

Solutions

DATE : (27th Oct – 2nd Nov)

1) Correct Answer: (b) Ministry of Environment, Forests and Climate Change

Explanation

1. Institutional Framework

- The **National Biodiversity Authority (NBA)** is a **statutory, autonomous body** functioning under the **Ministry of Environment, Forests and Climate Change (MoEFCC)**.
- It was established in **2003** under the **Biological Diversity Act, 2002**, emphasizing India's commitment to **biodiversity conservation, sustainable utilization, and equitable benefit sharing**.

2. Functional Mandate

- **Regulatory Role:** Approves the use of Indian biological resources by foreign entities and ensures **fair benefit sharing**.
- **Advisory Role:** Guides Central and State Governments on biodiversity management policies.
- **Collaborative Framework:** Works with **State Biodiversity Boards (SBBs)** and **Biodiversity Management Committees (BMCs)** to promote **decentralized governance**.
- **International Alignment:** Ensures India's compliance with the **Convention on Biological Diversity (CBD)** and **Nagoya Protocol**.

3. Option Analysis

- (a) **Ministry of Agriculture** – Not responsible for biodiversity governance.
- (b) **MoEFCC** – Correct; NBA operates under this ministry.
- (c) **Ministry of Science and Technology** – Oversees research, not biodiversity regulation.
- (d) **Ministry of Rural Development** – No jurisdiction over biological resources.

4. Current Relevance

- Supports **People's Biodiversity Registers (PBRs)** for local community participation.
- Helps implement the **Global Biodiversity Framework (2022-2030)** and **India's biodiversity targets**.

✓ Conclusion: NBA ensures **ecological sustainability and community-inclusive governance** of biological resources.

2) Correct Answer: (b) Invisible glue that holds the universe together

Explanation

1. Concept Overview

- **Dark Matter** is a **hypothetical, non-luminous form of matter** that does not emit, absorb, or reflect light.
- It exerts a **gravitational influence**, essential for understanding the **structure and dynamics of galaxies** and the **cosmic web**.

2. Characteristics

- Constitutes about **27% of the universe's mass-energy content**.
- **Interacts only via gravity**, not electromagnetic or nuclear forces.
- Detected indirectly through **galactic rotation curves, gravitational lensing, and cosmic microwave background (CMB) observations**.

3. Option Analysis

- (a) Not antimatter – antimatter annihilates ordinary matter producing gamma rays.
- (b) Correct – Acts as **gravitational glue** holding galaxies together.
- (c) Not radiation – it doesn't emit energy.

- (d) Not ionized gas – that refers to interstellar medium.

4. Contemporary Relevance

- Research ongoing at **CERN**, **Fermilab**, and via **James Webb Telescope** to identify **dark matter particles** like **WIMPs** or **axions**.

Conclusion: Dark Matter remains a **mystery of modern cosmology**, explaining **galactic cohesion** and **mass distribution** in the universe.

3) **Correct Answer:** (b) Co-developing the Hoyle–Narlikar Theory of Gravity

Explanation

1. Background

- Prof. Jayant Vishnu Narlikar, a leading Indian astrophysicist, collaborated with Sir Fred Hoyle to develop an **alternative gravitational theory** integrating **Mach's Principle**.
- The **Hoyle–Narlikar Theory of Gravity** provides a unique explanation of the **continuous creation of matter**, challenging the **Big Bang model**.

2. Key Contributions

- Integrates **Mach's Principle** with cosmology.
- Suggests **continuous creation** instead of a singular beginning.
- Provided a **new mathematical model** for cosmic evolution.

3. Option Analysis

- (a) Germ Theory – Louis Pasteur, Robert Koch.
- (b) Correct – Hoyle–Narlikar theory of gravity.
- (c) Polio Vaccine – Jonas Salk, Albert Sabin.
- (d) Electron Discovery – J.J. Thomson.

4. Recognition

- Founder of **IUCAA, Pune**.
- Recipient of **Padma Vibhushan, Vigyan Ratna**.

Conclusion: Prof. Narlikar's work represents **India's intellectual leadership** in **theoretical astrophysics** and **alternative cosmological models**.

4) **Correct Answer:** (b) Timor Leste

Explanation

1. Context

- The **Association of Southeast Asian Nations (ASEAN)** was established on **8 August 1967** by the **Bangkok Declaration**.
- The founding aim: to promote **peace, stability, and economic cooperation** in Southeast Asia.

2. Founding Members

1. **Indonesia**
2. **Malaysia**
3. **Philippines**
4. **Singapore**
5. **Thailand**

Later joined by: Brunei (1984), Vietnam (1995), Laos (1997), Myanmar (1997), Cambodia (1999). Recently, **Timor Leste** became the **11th member (2023)**.

3. Option Analysis

- (a) Indonesia – Founding member.

- (b) Timor Leste – Not an original member, joined recently.
- (c) Thailand – Founding member.
- (d) Malaysia – Founding member.

4. Contemporary Relevance

- ASEAN is central to India's Act East Policy and Indo-Pacific Vision.
- Plays key role in ASEAN Regional Forum (ARF), East Asia Summit (EAS), and RCEP.

Conclusion: Timor Leste's inclusion marks ASEAN's regional expansion and enduring importance in Asian geopolitics.

5) Correct Answer: (b) Arunachal Pradesh and Assam

Explanation

1. Project Overview

- The Subansiri Lower Hydroelectric Project (HEP) is a run-of-the-river hydropower project located on the Subansiri River, a major tributary of the Brahmaputra.
- Implemented by NHPC Limited, it lies on the Arunachal Pradesh-Assam border, near North Lakhimpur.

2. Project Features

- Designed capacity: 2000 MW, one of India's largest hydro projects.
- Objective: to enhance renewable energy generation in the Northeast region.
- Benefits: Power generation, flood moderation, and regional connectivity.

3. Option Analysis

- (a) Assam-Tripura – Incorrect geography.
- (b) Arunachal Pradesh-Assam – Correct location.
- (c) Assam-Mizoram – No such project alignment.
- (d) Arunachal Pradesh-Nagaland – Incorrect pairing.

4. Current Status

- The project is in testing and commissioning stages.
- Expected to supply power to Arunachal Pradesh, Assam, and neighboring states.

Conclusion: Subansiri Lower HEP is a strategic renewable energy initiative, symbolizing clean power development and cooperative federalism in the Northeast.

6) Correct Answer: (c) I, II and III

Explanation

1. Topic: The Western Ghats – Ecological Significance

1.1 Context and Background

- The Western Ghats stretch for about 1,600 km along India's western coast, covering six states — Gujarat, Maharashtra, Goa, Karnataka, Kerala, and Tamil Nadu.
- They are one of the eight "hottest" biodiversity hotspots globally and a UNESCO World Heritage Site.
- Their unique topography regulates the Indian monsoon system, supports major river systems (Godavari, Krishna, Kaveri, Periyar), and sustains agriculture, biodiversity, and local livelihoods.

1.2 Key Aspects

- **Policy Framework:** Recognized as a UNESCO World Heritage Site and a global biodiversity hotspot, monitored under the IUCN World Heritage Outlook program.
- **Environmental Role:** Acts as a climatic barrier, intercepting southwest monsoon winds, influencing rainfall distribution across peninsular India.

• Ecological Value:

Home to **over 300 globally threatened species**, with high levels of **endemism** (flora and fauna found nowhere else).

• Threats:

Faces degradation due to **deforestation, mining, infrastructure expansion, agricultural intensification, and climate change**.

1.3 Analysis of Statements

- **Statement (I): Correct** – The Western Ghats are a **UNESCO World Heritage Site** and one of the **world's eight hottest hotspots**, recognized for both high endemism and threats.
- **Statement (II): Correct** – They **act as a climatic barrier**, intercepting **monsoon winds** and influencing **rainfall and climate** across India.
- **Statement (III): Correct** – The **IUCN World Heritage Outlook** categorizes the Western Ghats (along with **Manas National Park** and **Sundarbans National Park**) as **sites of "Significant Concern."**

1.4 Conclusion: The **Western Ghats** are vital for **biodiversity, monsoon regulation, and ecological balance**, but their **conservation status** requires urgent attention.

✓ Hence, the correct answer is (c) — Statements I, II, and III are correct.

7) ✓ Correct Answer: (c) I and III only

Explanation**2.1 Context**

- The **MedTech sector** in India is a **rapidly growing sunrise industry**, valued at **\$14 billion** and projected to reach **\$30 billion by 2030**.
- Government programs like the **MAHA-MedTech Mission** and **Anusandhan National Research Foundation (ANRF)** aim to **boost domestic innovation, reduce imports, and strengthen medical technology ecosystems**.

2.2 Key Aspects

- **Policy Framework:** Supported by initiatives such as the **PLI Scheme, PRIP, and MAHA-MedTech Mission** for research, manufacturing, and innovation.
- **Implementation Mechanism:** Provides **milestone-linked funding**, up to **₹50 crore** in exceptional cases, to MedTech start-ups and research institutions.
- **Sectoral Context:** India is the **fourth-largest medical device market** in Asia — behind **Japan, China, and South Korea**.
- **Challenges:** High **import dependence** and **limited R&D ecosystem** constrain competitiveness.

2.3 Analysis of Statements

- **Statement (I): Correct** – The sector's valuation is projected to grow from **\$14 billion to \$30 billion by 2030**.
- **Statement (II): Incorrect** – India is **not the largest exporter** in Asia; it ranks **fourth in market size**.
- **Statement (III): Correct** – The **MAHA-MedTech Mission** provides funding up to **₹50 crore** in exceptional cases.

2.4 Conclusion: India's MedTech sector exemplifies the nation's **push for health innovation, self-reliance, and digital health infrastructure**, with strong **policy and funding support**.

✓ Hence, the correct answer is (c) — Statements I and III only.

8) ✓ Correct Answer: (c) I, II and III

Explanation**3.1 Context**

- Adopted by the **UN General Assembly in 2024**, this is the **first-ever global, legally binding treaty** addressing **cybercrime**.
- It harmonizes laws, strengthens international cooperation, and standardizes mechanisms for **investigation, prosecution, and evidence handling**.

3.2 Key Aspects

- **Policy Background:** Designed to address both **cyber-dependent crimes** (like hacking) and **cyber-enabled crimes** (like online fraud, data theft).
- **Implementation:** Comes into force **90 days after ratification by 40 UN member states**.
- **Scope:** Includes offences like **non-consensual dissemination of intimate images, identity theft**, and **online child exploitation**.
- **Broader Impact:** Promotes **digital sovereignty, data security**, and **international collaboration**.

3.3 Analysis of Statements

- **Statement (I):** Correct – It is the **first global treaty** to criminalize both cyber-dependent and cyber-enabled crimes.
- **Statement (II):** Correct – Establishes **global standards for handling electronic evidence** in all serious cyber offences.
- **Statement (III):** Correct – Recognizes **non-consensual dissemination of intimate images** as a punishable offence.

3.4 Conclusion: The **UN Convention Against Cybercrime (2024)** marks a historic milestone in **global digital governance**, ensuring **cooperation, accountability, and cyber justice**.

✓ Hence, the correct answer is (c) — Statements I, II and III.

9) ✓ Correct Answer: (c) II, III and IV only

Explanation

4.1 Context

- India is a **major global coffee producer**, renowned for its **shade-grown, eco-friendly coffee varieties**.
- Coffee cultivation supports **rural livelihoods, exports**, and **agro-biodiversity**, mainly across **southern India**.

4.2 Key Aspects

- **Policy Framework:** Supported by the **Coffee Board of India** for marketing, R&D, and export promotion.
- **Geographic Distribution:** Predominantly grown in **Karnataka (70%), Kerala, and Tamil Nadu** — notably in **Chikmagalur, Coorg, and Hassan**.
- **Production Status:** India ranks **seventh globally**, contributing around **3% of world production**.
- **Export Orientation:** **70% of India's coffee is exported**, mainly to Europe.

4.3 Analysis of Statements

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- **Statement (I):** Incorrect – India is the **7th largest**, not **2nd largest**, producer globally.
- **Statement (II):** Correct – Around **70% of India's coffee is exported**.
- **Statement (III):** Correct – Grown in **deep, fertile, slightly acidic soils**, ideal for high-quality coffee.
- **Statement (IV):** Correct – **Chikmagalur, Coorg, and Hassan (Karnataka)** are major producing regions.

4.4 Conclusion: The **Indian coffee sector** remains a pillar of **agricultural exports and livelihood security**, balancing **sustainability and economic growth**.

✓ Hence, the correct answer is (c) — Statements II, III and IV only.

10) ✓ Correct Answer: (c) I, II and IV only

Explanation

5.1 Context

- The **National Biodiversity Authority (NBA)** was established in **2003** under the **Biological Diversity Act, 2002**.
- It serves as India's apex body for **biodiversity regulation, sustainable use**, and **equitable benefit sharing**.

5.2 Key Aspects

- **Framework:** Created under the **Biological Diversity Act, 2002** (✗ not under the Environment Protection Act).
- **Functions:**
 - **Regulatory:** Approves access to biological resources for research/commercial use.
 - **Advisory:** Provides policy recommendations to the government.

- **Institutional Coordination:** Works with **State Biodiversity Boards (SBBs)** and **Biodiversity Management Committees (BMCs)** for **decentralized conservation**.
- **Location:** Headquarters in **Chennai, Tamil Nadu**.

5.3 Analysis of Statements

- **Statement (I): Correct** – NBA is headquartered in **Chennai**.
- **Statement (II): Correct** – **SBBs** and **BMCs** function under the same Act, complementing NBA's objectives.
- **Statement (III): Incorrect** – Established under the **Biological Diversity Act, 2002**, not the **Environment Protection Act**.
- **Statement (IV): Correct** – Performs **regulatory** and **advisory** functions on biological resources.

5.4 Conclusion: The NBA is vital to India's **biodiversity governance**, ensuring **decentralized conservation** and **equitable resource management**.

✓ Hence, the correct answer is (c) — Statements I, II and IV only.

11) ✓ Correct Answer: (d) Ratio of a building's total built-up area to its plot area

Explanation

1. Concept and Definition

- The **Floor Space Index (FSI)**, also called **Floor Area Ratio (FAR)**, is a key **urban planning parameter** that determines how much construction is allowed on a given plot of land.
- **Formula:**

$$\text{FSI (or FAR)} = \frac{\text{Total Built-up Area of all floors}}{\text{Total Plot Area}}$$

$$\text{FSI (or FAR)} = \frac{\text{Total Plot Area}}{\text{Total Built-up Area of all floors}}$$

2. Urban Policy Framework

- FSI/FAR is regulated by **urban local bodies (ULBs)** through **zoning regulations** and **development control rules (DCRs)**.
- It ensures a **balance between built-up density, infrastructure capacity, and environmental sustainability**.

3. Implementation Context

- **Low FSI:** Leads to **urban sprawl**, increased travel distances, and higher infrastructure costs.
- **High FSI:** Encourages **vertical development, efficient land use**, and supports **affordable housing** and **public transport-oriented growth**.

4. Contemporary Significance

- In cities like **Delhi, Mumbai, and Bengaluru**, higher FSI norms are being adopted to address **housing shortages** and promote **compact, climate-resilient cities**.
- FSI reform is central to **India's National Urban Policy Framework (NUPF)** and **Smart Cities Mission**.

5. Option Analysis

- (a) ✗ Refers to **population density**, not FSI.
- (b) ✗ Refers to **green cover ratio**.
- (c) ✗ Indicates **housing density**, not built-up area ratio.
- (d) ✓ **Correct** – FSI/FAR = Ratio of **total built-up area to plot area**.

✓ Conclusion: FSI/FAR is a critical measure for **urban density control and sustainable city planning**, directly influencing the **built environment and livability**.

12) ✓ Correct Answer: (b) Digitize and catalog India's manuscript heritage

Explanation

1. Context

- The **Gyan Bharatam Mission (2025)**, launched by the **Ministry of Culture**, focuses on **preserving India's manuscript heritage** through **digitization, cataloging, and dissemination**.
- It represents a **cultural-technological initiative** integrating **AI, blockchain, and OCR** for heritage management.

2. Key Aspects

- **Policy Framework:** Part of India's **Knowledge Heritage Preservation Program**, under the **National Mission on Manuscripts (NMM)**.
- **Institutional Collaboration:** MoUs signed with **17 institutions**, including archives, libraries, and research centers.
- **Digital Infrastructure:** Establishes a **National Digital Repository** for 1 crore manuscripts.
- **Technological Integration:** Uses **AI-based indexing** and **blockchain** for authenticity and provenance tracking.

3. Significance

- Preserves **ancient Indian knowledge systems**, literature, and philosophy.
- Enables **public and scholarly access** to digitized content.
- Strengthens India's **soft power and cultural diplomacy**.

4. Option Analysis

- (a) **✗** Not related to archaeological excavation.
- (b) **✓ Correct** – Mission's core focus is **digitization and cataloging of manuscripts**.
- (c) **✗** Not linked to space or digital health.
- (d) **✗** Not about translation of foreign texts.

✓ Conclusion: The **Gyan Bharatam Mission** symbolizes **India's digital cultural renaissance**, ensuring **knowledge preservation and accessibility** through technology.

13) **✓ Correct Answer:** (a) **Loaning or gifting giant pandas to other countries as a symbol of goodwill**

Explanation

1. Concept Overview

- **Panda Diplomacy** is a hallmark of **China's soft power diplomacy**, where **giant pandas** are loaned or gifted to other countries as **symbols of friendship** and **goodwill**.
- The practice blends **wildlife conservation** with **international relations**.

2. Policy and Historical Context

- Originated in the **1950s**, popularized during **Premier Zhou Enlai's era**.
- Pandas were gifted to allies, but since the **1980s**, they are **loaned** under long-term conservation and research agreements.
- Recipients pay **annual fees**, with proceeds funding **panda conservation** in China.

3. Global Context

- Pandas have been sent to the **U.S., Japan, U.K., and France** as part of major diplomatic milestones.
- Similar examples include **Koala Diplomacy** (Australia) and **Elephant Diplomacy** (Thailand).

4. Option Analysis

- (a) **✓ Correct** – Panda Diplomacy = gifting or loaning pandas as goodwill symbols.
- (b) **✗** Musical diplomacy not relevant.
- (c) **✗** Sending scientists abroad unrelated.
- (d) **✗** Exporting herbs not applicable.

✓ Conclusion: **Panda Diplomacy** showcases **China's soft power**—a blend of **symbolic goodwill, cultural outreach, and strategic diplomacy**.

14) **✓ Correct Answer:** (b) **II only**

Explanation

1.1 Policy Framework

- Announced in **April 2025** by the **Ministry of Electronics & IT (MeitY)**.
- Financial outlay: **₹22,919 crore**.
- Aims to make India a **global hub for electronics component manufacturing**, reducing import dependency.

1.2 Incentive Mechanisms

- **Turnover Linked Incentive (TLI):**
 - Duration: **6 years** with **1-year gestation**.
 - Based on incremental turnover.
- **Capex Incentive:**
 - Duration: **5 years**, not 7 (X).
 - Covers capital investments in sub-assemblies and core components.

1.3 Significance

- Complements **PLI Scheme** and **National Policy on Electronics (NPE 2019)**.
- Promotes **Atmanirbhar Bharat**, **job creation**, and **high-value exports**.
- Encourages **domestic + FDI participation** in India's electronics ecosystem.

2. Statement Analysis

- **Statement (I): Incorrect** – Capex incentive is for **5 years**, not **7 years**.
- **Statement (II): Correct** – ECMS targets both **domestic and international investments** to boost manufacturing.

✓ **Conclusion:** ECMS is a critical step toward **self-reliant electronics manufacturing**, ensuring **supply chain resilience and global competitiveness**.

Hence, the correct answer is (b) — II only.

15) ✓ **Correct Answer:** (a) I, II and III only

Explanation

1. Concept Overview

- **Coal Gasification** is a **thermochemical process** that converts coal into **syngas** (mixture of CO, H₂, CH₄, CO₂).
- Conducted under **high temperature and pressure** with **limited oxygen**, i.e., **partial oxidation**.

2. Policy Framework

- Promoted under the **National Coal Gasification Mission (NCGM)** to achieve **100 MT coal gasification capacity by 2030**.
- Aims to utilize India's **high-ash domestic coal** for **cleaner fuel production**, reducing crude oil imports.

3. Key Environmental Mechanism

- Integrated with **Carbon Capture, Utilisation, and Storage (CCUS)** to reduce **carbon footprint** and enable **low-emission fuel cycles**.

4. Challenges

- Most global technologies are designed for **low-ash coal** (e.g., Australian/Indonesian coal).
- Indian coal has **high ash content (30–45%)**, requiring **technology adaptation** (e.g., fluidized bed gasifiers).
- **High input cost** and **environmental risk** remain operational challenges.

5. Statement Analysis

- **Statement (I): Correct** – CCUS integration enhances environmental sustainability.
- **Statement (II): Correct** – Global gasification technologies require modification for high-ash Indian coal.
- **Statement (III): Correct** – Coal gasification involves **partial oxidation under high temperature and pressure**.

✓ **Conclusion:** Coal Gasification with CCUS is vital for India's **clean coal strategy**, enabling **energy diversification and low-carbon growth**.

Hence, the correct answer is (a) — I, II and III only.

16) **Answer:** (b) I and III only

Explanation:

- **Conceptual clarity — What is Burevestnik?**

- **Burevestnik (SSC-X-9 Skyfall)** is a **nuclear-powered, long-range cruise missile** under Russia's strategic modernization.

- Designed for **extended endurance, low-altitude flight, and unpredictable paths**, complicating missile defense.

- **Statement check**

- (I) Part of Russia's new nuclear arsenal — **Correct**. It's repeatedly showcased as a **next-gen strategic system**.
- (II) Short-range, solid-fuel ballistic missile — **Incorrect**. It is **not** a ballistic missile and **not** solid-fuel; it's a **nuclear-powered cruise missile**.
- (III) NATO name **SSC-X-9 Skyfall** — **Correct**. That is its **reported NATO designation**.

- **Contemporary relevance / implications**

- Raises **arms-control, safety, and environmental concerns** (nuclear propulsion).
- Demonstrates a shift toward **non-traditional propulsion** to **evade air defenses**.

17) **Answer:** (a) II and III only

Explanation:

- **Conceptual clarity — What are stablecoins?**

- **Stablecoins** are **blockchain-based tokens** designed to **maintain stable value** by **pegging** to **fiat** (USD, EUR, JPY) or other **reserve assets**.

- **Statement check**

- (I) **Bitcoin is a stablecoin** — **Incorrect**. **Bitcoin** is **volatile** and **not pegged**.
- (II) **Pegged to fiat for stability** — **Correct**. **Pegs** (e.g., **USDT, USDC, JPYC**) reduce price swings.
- (III) **Enable fast, low-cost, secure transactions** — **Correct**. Used for **remittances, settlement**, and **on/off-ramps** between crypto and TradFi.

- **Contemporary relevance / implications**

- Growing **regulatory focus** (reserve quality, transparency).
- Use cases in **cross-border payments** and **DeFi rails**.

18) **Answer:** (a) I, II and III

Explanation:

- **Conceptual clarity — Loktak & Keibul Lamjao**

- **Loktak Lake (Manipur)**: **largest freshwater lake** in NE India; famous for **phumdis** (floating biomass).
- **Keibul Lamjao National Park** (within Loktak): the **world's only floating national park**; critical habitat of the **Sangai** (brow-antlered deer).

- **Statement check**

- (I) **Montreux Record (since 1993)** — **Correct**. Signals **ecological concerns** under the Ramsar framework.
- (II) **Largest freshwater lake in NE India with phumdis** — **Correct**. Defining ecological feature.
- (III) **Only floating national park globally** — **Correct**. Unique conservation value.

- **Contemporary relevance / challenges**

- **Eutrophication, encroachment, hydrological alterations**; need **integrated wetland management**, community participation, and **regulated tourism**.

19) **Answer:** (a) Both Statement-I and Statement-II are correct and Statement-II explains Statement-I

Explanation:

- **Conceptual clarity — Western Indian Ocean Region (WIOR)**

- Connects **Asia-Africa-Middle East**; hosts **vital sea lanes** for **energy** and **trade**.

- **Statement check**

- **Statement-I (Rising geopolitical importance)** — **Correct**. WIOR is central to **energy security, trade flows, and power projection**.

- Statement-II (Chokepoints: Hormuz, Bab-el-Mandeb) — Correct. Hormuz carries ~20% of global oil; Bab-el-Mandeb links Asia-Europe routes.
- Explanation link: The presence and throughput of these chokepoints directly explain WIOR's heightened geopolitical significance → II explains I.
- Contemporary relevance / India angle
- SAGAR doctrine, IFC-IOR, Operation Sankalp; focus on maritime domain awareness, anti-piracy, and resilient supply chains.

20) **Answer:** (b) Both Statement-I and Statement-II are correct, but Statement-II does not explain Statement-I

Explanation:

- Conceptual clarity — UAE Consensus (COP28)

- The UAE Consensus (COP28) reaffirms the 1.5°C goal and net-zero by 2050, with directions to triple renewables, double efficiency, and scale climate finance.

• Statement check

- Statement-I — Correct. It reaffirms 1.5°C and net-zero by 2050 within the Global Stocktake.
- Statement-II — Correct. It calls for a "transition away from fossil fuels" in a just and balanced manner.
- Why II doesn't explain I: The transition-away clause is one component of the broader package; it does not logically explain why the 1.5°C/net-zero targets are reaffirmed (which stem from Paris architecture and science-based pathways). Thus, both are true, but II is not the explanatory basis for I.

• Contemporary relevance / implications

- Emphasis on equity, finance, adaptation, and loss & damage; operationalizes accelerated NDCs and sectoral transitions while safeguarding developmental needs.

21) **Correct Answer:** (c) The GST Council providing a platform for both Union and State governments

Explanation

1. Conceptual Clarity — "Self-rule with Shared-rule"

- The Indian Constitution embodies a federal system where power is divided between the Union and the States.
- The principle of "self-rule with shared-rule" implies that while States enjoy autonomy, they also participate in collective national decision-making.
- This cooperative mechanism promotes unity in diversity and ensures balanced governance.

2. Key Constitutional Framework

- **Federal Features:**
 - Dual polity – Union and States
 - Written Constitution and Supremacy of the Constitution
 - Division of powers (Union, State, Concurrent Lists)
 - Independent Judiciary
- **Cooperative Instruments:**
 - GST Council – Promotes fiscal federalism through joint decision-making.
 - NITI Aayog – Platform for policy dialogue between Centre and States.

3. Option Analysis

- (a) ~~✓~~ Refers to central unilateral powers; lacks shared-rule.
- (b) ~~✓~~ Indicates central dominance, not cooperative federalism.
- (c) **Correct** – The GST Council institutionalizes cooperative federalism, exemplifying "shared-rule" between Centre and States.
- (d) ~~✓~~ Refers to a unitary feature, not federal collaboration.

4. Contemporary Relevance

- The GST regime showcases both cooperation and friction between Centre and States.
- It reflects dynamic fiscal federalism where joint policy design fosters harmonized taxation and resource sharing.

✓ Conclusion: The GST Council epitomizes “self-rule with shared-rule”, representing **cooperative federalism** — a balance between **state autonomy** and **national unity**.

22) ✓ Correct Answer: (c) Carry energy from the Sun's surface into the corona, contributing to its high temperatures

Explanation

1. Conceptual Overview — Alfvén Waves

- **Alfvén waves** are **magnetohydrodynamic (MHD)** waves that travel through **ionized plasma** along the **Sun's magnetic field lines**.
- They are named after **Hannes Alfvén**, who first proposed them in **1942**.

2. Scientific Significance

- **Energy Transfer:**
 - Carry energy from the **solar surface (photosphere)** to the **corona**, heating it to **millions of Kelvin** — a phenomenon called the **coronal heating problem**.
- **Wave Properties:**
 - Generated by magnetic disturbances and propagate at the **Alfvén speed**, depending on magnetic field strength and plasma density.
- **Detection:**
 - Observed through **Doppler shifts** in coronal imaging studies (Solar Orbiter, Parker Solar Probe).

3. Option Analysis

- (a) ✗ Related to **solar flares**, not Alfvén waves.
- (b) ✗ They are **magnetic plasma oscillations**, not **gravitational waves**.
- (c) ✓ Correct — They **transport magnetic energy** to the corona, explaining its high temperature.
- (d) ✗ **Sunspots** are formed by localized magnetic field concentrations, unrelated to wave propagation.

✓ Conclusion: Alfvén waves are crucial to understanding **solar dynamics**, **space weather prediction**, and **coronal heating mechanisms**, bridging solar and astrophysical research.

23) ✓ Correct Answer: (b) Switzerland

Explanation

1. Concept Overview — Baltic Sea Region

- The **Baltic Sea** is a **brackish inland sea** in **Northern Europe**, bounded by **nine countries**:
 - **Sweden, Finland, Estonia, Latvia, Lithuania, Poland, Germany, Denmark, and Russia.**
- It is connected to the **North Sea** via the **Danish Straits** and the **Kiel Canal**.

2. Economic and Strategic Importance

- A crucial route for **energy transport, trade, and fisheries**.
- Strategic for **NATO, EU, and Baltic energy security**, especially amid evolving **Russia–Europe relations**.

3. Option Analysis

- (a) ✗ **Poland** borders the Baltic Sea.
- (b) ✓ Correct — **Switzerland** is **landlocked**, does **not** border the Baltic Sea.
- (c) ✗ **Latvia** borders the Baltic Sea.
- (d) ✗ **Germany** has a Baltic coastline (Kiel, Lübeck).

✓ Conclusion: Switzerland, being **landlocked**, does **not** border the **Baltic Sea**, distinguishing it from other listed nations.

24) ✓ Correct Answer: (c) Both I and II

Explanation

1. Context — Global Nuclear Treaties

The Nuclear Non-Proliferation Treaty (NPT) and Comprehensive Nuclear-Test-Ban Treaty (CTBT) are the two cornerstones of global nuclear governance.

2. Treaty Frameworks

- **NPT (1970):**
 - Seeks to **prevent proliferation** of nuclear weapons and promote **peaceful use of nuclear energy**.
 - Has **191 members**, except **India, Israel, Pakistan, South Sudan**.
 - Divides countries into **Nuclear-Weapon States (NWS)** and **Non-Nuclear-Weapon States (NNWS)**.
- **CTBT (1996):**
 - **Prohibits all nuclear explosions** for any purpose.
 - Not yet in force; pending ratification by key states (U.S., China, North Korea, India, Pakistan).

3. Statement Analysis

- **(I) Correct** – NPT's membership and exclusions are accurate.
- **(II) Correct** – CTBT prohibits nuclear testing; India, Bhutan, and Pakistan have not signed.

4. Relevance for India

- India maintains **non-signatory status** citing **security, sovereignty, and discriminatory classification** (NWS vs. NNWS).

✓ Conclusion: Both NPT and CTBT aim to **limit nuclear proliferation** and promote **global disarmament**, forming the bedrock of **nuclear diplomacy**.

25) ✓ Correct Answer: (d) I and III only

Explanation

1. Concept — UNESCO Creative Cities Network (UCCN)

- The UCCN, launched by **UNESCO** in **2004**, connects cities that prioritize **creativity and cultural industries** as drivers of **sustainable urban development**.

2. Key Features

- **Seven Creative Fields:**
 - Crafts & Folk Art, Design, Film, Gastronomy, Literature, Music, and Media Arts.
- **Purpose:** Promote **innovation, knowledge sharing, and urban revitalization**.
- **India's Participation:** Jaipur (Crafts), Chennai (Music), Hyderabad (Gastronomy), Gwalior (Music), and **Lucknow (Music)**.

3. Statement Analysis

- **(I) Correct** – UCCN was launched in **2004**, not 2014.
- **(II) Incorrect** – Lucknow is not India's first city in its category; **Hyderabad** joined earlier.
- **(III) Correct** – The **seven creative fields** are correct as per UNESCO's classification.

4. Broader Relevance

- Aligns with **SDG 11 (Sustainable Cities)** and **SDG 8 (Decent Work & Economic Growth)**.
- Encourages **urban innovation** and **cultural diplomacy**.

✓ Conclusion: The UCCN (2004) integrates **culture into development planning**, and India's participation underscores its **diverse creative potential**.

Hence, the correct answer is (d) — I and III only.

26) ✓ Correct Answer: (a) II and III only

Explanation

1.1 Context

- The **Iberian Lynx (Lynx pardinus)** is a **flagship conservation species** native to the **Iberian Peninsula (Spain and Portugal)**.

- Once **Critically Endangered**, its population recovery through sustained conservation makes it a global **model of species restoration**.

1.2 Conservation Framework

- IUCN Red List Status: Vulnerable** (upgraded from *Endangered* in 2015).
- Key Conservation Strategies:**
 - Habitat restoration** and reforestation.
 - Reintroduction programs** in Andalusia and Portugal.
 - Boosting prey population** (wild rabbits).
 - Monitoring genetic diversity** to prevent inbreeding.

1.3 Ecological Characteristics

- Prefers **mosaic habitats**—a mix of scrubland, forest edges, and open meadows.
- Exhibits **crepuscular and nocturnal behavior**, active during dawn and dusk; rests in the day.
- Serves as an **indicator species** for **Mediterranean ecosystem health**.

1.4 Statement Analysis

- Statement (I): Incorrect** – IUCN status is **Vulnerable**, not *Endangered*.
- Statement (II): Correct** – The lynx requires **mosaic habitats** for prey and cover.
- Statement (III): Correct** – It is mainly **nocturnal and crepuscular** but may show **daytime activity** in winter.

✓ **Conclusion:** The **Iberian Lynx** demonstrates a **conservation success story** through **habitat recovery and species reintroduction**, but remains vulnerable to **habitat loss and disease**.
Hence, the correct answer is (a) II and III only.

27) ✓ **Correct Answer:** (d) II and III only

Explanation

2.1 Conceptual Overview

- Savings Rate** = The proportion of **national income (GDP)** that is **saved rather than consumed**.
- It includes savings by **households, corporates**, and the **government sector**.

2.2 Economic Relevance

- A **higher savings rate** promotes **domestic capital formation** and **investment-led growth**, reducing dependence on external borrowing.
- India's **gross savings rate in 2024** stood at approximately **30.2% of GDP** (as per RBI and MoSPI data).

2.3 Statement Analysis

- Statement (I): Incorrect** – Savings rate ≠ Sum of investments; it is the **portion of income not spent on consumption**.
- Statement (II): Correct** – It represents **aggregate savings** from **households, businesses, and government**.
- Statement (III): Correct** – **Current savings rate (~30.2%)** confirms India's sound domestic savings base.

✓ **Conclusion:** India's savings rate remains **crucial for sustaining economic growth** and financing investment without external dependence.

Hence, the correct answer is (d) II and III only.

28) ✓ **Correct Answer:** (d) I and III only

Explanation

3.1 Context

- The **Baltic Sea** is the **world's largest brackish inland water body**, bounded by **nine nations: Sweden, Finland, Estonia, Latvia, Lithuania, Poland, Germany, Denmark, and Russia**.
- Connected to the **North Sea** via the **Kiel Canal** and **Danish Straits**.

3.2 Key Characteristics

- **Brackish Water:** Due to low salinity from large **river inflows** (Vistula, Neva) and limited exchange with the Atlantic.
- **Economic Importance:** A crucial route for **energy transport** and **maritime trade**; under **environmental stress** due to eutrophication.
- **Strategic Importance:** Key region for **EU-NATO-Russia** geopolitics.

3.3 Statement Analysis

- **Statement (I): Correct** – It is indeed the **largest brackish inland sea** in the world.
- **Statement (II): Incorrect** – The **Baltic Sea** has **lower salinity** (not higher) than open oceans.
- **Statement (III): Correct** – The **Kiel Canal** links the **Baltic** with the **North Sea**.

✓ **Conclusion:** The **Baltic Sea** is central to **European trade, ecology, and security**, balancing economic use and environmental preservation.

Hence, the correct answer is (d) I and III only.

29) ✓ **Correct Answer:** (c) Statement I is correct, but Statement II is incorrect

Explanation

4.1 Context

- India's **federal structure** balances **national unity** with **regional autonomy**, governed by **Schedule VII** and **Article 3** of the Constitution.
- The framework defines how **powers are divided** and **states can be reorganized**.

4.2 Key Constitutional Provisions

- **Schedule VII:**
 - Divides legislative powers into **Union, State, and Concurrent Lists**.
- **Article 3:**
 - **Parliament** can form new states or alter boundaries.
 - Requires the **President to refer** the Bill to the concerned **State Legislature** for its **views** (not consent).

4.3 Statement Analysis

- **Statement-I: Correct** – Schedule VII forms the **basis of India's federal structure**.
- **Statement-II: Incorrect** – State **consent is not binding**; Parliament can proceed even if the state disagrees.

4.4 Relevance

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- Highlights India's "**federal but not confederal**" nature.
- Reflects **strong centre tendencies**, yet maintaining **state participation** through institutions like **GST Council** and **Inter-State Council**.

✓ **Conclusion:** India's system combines **federal distribution** with **unitary flexibility**, enabling adaptability and national coherence.

Hence, the correct answer is (c) Statement-I is correct, but Statement-II is incorrect.

30) ✓ **Correct Answer:** (c) Statement-I is correct, but Statement-II is incorrect

Explanation

5.1 Context

- The **Arya Samaj**, founded by **Swami Dayanand Saraswati** in **1875**, was a major **19th-century reform movement** advocating **rationality, equality, and Vedic purity**.
- It sought to remove **superstition, caste discrimination, and ritualism** from Hindu society.

5.2 Key Principles

- Emphasized **Vedic authority** and **monotheism**.
- Rejected **idolatry, ritual worship**, and **priestly dominance**.
- Promoted **education**, especially through **DAV institutions**.
- Stood for **social equality** and **women's empowerment**.

5.3 Statement Analysis

- **Statement-I: Correct** – Arya Samaj denounced **idol worship** and upheld **Vedic rationalism**.
- **Statement-II: Incorrect** – It **opposed the hereditary caste system**, promoting **social equality** and **merit-based status**.

5.4 Broader Impact

- Influenced **nationalist thought, reformist movements**, and **constitutional ideals of equality and rationality**.
- Inspired leaders like **Lala Lajpat Rai** and movements such as **Shuddhi (reconversion)**.

✓ Conclusion: The Arya Samaj symbolized the **fusion of Vedic revivalism and social reform**, aligning religion with **reason and equality**.

Hence, the correct answer is (c) Statement-I is correct, but Statement-II is incorrect.

31) ✓ Correct Answer: (b) Food and Beverages

Explanation

1. Conceptual Overview – Consumer Price Index (CPI)

- The **Consumer Price Index (CPI)** is India's **primary inflation indicator**, measuring **changes in the retail prices of goods and services consumed by households**.
- It is compiled by the **Ministry of Statistics and Programme Implementation (MoSPI)** and used by the **RBI** for monetary policy decisions under the **Flexible Inflation Targeting Framework (4% ± 2%)**.

2. Structure of CPI

The CPI basket represents the **average household consumption pattern** and includes:

- **Food & Beverages**
- **Housing**
- **Miscellaneous (Health, Education, Transport, etc.)**
- **Fuel & Light**
- **Clothing & Footwear**

Weights are derived from the **Household Consumer Expenditure Survey (HCES)** to ensure accurate representation of spending habits.

3. Current Weight Distribution (Base Year 2012 = 100)

Category	Weight (All India)	Rural (%)	Urban (%)
Food & Beverages	45.86	54.18	36.29
Housing	10.07	0.00	21.67
Clothing & Footwear	6.53	7.36	5.57
Fuel & Light	6.84	7.94	5.58
Miscellaneous	28.31	22.10	31.31

► **Food & Beverages** has the highest weight, making it the most influential component in determining CPI inflation trends.

4. Option Analysis

- (a) ✗ **Housing** – Weight is **10.07%** (all-India); **not the highest**.
- (b) ✓ **Food & Beverages** – **Highest share (45.86%)**, drives CPI fluctuations.
- (c) ✗ **Fuel & Light** – Only **6.84%** weight.
- (d) ✗ **Miscellaneous** – 28.31%, less than Food & Beverages.

5. Contemporary Relevance

- Food inflation accounts for **~50% of CPI inflation** in India, influencing **RBI's repo rate decisions**.
- **Supply shocks** (due to monsoon, global commodity prices) cause sharp CPI variations.
- CPI is vital for **wage indexation, DA adjustments, and policy planning**.

✓ Conclusion: The **Food & Beverages** category has the **largest weight (45.86%)** in CPI, making it the **dominant driver of inflation in India**.
Hence, the correct answer is (b).

32) ✓ Correct Answer: (b) National Education Policy 2020

Explanation

1. Conceptual Overview – Mera Yuva Gram Sabha (MYGS)

- **Mera Yuva Gram Sabha (MYGS)** is a **participatory governance and civic education initiative**.
- Launched in **2024** by the **Ministry of Panchayati Raj**, in collaboration with the **Ministries of Education and Tribal Affairs**.
- Aims to build **democratic consciousness and leadership among youth** through **simulated Gram Sabha sessions**.

2. Policy Linkage

- Aligned with the **National Education Policy (NEP) 2020**, which promotes **experiential learning, citizenship education, and community engagement**.
- Encourages youth to participate in **local self-governance**, fostering **Janbhagidari (public participation)**.

3. Implementation Mechanism

- Conducted in **Jawahar Navodaya Vidyalayas, Eklavya Model Residential Schools, and State Government Schools**.
- Involves students in **mock Gram Sabhas** to discuss **local development issues**, enhancing awareness of **Panchayati Raj Institutions (PRIs)**.
- Promotes **inclusivity** by engaging **tribal and rural youth**.

4. Option Analysis

- (a) ✗ Not related to health sector.
- (b) ✓ Correct – Directly linked to **NEP 2020's experiential education and democratic learning framework**.
- (c) ✗ Digital literacy is not the mission's focus.
- (d) ✗ Skill development is incidental, not the primary goal.

5. Contemporary Relevance

- Reinforces **grassroots democracy and civic learning**.
- Encourages the youth to become **active citizens and future leaders** of participatory governance.

✓ Conclusion: MYGS aligns with NEP 2020, integrating **democratic education with civic engagement** to foster **inclusive, participatory governance**.
Hence, the correct answer is (b).

33) ✓ Correct Answer: (c) Both I and II

Explanation

1. Context – Cryptocurrency Regulation in India

- Cryptocurrencies are **decentralized digital assets** built on **blockchain technology**.
- India's stance has evolved from **regulatory prohibition** to **legal supervision** emphasizing **AML (Anti-Money Laundering)** compliance.

2. Key Legal Developments

- **2018:** RBI restricted banks from dealing in crypto.
- **2020:** Supreme Court struck down RBI's ban (violated Article 19(1)(g) – Freedom to Trade).
- **2023:** Government extended **PMLA (Prevention of Money Laundering Act)** provisions to **crypto exchanges**, mandating **KYC norms** and **reporting standards**.

3. Statement Analysis

- **Statement (I): Correct** – In **March 2023**, crypto entities brought under **PMLA** to curb **illicit fund flows** and ensure **compliance**.

- **Statement (II):** Correct – The Supreme Court's 2020 judgment upheld **trade freedom**, reversing RBI's circular.

4. Policy Impact

- Moves India toward **regulated acceptance** of digital assets.
- Balances **innovation, investor protection, and financial stability**.
- Aligns with **global FATF (Financial Action Task Force)** norms on virtual assets.

✓ **Conclusion:** India's crypto framework now ensures **regulatory oversight and judicial protection**, marking a shift from **prohibition to supervision**.

Hence, the correct answer is (c) Both I and II.

34) ✓ Correct Answer: (b) I and II only

Explanation

1. Topic – Pasumpon Muthuramalinga Thevar

- **Pasumpon Muthuramalinga Thevar (1908–1963)** was a **nationalist, social reformer, and political leader** from Tamil Nadu.
- Prominent associate of **Subhas Chandra Bose** and supporter of **Forward Bloc** ideology.

2. Contributions

- **Temple Entry Movement:** Advocated for **caste equality** and **social justice**.
- **Repeal of Criminal Tribes Act (CTA):** Worked for **rehabilitation and dignity** of marginalized communities.
- **Political Role:** Strengthened **Congress organization** in rural Tamil Nadu and later supported **Netaji's inclusive nationalism**.

3. Statement Analysis

- (I): Correct – Close associate of **Subhas Chandra Bose**; expanded Congress influence in South India.
- (II): Correct – Played key role in **Temple Entry** and **CTA repeal** movements.
- (III): Incorrect – Never served as **Chief Minister**; popularly called the “**Netaji of the South**.”

4. Broader Impact

- His life symbolizes **integration of social reform with freedom struggle**.
- Continues to inspire movements for **social equality** and **self-respect** in Tamil Nadu.

✓ **Conclusion:** **Pasumpon Muthuramalinga Thevar** remains a **symbol of equality, reform, and nationalism**, blending **social justice with patriotic leadership**.

Hence, the correct answer is (b) I and II only.

35) ✓ Correct Answer: (b) I and II only

Explanation

1.1 Constitutional Basis

- Governed by **Article 124(2)** of the Constitution.
- Appointment made by the **President of India** based on **seniority convention** and **consultation process**.

1.2 Procedure

1. **Outgoing CJI Recommendation:** Suggests the name of the senior-most judge of the Supreme Court.
2. **Law Ministry:** Processes the recommendation and forwards it to the **Prime Minister**.
3. **Prime Minister:** Advises the **President** to appoint the next CJI.
4. **President:** Issues warrant of appointment.

1.3 Convention and Exceptions

- **Convention:** Senior-most judge is appointed as CJI.
- **Exceptions:** In rare cases (e.g., during 1970s), deviations occurred leading to debates over **executive interference**.

1.4 Statement Analysis

- (I): Correct – Prime Minister advises President for appointment.
- (II): Correct – Law Ministry initiates process by seeking recommendation from the outgoing CJI.
- (III): Incorrect – Seniority is a convention, not a binding rule, though widely followed.

✓ Conclusion: The CJI appointment process reflects executive consultation with judiciary, ensuring continuity, seniority, and independence.

Hence, the correct answer is (b) I and II only.

36) Answer: (b) I, III and IV only

Explanation:

- Concept & scope:

- Secondary sanctions are penalties imposed by a country (e.g., USA) on third-party states/firms that transact with a primary-sanctioned target, thereby extending extraterritorial reach of sanctions.

- Statement-wise validation:

- (I) Force multiplier for primary sanctions — Correct. They amplify pressure by threatening third parties with loss of market access, dollar clearing, financing, etc.
- (II) Only penalize the target state — Incorrect. By design, they penalize third countries/entities that engage with the target.
- (III) Restrict normal commerce by third states — Correct. They deter banks, shippers, insurers, refiners, etc., from “business as usual” with the target.
- (IV) Extraterritorial application — Correct. They apply beyond the sanctioning state’s territory, often via leverage over global finance and supply chains.

- Contemporary relevance:

- Shapes energy trade (e.g., Russian oil), shipping/insurance, and financial flows, forcing recalibration of trade routes and payment mechanisms.

37) Answer: (c) Statement-I is correct, but Statement-II is incorrect

Explanation:

- Legal position in India:

- Statement-I (Correct): Crypto assets are recognized in law as Virtual Digital Assets (VDAs) via the Finance Act, 2022, with a 30% tax regime, 1% TDS, and subsequent PMLA coverage mandating KYC/record-keeping. They are not treated as “speculative transactions” under Sec. 43(5) IT Act.
- Statement-II (Incorrect): The RBI’s 2018 circular restricted banks from servicing crypto businesses but did not outlaw holding/using crypto. The Supreme Court (2020) set aside the banking restriction for violating Article 19(1)(g); hence no blanket ban exists.

- Policy trajectory:

- From de-facto banking curbs to a regulated-oversight model: taxation, AML/KYC obligations, and compliance under PMLA, while a comprehensive statute is still evolving.

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

Explanation:

- Concept of G-2:

- Envisions the US and China as co-managers of global order—coordinating on economy, security, technology, while competing elsewhere—signaling a drift toward bipolarity.

- Statement-wise validation:

- Statement-I — Correct: G-2 implies two dominant powers steering global governance, a move away from uni/multipolarity.
- Statement-II — Correct & explanatory: The idea specifically names the US-China dyad coordinating on global problems; this operationalizes the bipolar premise in Statement-I, hence II explains I.

- **Implications for India/Global South:**

- Necessitates **strategic autonomy, issue-based coalitions** (Quad/BRICS/IORA), and hedging within a **bipolar strategic theatre**.

39) **Answer:** (c) Statement-I is correct, but Statement-II is incorrect

Explanation:

- **What is KBF/KMGBF?**

- **Kunming Biodiversity Fund (KBF):** A multi-partner trust fund to finance implementation of the **Kunming-Montreal Global Biodiversity Framework (KMGBF)**, prioritizing **developing countries** (capacity, finance, implementation).
- **KMGBF:** Adopted at **CBD CoP-15** with **4 goals (2050)** and **23 targets (2030)** (e.g., **30x30**), but **non-binding**—relies on **NBSAPs**, monitoring, and voluntary national commitments.

- **Statement-wise validation:**

- **Statement-I — Correct:** KBF's raison d'être is **accelerating KMGBF implementation** via funding/support.
- **Statement-II — Incorrect:** KMGBF is **not legally binding**; it lacks treaty-style enforcement.

- **Policy salience:**

- Delivery hinges on **finance, domestic policy uptake**, and **transparent monitoring** (targets, indicators, disclosure).

40) **Answer:** (b) Only two

Explanation:

- **Techniques & matching:**

- **Blue Carbon Sinks** → **Incorrectly matched** in the pair: Blue carbon refers to **natural carbon storage in coastal ecosystems** (mangroves, salt marshes, seagrasses), **not** aquifer recharge/saltwater intrusion.
- **Ocean Fertilization** → **Correct:** **Micronutrient addition** (e.g., iron) to stimulate **phytoplankton blooms** that draw down CO₂; some carbon sinks to **deep ocean**.
- **Ocean Alkalinity Enhancement (OAE)** → **Correct:** Adding **alkalinity-enhancing minerals** (e.g., lime/olivine) increases **seawater alkalinity**, shifting carbonate chemistry to **absorb more CO₂**.

- **Net assessment:**

- **Two pairs (2) and (3) are correct**; pair (1) is **incorrect**.
- Benefits: potentially **durable CO₂ removal**; Risks: **ecological impacts, MRV challenges, governance gaps**—hence the push for **pilot studies and guardrails**.

41) **Correct Answer:** (d) Rapid spread of information across a quantum system, making it inaccessible to local measurements

Explanation

1. Concept Overview – Quantum Information Scrambling

- **Quantum Information Scrambling (QIS)** is a phenomenon where **information stored in a few qubits** becomes **rapidly distributed (entangled)** across an entire quantum system.
- The information isn't lost — it becomes **delocalized** and **impossible to retrieve from local measurements**, even though it's still present globally within the system.

2. Key Principles

- **Mechanism:**
 - Scrambling occurs due to **quantum entanglement** and **unitary evolution**, which mix information across many qubits.
- **Difference from Classical Systems:**
 - In classical systems, information diffuses through thermalization; in quantum systems, it **spreads non-locally** due to entanglement.
- **Physical Meaning:**
 - It describes **how fast quantum systems lose track of local information**, crucial for **quantum chaos, cryptography, and black hole information paradox**.

3. Implementation Context

- Experimentally verified by **Google's Sycamore quantum processor**, demonstrating how **scrambling helps preserve quantum coherence** and ensures **security in quantum communication**.
- Related to the concept of "**quantum advantage**", where quantum systems outperform classical computers in processing complex operations.

4. Option Analysis

- (a) **✗ Quantum Key Distribution**—concerns secure key sharing, not information dispersal.
- (b) **✗ Scrambling redistributes**, not **erases**, information.
- (c) **✗ Does not involve hardware destruction** or data erasure.
- (d) **✓ Correct** – Information spreads rapidly across qubits, becoming **inaccessible to local observations**, i.e., **scrambled**.

5. Contemporary Relevance

- Foundation for **quantum encryption** and **fault-tolerant quantum computing**.
- Used in studying **information paradox in black holes** — theorized that black holes “scramble” information rather than destroy it.

✓ Conclusion: Quantum information scrambling demonstrates **how quantum data spreads via entanglement**, making it **secure and globally encoded** — central to **quantum computing, cryptography, and physics of information**.

42) **✓ Correct Answer:** (b) **Subsidies contingent upon the use of domestic over imported goods**

Explanation

1. Context – WTO Subsidy Rules

- The **WTO Agreement on Subsidies and Countervailing Measures (SCM)** classifies subsidies as:
 - **Prohibited Subsidies:** Directly trade-distorting.
 - **Actionable Subsidies:** Cause adverse effects to other members.
 - **Non-actionable Subsidies:** Allowed under certain conditions (rare today).

2. What Are Prohibited Subsidies?

- **Two categories:**
 1. **Export-contingent subsidies** (conditional on export performance).
 2. **Local content subsidies** (conditional on using domestic over imported goods).

→ Both distort trade by incentivizing domestic production unfairly.

3. Implementation and Impact

- These rules apply equally to **developed and developing countries** (with limited transition periods for LDCs).
- Violation allows affected countries to take **countervailing measures** (tariffs, restrictions).
- Some of India's **PLI schemes** have drawn **scrutiny under SCM** for domestic content criteria.

4. Option Analysis

- (a) **✗** Export subsidies are not automatically prohibited for developing countries with special exceptions.
- (b) **✓ Correct.** “Local content” subsidies—conditional use of **domestic goods**—are explicitly **prohibited** under **Article 3.1(b)** of the SCM.
- (c) **✗** Subsidies linked to R&D or environmental objectives are not prohibited.
- (d) **✗** Generic fiscal support or tax holidays are not directly prohibited unless contingent.

5. Broader Relevance

- Ensures **fair global trade** and **WTO compliance**.
- Promotes **non-discriminatory access** to markets for all members.

✓ Conclusion: Under the **SCM Agreement**, subsidies contingent upon **using domestic inputs** instead of imports are **prohibited** as they distort fair competition.

43) **Correct Answer:** (b) Their per capita emissions are 75 times higher than those of the bottom 50% by consumption

Explanation

1. Context – Climate Inequality Report 2025

- Published by the **World Inequality Lab (WIL)**, the report examines **global disparities in carbon emissions** linked to **wealth and consumption**.
- Highlights how **climate change** and **inequality** reinforce each other.

2. Key Findings

- Top 1% of global population:**
 - Responsible for **15% of global CO₂ emissions**.
 - Their **per capita emissions** are **75 times higher** than the **bottom 50%**.
- Top 10%** emit **half of global emissions**.
- Bottom 50%** contribute less than **10%** of total emissions.

3. Policy Significance

- Calls for **progressive climate action** — linking **emission responsibility with wealth and consumption**.
- Reinforces principles of **climate justice** and **Common But Differentiated Responsibilities (CBDR-RC)**.
- Impacts **carbon taxation**, **climate finance**, and **just transition policies**.

4. Option Analysis

- (a) Wrong data — not a key finding.
- (b) **Correct** – Matches WIL's major statistic (75x higher emissions for the top 1%).
- (c) Incorrect number.
- (d) 71% applies to **corporations**, not **individuals**.

Conclusion: The Climate Inequality Report 2025 underscores that **wealthiest individuals drive global emissions disproportionately**, demanding **equitable climate responsibility and financial transfers**.

44) **Correct Answer:** (c) Both I and II

Explanation

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1. Context – India's COP26 Energy Commitments

- At **COP26 (Glasgow, 2021)**, India announced its **Panchamrit** commitments, including:
 - 50% installed capacity from **non-fossil fuel sources** by **2030**.
 - 500 GW** renewable energy capacity by 2030.
 - Net zero emissions by 2070.

2. India's Progress (as of 2025)

- Achieved Goal Early:**
 - Non-fossil fuel capacity crossed **51%** in **2025**, **five years ahead** of the 2030 target.
- Energy Mix:**
 - Solar:** ~127 GW (largest share)
 - Wind:** ~53 GW
 - Hydro:** ~47 GW
 - Nuclear & Bio-energy:** remaining portion.

3. Policy Mechanisms

- Schemes:** PLI for solar modules, PM-KUSUM, Green Energy Corridors, Renewable Purchase Obligations (RPOs).
- Financing:** Green bonds, sovereign green fund initiatives.
- Institutional Support:** MNRE and SECI enabling large-scale project rollouts.

4. Statement Analysis

- Statement (I): Correct** – India achieved the 50% non-fossil capacity target ahead of 2030.

- **Statement (II): Correct** – Solar is the largest component of India's renewable mix (~127 GW).

5. Broader Impact

- Strengthens India's **climate leadership** and **energy security**.
- Encourages **domestic manufacturing** under **Atmanirbhar Bharat**.
- Challenges remain in **grid integration, energy storage, and import dependence**.

✓ **Conclusion:** India has achieved its **non-fossil capacity target ahead of time**, with **solar power leading the transition**, reaffirming its role as a **global climate leader**.
Hence, the correct answer is (c) Both I and II.

45) ✓ **Correct Answer:** (d) Neither I nor II

Explanation

1. Concept Overview – ICCVAI and Operation Greens

- **Integrated Cold Chain and Value Addition Infrastructure (ICCVAI)** and **Operation Greens** are flagship schemes promoting **agricultural value addition, cold chain modernization, and price stability** for perishable produce.
- Both aim to reduce **post-harvest losses**, ensure **remunerative prices** for farmers, and support **food processing infrastructure**.

2. Scheme Details

Scheme	Implementing Ministry	Main Focus Areas	Coverage
ICCVAI	Ministry of Food Processing Industries (MoFPI) under Pradhan Mantri Kisan Sampada Yojana (PMKSY)	Integrated cold chain, storage, value addition, transport & processing	Farm to retail – fruits, vegetables, dairy, fish, meat, etc.
Operation Greens	MoFPI	Price stabilization, supply chain management, and loss reduction	Originally TOP crops (Tomato, Onion, Potato); expanded to fruits, vegetables, and shrimp under Atmanirbhar Bharat (2020)

3. Statement Analysis

- **Statement (I): Incorrect** –
The ICCVAI Scheme is implemented by the **Ministry of Food Processing Industries (MoFPI)**, not by the **Ministry of Agriculture & Farmers Welfare**.
- **Statement (II): Incorrect** –
Operation Greens covers **fruits, vegetables, and shrimp**, not just fruits and vegetables. It was expanded beyond the original **TOP crops** to include wider perishables under the **Atmanirbhar Bharat Package**.

4. Policy Significance

- Both schemes align with:
 - **Doubling Farmers' Income Initiative** (NITI Aayog).
 - **PMKSY** for agri-infrastructure and cold chain development.
 - **Food security and export diversification** through perishables.

✓ **Conclusion:** Both statements are incorrect — the **ICCVAI Scheme** is implemented by **MoFPI**, and **Operation Greens** includes **shrimp** along with fruits and vegetables.
Hence, the correct answer is (d) Neither I nor II.

46) ✓ **Correct Answer:** (c) In 2024–25, it contributed nearly 55% of Gross Value Added (GVA)

Explanation

1. Concept Overview – Services Sector in India

- The **Services Sector** is the **largest contributor to India's economy**, encompassing **IT, finance, health, trade, transport, education, tourism, and professional services**.
- It is central to India's transition toward a **knowledge and urban economy**, driving **growth, innovation, and exports**.

2. Key Economic Role

- **Contribution to GVA:**
 - As of 2024–25, services contributed ~55% of India's **Gross Value Added (GVA)**.
- **Employment:**
 - Provides less than **one-third of total jobs**, indicating a **jobless growth pattern** compared to its share in output.
- **Employment Drivers:**
 - IT-BPM, trade, transport, financial services, and construction-led spillovers.

3. Statement/Option Analysis

- (a) **✗ Incorrect** – Services sector is not the largest employer; **agriculture and construction** dominate employment.
- (b) **✗ Incorrect** – Construction has added more jobs than services in recent years.
- (c) **✓ Correct** – As per latest data (Economic Survey 2024–25), **Services Sector = ~55% GVA**.
- (d) **✗ Incorrect** – Employment contribution is below one-third of total jobs.

4. Contemporary Context

- Major government initiatives driving the sector:
 - **Digital India, Gati Shakti, PM Vishwakarma, Startup India, Make in India 2.0**, etc.
- **Export potential:** Services exports crossed **\$340 billion (2024–25)**, led by **IT & financial services**.

✓ Conclusion: The **Services Sector** remains the **backbone of India's GVA (~55%)**, though its employment generation lags behind.
Hence, the correct answer is (c).

47) **✓ Correct Answer: (b) I, II and III**

Explanation

1. Concept Overview – Forest Rights Act (FRA), 2006

- FRA aims to **correct historical injustice** faced by **Scheduled Tribes (STs)** and **Other Traditional Forest Dwellers (OTFDs)** by recognizing **individual and community forest rights**.
- It ensures **livelihood security** and promotes **participatory forest governance**.

2. Key Legal Provisions

- **Section 4(5):** No eviction or removal of forest dwellers until verification and recognition of rights are completed.
- **Applicability:** Extends to **National Parks, Wildlife Sanctuaries, and Tiger Reserves**.
- Recognizes **Individual Forest Rights (IFRs)** and **Community Forest Resource (CFR) rights**.

3. Statement Analysis

- **Statement (I): Correct** – No eviction permitted before completion of rights recognition and verification process.
- **Statement (II): Correct** – FRA legally safeguards forest dwellers against forced eviction and displacement.
- **Statement (III): Correct** – FRA explicitly applies to all protected areas, including National Parks and Tiger Reserves.

4. Relevance & Challenges

- **Relevance:** Aligns with **SDG-1 (No Poverty)** and **SDG-13 (Climate Action)** through inclusive conservation.
- **Challenges:** Implementation delays, conflicting forest and wildlife laws, and awareness gaps.

✓ Conclusion: All statements are correct — FRA protects forest dwellers' rights, ensures due process before eviction, and applies across all protected areas.

Hence, the correct answer is (b) I, II and III.

48) **✓ Correct Answer: (d) I and III only**

Explanation

1. Context – International Solar Alliance (ISA)

- The **International Solar Alliance (ISA)** is a **treaty-based intergovernmental organization** co-founded by **India and France** in **2015 at COP21 (Paris)**.
- It promotes **solar energy deployment, investment, and technology cooperation** across member states.

2. Key Institutional Features

- **Headquarters:** Gurugram, India.
- **Membership:** Originally for **tropical countries** (between Tropics of Cancer & Capricorn), but **opened to all UN members** via **2020 amendment**.
- **Mandate:** Scale up **solar financing, capacity building, and cross-border energy trade**.

3. Statement Analysis

- **Statement (I): Correct** – Headquarters is in **Gurugram**, symbolizing India's leadership.
- **Statement (II): Incorrect** – Post-2020, ISA's membership includes **all UN states**, not only tropical countries.
- **Statement (III): Correct** – ISA was co-founded by **India and France** at **COP21** in 2015.

4. Relevance

- ISA has **124 members/signatories**.
- Major initiatives: **SolarX Grand Challenge, Global Solar Facility, and One Sun One World One Grid (OSOWOG)** vision.

✓ **Conclusion:** ISA exemplifies India's global climate leadership, with headquarters in **Gurugram** and **universal membership** post-2020 amendment.

Hence, the correct answer is **(d) I and III only**.

49) ✓ **Correct Answer:** (c) I, II and III only

Explanation

1. Concept Overview – Soil Health Card (SHC) Scheme

- **Launched in 2015** to evaluate **soil fertility and nutrient status** and promote **balanced fertilizer use**.
- Provides farmers with **individual soil reports** containing nutrient data and recommendations.

2. Implementation Framework

- Implemented by the **Department of Agriculture and Farmers Welfare (DoA&FW)**.
- Measures **12 key parameters**:
 - **Macronutrients (N, P, K, S)**
 - **Micronutrients (Fe, Mn, Zn, Cu, B)**
 - **Soil Organic Carbon, pH, and Electrical Conductivity (EC)**

3. Statement Analysis

- **(I) Correct:** Integrated into **Rashtriya Krishi Vikas Yojana (RKVY) Cafeteria** since 2022-23.
- **(II) Correct:** Urea dominates fertilizer usage (≈68% of total consumption in 2023-24).
- **(III) Correct:** ~43% of **climate-risk districts** have **low soil organic carbon**, highlighting degradation.
- **(IV) Incorrect:** SHC includes both **macro & micronutrients** plus **pH, EC, and organic carbon**, so the claim that it excludes them is wrong.

4. Relevance

- Enhances **soil productivity, fertilizer efficiency, and climate resilience**.
- Aids in **reducing input costs** and promoting **sustainable agriculture**.

✓ **Conclusion:** The **SHC Scheme** effectively addresses soil degradation and nutrient imbalance, now embedded under **RKVY** for integrated management.

Hence, the correct answer is **(c) I, II and III only**.

50) ✓ **Correct Answer:** (b) I, II and III

Explanation

1. Concept Overview – East Asia Summit (EAS)

- The **East Asia Summit (EAS)** is a **leaders-led regional platform** founded in **2005** in **Kuala Lumpur, Malaysia**.
- It includes **ASEAN's 10 members** plus **8 dialogue partners** — making **18 members** in total.

2. Structure & Mandate

- Anchored under **ASEAN's leadership**, promoting **peace, stability, and economic cooperation** in the Indo-Pacific.
- Addresses issues like **maritime security, connectivity, trade, terrorism, and climate resilience**.

3. Statement Analysis

- **(I) Correct:** EAS was established in **2005**.
- **(II) Correct:** The first EAS summit was held in **Kuala Lumpur, Malaysia**.
- **(III) Correct:** All listed countries (India, China, Japan, USA, Russia, etc.) are **EAS members**.

4. Relevance

- Strengthens **ASEAN centrality** and **regional security architecture**.
- Acts as a bridge between **Indo-Pacific powers** for dialogue and cooperation.

✓ **Conclusion:** The **East Asia Summit (EAS)**, established in 2005, remains vital to Asia-Pacific diplomacy and regional governance.

Hence, the correct answer is **(b) I, II and III**.



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