, consider the following statements:

1. Bamboo is classified botanically as a grass.
2. Bamboo grown outside forests was removed from the definition of tree under an amendment to the Indian Forest Act.

Which of the statements given above is/are correct?

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

Answer: (c)

Mains PYQ

Discuss the role of bamboo in promoting sustainable development and rural livelihoods in India. (GS-III)

PadhAI MAINS PRACTICE QUESTION

Examine the ecological and economic significance of bamboo in India's transition toward a green economy. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to bamboo, consider the following statements:

1. Bamboo has high carbon sequestration potential.
2. It matures faster than most timber species.
3. Bamboo cultivation has no relevance to rural livelihoods.

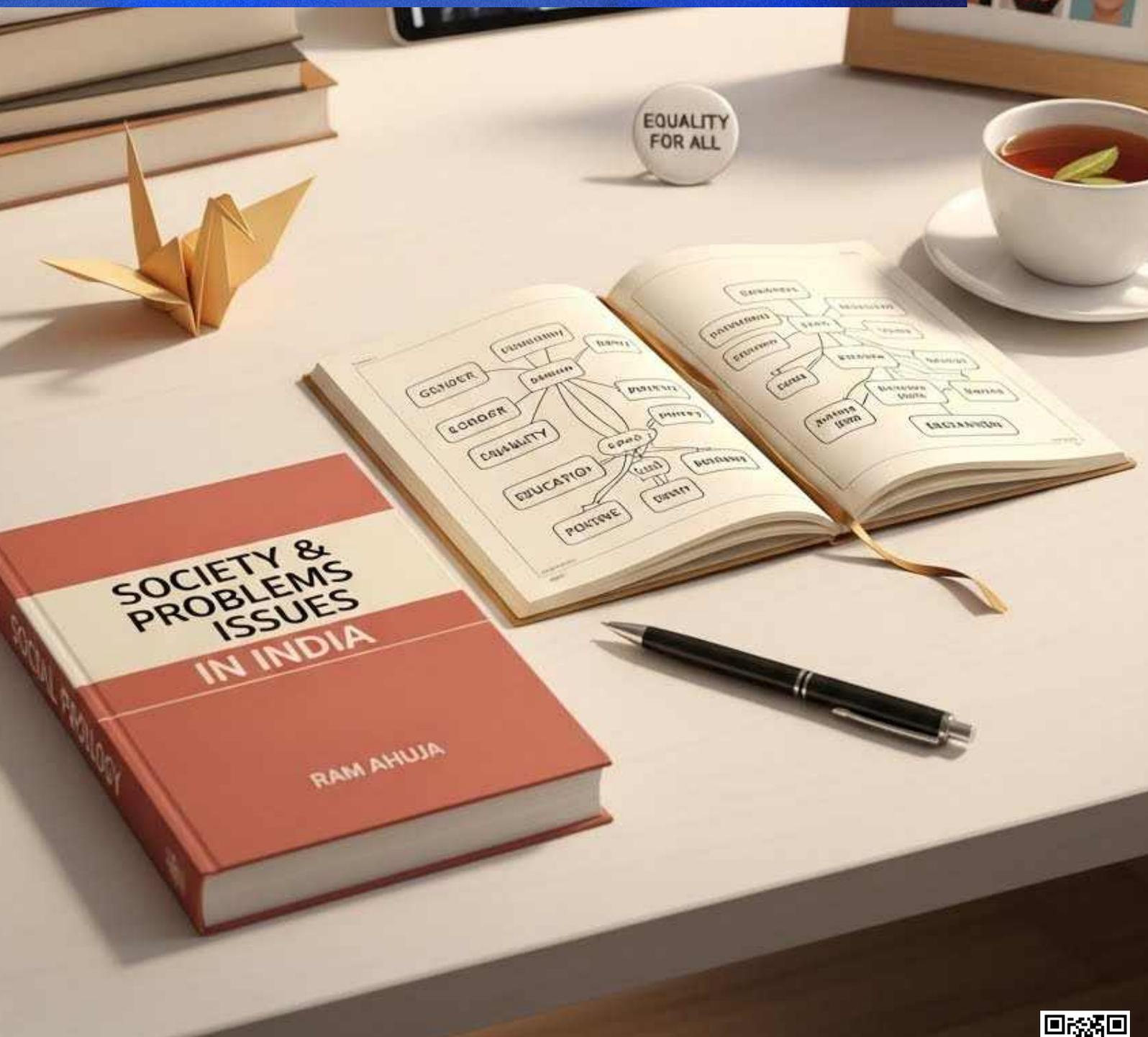
Which of the statements given above is/are correct?

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

Answer: (a)



SOCIETY & SOCIAL ISSUE



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I. PRIYA: B12 INTAKE BOOSTS BABY HEALTH

Why in the news?

- The PRIYA study demonstrated that improving Vitamin B12 levels among adolescent girls – even before pregnancy – leads to better fetal growth and cognitive outcomes in babies.
- The findings strengthen the case for nutrition-focused public health interventions targeting adolescents, especially in regions with widespread micronutrient deficiencies.

BACKGROUND / CONTEXT

- I. PRIYA trial was conducted by researchers from King Edward Memorial Hospital Research Centre in collaboration with Indian and international institutions.
- II. India has a high prevalence of **Vitamin B12 deficiency**, particularly among vegetarian populations.
- III. B12 is essential for:
 - A. DNA synthesis
 - B. Red blood cell formation
 - C. Neurological development
- IV. The study focused on supplementation in adolescent girls before conception.

KEY HIGHLIGHTS

- **Preconception Nutrition Matters** – Health interventions before pregnancy yield long-term intergenerational benefits.
- **Improved Birth Outcomes** – Higher B12 intake linked to healthier birth weight and reduced metabolic risks.

- **Neurodevelopment Gains** – Better cognitive development markers observed in infants.

- **Public Health Implication** – Strengthens argument for integrating B12 supplementation in national programmes.

- **Adolescent Focus** – Aligns with lifecycle approach in maternal and child health policy.

PRELIMS BOOSTER BOX

Vitamin B12 (Cobalamin)

- Water-soluble vitamin.
- Found mainly in animal-based foods.
- Deficiency causes megaloblastic anaemia and neurological disorders.

National Linkages

- POSHAN Abhiyaan.
- Anaemia Mukt Bharat.
- Weekly Iron and Folic Acid Supplementation (WIFS) Programme.

Lifecycle Approach

- Focus on adolescent health to break intergenerational malnutrition cycle.

SDG Linkage

- SDG 2 (Zero Hunger).
- SDG 3 (Good Health and Well-being).

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

Which of the following nutrients is essential for the formation of red blood cells and prevention of megaloblastic anaemia?



- (a) Vitamin C
- (b) Vitamin D
- (c) Vitamin B12
- (d) Vitamin K

Answer: (c)

Mains PYQ

“Discuss the importance of maternal nutrition in improving child health outcomes in India.” (GS-II)

PadhAI MAINS PRACTICE QUESTION

Examine the significance of preconception nutrition interventions in addressing intergenerational malnutrition in India. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to Vitamin B12, consider the following statements:

1. Vitamin B12 deficiency can lead to neurological disorders.
2. It is abundantly found in plant-based foods.
3. It plays a role in DNA synthesis.

Which of the statements given above is/are correct?

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

Answer: (a)

2.THOUSANDS RALLY FOR MANIPUR'S INTEGRITY

Why in the news?

- Public demonstrations were organised to oppose any move perceived as threatening Manipur’s territorial unity.
- The rallies reflect continuing tensions between ethnic communities, concerns over administrative restructuring, and the demand for peace and constitutional safeguards.

BACKGROUND / CONTEXT

- I. Manipur is a strategically located northeastern State bordering Myanmar.
- II. The State comprises:
 - A. **Imphal Valley** (largely inhabited by Meitei community)
 - B. **Hill districts** (inhabited mainly by tribal groups such as Kuki-Zomi and Naga communities)
- III. Ethnic clashes since 2023 have led to violence, displacement, and law-and-order challenges.
- IV. Demands for separate administrative arrangements or autonomy have triggered concerns about territorial fragmentation.

KEY HIGHLIGHTS

- **Territorial Integrity Demand** – Protesters emphasised unity of hill and valley regions.
- **Ethnic Tensions** – Conflict between Meitei and tribal communities over land, reservation, and political rights.



• **Constitutional Safeguards** – Issues linked to Scheduled Tribe status, land protections, and Sixth Schedule demands.

• **Strategic Location** – Border with Myanmar adds a security dimension.

• **Governance Challenges** – Need for reconciliation, rehabilitation, and institutional trust-building.

• **Centre–State Role** – Involvement of Union Government in restoring peace and stability.

PRELIMS BOOSTER BOX

Article 371C

- Special provision for Manipur.
- Provides for the Hill Areas Committee in the State Assembly.

Sixth Schedule

- Autonomous District Councils in certain northeastern States.
- Currently applies to Assam, Meghalaya, Tripura, Mizoram (not Manipur).

Inner Line Permit (ILP)

- Restricts entry of outsiders.
- Applicable in Manipur.

Geostrategic Importance

- Gateway to Southeast Asia (Act East Policy).
- Proximity to India–Myanmar border.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to the Sixth Schedule of the Constitution, consider the following statements:

1. It provides for Autonomous District Councils.
2. It applies to all northeastern States.

Which of the statements given above is/are correct?

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

Answer: (a)

Mains PYQ

“Discuss the challenges of ethnic conflicts in Northeast India and suggest measures for sustainable peace.” (GS-II)

PadhAI MAINS PRACTICE QUESTION

Examine the constitutional, political, and socio-ethnic dimensions of the ongoing tensions in Manipur. Suggest measures to ensure territorial integrity and lasting peace. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to Manipur, consider the following statements:

1. Article 371C provides special constitutional provisions for Manipur.
2. The Sixth Schedule currently applies to Manipur.
3. Manipur shares an international border with Myanmar.



Which of the statements given above is/are correct?

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

Answer: (a)

3. INDIAN SCIENTISTS CREATE AMR SEWAGE TEST

Why in the news?

- Scientists have created a wastewater surveillance system to track antimicrobial resistance genes in sewage.
- This approach allows public health authorities to assess the spread of resistant bacteria without relying solely on hospital-based data.
- The innovation strengthens India's fight against AMR, a growing global health threat.

BACKGROUND / CONTEXT

- I. AMR occurs when microorganisms (bacteria, viruses, fungi, parasites) evolve resistance to antimicrobial drugs.
- II. India bears a high burden of drug-resistant infections.
- III. Wastewater-based epidemiology (WBE) gained prominence during COVID-19 for tracking SARS-CoV-2.
- IV. The new method adapts similar principles to detect antibiotic resistance genes in community sewage.

KEY HIGHLIGHTS

- **Community-Level Surveillance** – Captures data beyond hospital settings, including asymptomatic carriers.
- **Early Warning System** – Detects resistance patterns before widespread outbreaks.
- **Cost-Effective Monitoring** – Reduces dependence on individual diagnostic testing.
- **Policy Utility** – Assists in targeted antibiotic stewardship interventions.
- **One Health Approach** – Integrates human, animal, and environmental health perspectives.
- **Supports National Action Plan on AMR** – Strengthens surveillance pillar.

PRELIMS BOOSTER BOX

Antimicrobial Resistance (AMR)

- Caused by misuse/overuse of antibiotics.
- Leads to treatment failure and higher mortality.

National Action Plan on AMR (2017–2025)

- Surveillance.
- Infection prevention.
- Optimising antimicrobial use.

One Health Concept

- Recognises interconnection between people, animals, plants, and environment.

Global Context

- WHO lists AMR among top 10 global public health threats.
- World Antimicrobial Awareness Week (November).



PadhAI PYQ BOOSTER

SECTION

Prelims PYQ

Which of the following practices contribute to antimicrobial resistance?

1. Overuse of antibiotics in humans
2. Use of antibiotics in livestock
3. Incomplete course of antibiotic treatment

Select the correct answer using the code below:

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

Answer: (d)

Mains PYQ

“Antimicrobial resistance is emerging as a major public health crisis.” Discuss the causes and suggest strategies to tackle it. (GS-III)

PadhAI MAINS PRACTICE QUESTION

Explain how wastewater-based epidemiology can strengthen India’s response to antimicrobial resistance. Discuss its advantages and limitations. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to antimicrobial resistance (AMR), consider the following statements:

1. AMR occurs when microorganisms evolve resistance to antimicrobial drugs.
2. Wastewater surveillance can help detect resistance genes at the community level.
3. AMR affects only human health and has no environmental dimension.

Which of the statements given above is/are correct?

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

Answer: (a)

4. 4 IN 10 CANCER CASES AMONG INDIANS ARE PREVENTABLE: STUDY

Why in the news?

- The study underscores that a significant proportion of cancers in India are linked to preventable causes such as tobacco use, alcohol consumption, infections, unhealthy diet, obesity, and environmental pollution.
- Strengthening awareness, early screening, vaccination, and lifestyle interventions can substantially reduce cancer burden.

BACKGROUND / CONTEXT

- I. Cancer is a leading cause of mortality globally and in India.
- II. Common cancers in India include:
 - A. Oral cancer (strongly linked to tobacco chewing)
 - B. Lung cancer
 - C. Breast cancer



- D. Cervical cancer
- III. Preventable risk factors:
 - A. Tobacco (smoking & smokeless)
 - B. Alcohol
 - C. Obesity and sedentary lifestyle
 - D. Human Papillomavirus (HPV) infection
 - E. Air pollution
- IV. India's cancer control efforts are integrated under the National Health Mission.

Cardiovascular Diseases and Stroke (NPCDCS)

HPV Vaccine

- Prevents cervical cancer.
- Included in India's Universal Immunisation Programme (recent rollout).

WHO Target

- Elimination of cervical cancer as a public health problem.

KEY HIGHLIGHTS

- **High Preventability** – 4 in 10 cancers linked to modifiable lifestyle and environmental factors.
- **Tobacco Major Contributor** – Largest single preventable cause of cancer in India.
- **Infection-Linked Cancers** – HPV (cervical cancer) and Hepatitis B (liver cancer).
- **Screening Importance** – Early detection improves survival rates.
- **Policy Relevance** – Supports stronger tobacco control laws and vaccination drives.
- **Economic Burden** – Rising healthcare expenditure due to late-stage diagnosis.

PRELIMS BOOSTER BOX

Key Risk Factors

- Tobacco (smoked & smokeless)
- Alcohol
- High BMI
- Viral infections (HPV, Hepatitis B)

National Programme

- National Programme for Prevention and Control of Cancer, Diabetes,

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

Which of the following cancers is primarily associated with Human Papillomavirus (HPV) infection?

- (a) Lung cancer
- (b) Cervical cancer
- (c) Liver cancer
- (d) Prostate cancer

Answer: (b)

Mains PYQ

“Non-communicable diseases are emerging as a major public health challenge in India.” Discuss with special reference to cancer prevention strategies. (GS-II)

PadhAI MAINS PRACTICE QUESTION

Examine the major preventable risk factors contributing to cancer burden in India.



Suggest policy measures to reduce incidence and mortality. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to cancer prevention in India, consider the following statements:

1. Tobacco use is a major preventable cause of cancer.
2. HPV vaccination can reduce the risk of cervical cancer.
3. All types of cancer are genetically determined and cannot be prevented.

Which of the statements given above is/are correct?

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

Answer: (a)

5. NDMA'S FIRST-EVER GUIDELINES FOR IDENTIFICATION OF DISASTER VICTIMS

Why in the news?

- The new guidelines aim to institutionalise scientific, transparent, and legally sound processes for identifying victims in disasters.
- They emphasise forensic methods, inter-agency coordination, dignity of the deceased, and support for families.
- The move strengthens India's disaster response framework under the Disaster Management Act, 2005.

BACKGROUND / CONTEXT

- I. NDMA was established under the Disaster Management Act, 2005.
- II. Mass fatality incidents in India (earthquakes, floods, air crashes, industrial accidents) have exposed gaps in victim identification protocols.
- III. Globally, Interpol's Disaster Victim Identification standards guide forensic identification practices.
- IV. Proper identification is essential for:
 - A. Legal documentation
 - B. Insurance claims
 - C. Succession rights
 - D. Emotional closure for families

KEY HIGHLIGHTS

- **Scientific Identification Methods** – DNA profiling, dental records, fingerprints, and medical records.
- **Standard Operating Procedures (SOPs)** – Uniform documentation and chain-of-custody protocols.
- **Inter-Agency Coordination** – Police, forensic experts, hospitals, local authorities.
- **Dignity & Human Rights** – Respectful handling of remains.
- **Family Assistance** – Communication mechanisms and psychosocial support.
- **Capacity Building** – Training and infrastructure development for forensic preparedness.

PRELIMS BOOSTER BOX

NDMA

- Apex statutory body for disaster management.
- Chaired by the Prime Minister.



Disaster Management Act, 2005

- Provides institutional framework at national, state, district levels.
- Mandates National & State Disaster Management Authorities.

Forensic Tools in DVI

- DNA profiling.
- Dental examination (Odontology).
- Fingerprint analysis.

Constitutional Link

- Article 21 – Right to dignity extends even after death (judicial interpretation).

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to the Disaster Management Act, 2005, consider the following statements:

1. The Prime Minister is the Chairperson of the National Disaster Management Authority.
2. The Act provides for the establishment of State Disaster Management Authorities.

Which of the statements given above is/are correct?

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

Answer: (c)

Mains PYQ

“Disaster management in India requires a shift from reactive relief to proactive preparedness.” Discuss in light of institutional mechanisms. (GS-III)

PadhAI MAINS PRACTICE QUESTION

Examine the significance of standardised Disaster Victim Identification (DVI) guidelines in strengthening India’s disaster management framework. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to Disaster Victim Identification (DVI), consider the following statements:

1. DNA profiling is one of the scientific methods used for victim identification.
2. NDMA functions under the Disaster Management Act, 2005.
3. Identification of disaster victims has no legal implications once compensation is provided.

Which of the statements given above is/are correct?

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

Answer: (a)

6.INFERTILITY IN INDIA: MENTAL HEALTH FOCUS

Why in the news?



- Infertility affects millions of couples in India and often carries deep social stigma, particularly for women.
- Beyond medical challenges, individuals face anxiety, depression, marital stress, and social isolation.
- Experts advocate a holistic approach that combines assisted reproductive technologies (ART) with structured psychological counselling and community awareness.

BACKGROUND / CONTEXT

- I. **WHO Definition** – Infertility is failure to achieve pregnancy after 12 months or more of regular unprotected intercourse.
- II. India faces:
 - A. Rising infertility due to lifestyle changes, delayed marriages, environmental factors.
 - B. Strong socio-cultural emphasis on parenthood.
- III. Legal-regulatory framework:
 - A. Assisted Reproductive Technology Act
 - B. Surrogacy Regulation Act

KEY HIGHLIGHTS

- **Psychological Distress** – Infertility linked with depression, anxiety, and low self-esteem.
- **Gendered Impact** – Women often face disproportionate blame and stigma.
- **Marital Strain** – Emotional stress can affect relationships and family dynamics.
- **Social Isolation** – Cultural expectations intensify pressure in Indian society.
- **Need for Integrated Care** – Combining ART with psychological counselling.

- **Policy Gap** – Limited structured mental health support in fertility clinics.

- **Public Awareness** – Importance of reducing stigma through community outreach.

PRELIMS BOOSTER BOX

Infertility

- Primary: No prior pregnancy.
- Secondary: Difficulty conceiving after previous pregnancy.

IVF (In Vitro Fertilisation)

- Fertilisation of egg outside the body, then embryo transfer.

ART (Assisted Reproductive Technology)

- Medical procedures used to address infertility.

Mental Health

- State of well-being enabling individuals to cope with life stresses.

WHO Reproductive Health

- Complete physical, mental, and social well-being in reproductive matters.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to Assisted Reproductive Technology (ART), consider the following statements:

1. ART includes procedures such as in vitro fertilisation.



2. Surrogacy is regulated in India by a specific legislation.

Which of the statements given above is/are correct?

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

Answer: (c)

Mains PYQ

Discuss the importance of integrating mental healthcare into primary healthcare services in India. (GS-II)

PadhAI MAINS PRACTICE QUESTION

Examine the psychological and social dimensions of infertility in India. Suggest measures to integrate mental health support within reproductive healthcare systems. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to infertility in India, consider the following statements:

1. Infertility can have significant psychological consequences.
2. Assisted Reproductive Technology (ART) addresses only the physical aspects of infertility.
3. Social stigma associated with infertility can intensify mental health challenges.

Which of the statements given above is/are correct?

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

Answer: (a)

7.COLOUR THEORY

Why in the news?

- Colour theory explains how colours interact, combine, and influence perception. It integrates principles from physics (light spectrum), biology (human vision), and psychology (emotional response).
- Understanding colour relationships is crucial in art, design, architecture, data visualization, and scientific imaging.

BACKGROUND / CONTEXT

- I. **Physics Basis** – Colours arise from different wavelengths of visible light ($\approx 400\text{--}700\text{ nm}$).
- II. **Biological Basis** – Human retina contains cone cells sensitive to red, green, and blue light.
- III. **Artistic Development** – Early formalization by Isaac Newton through prism experiments.
- IV. Widely applied in:
 - A. Visual arts
 - B. Digital imaging
 - C. Branding and marketing
 - D. Environmental and ecological studies

KEY HIGHLIGHTS

• Primary Colours

- Additive (Light): Red, Green, Blue (RGB).



- Subtractive (Pigment): Cyan, Magenta, Yellow (CMY).

• Secondary Colours

- Formed by mixing two primary colours.

• Colour Wheel

- Circular representation showing relationships between colours.

• Complementary Colours

- Opposite on the colour wheel; enhance contrast.

• Additive vs Subtractive Mixing

- Additive (Light): Mixing produces white.
- Subtractive (Pigments): Mixing produces darker tones.

• Psychological Effects

- Red: Energy, urgency.
- Blue: Calm, trust.
- Green: Nature, sustainability.

• Applications

- Digital screens (RGB model)
- Printing (CMYK model)
- Data visualization clarity
- Urban planning & camouflage

PRELIMS BOOSTER BOX

Visible Spectrum

- Range of electromagnetic radiation visible to the human eye (VIBGYOR).

Additive Colour Model

- Used in electronic displays; RGB combination creates white.

Subtractive Colour Model

- Used in printing; CMYK absorbs light.

Wavelength

- Distance between successive peaks of a wave.

Cone Cells

- Photoreceptor cells responsible for colour vision.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to visible light, consider the following statements:

1. Violet light has a shorter wavelength than red light.
2. Mixing all primary colours of light produces white colour.

Which of the statements given above is/are correct?

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

Answer: (c)

Mains PYQ

Discuss the scientific principles behind the visible spectrum and explain its applications in modern technology. (GS-III)

PadhAI MAINS PRACTICE QUESTION

Explain the principles of colour theory and examine its interdisciplinary applications in



science, technology, and design. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to colour theory, consider the following statements:

1. The RGB model is primarily used in digital display systems.
2. Complementary colours lie opposite each other on the colour wheel.
3. In subtractive colour mixing, combining all primary colours results in white.

Which of the statements given above is/are correct?

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

Answer: (a)

8.LINGUISTIC, CULTURAL CLUES SOLVE CASTE RIDDLE

Why in the news?

- Scholars are increasingly using linguistic patterns, cultural practices, and genetic data to study the origins and consolidation of caste hierarchies.
- Evidence suggests that language groups, migration patterns, and occupational specialization played a significant role in shaping caste identities over centuries.
- The findings challenge simplistic narratives and highlight the complex socio-historical evolution of caste in India.

BACKGROUND / CONTEXT

- I. Caste (Varna-Jati system) has deep historical roots in India.
- II. Linguistic families in India:
 - A. Indo-Aryan
 - B. Dravidian
 - C. Austroasiatic
 - D. Tibeto-Burman
- III. Early textual references:
 - A. Rigveda (mentions Varna categories).
- IV. Over time, occupational specialization and endogamy strengthened caste boundaries.

KEY HIGHLIGHTS

- **Linguistic Correlations** – Shared language roots reveal migration and social interaction patterns.
- **Endogamy Evidence** – Genetic studies indicate long-term social segregation within groups.
- **Occupational Stratification** – Profession-based identities crystallized into hereditary castes.
- **Regional Variation** – Caste structures differ across linguistic and cultural zones.
- **Fluidity to Rigidity** – Early social categories were more flexible; rigidity increased over time.
- **Interdisciplinary Method** – Combines archaeology, linguistics, anthropology, and genomics.
- **Contemporary Relevance** – Informs debates on social justice, reservation policy, and equality.

PRELIMS BOOSTER BOX



Varna System

- Four-fold classification: Brahmin, Kshatriya, Vaishya, Shudra.

Jati

- Birth-based social group; more localized and occupational.

Endogamy

- Marriage within a specific social group.

Linguistic Family

- Group of languages descended from a common ancestral language.

Anthropology

- Study of human societies and cultures.

PadhAI PYQ BOOSTER SECTION

Prelims PYQ

With reference to Indian society, consider the following statements:

1. Endogamy strengthens social group boundaries.
2. Linguistic diversity in India reflects multiple historical migration patterns.

Which of the statements given above is/are correct?

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

Answer: (c)

Mains PYQ

Discuss the historical evolution of caste in India and examine how socio-cultural factors contributed to its consolidation. (GS-I)

PadhAI MAINS PRACTICE QUESTION

How do linguistic and cultural studies contribute to understanding the historical evolution of caste in India? Discuss with suitable examples. (150 words)

PadhAI-GENERATED UPSC MCQ

With reference to caste evolution in India, consider the following statements:

1. Endogamy played a role in strengthening caste boundaries.
2. Linguistic evidence can help trace historical migration patterns.
3. The caste system has remained completely unchanged since Vedic times.

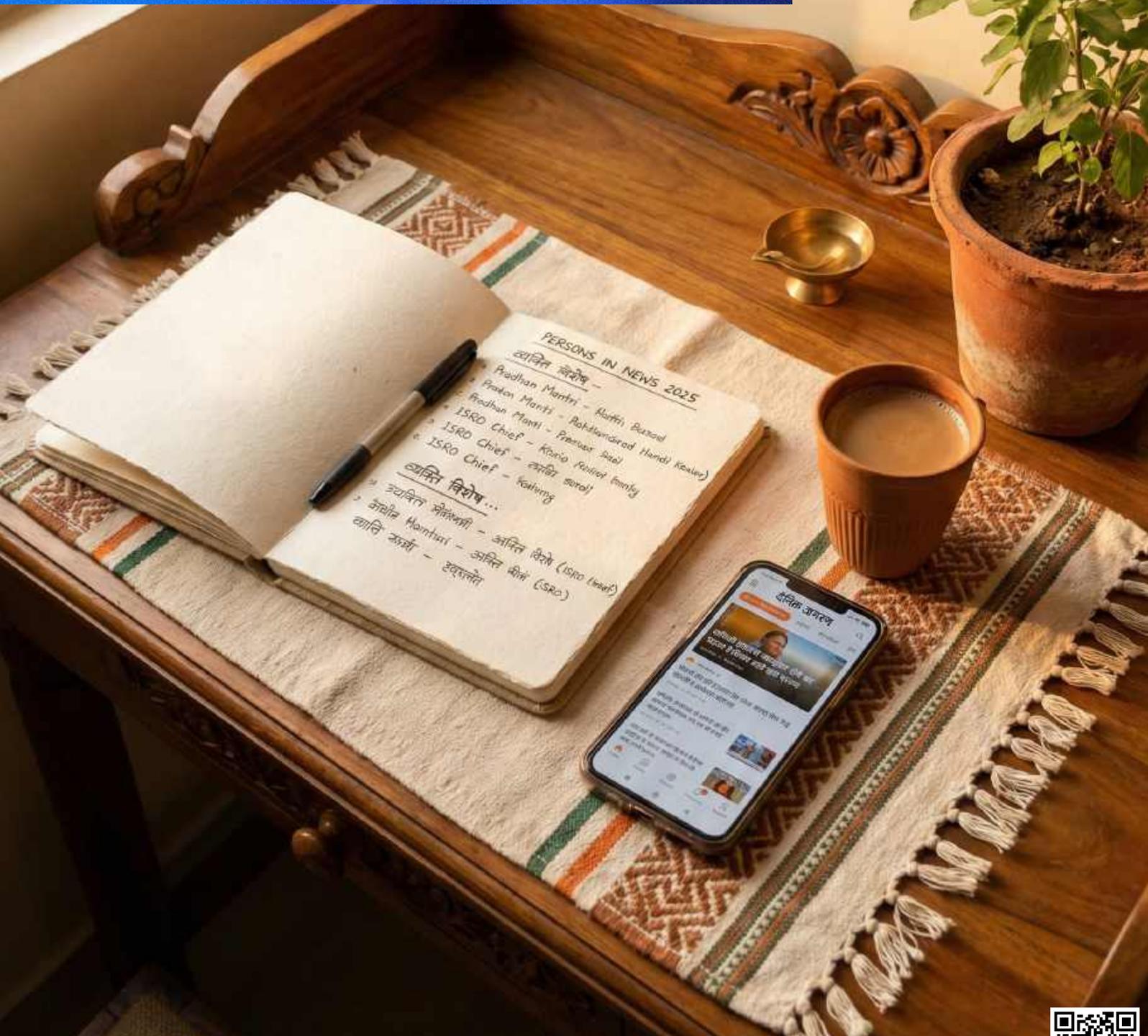
Which of the statements given above is/are correct?

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

Answer: (a)



PERSON IN NEWS



PERSONS IN NEWS 2025
व्यक्ति विशेष -
Pradhan Mantri - Narendra Modi
Pradhan Mantri - Rajkumar Ranjan
Pradhan Mantri - Prakash Singh
ISRO Chief - K. Sivan
ISRO Chief - K. Sivan
व्यक्ति विशेष...
उद्योग मंत्री - अमित शर्मा (ISRO)
केंद्रीय मंत्री - अमित शर्मा (ISRO)
व्यक्ति विशेष - अमित शर्मा



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1) Sarojini Naidu



Identification

Recent News Hook: 13 February observed as *National Women's Day* marking her birth anniversary; cited in discussions on women's political leadership.

Core Facts

1. First Indian woman President of the Indian National Congress (1925, Kanpur Session).
2. First woman Governor of an Indian state (United Provinces).
3. Active participant in Civil Disobedience & Salt Satyagraha.
4. Close associate of Gandhi and Gokhale.
5. Known as the "Nightingale of India."

6. Literary Works: *The Golden Threshold*, *The Bird of Time*.
7. Advocated women's suffrage and social reform.
8. Played diplomatic role in Round Table Conferences.

2) Chhatrapati Shivaji Maharaj



Identification

Recent News Hook: Shiv Jayanti (February observance); debates on indigenous governance & naval legacy.

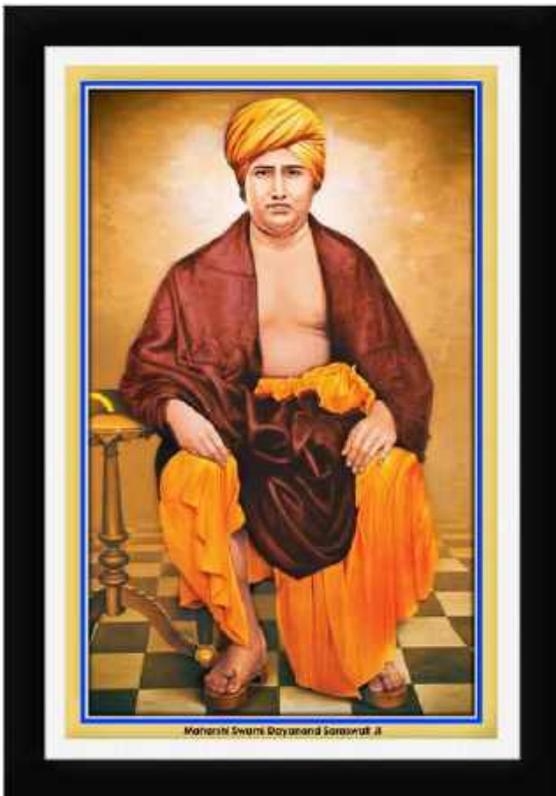
Core Facts

1. Founder of the Maratha Empire (1674 coronation at Raigad).



2. Introduced *Ashta Pradhan* council (cabinet system).
3. Built a strong naval force to counter Portuguese & Siddis.
4. Promoted guerrilla warfare (*Ganimi Kava*).
5. Fort architecture—Raigad, Pratapgad.
6. Religious tolerance policy.
7. Efficient revenue administration (*Chauth & Sardeshmukhi*).
8. Conflict with Aurangzeb.

3) Swami Dayananda Saraswati



Identification

Recent News Hook: Birth anniversary (12 February) highlighted in reform movement discussions.

Core Facts

1. Founder of Arya Samaj (1875).
2. Advocated “Back to the Vedas.”
3. Opposed idol worship & caste rigidity.
4. Promoted women’s education & widow remarriage.
5. Book: *Satyarth Prakash*.
6. Influenced nationalist thought.
7. Supported Swadeshi ideals.
8. Critiqued social superstitions.

4) Ramkrishna Paramhansa



Identification

Recent News Hook: Jayanti observed in February; cited in pluralism debates.



Core Facts

1. Mystic saint of 19th century Bengal.
2. Priest at Dakshineswar Kali Temple.
3. Emphasized unity of religions.
4. Spiritual mentor of Swami Vivekananda.
5. Advocated experiential spirituality.
6. Inspired Ramakrishna Mission.
7. Promoted interfaith harmony.
8. Rejected dogmatism.

5) Vinayak Damodar Savarkar



Identification

Recent News Hook: Death anniversary (26 February); ideological debates on nationalism.

Core Facts

1. Revolutionary nationalist; linked to India House, London.
2. Imprisoned in Cellular Jail, Andaman.
3. Authored *Hindutva: Who is a Hindu?*

4. Advocated armed resistance.
5. President of Hindu Mahasabha.
6. Mercy petitions controversy.
7. Concept of cultural nationalism.
8. Role in Abhinav Bharat Society.

6) Rajendra Prasad



Identification

Recent News Hook: Death anniversary (28 February); constitutional legacy discussions.

Core Facts

1. First President of India (1950–1962).
2. President of Constituent Assembly.
3. Close associate of Mahatma Gandhi.
4. Participated in Champaran Satyagraha.
5. Awarded Bharat Ratna (1962).
6. Lawyer by profession.
7. Advocated agrarian reforms.
8. Known for constitutional propriety.



7) Morarji Desai



Identification

Recent News Hook: Birth anniversary (29 February); Emergency-era reflections.

Core Facts

1. 4th Prime Minister of India (1977–79).
2. First non-Congress PM.
3. Leader of Janata Party coalition.
4. Opposed Emergency (1975–77).
5. Strengthened civil liberties post-Emergency.
6. Bharat Ratna awardee.
7. Known for personal austerity.
8. Advocated administrative integrity.

8) Subhas Chandra Bose



Identification

Recent News Hook: INA archives & declassification debates.

Core Facts

1. President of INC (1938–39).
2. Founded Forward Bloc.
3. Led Indian National Army (Azad Hind Fauj).
4. Provisional Government of Free India (1943).
5. Slogan: "Give me blood, I will give you freedom."
6. Alliances with Axis powers.
7. Differences with Gandhi on strategy.
8. Militarized nationalism approach.



9) C V Raman



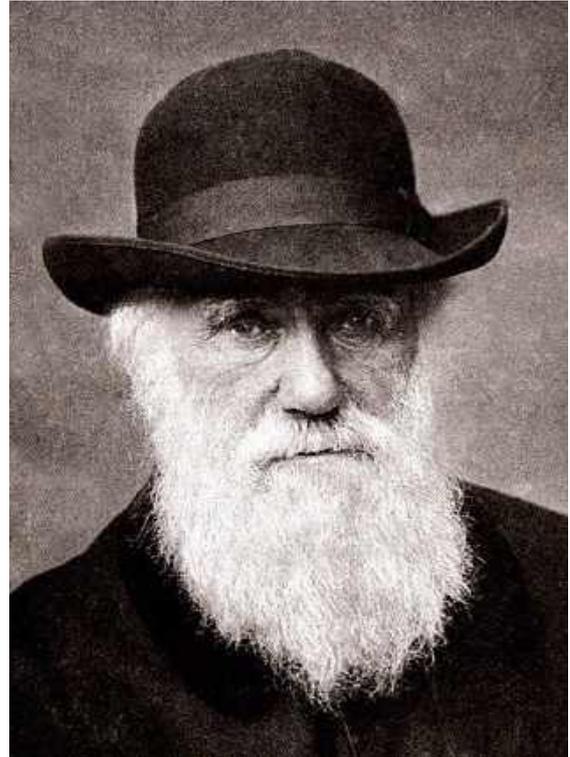
Identification

Recent News Hook: 28 February – National Science Day (Raman Effect).

Core Facts

1. Discovered Raman Effect (1928).
2. Nobel Prize in Physics (1930).
3. Founded Raman Research Institute.
4. First Asian Nobel laureate in sciences.
5. Worked on light scattering.
6. Knighted by British Crown.
7. Promoted indigenous scientific research.
8. Emphasized scientific temperament.

10) Charles Darwin



Identification

Recent News Hook: Darwin Day (12 February).

Core Facts

1. Theory of Evolution by Natural Selection.
2. Book: *On the Origin of Species* (1859).
3. Voyage on HMS Beagle.
4. Concept of survival of the fittest.
5. Influenced modern biology.
6. Galápagos finches study.
7. Challenged theological orthodoxy.
8. Foundation of evolutionary genetics.



PLACES IN NEWS



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Shahpur Kandi Barrage

Locational Context (Prelims Mapping Focus)

- Location: Pathankot district, Punjab
- Constructed on the Ravi River
- Near the Punjab–Jammu & Kashmir border
- Part of the Indus River system
- Important: Ravi is one of the eastern rivers under the Indus Waters Treaty.

Chunar Fort

1. Locational Context (Prelims Mapping Focus)

- Location: Mirzapur district, Uttar Pradesh
 - Situated on the banks of the Ganges River
 - Overlooks the river from a rocky outcrop in the Vindhyan range
 - Close to Varanasi
- Strategically located to control riverine trade routes of the Ganga.

Farakka Barrage

1. Locational Context (Prelims Mapping Focus)

- Location: Murshidabad district, West Bengal
 - Constructed across the Ganga River
 - Very close to the India–Bangladesh border
 - Diverts water into the Hooghly River
- Important: Bangladesh stretch of the Ganga is known as the Padma River.

Jagannath Temple (Puri, Odisha)

1. Locational Context (Prelims Mapping Focus)

- Location: Puri district, Odisha
 - Situated on the eastern coast along the Bay of Bengal
 - Part of the sacred Char Dham pilgrimage circuit
 - Lies in the coastal plains of eastern India
- Puri is one of the four major Hindu pilgrimage sites (others: Badrinath, Dwarka, Rameswaram).

Kondaveedu Fort (Andhra Pradesh)

1. Locational Context (Prelims Mapping Focus)

- Location: Guntur district, Andhra Pradesh
 - Situated on a hill range in the Eastern Ghats region
 - Near the city of Guntur
 - Overlooks fertile Krishna River plains
- Lies in coastal Andhra but slightly inland from the Bay of Bengal.

Papikonda National Park

1. Locational Context (Prelims Mapping Focus)

- State: Andhra Pradesh
 - Districts: Alluri Sitharama Raju & Eluru region (earlier parts of East/West Godavari)
 - Located along the Godavari River
 - Situated in the Eastern Ghats hill range
- Important: The Godavari flows through the park in a scenic gorge-like stretch known as the Papikonda hills.



Shipki La Pass (Himachal Pradesh)

1. Locational Context (Prelims Mapping Focus)

- Location: Kinnaur district, Himachal Pradesh
 - Situated on the India–China border
 - Connects India with the Tibet Autonomous Region of China
 - Close to the course of the Suttlej River
- Important: The Suttlej enters India near Shipki La after flowing from Tibet (near Lake

Tehri Lake (Uttarakhand)

1. Locational Context (Prelims Mapping Focus)

- Location: Tehri Garhwal district, Uttarakhand
 - Formed by construction of Tehri Dam
 - Built across the Bhagirathi River
 - Lies in the Himalayan region
- The Bhagirathi later joins the Alaknanda at Devprayag to form the Ganga.

Patna Bird Sanctuary (Uttar Pradesh)

1. Locational Context (Prelims Mapping Focus)

- Location: Etah district, Uttar Pradesh
 - Also known as: Sarsai Nawar Jheel
 - Situated in the central Gangetic plains
 - Near towns: Etah & Aliganj
 - Falls within the Yamuna–Ganga Doab region
- Important: Do not confuse Patna (Bihar). This sanctuary is in western Uttar Pradesh.

Chari-Dhand Wetland (Gujarat)

1. Locational Context (Prelims Mapping Focus)

- Location: Kutch district, Gujarat
 - Lies in the Banni grasslands region
 - North of the Rann of Kutch
 - Close to India–Pakistan border
 - Situated in an arid to semi-arid zone of western India
- Important: It is a seasonal wetland formed mainly during monsoon.

Hooghly River (West Bengal)

1. Locational Context (Prelims Mapping Focus)

- State: West Bengal
- It is a distributary of the Ganga River
- Originates near Farakka Barrage
- Flows southward and drains into the Bay of Bengal

Major Cities on Its Banks:

- Murshidabad
- Kolkata
- Howrah

Important: It is not an independent river; it branches off from the Ganga.



Al-Jawf Region

1. Locational Context (Prelims Mapping Focus)

- I. Country: Saudi Arabia
- II. Region: Al-Jawf Province (Northern Saudi Arabia)
- III. Capital: Sakakah
- IV. Borders:

A. North: Jordan

B. West: Tabuk region

V. Lies in the northern part of the Arabian Peninsula

Located within the broader Arabian Desert zone.

Kilauea Volcano

1. Locational Context (Prelims Mapping Focus)

- Located in the United States
- Situated on the Big Island of Hawaii
- Part of the Hawaiian Islands chain in the central Pacific Ocean
- Lies within Hawaii Volcanoes National Park

Important: It is not on a plate boundary but over a hotspot.

Lake Tumba

1. Locational Context (Prelims Mapping Focus)

- Country: Democratic Republic of the Congo
 - Located in the western part of the country
 - Part of the Congo Basin
 - Close to the Congo River system
- The lakes lie within the Cuvette Centrale – a vast low-lying swamp forest region.

Taftan Volcano

1. Locational Context (Prelims Mapping)

- Taftan (volcano) is located in Iran, in Sistan and Baluchestan province in the southeast near the Pakistan border.
- It is part of the Makran volcanic arc, formed by subduction of the oceanic Arabian Plate beneath the Eurasian Plate.
- Elevation: ~3,940 m above sea level.



Canada

1. Locational Context (Prelims Mapping Focus)

- I. Continent: North America
 - II. Capital: Ottawa
 - III. Shares the world's longest international land border with the United States
 - IV. Bounded by:
 - A. Arctic Ocean (North)
 - B. Atlantic Ocean (East)
 - C. Pacific Ocean (West)
 - V. Key Geographical Features:
 - A. Great Lakes (shared with US)
 - B. Rocky Mountains (West)
 - C. Extensive Arctic coastline
- Mapping Tip: Canada stretches from the Atlantic to the Pacific and deep into the Arctic Circle.

Hudson River (United States)

1. Locational Context (Prelims Mapping Focus)

- I. Country: United States
 - II. State: New York
 - III. Origin: Adirondack Mountains (northeastern New York)
 - IV. Flows southward into the Atlantic Ocean
 - V. Forms boundary between:
 - A. New York City (Manhattan)
 - B. New Jersey (in lower stretch)
- Drains into New York Harbor near the **Statue of Liberty**.

Greece

1. Locational Context (Prelims Mapping Focus)

- I. Country: Greece
 - II. Region: Southeastern Europe (Balkan Peninsula)
 - III. Capital: Athens
 - IV. Bounded by:
 - A. Albania (NW)
 - B. North Macedonia (N)
 - C. Bulgaria (NE)
 - D. Turkey (E)
 - V. Surrounded by:
 - A. Aegean Sea (East)
 - B. Ionian Sea (West)
 - C. Mediterranean Sea (South)
- Important: Has thousands of islands, many in the Aegean Sea close to Turkey..

Fuego Volcano (Guatemala)

1. Locational Context (Prelims Mapping)

- Official Name: Volcán de Fuego
 - Located in: Guatemala
 - Continent: Central America
 - Coordinates: ~14.47°N, 90.88°W
 - Lies near: Colonial city of Antigua Guatemala
 - Part of: Central American Volcanic Arc
 - Near: Pacific Coast (west of the capital, Guatemala City)
- Neighbouring Countries of Guatemala:
 - Mexico (North & West)
 - Belize (Northeast)
 - Honduras & El Salvador (Southeast)
- Mapping Angle: It is on the Pacific "Ring of Fire" belt

Valley of the Kings (Egypt)

1. Locational Context (Prelims Mapping Focus)

- Country: Egypt
 - Located on the west bank of the Nile River
 - Near the city of Luxor
 - Lies in Upper Egypt (southern Egypt)
- Important: West bank of Nile was traditionally associated with the "land of the dead" in ancient Egyptian belief.

1. Locational Context (Prelims Mapping Focus)

- Located on the west bank of the Nile River
 - Near the city of Luxor
 - Lies in Upper Egypt (southern Egypt)
- Important: West bank of Nile was traditionally associated with the "land of the dead" in ancient Egyptian belief.

East China Sea

1. Locational Context (Prelims Mapping Focus)

- I. Part of the Western Pacific Ocean
 - II. Bounded by:
 - A. China (West)
 - B. Japan (East)
 - C. South Korea (North)
 - D. Taiwan (South)
 - III. Connected to:
 - A. Yellow Sea (via Korea Strait)
 - B. South China Sea (via Taiwan Strait)
 - C. Pacific Ocean (via Ryukyu Islands chain)
 - D. Major river draining into it: Yangtze River
- Mapping Tip: Lies between the Chinese mainland and Japan's Ryukyu island chain.



Mohawk River (United States)

1. Locational Context (Prelims Mapping Focus)
 - Country: United States
 - State: New York
 - It is the largest tributary of the Hudson River
 - Flows eastward and joins the Hudson River near Albany
- Important: It forms a natural east-west corridor across New York State.

Ionian Sea

- Ionian Sea
1. Locational Context
 - I. Part of the Mediterranean Sea
 - II. Lies west of Greece and south of Italy
 - III. Bounded by:
 - A. Greece (East)
 - B. Italy (West)
 - C. Albania (North)
- Connected to the Adriatic Sea via the Strait of Otranto.

Aegean Sea

- Aegean Sea
1. Locational Context
 - Also part of the Mediterranean Sea
 - Lies between Greece (west) and Turkey (east)
 - Connected to:
 - Black Sea (via Dardanelles-Bosporus straits system)
 - Mediterranean (to the south)
- Contains hundreds of islands, many close to Turkey's coast

Lakes Mai Ndombe & Tumba

1. Locational Context (Prelims Mapping Focus)
 - Country: Democratic Republic of the Congo
 - Located in the western part of the country
 - Part of the Congo Basin
 - Close to the Congo River system
- The lakes lie within the Cuvette Centrale — a vast low-lying swamp forest region.

Lake Victoria

1. Locational Context (Prelims Mapping Focus)
 - I. Continent: Africa
 - II. Shared by three countries:
 - A. Tanzania
 - B. Uganda
 - C. Kenya
 - III. Located in East Africa
 - IV. Part of the African Great Lakes region
 - V. Near the Equator
- Important: It is the source of the White Nile, which later joins the Blue Nile in Sudan.

Strait of Hormuz

1. Locational Context (Prelims Mapping Focus)
 - I. Narrow strait connecting:
 - A. Persian Gulf
 - B. Gulf of Oman
 - II. Bordered by:
 - A. Iran (North)
 - B. Oman (South; Musandam Peninsula)
 - III. It ultimately connects to the Arabian Sea and Indian Ocean.
- Width: ~33 km at its narrowest point (shipping lane even narrower).

