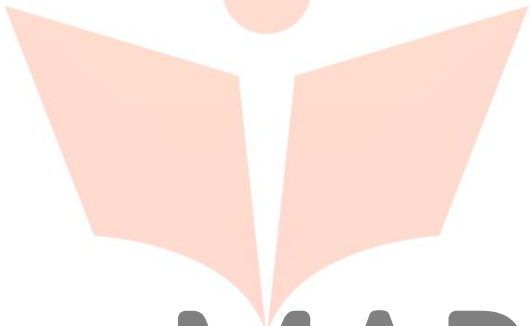




INSIGHTSIAS

SIMPLIFYING IAS EXAM PREPARATION

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INSIGHTSIAS

SIMPLIFYING IAS EXAM PREPARATION

MARCH 2025

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1. Economy

- 1) Which of the following best describes Ex-Gratia Payment in India?
- A legally mandated financial compensation granted by the government to disaster victims
 - A goodwill payment made voluntarily by the government or private organizations without a legal obligation
 - A fixed monthly payment under social security schemes such as PM-KISAN and PM Jan Dhan Yojana
 - A court-ordered compensation for wrongful death or injury under the Motor Vehicles Act

Solution: B

Ex-Gratia Payment is voluntary and discretionary, unlike court-ordered compensations or legally mandated schemes.

Option a is incorrect as ex-gratia is not legally mandated.

Option c is incorrect because ex-gratia is **one-time relief, not a fixed payment scheme**.

Option d is incorrect as **court-ordered compensations are legally binding, unlike ex-gratia**.

- **What is Ex-Gratia?**
 - **Ex-gratia** refers to a **payment made as a goodwill gesture**, not a legal obligation.
 - The government provides **ex-gratia relief** in cases like **accidents, natural disasters, and tragedies**.
- **Legal Framework Governing Ex-Gratia:**
 - No specific **statutory law** governs ex-gratia payments.
 - The **concerned ministry or department** determines the **amount and mode of disbursement**.
 - Railway ex-gratia payments follow the **Railway Accidents and Untoward Incidents (Compensation) Rules, 1990**.
- **Procedure for Ex-Gratia Payments:**
 - **Verification of Identity:** Aadhaar, legal heir certificate, and death certificate.
 - **Approval by Authorities:** Competent authority sanctions the amount.
 - **Disbursement of Funds:** Either **cash (immediate relief)** or **bank transfer (final payment)**.
- **Modes of Payment:**
 - **Cash:** Immediate assistance for initial expenses (Railway guidelines permit up to Rs 50,000 in cash).
 - **Bank Transfer:** Aadhaar-linked **Direct Benefit Transfer (DBT)** for full compensation.
 - **Cheque/NEFT:** Preferred for large amounts, ensuring accountability and transparency.

Difference Between Ex-Gratia and Compensation:

| Aspect | Ex-Gratia | <u>Compensation</u> |
|-------------|---------------------------|---------------------------------|
| Nature | Voluntary, goodwill-based | Legal obligation |
| Purpose | Immediate relief | Compensation for loss or damage |
| Legal Basis | No legal requirement | Defined under law |
| Approval | By government/officials | Decided by courts or statutes |

- 2) Consider the following statements regarding the impact of Rupee-Dollar Swap Auctions on the Indian economy:
- These swaps improve banking system liquidity by injecting or absorbing rupees.
 - They help stabilize the exchange rate by reducing currency volatility.
 - Swap auctions are directly used by the RBI to control inflation.

How many of the above statements is/are incorrect?

- Only one

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

Solution: A

Statements 1 and 2 are correct as swaps **affect liquidity, stabilize exchange rates, and can increase forex reserves.**

Statement 3 is incorrect because while swap auctions **can influence liquidity and exchange rates**, they are **not a direct inflation control tool.**

About Rupee & Dollar Swap Auctions:

- It is a tool used by **RBI** to **manage liquidity** in the economy and **stabilize currency volatility.**
- Banks **sell US dollars** to RBI in exchange for rupees in the first leg and agree to **repurchase dollars at a future date.**
- **Who Conducts It?**
 - The **Reserve Bank of India (RBI)**, as part of its monetary policy interventions, executes the **swap auctions.**
- **How It Works?**
 - **First Leg (Buy Phase):** Banks **sell USD** to RBI and receive **Indian Rupees (INR).**
 - **Reverse Leg (Sell Phase):** Banks **buy back USD** from RBI at a pre-determined price at the end of the swap period.
- **Key Features of the Swap:**
 - **Tenor:** Can be **short-term (6 months)** or **long-term (3 years or more).**
 - **Liquidity Management:** Used to **infuse or absorb rupee liquidity** in the system.
 - **Forex Reserve Utilization:** RBI uses its **forex reserves** to regulate currency flows.
 - **Impact on Exchange Rate:** Helps stabilize **rupee fluctuations** against the dollar.
- **Impact on the Indian Economy:**
 - **Improves Banking Liquidity:** Injects Rs 86,000 crore into the banking system, addressing the current liquidity shortfall of Rs 1.7 lakh crore.
 - **Enhances Monetary Policy Transmission:** Ensures that interest rates in money markets align with RBI's policy stance.
 - **Strengthens the Rupee:** Reduces depreciation pressure on INR due to forex market fluctuations.
 - **Supports Economic Growth:** Enables banks to lend more to businesses and industries, promoting investment and consumption.
 - **Controls Inflation Risks:** Provides liquidity without increasing inflationary pressures, as money is infused against future forex obligations.

3) Consider the following statements regarding Purchasing Managers' Index (PMI's) significance for economic analysis:

1. PMI is a leading indicator, providing early signals about business cycle changes.
2. Central banks use PMI to make monetary policy decisions.
3. PMI is highly correlated with GDP growth and stock market performance.
4. PMI measures inflation trends directly by analyzing consumer price movements.

How many of the above statements is/are correct?

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

Solution: C

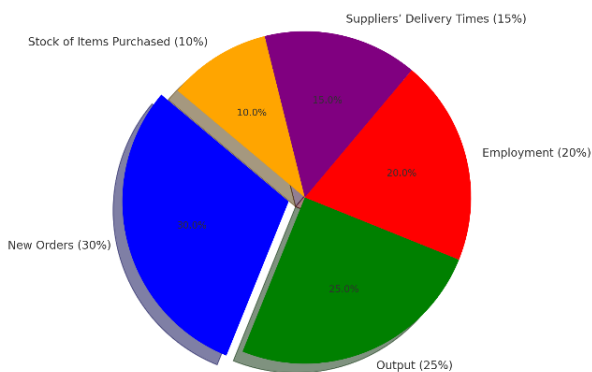
Statements 1, 2, and 3 are correct as PMI **acts as a leading indicator, influences monetary policy decisions, and correlates with GDP and markets.**

Statement 4 is incorrect because PMI does not directly measure inflation; it tracks **business activity and supply chain conditions**, which may have an indirect inflationary effect.

About Purchasing Managers' Index (PMI):

- **What is PMI?**
 - **PMI (Purchasing Managers' Index)** is an **economic indicator** derived from monthly **business surveys**.
 - It measures **activity at the purchasing/input stage**, unlike **IIP (Index of Industrial Production)**, which tracks **actual output**.
 - There are **two types**:
 - **Manufacturing PMI** – Tracks industrial and factory activity.
 - **Services PMI** – Assesses the growth in the services sector.
 - **PMI above 50** indicates **economic expansion**, while **below 50** signals **contraction**.
- **Who Releases PMI in India?**
 - **S&P Global** (earlier released by **IHS Markit**) conducts **PMI surveys in India**.
 - Based on a **survey of 500 manufacturing companies** for the **Manufacturing PMI**.
- **PMI Calculation Methodology:**
 - Derived from **qualitative responses** of purchasing managers.
 - **Five key indicators** with assigned weights:

PMI Calculation: Key Indicators and Weights



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- 4) Which of the following best describes the concept of Reciprocal Tariffs in international trade?
- (a) A trade policy where a country imposes tariffs equal to the tariff rates imposed by other nations on its exports.
 - (b) A World Trade Organization (WTO) principle mandating member countries to charge the same tariffs on all trading partners.
 - (c) A protectionist policy that only applies to agricultural products, preventing excessive subsidies in global markets.
 - (d) A system where countries agree to reduce tariff rates in a mutual exchange, known as Preferential Trade Agreements (PTAs).

Solution: A

Option a is correct – Reciprocal Tariffs are **retaliatory trade measures** where a country **matches the tariffs imposed by its trading partners**.

Option b is incorrect – The **WTO follows the Most-Favored-Nation (MFN) principle**, which prevents discriminatory tariff rates.

Option c is incorrect – Reciprocal tariffs **apply to all goods and services**, not just agriculture.

Option d is incorrect – Preferential Trade Agreements (PTAs) are **negotiated tariff reductions, not retaliatory tariffs**.

What is a Reciprocal Tariff?

- A **reciprocal tariff is a trade policy** where a country imposes **import duties equal to the tariffs charged on its exports** by other nations.
- It is designed to **counter trade imbalances and discourage unfair tariff policies** by foreign governments.

How Does It Work?

- If a country imposes **higher tariffs on U.S. goods**, the U.S. will **match the rate** on imports from that nation.
- The policy applies to **goods, services, and non-tariff barriers** restricting U.S. market access.
- It aims to **reduce trade deficits and encourage countries to lower their tariffs** to maintain access to the U.S. market.

Does It Violate WTO Rules?

- **Yes, it may contradict [WTO principles](#)**, which advocate **non-discriminatory trade policies** under the **Most-Favored-Nation (MFN) rule**.
- However, the U.S. can justify it under **Article XXI (national security exception) or Article XX (general exceptions)** of the WTO agreement.

5) Consider the following statements about the protection offered by GI registration in India:

1. The GI tag helps to protect products against unauthorized use by individuals or entities outside the registered geographic area.
2. GI registration helps promote exports by enhancing the marketability of products linked to their origin.
3. A GI tag can be transferred or assigned to other producers outside the geographical region.

How many of the above statements is/are correct?

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

Solution: b)

- Statement 1 is correct as the **GI tag helps protect products from unauthorized use by individuals or producers outside the specified geographical area**, thus preserving the unique identity and reputation of the product.
- Statement 2 is also correct because the **GI tag enhances the marketability and export potential of products** by linking them to a specific origin known for quality and distinctiveness.
- Statement 3 is incorrect because a GI tag cannot be transferred or assigned to other producers outside the defined geographical region. GIs are tied to the location of production and the qualities associated with that region.

6) Consider the following statements.

1. Royalties refer to the fees paid to the owner of a product in exchange for the right to use that product.
2. According to Mines and Minerals (Development and Regulation) Act, 1957 (MMDRA), those who obtain leases to conduct mining activities are required to pay royalty to the individual or corporation who leased the land to them.
3. India's states does not have the power to tax mining activities, and collecting "royalties" from mining leaseholders.

How many of the above statements is/are incorrect?

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

Solution: A

Statement 3 is incorrect.

India's states have the power to tax mining activities, and collecting "royalties" from mining leaseholders is entirely separate from, and does not interfere with, the power to impose taxes, a nine-judge Constitution Bench ruled.

Following the judgment, states can generate additional revenues in the form of taxes on mining activities and on the land used to conduct these activities.

Royalties refer to the fees paid to the owner of a product in exchange for the right to use that product. For example, if a movie studio wants to use an existing piece of music by a specific artist in their new film, they will have to pay a royalty fee that goes to the artist.

Section 9 of the Mines and Minerals (Development and Regulation) Act, 1957 (MMDRA) requires those who obtain leases to conduct mining activities to "pay royalty in respect of any mineral removed" to the individual or corporation who leased the land to them.

- 7) With respect to the Federal Reserve, which of the following statements is/are correct?
1. The Federal Reserve serves as the central banking system of the United States.
 2. The Fed directly controls the interest rates for consumer loans and mortgages.
 3. The Federal Funds Rate is the rate at which banks lend money to each other overnight.

Select the correct answer code:

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

Solution: D

Statement 1 is correct, as the **Federal Reserve was indeed established in 1913 to serve as the central bank of the United States, with responsibilities for monetary policy, banking supervision, and providing financial services.**

Statement 2 is incorrect because the **Federal Reserve does not directly control consumer loan and mortgage rates;** instead, it influences them through its control of the Federal Funds Rate and other monetary policy tools.

Statement 3 is correct, as the **Federal Funds Rate is the interest rate at which banks lend money to one another overnight,** and it serves as a benchmark for other interest rates in the economy.

- 8) Consider the following statements regarding the Financial Intelligence Unit – India (FIU-IND):
1. FIU-IND has its headquarters in Mumbai.
 2. FIU-IND shares intelligence with law enforcement agencies but does not investigate crimes.
 3. It was formed as an independent body under the Department of Revenue.
 4. FIU-IND works to combat financial crimes under the Foreign Exchange Management Act, 1999.

Which of the above statements is/are correct?

- (a) 1, 2 and 3 only
- (b) 1, 3, and 4 only
- (c) 2 and 3 only
- (d) 1, 2, 3 and 4

Solution: C

Statement 1 is incorrect. **FIU-IND is headquartered in New Delhi,** not Mumbai.

Statement 2 is correct. FIU-IND shares financial intelligence with law enforcement agencies but does not conduct investigations itself.

Statement 3 is correct. **FIU-IND was established in 2004 under the Department of Revenue** and operates as an independent body.

Statement 4 is incorrect. **FIU-IND works under the Prevention of Money Laundering Act (PMLA), 2002**, not the Foreign Exchange Management Act (FEMA), 1999.

- 9) With reference to Third-Party Litigation Funding (TPLF) in India, consider the following statements:
1. TPLF can help marginalized communities pursue legal action by providing the necessary financial support.
 2. There is currently a comprehensive national regulatory framework governing TPLF in India.
 3. One of the concerns about TPLF is that funders may prioritize cases with high monetary returns over those with significant social impact.

How many of the above statements is/are correct?

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

Solution: B

- TPLF can bridge the financial gap for marginalized communities, enabling them to pursue legal action that they might otherwise abandon due to lack of funds.
- India currently lacks a comprehensive national regulatory framework for TPLF, though some states have amended civil procedure codes to recognize third-party financing.
- A concern with TPLF is that funders may focus on cases with high profit potential, potentially sidelining cases with significant social importance but lower financial returns.

Therefore, **statements 1 and 3 are correct.**

10) Consider the following statements with respect to the revised MSME classification:

1. The classification considers both manufacturing and service sectors equally without sectoral distinction.
2. Enterprises must exceed both investment and turnover thresholds to move to a higher category.
3. The classification facilitates ease of doing business and improved credit access for growing enterprises.
4. MSME registration is now linked to PAN and Aadhaar-based digital verification.

Which of the above statements are correct?

- (a) 1, 2, 3 and 4
- (b) 2, 3 and 4 only
- (c) 1, 2 and 3 only
- (d) 1, 3 and 4 only

Solution: D

- Statement 1 is correct — the **post-2020 MSME classification** removed the distinction between **manufacturing and service enterprises**, bringing them under the **same threshold criteria**.
- **Statement 2 is incorrect** — an enterprise is classified under a ****higher category** if it crosses **either** the investment **or** the turnover threshold, not both. This is done to **avoid bottlenecks** in scaling.
- Statements 3 and 4 are correct — the revision is intended to **ease formalization**, improve **access to credit and markets**, and the **Udyam portal** uses **PAN and Aadhaar** for digital registration and authentication.

The Government of India has notified revised criteria for MSME classification, increasing investment and turnover limits.

- Finance Minister had announced new classification criteria for **MSMEs**, with investment and turnover limits for the classifications proposed to be increased to **5 times and 2 times**, respectively.

| Rs. in Crore | Investment | | Turnover | |
|--------------------|------------|---------|----------|---------|
| | Current | Revised | Current | Revised |
| Micro Enterprises | 1 | 2.5 | 5 | 10 |
| Small Enterprises | 10 | 25 | 50 | 100 |
| Medium Enterprises | 50 | 125 | 250 | 500 |

About Revision of MSME Definition:

- **What it is:**
 - A policy update amending the thresholds for classifying Micro, Small, and Medium Enterprises based on investment and turnover.
- **Announced In:** Announced during the [Union Budget](#) speech by Finance Minister.
- **Amended By:** The Ministry of MSME under Section 7 of the Micro, Small, and Medium Enterprises Development ([MSMED](#)) Act, 2006.
- **New Revision Effective From:** Effective from April 1, 2025.
- **Purpose of Revision:**
 - To align MSME classification with current business realities and growth trends.
 - To facilitate scaling-up, better credit access, and market expansion.
 - To promote resilience, employment, and self-reliance in the MSME sector.
- **Features of New MSME Definition:**
 1. **Micro Enterprises:**
 - Investment limit raised from ₹1 crore to ₹2.5 crore.
 - Turnover limit increased from ₹5 crore to ₹10 crore.
 2. **Small Enterprises:**
 - Investment threshold increased from ₹10 crore to ₹25 crore.
 - Turnover ceiling raised from ₹50 crore to ₹100 crore.
 3. **Medium Enterprises:**
 - Investment limit revised from ₹50 crore to ₹125 crore.
 - Turnover limit doubled from ₹250 crore to ₹500 crore.

11) Consider the following statements regarding Anti-Dumping Duties (ADD) in India:

1. The authority to recommend anti-dumping duties lies with the Directorate General of Trade Remedies (DGTR).
2. These duties are imposed when imports are priced below the normal value and cause material injury to domestic industry.

Which of the above statements is/are correct?

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

Solution: C

Statement 1 is correct — the **DGTR**, under the **Ministry of Commerce and Industry**, is the nodal agency that conducts investigations and recommends ADD to the Ministry of Finance.

Statement 2 is correct — ADD is imposed when an imported product is **sold at a price lower than its normal value (typically the domestic market price of the exporting country)** and such imports **cause injury** to domestic producers.

About [Anti-Dumping Duties](#):

- **What it is**
 - Anti-dumping duty is a protectionist tariff imposed on imports priced below their normal value in the exporting country.

- It aims to protect domestic industries from injury caused by unfairly priced imports.
- **Authority to impose in India**
 - The Directorate General of Trade Remedies (DGTR) under the Ministry of Commerce and Industry recommends anti-dumping duties.
 - The **Ministry of Finance notifies and levies** these duties based on DGTR's investigation and recommendation.
- **When it is imposed:**
 - Imposed after evidence of material injury to domestic industry from cheap imports sold at below market price.
 - Duties are typically levied for a period of up to five years and periodically reviewed.
- **Does it violate [WTO](#) rules?**
 - No, it is permitted under **Article 6** of the General Agreement on Tariffs and Trade (GATT), 1994.
 - The [WTO Anti-Dumping Agreement](#) allows members to impose duties to ensure fair trade practices.

12) Consider the following statements regarding revised MSME classification.

Statement-I: The revised MSME classification allows units with higher turnover and investment to continue availing MSME benefits.

Statement-II: This move aims to ensure MSMEs are not prematurely excluded from policy incentives as they scale up.

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

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

Solution: A

- Both statements are correct. The **revised MSME classification** is intended to **support growing enterprises** so they can **stay within the MSME bracket longer**, thereby accessing benefits like **priority sector lending, interest subvention, and market linkage schemes**.
- Statement II correctly **explains the policy intent** — the earlier definitions often pushed fast-growing units out of the MSME umbrella, depriving them of support during their critical growth phase.

13) Consider the following statements regarding India's recent actions on Anti-Dumping Duties:

1. Anti-dumping duties are levied by the Ministry of Commerce and enforced by the Ministry of External Affairs.
2. The duty can be levied for a maximum of 5 years but is subject to a sunset review.
3. These duties aim to ensure fair trade rather than protectionism in violation of WTO norms.

How many of the above statements is/are correct?

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

Solution: B

Statement 1 is incorrect — while the **DGTR (Ministry of Commerce)** recommends the duties, **they are imposed by the Ministry of Finance, not the Ministry of External Affairs**.

- **Anti-dumping duties** are typically valid for **up to 5 years**, after which a **sunset review** may continue or terminate the duty.
- ADD is not a violation of WTO norms when used appropriately; it is a **WTO-sanctioned trade remedy to ensure fair pricing** and prevent market distortion.

14) Consider the following statements regarding the Customs Act, 1962:

1. It empowers the central government to prohibit imports for reasons including public health and conservation.
2. The Act allows immediate confiscation of imported goods even if proper documentation is submitted.
3. The Act provides a warehousing mechanism for imported goods before duty is paid.

How many of the above statements is/are correct?

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

Solution: B

- Statement 1 is **correct** – The Act gives the central government the authority to **prohibit or restrict imports or exports** to protect national interests like **public health, morality, wildlife conservation**, and security.
- Statement 3 is also **correct** – A distinctive feature of the Act is the **warehousing provision**, which permits imported goods to be stored in licensed warehouses **without immediate payment of duties**, until cleared for home consumption or re-export.
- Statement 2 is **incorrect** – confiscation of goods generally arises from violations such as **misdeclaration, undervaluation, or smuggling**, not when documentation is properly furnished.

- **What is the Customs Act of 1962?**

- The Customs Act, 1962 regulates the **import and export of goods** in India.
- It safeguards the economy, controls smuggling, and promotes legal international trade.

- **Implementing Agency:** Administered by the **Central Board of Indirect Taxes and Customs (CBIC)** under the **Ministry of Finance**.

- **Key Provisions of the Act:**

- **Customs Duty:** Imposes duties on imported and exported goods based on the **Customs Tariff Act, 1975**.
- **Prohibitions and Restrictions:** Empowers the government to **ban or restrict certain imports/exports** for national security and public health.
- **Clearance Procedures:** Mandates proper documentation, duty payment, and adherence to customs protocols before clearance.
- **Warehousing Provisions:** Allows imported goods to be **stored without immediate duty payment** until released for consumption or export.

- **Exemptions Allowed for Passengers (International Arrivals):**

- **General Duty-Free Allowance:** ₹50,000 worth of goods for international passengers.
- **Gold Allowance:**
 - **Male passengers:** 20 gm of gold (value up to ₹50,000).
 - **Female passengers:** 40 gm of gold (value up to ₹1,00,000).
 - **NRIs:** Can bring up to **10,000 gm** once in six months (duty applicable beyond exemption).
- **Other Allowances:**
 - One laptop per adult passenger.
 - **Alcohol:** 2 litres.
 - **Tobacco:** 100 cigarettes or equivalent.

- **Cash Carrying Limit:**

- Passengers can carry up to **₹25,000** in Indian currency without declaration.
- Must declare foreign currency if exceeding **\$5,000 or \$10,000 equivalent in total foreign exchange**.

- **Fines and Punishment for Smuggling:**

- **Imprisonment:** Jail term between **3 to 7 years**, based on severity.
- **Fines:** Penalties may extend up to **three times the value** of smuggled goods.

2. Ecology and Environment

- 1) Consider the following statements regarding volcanic gases:
1. Carbon dioxide emissions from volcanic eruptions are the primary cause of global warming.
 2. Volcanic gases such as sulfur dioxide can cause acid rain and atmospheric cooling.
 3. Water vapor is the least abundant gas emitted during volcanic eruptions.

How many of the above statements is/are correct?

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

Solution: A

Statement 2 is correct as sulfur dioxide from volcanoes can cause acid rain and reflect sunlight, leading to temporary global cooling.

Statement 1 is incorrect because anthropogenic CO₂ emissions contribute far more to global warming than volcanic CO₂.

Statement 3 is incorrect because water vapor is the most abundant volcanic gas.

- 2) Which of the following are objectives of the CAMPA funds?

1. Treatment of catchment areas
2. Assisted natural regeneration
3. Urban infrastructure development
4. Managing human-wildlife conflicts

Select the correct answer using the code below:

- (a) 1, 2, and 3 only
- (b) 1, 2, and 4 only
- (c) 2, 3, and 4 only
- (d) 1, 2, 3, and 4

Solution: B

Objectives of CAMPA funds include the treatment of catchment areas, assisted natural regeneration, and managing human-wildlife conflicts. **Urban infrastructure development is not among the specified objectives of CAMPA funds.**

What is **CAMPA**?

- **Compensatory Afforestation Fund Management and Planning Authority (CAMPA)** is a mechanism for afforestation and forest conservation to compensate for the diversion of forest land for non-forest purposes.
- Established by the **Supreme Court in 2009**, it operates at both **national and state levels**.

Objectives of CAMPA

- **Compensate forest loss** by promoting afforestation and natural regeneration.
- **Ensure effective fund utilization** for forest and wildlife conservation.
- **Provide financial support** for forest protection, research, and training.
- **Strengthen institutions** responsible for forest management.

Provisions Under CAMPA

- **Funds Collection:** Money is collected from **project proponents** seeking forest clearance under the **Forest (Conservation) Act, 1980**.
- **Utilization of Funds:** Used for **compensatory afforestation, additional afforestation, penal compensatory afforestation, and wildlife conservation**.
- **State CAMPA:** Receives funds from the **Adhoc CAMPA** and administers their utilization for forest development.

- **Monitoring & Accountability:** An independent system is set up for concurrent monitoring and evaluation.

3) Consider the following statements regarding Tiger Reserves in India:

1. Critical Tiger Habitat (CTH) is legally inviolate and free from human habitation.
2. The declaration of a Tiger Reserve makes the area a 'no-go' zone, permanently prohibiting any human presence, including indigenous communities.
3. The core and buffer zones of Tiger Reserves are defined under the Wildlife Protection Act, 1972.

How many of the above statements is/are correct?

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

Solution: B

Statement 1 is correct – **Critical Tiger Habitat (CTH)** is legally inviolate and set aside for tiger conservation.

Statement 2 is incorrect – While **relocation of human settlements from core zones is encouraged**, traditional rights of forest dwellers are recognized under the **Forest Rights Act (2006)**, and they can co-exist in buffer zones.

Statement 3 is correct – The **Wildlife Protection Act, 1972** defines core and buffer zones in Tiger Reserves.

What is a [Tiger Reserve](#)?

- A **Tiger Reserve** is a protected area meant for the conservation of **Bengal tigers** and their ecosystem.
- It falls under **Project Tiger (1973)**, a centrally sponsored scheme by the **National Tiger Conservation Authority (NTCA)**.
- These reserves ensure **tiger population growth, habitat conservation, and human-wildlife conflict mitigation**.

4) Which of the following best explains the ecological significance of Satkosia Tiger Reserve?

- (a) It is located at the confluence of the Mahanadi and Godavari rivers, making it one of India's largest riparian tiger reserves.
- (b) Satkosia Tiger Reserve is a completely uninhabited protected area, ensuring minimal human-wildlife conflict.
- (c) It was the first Tiger Reserve in India to successfully reintroduce tigers from another state under Project Tiger.
- (d) It acts as a transitional zone between the Eastern Ghats and Deccan Plateau, supporting a unique blend of biodiversity.

Solution: D

Satkosia Tiger Reserve serves as a transitional zone between the Eastern Ghats and the Deccan Plateau, making it ecologically unique.

- **Option a is incorrect** because Satkosia is located along the **Mahanadi River**, but **not at the confluence of Mahanadi and Godavari**.
- **Option b is incorrect** because there are **234 villages in the impact zone**, leading to significant **human-wildlife conflicts**.
- **Option c is incorrect** because the tiger reintroduction project at **Satkosia failed** due to poaching and mismanagement.

About [Satkosia Tiger Reserve](#):

- **Location:** Spans **Angul, Cuttack, Boudh, and Nayagarh districts** in Odisha.
- **Established:** **2007**, by merging **Satkosia Gorge Sanctuary (1976)** and **Baisipali Wildlife Sanctuary (1981)**.
- **Total Area:** **1,136.70 sq. km**.
- **Geographical Significance:** A **transitional zone** between **Eastern Ghats and Deccan Plateau**, promoting rich biodiversity.

- **Fauna:** Previously home to **12 tigers (2007)**, but the **2022 census found none**; shelters **elephants, leopards, mugger crocodiles, wild dogs, and 200+ bird species**.
- **Flora:** Houses **400+ plant species**, including **Sal, Mahua, Bamboo, and medicinal plants**.
- **Ramsar Site:** Recognized as a **wetland of international importance**.
- **Tiger Reintroduction:** Initiated in **2018** with two tigers from Madhya Pradesh; **failed due to poaching and mismanagement**.
- **Human Settlements:** **234 villages in the surrounding impact zone**, creating **conflicts over land and resources**.

- 5) Consider the following statements regarding Smooth-Coated Otters and their conservation:
1. They are included in Appendix I of CITES, prohibiting international trade of the species.
 2. The Ganga and Brahmaputra river basins provide major habitats for the species in India.
 3. Smooth-Coated Otters build extensive burrows along riverbanks for shelter and breeding.
 4. The species is known for forming large social groups and engaging in cooperative hunting behavior.

How many of the above statements is/are correct?

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

Solution: C

Statement 1 is incorrect – They are listed under **Appendix II of CITES**, which restricts but does not fully prohibit trade.

Statement 2 is correct – The **Ganga and Brahmaputra river basins** provide **key habitats** for Smooth-Coated Otters in India.

Statement 3 is correct – They **build burrows along riverbanks** for shelter and breeding.

Statement 4 is correct – They **form large family groups** and **engage in cooperative hunting**.

About the **Smooth-Coated Otter**:

- **Scientific Name:** *Lutrogale perspicillata*
- **Habitat:** Found in **wetlands, rivers, lakes, mangroves, and estuaries** across **South and Southeast Asia**.
- **Distribution:** Native to **India, Bangladesh, Nepal, Sri Lanka, Myanmar, Thailand, Malaysia, and Indonesia**.
- **Physical Characteristics:**
 - **Larger than other otter species**, with **shorter fur and a flattened tail**.
 - Has **webbed feet** for efficient swimming.
 - Primarily **carnivorous**, feeding on **fish, crustaceans, and amphibians**.

IUCN Status & Conservation

- **IUCN Red List:** **Vulnerable (VU)** due to **habitat destruction, poaching, and water pollution**.
- **CITES Listing:** **Appendix II**, restricting international trade.
- **Threats:**
 - **Habitat loss** due to **wetland degradation**.
 - **Illegal hunting for fur and pet trade**.
 - **Decline in fish population** impacting food availability.
- **Conservation Measures:**
 - **Protected under Schedule II of the Wildlife Protection Act, 1972 (India)**.
 - Conservation projects focusing on **wetland restoration and anti-poaching efforts**.



6) Consider the following statements regarding Project Tiger and Tiger Reserves in India:

1. All Tiger Reserves in India are legally designated under the Environment Protection Act, 1986.
2. The buffer zone of a Tiger Reserve allows regulated human activities for livelihood and conservation purposes.
3. The NTCA is empowered to disband a Tiger Reserve if it fails to maintain minimum tiger population thresholds.

How many of the above statements is/are correct?

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

Solution: A

Statement 1 is incorrect – Tiger Reserves are designated under the Wildlife Protection Act, 1972, not the Environment Protection Act, 1986.

Statement 2 is correct – Buffer zones allow regulated activities like eco-tourism, grazing, and sustainable forest use.

Statement 3 is incorrect – NTCA does not have the power to disband a Tiger Reserve, though it can recommend conservation interventions.

Procedure to Designate a Tiger Reserve in India

- **Proposal & Identification:**-The State Government proposes a region based on the viability of the tiger population, habitat conditions, and biodiversity value.
- **Approval by the National Tiger Conservation Authority (NTCA):**-NTCA evaluates the proposal, considering factors such as tiger presence, ecological balance, and community impact.
- **Central Government Notification:**- After NTCA's approval, the Union Ministry of Environment, Forest, and Climate Change (MoEFCC) declares the area as a Tiger Reserve under Section 38V of the Wildlife Protection Act, 1972.
- **Core & Buffer Zone Demarcation:**
 - The reserve is divided into:
 - **Core Zone:** Strictly protected for wildlife, with zero human disturbance.
 - **Buffer Zone:** Allows regulated human activities to support conservation while considering local livelihoods.
- **Conservation Measures & Monitoring:**- Regular population surveys, habitat management, and anti-poaching measures are implemented.
 - NTCA oversees monitoring through the M-STripES (Monitoring System for Tigers – Intensive Protection and Ecological Status) program.

7) Which of the following is a major environmental challenge affecting the North Sea?

- (a) Rising salinity levels due to reduced freshwater inflow.
- (b) Increased frequency of dead zones due to excessive nutrient runoff.
- (c) Formation of underwater volcanoes due to tectonic activity.
- (d) Expansion of mangrove forests along the coastline.

Solution: B

Excessive nitrogen and phosphorus from agricultural runoff cause eutrophication, leading to dead zones (oxygen-depleted areas) in the North Sea.

The North Sea does not have significant mangrove forests due to its cold climate.

Underwater volcanoes are not a feature of the North Sea.

What is the North Sea?

- The **North Sea** is a **marginal sea of the Atlantic Ocean**, located between **Great Britain, Scandinavia, Germany, the Netherlands, Belgium, and France**.

Key Facts About the North Sea

- **Area:** Approximately **570,000 square kilometers**.
- **Average Depth:** **95 meters**, with a **maximum depth of 700 meters** in the Norwegian Trench.
- **Connected Water Bodies:** Linked to the **Norwegian Sea, English Channel, and the Baltic Sea**.
- **Bordering Countries:** **United Kingdom, Norway, Denmark, Germany, Netherlands, Belgium, France**
- **Major Rivers Flowing into the North Sea:** **Rhine River** (Germany, Netherlands), **Elbe River** (Germany), **Thames River** (United Kingdom), **Seine River** (France), **Ems River** (Germany), **Meuse River** (Belgium, Netherlands)

8) Consider the following statements regarding Soil Fertility Mapping:

1. It involves the use of geospatial techniques, remote sensing, and AI-based models for soil analysis.
2. The mapping process focuses primarily on physical soil properties rather than nutrient composition.
3. It helps in the implementation of precision agriculture.

How many of the above statements is/are correct?

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

Solution: B

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Statement 1 is correct – Soil fertility mapping integrates remote sensing, geospatial tools, and AI-driven models for high-accuracy soil health analysis.

Statement 2 is incorrect – The mapping process prioritizes soil nutrient composition (NPK, sulfur, micronutrients) rather than just physical properties like texture and porosity.

Statement 3 is correct – It supports precision agriculture by customizing fertilizer application based on real-time soil fertility data.

What is Soil Fertility Mapping?

- It is a **scientific method** of assessing and visualizing soil nutrient composition across different regions.
- Uses **geospatial techniques, remote sensing, and AI-based tools** to generate precise **soil health data**.

Benefits of Soil Fertility Mapping

- **Precision Agriculture:** Helps farmers identify **nutrient deficiencies and surpluses**.
 - Enables **targeted fertilizer application** for better crop yield.
- **Cost-Efficient Farming:** Reduces **overuse and underuse of fertilizers**, optimizing costs.
 - Enhances **soil productivity and economic returns** for farmers.
- **Improved Soil Health Management:** Encourages **integrated nutrient management (INM)**.
 - Promotes **organic manures and bio-fertilizers** for sustainable farming.
- **Environmental Sustainability:** Minimizes **soil degradation and nutrient depletion**.
 - Reduces **chemical runoff and groundwater contamination**.
- **Empowering Farmers:** **Soil Health Cards (SHC)** provide **customized recommendations**.
 - Farmers can **download SHC data** using mobile-based services.

- 9) Consider the following statements regarding Solar Radiation Management (SRM) and the use of diamond dust:
1. SRM aims to reduce greenhouse gases in the atmosphere by increasing the amount of sunlight that reaches the Earth's surface.
 2. Diamond dust is considered for SRM due to its low reflectivity and minimal effect on solar radiation.
 3. The Mount Pinatubo eruption is an example of natural SRM effects, where sulfur dioxide release led to a temporary cooling of the Earth's surface.

How many of the above statements is/are correct?

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

Solution: A

The Mount Pinatubo eruption in 1991 released vast amounts of sulfur dioxide, which created a reflective aerosol layer in the stratosphere. This layer temporarily cooled the Earth by approximately 0.5°C, demonstrating a natural form of SRM.

Statement 1 is incorrect because **SRM does not reduce greenhouse gases**; instead, it aims to reduce the amount of heat reaching the Earth's surface by reflecting sunlight back into space.

Statement 2 is incorrect because **diamond dust is considered for SRM due to its high reflectivity, making it highly effective at scattering solar radiation** and potentially reducing global temperatures if dispersed in the stratosphere. This approach mimics volcanic cooling effects without altering atmospheric greenhouse gas levels.

- 10) Consider the following statements regarding the distribution and lifestyle of the Indian flapshell turtle:
1. The Indian flapshell turtle is found across South Asia, including countries like Pakistan, Sri Lanka, and Bangladesh.
 2. This species is omnivorous, feeding on a variety of plants, insects, and small animals.
 3. It is well adapted to drought conditions and can survive in low-water environments.

How many of the above statements is/are incorrect?

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

Solution: D

Statement 1 is correct. **The Indian flapshell turtle has a wide distribution across South Asia, including India, Pakistan, Sri Lanka, Nepal, Bangladesh, and Myanmar.**

Statement 2 is correct. The species is omnivorous, consuming plants, insects, small fish, and other small animals.

Statement 3 is correct. The Indian flapshell turtle has evolved to survive in drought-prone areas and can live in low-water or even dried-out conditions.

- 11) Consider the following statements regarding the conservation status and threats to the Great Indian Bustard:
1. The Great Indian Bustard is listed under Appendix II of CITES.
 2. The primary threats to its survival include habitat destruction, power line collisions, and human interference.
 3. It is included under Schedule II of the Wildlife Protection Act, 1972, in India.

How many of the above statements is/are correct?

- (a) Only one
- (b) Only two

- (c) All three
- (d) None

Solution: A

Statement 1 is incorrect. The Great Indian Bustard is listed under **Appendix I of CITES**, which provides the highest level of protection for endangered species in international trade.

Statement 2 is correct. Major threats to the Great Indian Bustard include habitat destruction, collisions with power lines, and human interference, all of which have drastically reduced its population.

Statement 3 is incorrect. The species is protected under **Schedule I of the Wildlife Protection Act, 1972**, which ensures maximum protection under Indian law.

12) Consider the following statements about Stratospheric Aerosol Injection (SAI) and Cirrus Cloud Thinning (CCT):

1. Both SAI and CCT target shortwave solar radiation to mitigate global warming.
2. SAI involves dispersing reflective aerosols in the troposphere, while CCT focuses on reducing the amount of longwave radiation emitted by cirrus clouds.
3. Both techniques aim to increase the Earth's albedo to reduce the amount of heat absorbed by the surface.

How many of the above statements is/are incorrect?

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

Solution: B

Both Stratospheric Aerosol Injection (SAI) and Cirrus Cloud Thinning (CCT) are aimed at increasing the Earth's albedo. **SAI focuses on reflecting shortwave solar radiation** by injecting reflective aerosols like sulfur dioxide into the stratosphere. **CCT, on the other hand, aims to reduce cirrus clouds' thickness and cover to allow more longwave radiation to escape into space**, thus reducing the greenhouse effect.

Statement 1 is incorrect because while SAI targets shortwave solar radiation, CCT focuses on longwave radiation emitted by cirrus clouds.

Statement 2 is incorrect because SAI targets the stratosphere, not the troposphere, and CCT reduces the greenhouse effect by affecting longwave radiation, not shortwave solar radiation.

13) Consider the following statements about the composition and formation of coking coal:

1. Coking coal has high sulphur and phosphorus levels, making it ideal for steel production.
2. It is formed from the carbonization process, which produces metallurgical coke at high temperatures.

Which of the above statements is/are correct?

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

Solution: B

Statement 2 is correct: **Coking coal undergoes a carbonization process at high temperatures to produce metallurgical coke, which is crucial for steel production.**

Statement 1 is incorrect. Coking coal must have low sulphur and phosphorus levels to avoid contamination in steel production, and a high, not low, carbon content is essential to provide the required strength and efficiency in the blast furnace process. These factors underline the significance of specific chemical and physical properties of coking coal in its role within the steel industry.

14) Consider the following statements regarding Habitat Rights.

1. Habitat rights are granted under the Forest Rights Act and provide communities with rights over their customary territories, cultural practices, livelihood means and protection of their natural and cultural heritage.
2. They empower Particularly Vulnerable Tribal Group (PVTG) communities to access government schemes and initiatives to develop their habitats.
3. In India, more than half of Particularly Vulnerable Tribal Groups (PVTGs) have been granted habitat

rights.

How many of the above statements is/are correct?

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

Solution: B

Statement 3 is incorrect.

About Habitat Rights:

- Habitat rights are granted under the Forest Rights Act and provide communities with rights over their customary territories, cultural practices, livelihood means, biodiversity knowledge, and protection of their natural and cultural heritage.
- Habitat rights help safeguard traditional livelihoods and ecological knowledge, and they empower PVTG communities to access government schemes and initiatives to develop their habitats.

The **Mankidia community in Odisha has been granted habitat rights**, making them the sixth Particularly Vulnerable Tribal Group (PVTG) to receive this recognition under the Forest Rights Act, 2006.

15) Consider the following statements.

1. Mustard flowers contain both female and male reproductive organs, which makes the plant largely self-pollinating.
2. GM mustard is the first approved GM crop in India, that is meant for human consumption.
3. Genetic Engineering Appraisal Committee (GEAC) is responsible for approving proposals relating to genetically engineered organisms.

Which of the above statements is/are correct?

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

Solution: D

Genetic Engineering Appraisal Committee (GEAC) — the body that is responsible for approving proposals relating to genetically engineered organisms.

Bacillus thuringiensis cotton (or Bt cotton) is the only GM crop that has been approved for cultivation in India so far.

Mustard flowers contain both female (pistil) and male (stamen) reproductive organs, which makes the plant largely self-pollinating. The GM mustard developed by the DU scientists contains two alien genes — the first,

'barnase', gene interferes with pollen production and renders the plant male-sterile, and the resulting plant is crossed with fertile mustard flowers containing the second, 'barstar', gene which blocks the action of the barnase gene. The resulting plants are meant to be high-yield variants of mustard.

16) Consider the following statements regarding microplastics and initiatives to tackle them:

1. Microplastics are easily broken down into harmless molecules by natural processes.
2. The GloLitter Partnerships Project is a global initiative to address the issue of marine litter, including microplastics.
3. India's "Un-Plastic Collective" is a collaborative initiative to reduce plastic pollution in the country.

Which of the above statements is/are correct?

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

Solution: C

Statement 1 is incorrect because **microplastics are not easily broken down by natural processes**. They persist in the environment, particularly in marine ecosystems, where they can cause significant harm to wildlife and ecosystems.

Statement 2 is correct; the **GloLitter Partnerships Project is a global initiative aimed at preventing and reducing marine litter, including microplastics**, by promoting best practices and reducing plastic waste from maritime sources.

Statement 3 is also correct; **the "Un-Plastic Collective" is an Indian initiative that brings together businesses, NGOs, and government agencies to collectively reduce plastic pollution and promote sustainable alternatives**. This initiative is part of India's broader efforts to combat the environmental challenges posed by plastic waste.

17) Consider the following statements regarding the differences between cheetahs, leopards, and jaguars:

1. Cheetahs have solid black spots, while leopards and jaguars have rosettes.
2. Jaguars have a stronger bite force compared to cheetahs and leopards, enabling them to crush the skulls of their prey.
3. Leopards have a relatively larger head compared to cheetahs and jaguars.

Which of the above statements is/are correct?

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

Solution: C

Statement 1 is correct; **cheetahs have solid black spots on their coat, which is distinct from the rosettes found on leopards and jaguars**.

Statement 2 is also correct; **jaguars are known for having the strongest bite force among big cats**, which allows them to bite directly through the skulls of their prey, a trait not shared by cheetahs or leopards.

Statement 3 is incorrect; **leopards have a relatively smaller and more angular head compared to jaguars**, which have a larger, rounded head. Cheetahs have a small, rounded head with distinctive tear marks, which help them in hunting during the day.

18) Consider the following key properties of Mycelium Bricks:

1. They are fire-resistant, but prolonged exposure to extreme heat can degrade them.
2. They naturally bind together, eliminating the need for synthetic adhesives.

3. They are completely impermeable to water, making them suitable for underwater structures.
4. Their biodegradability can be controlled using specific post-processing treatments.

Which of the above statements are correct?

- (a) 1, 2, and 4 only
- (b) 2, 3, and 4 only
- (c) 1, 3, and 4 only
- (d) 1, 2, 3, and 4

Solution: A

- Statement 1 is correct – Mycelium Bricks are fire-resistant, but they can degrade under prolonged high temperatures.
- Statement 2 is correct – Mycelium naturally binds to organic matter, reducing the need for synthetic adhesives.
- **Statement 3 is incorrect – Mycelium Bricks are not waterproof; they are naturally porous and require treatment to be used in wet conditions.**
- Statement 4 is correct – Biodegradability can be controlled using heat treatment, resins, or coatings to increase longevity.

- **What are Mycelium Bricks?**

- **Bioengineered construction material** made from **fungal mycelia**, sawdust, and husk.
- Mycelium forms a **fibrous network** that solidifies into **lightweight, durable bricks**.

- **Developed by:**

- Research in [sustainable construction](#) has driven their development.
- Innovators like **Roha Biotech (IIT Madras Incubated)** and global research institutions are refining production techniques.

- **Key Features:**

- **Lightweight & Strong:** High strength-to-weight ratio but weaker than concrete.
- **Thermal Insulation:** Effective [heat insulator](#), reducing energy consumption.
- **Fire-Resistant:** Naturally resistant to flames but requires treatment for long-term durability.
- **Biodegradable:** Decomposes naturally, reducing waste.
- **Eco-Friendly Production:** [Low carbon footprint](#) as it does not require high-temperature kilns.

19) Consider the following statements regarding the physical behaviour of Plastic Ice VII:

1. It forms naturally in Earth's polar ice caps due to high compression from overlying ice layers.
2. It has a lower density than liquid water, causing it to float when placed in water.
3. It remains in a stable phase at room temperature if kept in a vacuum-sealed environment.

How many of the above statements are correct?

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

Solution: D

- Statement 1 is incorrect – Plastic Ice VII does not form naturally on Earth; it requires extreme pressures found in planetary mantles.
- Statement 2 is incorrect – Unlike normal ice, Plastic Ice VII is denser than water and would sink rather than float.
- Statement 3 is incorrect – It is not stable at room temperature, even in a vacuum-sealed environment; it requires high pressure to remain stable.

- **What is [Plastic Ice VII](#)?**

- A unique phase of water where molecules remain in a rigid crystalline structure while retaining rotational motion.
- Originally predicted in 2008, but experimentally confirmed in 2025.
- **How does it form?**
 - **Extreme Conditions:** Forms under 450-600K (177-327°C) temperature and 0.1-6 GPa pressure (60,000 times atmospheric pressure).
 - **Lab Confirmation:** Verified through [Quasi-Elastic Neutron](#) Scattering (QENS) at ILL, France.
- **Key Characteristics:**

| Feature | Description |
|------------------------|--|
| Structure | Cubic crystalline lattice, similar to Ice VII |
| Molecular Motion | Picosecond rotational movement, unlike rigid ice |
| Formation Conditions | High temperature (450-600K) & high pressure (0.1-6 GPa) |
| Scientific Method Used | QENS (Quasi-Elastic Neutron Scattering) |
| Phase Transition | Transition from Ice VII to Plastic Ice VII, possibly leading to a superionic phase at even higher pressures. |

- **Applications & Significance:**
 - **Planetary Science:** Explains water's behavior inside [icy moons](#) (Ganymede, Callisto, Titan) and exoplanets.
 - **Extreme Environment Research:** Helps in understanding high-pressure physics and material science.
 - **Space Exploration:** Improves knowledge of ice phases in extreme planetary conditions, aiding in future astrobiology studies.
 - **Hydrogen Storage & Energy Research:** May have potential technological applications in material sciences.

- 20) India played a pivotal role in forming the Green Group alliance at the first Conference of Parties (COP) under the UNFCCC. What was the primary objective of this coalition?
- To create a fund for technological advancement in developed nations
 - To counter demands from developed countries for stringent commitments on developing countries
 - To negotiate favorable trade agreements for developing nations
 - To promote the rapid development of renewable energy technologies

Solution: B

- **India's role in forming the Green Group alliance of 72 like-minded developing countries during the first Conference of Parties (COP) under the UNFCCC was primarily aimed at countering the demands from developed countries.**
- These demands sought to place stringent climate-related commitments on developing nations, without considering their varied development levels and historical contributions to global emissions.
- The coalition helped ensure that the interests of the Global South were adequately represented, emphasizing that developing countries should not be subjected to the same obligations as developed nations in global climate negotiations.

- 21) Consider the following statements regarding the energy sector and methane emissions:
- Methane often escapes during oil and gas production, transportation, and storage.
 - Methane is less likely to leak during natural gas production than during coal extraction.

3. Flaring and venting processes contribute to methane emissions in the energy sector.

How many of the above statements is/are incorrect?

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

Solution: A

Statement 1 is correct as **methane often escapes during oil and gas production, transportation, and storage due to leaks and equipment failure.**

Statement 3 is also correct; flaring and venting processes in the energy sector release methane.

Statement 2 is incorrect because **methane leaks occur more frequently in natural gas production than in coal extraction.**

22) Which of the following correctly describes Kanger Valley National Park, one of the sites added to India's UNESCO Tentative List?

- (a) It is a biodiversity hotspot with rare limestone caves and dense forests.
- (b) It is known for prehistoric rock paintings dating back to the Mesolithic Age.
- (c) It is a mangrove ecosystem famous for its estuarine crocodiles.
- (d) It primarily consists of coastal sand dunes and desert wildlife.

Solution: A

Explanation:

- **Option a is correct** – It is a **biodiversity hotspot with limestone caves and dense forests**, home to species like the **Bastar Hill Myna**.
- **Option b is incorrect** – Although prehistoric sites exist in Chhattisgarh, Kanger Valley is **not known for Mesolithic rock paintings**.
- **Option c is incorrect** – Kanger Valley is **not a mangrove ecosystem**, but a forested region.
- **Option d is incorrect** – It is **not a desert ecosystem** but a **moist deciduous forest**.

23) What is the key characteristic of Oxo-degradable plastics?

- (a) They are compostable and yield biomass during decomposition
- (b) They are derived from renewable biomass
- (c) They contain additives that help break them into smaller fragments, leading to microplastic leakage
- (d) They are completely biodegradable in the environment

Solution: C

- **Oxo-degradable plastics are not truly biodegradable but instead fragment into microplastics due to the presence of chemical additives. These additives enable oxidation, which accelerates the breakdown of plastic under exposure to heat, light, and oxygen.** However, instead of decomposing into harmless organic matter, they **disintegrate into microplastics**, which persist in the environment and contribute to long-term pollution.
- Unlike **compostable plastics** (which degrade into biomass, water, and carbon dioxide), **oxo-degradable plastics do not fully break down** and instead create **microplastic contamination in soil, water bodies, and marine ecosystems**. They are often mistaken as a solution to plastic waste, but their environmental impact remains a major concern.
- Due to these issues, many countries and environmental organizations **discourage or ban** the use of oxo-degradable plastics, advocating instead for **biodegradable or compostable alternatives** that completely degrade into **natural elements** without harmful residues.

- 24) Consider the following statements about the impact of polar ice melt on marine ecosystems:
1. Habitat loss due to ice melt primarily affects species like polar bears and penguins.
 2. Changing salinity levels and water temperatures in the ocean are altering the biodiversity of marine ecosystems.
 3. Ocean acidification benefits shell-forming marine species by creating more favorable environments.

How many of the above statements is/are incorrect?

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

Solution: A

Statement 1 is correct because **polar ice melt leads to habitat loss for species like polar bears and penguins**, which depend on sea ice for hunting and breeding.

Statement 2 is also correct, as **changing salinity and rising ocean temperatures due to melting ice are altering marine biodiversity**, affecting species composition and distribution.

However, **statement 3 is incorrect** because ocean acidification harms shell-forming species by reducing the availability of carbonate ions, which are essential for building shells. Acidification poses a severe threat to these species.

- 25) Consider the following statements regarding swamps:

1. Swamps are found only in tropical regions.
2. Swamps can be either freshwater or saltwater ecosystems.
3. Swamps are usually located in areas with poor drainage where water accumulates.

Which of the above statements is/are correct?

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

Solution: C

Swamps can be freshwater or saltwater ecosystems, depending on their proximity to rivers, lakes, or coastlines. They are **typically found in areas with poor drainage where water accumulates**, such as floodplains, coastal regions, or low-lying areas.

Statement 1 is incorrect because swamps are not limited to tropical regions; they can **occur in various climatic zones**, including temperate and subtropical regions.

- 26) Which of the following represents a significant application of green hydrogen in water management?

- (a) It is used to recycle wastewater more efficiently
- (b) It enhances the capacity of hydropower stations
- (c) It powers desalination plants to produce freshwater
- (d) It powers irrigation systems for agriculture

Solution: C

Green hydrogen has the potential to power desalination plants, which convert saltwater into freshwater, playing a crucial role in sustainable water management. By using renewable energy sources like green hydrogen, desalination plants can operate without emitting greenhouse gases, making them more environmentally friendly. This application is particularly important for regions facing freshwater scarcity, helping them meet their water needs in a sustainable manner.

27) Which of the following statements best describes White Hydrogen?

- (a) A hydrogen variant artificially synthesized in labs through electrolysis.
- (b) A hydrogen fuel that is extracted from methane and other hydrocarbons.
- (c) A by-product of nuclear fusion in controlled reactor environments.
- (d) Naturally occurring hydrogen found underground due to geological reactions.

Solution: D

White hydrogen is a naturally occurring form of hydrogen found beneath the Earth's surface due to **geological reactions between minerals and water**. It is distinct from **Green Hydrogen**, which is produced through electrolysis, and **Grey Hydrogen**, which is derived from fossil fuels like methane. Nuclear fusion does not produce White Hydrogen, making options (a), (b), and (c) incorrect.

About **White Hydrogen**:

- **What it is:**
 - White hydrogen is naturally occurring pure hydrogen found underground, formed due to geological reactions. It emerges when minerals react with water deep beneath the [Earth's crust](#).
- **Key Features:**
 - **Zero-emission:** It occurs naturally without requiring industrial production, avoiding CO₂ emissions.
 - **Low cost:** White hydrogen production costs around \$1 per kilogram, making it highly affordable.
 - **Renewable source:** White hydrogen constantly regenerates within the Earth, unlike exhaustible fossil fuels.
 - **Combustion output:** When used as fuel, white hydrogen produces only water vapor after combustion.
- **Significance:**
 - **Clean energy alternative:** Can reduce reliance on fossil fuels for heavy industries like aviation, shipping, and steel.
 - **Energy security:** Potential game-changer for energy independence in hydrogen-importing countries.
 - **Cost-effectiveness:** Could significantly lower global hydrogen prices compared to synthetic alternatives.
 - **Sustainability:** Supports climate action with its low [carbon footprint](#) and renewable nature.
- **Limitations:**
 - **Exploration difficulty:** Hard to locate deposits due to specific geological conditions.
 - **Environmental risks:** Potential hydrogen leakage could disrupt greenhouse gas reduction efforts.
 - **Storage and transport challenges:** Requires extremely low liquefaction temperatures (-253°C) and robust pipelines.
 - **Regulatory barriers:** Absence of clear guidelines for extraction and safe handling.

28) How does green hydrogen benefit industrial operations?

- (a) It reduces waste generation in industrial processes.
- (b) It offers lower energy efficiency compared to traditional combustion engines.
- (c) It enables on-site production and storage, reducing energy costs and grid dependence.
- (d) It increases dependence on the electricity grid for energy supply.

Solution: C

Green hydrogen production in the industrial sector allows for on-site generation and storage, making it a reliable and flexible energy source. This can significantly reduce dependence on the electricity grid and lower energy costs, especially when produced using excess renewable energy. The use of green hydrogen in fuel cells also increases energy efficiency compared to traditional combustion engines, contributing to a reduction in overall energy consumption and promoting sustainable industrial operations.

29) Consider the following statements regarding CO₂-to-methanol technology:

1. The CO₂-to-methanol technology supports India's commitment to achieving net-zero carbon emissions by 2030.
2. Methanol produced from CO₂ can be used in a wide range of industrial applications, including the chemical and energy sectors.
3. The primary challenge in scaling up the CO₂-to-methanol technology is the lack of CO₂ availability from industrial sources in India.

How many of the above statements is/are correct?

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

Solution: A

India has committed to achieving net-zero carbon emissions by 2070, not 2030 (Statement 1 is incorrect).

Methanol produced from CO₂ can be used in various industrial applications, including the chemical, energy, and transport sectors (Statement 2 is correct).

India's challenge in scaling up CO₂-to-methanol technologies is not due to a lack of CO₂ availability but rather the cost and efficiency of capturing CO₂ from industrial emissions (Statement 3 is incorrect).

30) Consider the following statements regarding Wular Lake:

1. Wular Lake was formed as a result of tectonic activity and is one of the largest freshwater lakes in South Asia.
2. The lake is primarily fed by the Jhelum River and also receives glacial meltwater from the Pir Panjal range.
3. The Wular Lake basin is designated as a Ramsar site due to its ecological importance and biodiversity.

How many of the above statements is/are correct?

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

Solution: C

- Wular Lake was formed due to tectonic activity and is among the largest freshwater lakes in South Asia, making statement 1 correct.
- It is primarily fed by the Jhelum River and additional water from mountain streams, including glacial melt from nearby ranges such as Pir Panjal, making statement 2 also correct.
- Statement 3 is correct as Wular Lake is a Ramsar site recognized for its significant biodiversity and wetland ecology.

31) Consider the following statements regarding George VI Ice Shelf region, recently seen in news.

1. The George VI Ice Shelf region is governed under the Antarctic Treaty System.
2. The Antarctic Treaty permits sovereign control and exclusive research zones by signatory countries.

Which of the above statements is/are correct?

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

Solution: A

- Statement I is correct — the **George VI Ice Shelf** lies within the area governed by the **Antarctic Treaty System (ATS)**, which covers all land and ice shelves south of 60°S latitude.
- Statement II is incorrect — under ATS, **no new territorial claims are recognized**, and existing claims are held in abeyance. The **continent is demilitarized and dedicated to peaceful scientific exploration**, not exclusive control.

Scientists discovered thriving ecosystems with potential new species beneath the Antarctic ice shelf after the A-84 iceberg broke away from the George VI Ice Shelf.

About George VI Ice Shelf:

- **Located in:**
 - Situated in [Antarctica](#), occupying **George VI Sound**, which separates **Alexander Island** from **Palmer Land**.
- **Nation controlling it:**
 - Governed under the **Antarctic Treaty System**, with research presence and exploration led by **United Kingdom** and **United States**.
- **Neighbouring Sea:** Lies adjacent to the **Bellingshausen Sea** in the Southern Ocean.
- **Geographical Features:**
 - Stretches from **Ronne Entrance** in the southwest to **Niznik Island** in the north, covering around 30 nautical miles.
 - Ice thickness exceeds **150 metres**, with underlying waters reaching depths of **1,300 metres**.
 - Characterized by extensive floating ice shelves, subglacial ecosystems, and complex underwater geography.
- **Recent Discoveries Beneath George VI Ice Shelf:**
 - **New Species Found:** Discovery of giant sea spiders, octopi, corals, and a giant phantom jellyfish at depths of up to 1,300 meters.
 - **Unexplored Ecosystems:** Accessed after the break-away of the [A-84 iceberg](#), revealing life in previously inaccessible regions.
 - **Nutrient Transport Mystery:** Possible unknown nutrient transport mechanisms sustaining life under 150-meter-thick ice.
- **Significance of Discoveries:**
 - **Scientific Breakthrough:** Challenges existing assumptions about life in extreme, nutrient-deprived environments.
 - **Climate Insights:** Offers clues on how ecosystems may respond to melting ice shelves and climate change.
 - **Marine Conservation:** Underlines the need to protect fragile Antarctic marine ecosystems.

32) Indore is set to launch India's first PPP-based green waste processing plant under Swachh Bharat Mission-Urban. Consider the following statements regarding PPP-based green waste processing plant.

Statement-I: India's PPP-based green waste processing plant helps in reducing dependence on fossil fuels.

Statement-II: The plant converts green waste into eco-friendly fuels that can replace coal.

Which one of the following is correct?

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

Solution: A

Both statements are correct, and **Statement-II provides a valid reason** for **Statement-I** by explaining how green waste conversion into wooden pellets reduces fossil fuel dependence.

Indore is set to launch India's first PPP-based green waste processing plant under [Swachh Bharat Mission-Urban](#).

About India's first PPP-based [green waste processing](#) plant:

- **What it is:**
 - A Public-Private Partnership (PPP) model waste processing facility for converting green waste into eco-resources.
- **Aim of the initiative:**
 - To process green waste (wood, leaves, branches, flowers) into pellets and sawdust, replacing coal and supporting clean energy goals.
- **Key features:**
 - Partnered with **Astronomical Industries Private Limited**.
 - Converts waste into wooden pellets, sawdust, and biodegradable products.
 - **End products:** eco-friendly fuels, packaging materials, biodegradable plates, fertilizers.
 - Reduces pollution, improves [Air Quality Index](#) (AQI), and contributes to energy conservation.

33) Consider the following statements regarding the objectives of the Convention on Biological Diversity (CBD).

1. The CBD's sole focus is on conserving endangered species.
2. Sustainable use of biodiversity resources is not included in the CBD's goals.
3. The CBD excludes benefit-sharing from genetic resources as part of its framework.
4. The CBD does not address biodiversity-related issues in national policies.

How many of the above statements is/are correct?

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

Solution: d)

The CBD has three main objectives: **the conservation of biodiversity, sustainable use of its components, and the equitable sharing of benefits arising from genetic resources.**

Statement 1 is incorrect as the CBD's goals are broad, addressing not only endangered species but also ecosystem conservation and genetic diversity.

Statement 2 is incorrect because sustainable use of biodiversity resources is one of the primary goals of the CBD.

Statement 3 is incorrect as benefit-sharing from genetic resources is a crucial component of the CBD.

Statement 4 is also incorrect because the CBD encourages the integration of biodiversity conservation and sustainable use into national policy frameworks.

34) Consider the following statements about the Cartagena and Nagoya Protocols under the Convention on Biological Diversity (CBD):

1. The Cartagena Protocol solely addresses climate change adaptation in biodiversity conservation.
2. The Nagoya Protocol emphasizes marine biodiversity conservation exclusively.
3. Both protocols are independent of the CBD and do not require CBD membership for participation.

How many of the above statements is/are correct?

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

Solution: D

The Cartagena Protocol on Biosafety focuses on regulating the transboundary movement of living modified organisms (LMOs) to protect biodiversity, not climate change adaptation, making statement 1 incorrect.

The Nagoya Protocol addresses access to genetic resources and fair benefit-sharing rather than marine biodiversity conservation exclusively, making statement 2 incorrect.

Finally, both the Cartagena and Nagoya Protocols are supplementary agreements under the CBD, and membership in the CBD is generally required to participate in these protocols, making statement 3 incorrect.

These protocols are vital components of the CBD, focusing on biosafety and benefit-sharing, respectively, enhancing the convention's scope in biodiversity management.

35) The 2023 update to India's Nationally Determined Contributions (NDCs) emphasizes which of the following as a major part of India's climate strategy?

- (a) Provision of subsidies for fossil fuel industries
- (b) Setting up international partnerships for non-renewable energy resources
- (c) Complete phase-out of coal-based energy by 2030
- (d) Establishment of a domestic carbon market

Solution: D

India's updated NDCs in 2023 emphasized the establishment of a domestic carbon market as a key part of its climate strategy. This move aligns with the Energy Conservation (Amendment) Act of 2022, which provides a statutory basis for a Carbon Credit Trading Scheme (CCTS) to help India meet its commitments under the Paris Agreement.

36) Consider the following statements about the practice of light fishing:

1. It is most commonly used in the monsoon season when fish abundance is at its peak.
2. It can interfere with the natural reproductive cycles of marine species.
3. It increases the risk of biodiversity loss by attracting non-target marine species.

Which of the above statements are correct?

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

Solution: b)

- **Light fishing** is a practice that uses artificial lighting to attract fish toward nets or traps, and while it increases short-term catch efficiency, it raises several ecological concerns.
- **Statement 1 is incorrect** — light fishing is **not typically practiced during the monsoon**, when sea conditions are rough and fish populations are naturally abundant. Instead, it is predominantly used during **lean fishing months**, especially between **December and February**, when fish catch is low. The artificial attraction of fish during these periods boosts economic returns but comes at a cost.
- **Statement 2 is correct** — artificial lights can **disrupt the natural behavioral and reproductive cycles** of marine organisms. Many fish species rely on natural light cues for **spawning, migration, and feeding rhythms**, and the presence of continuous artificial light can lead to **physiological stress** or failure to spawn.
- **Statement 3 is also correct** — artificial lights **attract not only target species** but a wide range of marine life, including **juveniles and non-target species**, thereby increasing the incidence of **bycatch** and contributing to **biodiversity loss** in marine ecosystems.

37) Which of the following best defines the concept of 'Green Grabbing'?

- a) Legal conservation of forest lands under community rights
- b) Appropriation of land and resources under environmental pretexts, displacing local people
- c) Plantation of exotic species for commercial timber harvesting
- d) Introduction of green technologies in agriculture by local governments

Solution: b)

- **Green Grabbing** refers to the **appropriation of land, forests, water bodies, and resources** under the pretext of **achieving environmental goals**, such as afforestation, carbon offsetting, or conservation.
- Often backed by governments, corporations, or international environmental regimes, such projects **displace local or indigenous communities**, threatening their **livelihoods, food security, and traditional ecological knowledge systems**.
- Unlike genuine community-based conservation, green grabbing commodifies nature for profit or global climate targets, frequently **excluding local participation**.

3. Geography

- 1) Consider the following statements regarding the geographical significance of the Pir Panjal Range:
1. It is home to important passes such as the Banihal Pass and Pir Panjal Pass.
 2. It acts as a climatic barrier, influencing the precipitation pattern in the region.

Which of the above statements is/are correct?

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

Solution: C

Statements 1 and 2 are correct because the **Pir Panjal Range includes Banihal and Pir Panjal Pass** and **acts as a climatic barrier affecting monsoon precipitation in Kashmir**.

About Pir Panjal Range:

- **Location:** Part of the **Lesser Himalayas**, spanning India and Pakistan-administered Kashmir.
 - **States covered:** Extends across **Himachal Pradesh** and **Jammu & Kashmir** in India.
 - **Key Geographic Features:**
 - **Mountain Peaks:**
 - **Deo Tibba (6,001 m)** and **Indrasan (6,221 m)** at its eastern end.
 - **Major Rivers:**
 - **Separates the Beas and Ravi rivers** from the Chenab River.
 - **Origin of tributaries feeding the Jhelum and Indus rivers.**
 - **Strategic Connectivity:**
 - The **Mughal Road** links **Rajouri and Poonch** with **Kashmir Valley** via the **Pir Panjal Pass (3,490 m)**.
 - **Jawahar Tunnel (2.5 km)** under the **Banihal Pass** connects **Banihal to Qazigund**.
 - **Tourist and Historical Importance:**
 - Home to **Gulmarg**, a famous **hill resort in Kashmir**.
 - Historically, **Pir Panjal** was Kashmir's **ancient trade route** with India.
- 2) The Pir Panjal Range is significant for which of the following reasons?
- (a) It forms the main water divide between the Ganges and Indus river systems.
 - (b) It is part of the Shivalik Hills, forming the outermost range of the Himalayas.
 - (c) It separates the Kashmir Valley from the outer Himalayas and plains.
 - (d) It is an extension of the Eastern Himalayas into Himachal Pradesh and Uttarakhand.

Solution: c)

The **Pir Panjal Range separates the Kashmir Valley from the outer Himalayas** and extends across **Himachal Pradesh and Jammu & Kashmir**.

Option a is incorrect because it **does not form the water divide between the Ganges and Indus**.

Option b is incorrect because it belongs to the **Lesser Himalayas, not the Shivaliks.**

Option d is incorrect as the **Pir Panjal Range is part of the Western Himalayas, not the Eastern Himalayas.**

3) Consider the following statements regarding the global impact of volcanic eruptions:

1. Large-scale volcanic eruptions can lead to a temporary cooling of the Earth's climate due to sulfur dioxide emissions.
2. Volcanic eruptions contribute to the formation of new landmasses, such as the Hawaiian Islands.
3. Volcanic eruptions have no effect on global ocean circulation.
4. Some volcanic eruptions release gases that contribute to the depletion of the ozone layer.

Which of the above statements are correct?

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

Solution: A

- **Sulfur dioxide from eruptions can cause temporary cooling.**
- **Volcanoes contribute to new land formation, such as the Hawaiian Islands.**
- **Some eruptions release halogens that can deplete the ozone layer.**

Statement 3 is incorrect as **volcanic activity can influence ocean circulation, particularly through the release of volcanic ash and underwater eruptions.**

4) Which of the following best explains the significance of The Wallace Line in biogeography?

- (a) It marks the boundary between the Eurasian and Indo-Australian tectonic plates, influencing volcanic activity in the region.
- (b) It is a transition zone where species from both the Oriental and Australian biogeographic regions coexist without major differences in fauna.
- (c) It represents a sharp faunal boundary between Asian and Australian species, due to deep oceanic trenches that prevented species migration.
- (d) It is an imaginary line marking the divergence of early hominins between Southeast Asia and Oceania, explaining human migration patterns.

Solution: C

Option a is incorrect – The Wallace Line is a **biological boundary, not a tectonic plate boundary.**

Option b is incorrect – The Wallace Line **creates a stark contrast in species, not a smooth transition zone.**

Option c is correct – The Wallace Line **separates Asian and Australian fauna**, and deep ocean trenches **prevented migration.**

Option d is incorrect – The Wallace Line is **not related to early human migration patterns.**

What is the Wallace Line?

- A **biogeographical boundary** that **separates the eco-zones of Asia and Australia.**
- Identified by **Alfred Russel Wallace in 1863**, it runs between **Bali and Lombok**, and continues north through the Makassar Strait between Borneo and Sulawesi.

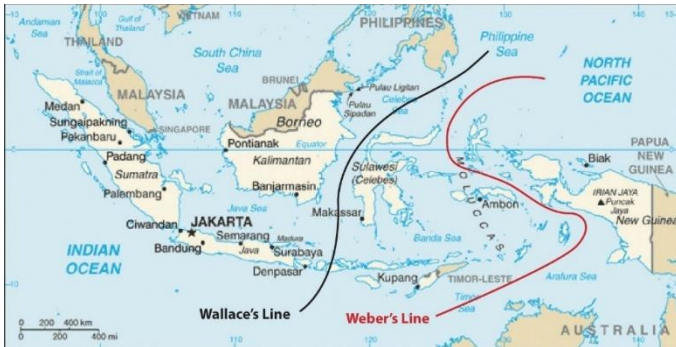
Formation of the Wallace Line:

- **Result of continental drift:** Australia **split from Antarctica and drifted northward**, colliding with **Asia around 35 million years ago.**
- This movement **formed deep-water channels** that still **act as barriers**, preventing species migration.
- During the **Pleistocene Epoch**, land bridges emerged due to **lower sea levels**, yet the **deep waters between Asia and Australia maintained the boundary.**

Uniqueness of the Wallace Line:

- **Sharp distinction in species:** To the **west**, Asiatic species like **tigers and elephants** dominate, while to the **east**, Australian fauna such as **kangaroos and marsupials** thrive.

- **Narrow geographical divide:** Despite being just **20 km apart**, islands on either side have **distinct biodiversity**.
- **Birds and mammals** are heavily influenced, with **few species crossing the line**, while **marine species remain unaffected** due to the **high connectivity of ocean ecosystems**.



- 5) Consider the following statements in the context of Lightning characteristics and occurrence in India
1. Lightning is a rapid discharge of atmospheric electricity.
 2. Eastern and central India experience the highest cloud-to-ground strikes.
 3. Palm trees provide immediate protection against lightning strikes.

How many of the above statements is/are incorrect?

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

Solution: A

Statement 3 is incorrect.

Lightning is indeed a rapid discharge of electricity in the atmosphere. This occurs when there's a buildup of electrical charge within clouds or between clouds and the ground, which is then suddenly released, creating the flash we see as lightning.

According to the Annual Lightning Report 2023-2024 published by CROPC and IMD, **eastern and central India do experience the highest number of cloud-to-ground (CG) lightning strikes.** This is likely due to the specific atmospheric conditions prevalent in these regions.

Palm tree needs at least 15 to 20 years to attain a height of 20 feet. Therefore, they do not provide immediate protection against lightning strikes, but rather a long-term solution.

- 6) Why are palm trees considered suitable for mitigating lightning strikes?
- (a) They have a wide canopy
 - (b) They are resistant to fire
 - (c) They contain high moisture and sap
 - (d) They have deep root systems

Solution: C

- **Palm trees are considered suitable for mitigating lightning strikes primarily because they contain high moisture and sap.** This characteristic allows them to effectively absorb lightning and reduce its direct impact on the ground.
- The high water content in palm trees acts as a natural conductor, channeling the electrical discharge from lightning through the tree and into the ground, thereby potentially reducing the risk of damage to surrounding areas or structures.

- This property, combined with their typically tall stature among other trees, makes palm trees uniquely suited to act as natural lightning conductors in areas prone to frequent strikes.
- 7) Which of the following best describes the primary cause of mass wasting?
- (a) The erosion of coastal areas by tidal forces
 - (b) The influence of gravity on weakened slope materials
 - (c) The formation of glaciers at high altitudes
 - (d) The accumulation of sediment in river beds

Solution: B

- **Mass wasting, also known as mass movement, primarily occurs when the gravitational force acting on the materials on a slope exceeds their strength, causing them to move downhill.**
- This process is influenced by various factors such as weathering, which weakens the materials; water saturation, which reduces cohesion; and seismic activity, which shakes and destabilizes the slope.
- While sediment accumulation, glacier formation, and coastal erosion are significant geological processes, they do not directly cause mass wasting.
- Therefore, option (b) correctly identifies the influence of gravity on weakened slope materials as the primary cause of mass wasting.

- 8) Consider the following statements about the formation of tropical storms:
1. High humidity and ocean temperatures above 26°C are necessary for the formation of tropical storms.
 2. The interaction between evaporating warm water and a mass of cold air leads to the formation of clouds and a low-pressure column.
 3. As the pressure in the eye of the storm increases, the speed of the surrounding winds increases.

How many of the above statements is/are incorrect?

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

Solution: A

Statement 1 is correct; **high humidity and ocean temperatures above 26°C are essential factors in the formation of tropical storms.** These conditions provide the necessary heat and moisture to fuel the storm.

Statement 2 is also correct; the process begins with the evaporation of warm water, which rises and interacts with cooler air, forming clouds and creating a low-pressure column at the center of the developing storm.

Statement 3 is incorrect because, **as the pressure in the eye of the storm decreases (not increases), the speed of the surrounding winds increases.** This intensification of wind speed around the low-pressure eye is a defining characteristic of tropical storms.

- 9) Consider the following statements regarding Greenland.
1. Greenland is an autonomous territory under the Kingdom of Denmark but has full control over its foreign affairs and defence policies.
 2. The island is strategically located between the Arctic and Atlantic Oceans, making it crucial for global shipping and military operations.

Which of the above statements is/are correct?

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

Solution: B

Statement 1 is incorrect: Greenland is an autonomous territory of Denmark, but Denmark retains control over foreign affairs, defence, and security. Greenland has self-governance in domestic matters, including resource management and local policies.

Statement 2 is correct: Greenland's strategic location between the Arctic and Atlantic Oceans makes it critical for global trade routes and military positioning. It hosts the Thule Air Base, a key U.S. military installation.

About Greenland:

- **Location:** World's largest island, situated between the Arctic and Atlantic Oceans.
- **Capital:** Nuuk.
- **Political Status:** An autonomous territory within the Kingdom of Denmark.
- **Population:** Approximately 57,000 people.
- **Geographic Features:**
 - **Ice Sheet:** Covers around 80% of Greenland.
 - **Mountains:** Watkins Range, including GUNNBjørn Fjeld (tallest mountain in the Arctic).
 - **Major Water Bodies:** Scoresby Sound (world's largest fjord), Ilulissat Icefjord (UNESCO World Heritage Site).
- **Economy:**
 - **Primary Sectors:** Fishing (accounts for 90% of exports), tourism, and small-scale mining.
 - **Potential Growth Areas:** Rare earth minerals, uranium, and other strategic metals.

Why is Greenland in the Spotlight?

- **Push for Independence:** All major political parties support the idea of breaking away from Danish rule.
 - Greenland currently receives an **annual subsidy of \$565 million from Denmark**, about 20% of its GDP.

Geopolitical Interests:

- **Trump's Renewed Interest:** First proposed purchasing Greenland in 2019, leading to diplomatic tensions.
 - Recently, Trump revived his ambition, claiming Greenland should join the US for "prosperity and security."
- **Resource Race in the Arctic:** Greenland is rich in **rare earth elements, uranium, and critical minerals** needed for global industries.



10) Consider the following statements regarding the Yamuna River basin:

1. It is the only major tributary of the Ganga that flows through the National Capital Territory (NCT) of Delhi.
2. The Tons River, a major tributary of the Yamuna, contributes more water than the Yamuna itself at their confluence.

Which of the above statements is/are incorrect?

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

Solution: A

Statement 1 is incorrect – While the Yamuna flows through Delhi, other tributaries of the Ganga (e.g., Hindon) also pass through the region.

Statement 2 is correct – The Tons River is the largest tributary of the Yamuna, contributing more water than the Yamuna itself at their confluence.

About Yamuna River:

- **Origin:** The Yamuna originates from the [Yamunotri Glacier](#) in the Himalayas at an altitude of **4,421 meters**.
 - Historically, it was a **tributary of the River Ghaggar (likely the [Saraswati River](#) of the Vedas)** but later shifted **eastward due to tectonic activity**.
- **Course & States:** The **Yamuna River basin** extends across **Uttarakhand, Himachal Pradesh, Haryana, Delhi, Uttar Pradesh, and Rajasthan**.
 - **Total Length: 1,376 km** (Longest River in India that does not directly drain into the sea).
- **Major Tributaries:**
 - **Himalayan Region:** Rishi Ganga, Hanuman Ganga, Tons, and Giri.
 - **Plains:** Hindon, Chambal, Sind, Betwa, and Ken.
 - **Tons River** contributes approximately **60% of the Yamuna's total water flow**.
- **Confluence:** The **Yamuna merges with the Ganga at Prayagraj (Allahabad)**, forming the **sacred Sangam**.
- **Key Cities Along the Yamuna:**
 - Noida, Mathura, Agra, Firozabad, Etawah, Kalpi, Hamirpur, and Prayagraj (Allahabad).
 - In **Delhi**, the Yamuna enters at **Palla Village** and exits at **Jaitpur**, covering **52 km** within the National Capital Territory.

11) Consider the following statements regarding the geography of Jordan:

1. Jordan has a coastline along the Gulf of Aqaba, providing access to the Red Sea.
2. The Dead Sea, located on Jordan's western border, is one of the saltiest bodies of water in the world.
3. The Sea of Galilee is located entirely within Jordan's territory.

Which of the above statements is/are correct?

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

Solution: B

Statement 1 is correct. **Jordan has a small coastline along the Gulf of Aqaba, providing access to the Red Sea.** The city of Aqaba is Jordan's main port on this coast.

Statement 2 is correct. **The Dead Sea**, shared with Israel and the West Bank, **is one of the saltiest bodies of water in the world** and lies along Jordan's western border.

Statement 3 is incorrect. The Sea of Galilee is located to the northwest of Jordan, primarily within Israel and the Golan Heights. **It does not fall within Jordan's territory.**



12) Consider the following statements about Ocean Thermal Energy Conversion (OTEC):

1. OTEC systems work best in tropical regions where the temperature difference between surface and deep waters is significant.
2. OTEC can generate energy both day and night, making it a continuous energy source.
3. The system requires high tidal ranges to function efficiently.
4. OTEC is fully commercialized and widely deployed around the world.

How many of the above statements is/are correct?

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

Solution: B

Statement 1 is correct. **OTEC systems work best in tropical regions where the temperature difference between the warm surface water and cold deep water is significant.**

Statement 2 is correct. **Since temperature differences exist both day and night, OTEC can provide continuous energy.**

Statement 3 is incorrect. **OTEC does not depend on tidal ranges; it works based on the temperature difference in water layers.**

Statement 4 is incorrect. **OTEC is still in its developmental stages** and is not yet widely deployed on a commercial scale.

13) Consider the following statements about Nal Sarovar:

1. Nal Sarovar is a saline lake located in the state of Gujarat.
2. It is known for its migratory bird population and has been designated a Ramsar site.
3. Nal Sarovar is the largest lake in Northeast India.
4. It is primarily a freshwater lake, with minimal saline properties.

Which of the above statements are correct?

- (a) 2 and 3 only
- (b) 2 and 4 only
- (c) 1 and 2 only
- (d) 3 and 4 only

Solution: C

Statement 1 is correct, as Nal Sarovar is a saline lake located in Gujarat.

Statement 2 is also correct; it is famous for its migratory bird population and is designated as a Ramsar site.

Statement 3 is incorrect, as Nal Sarovar is located in Gujarat, not Northeast India.

Statement 4 is incorrect as Nal Sarovar is a saline lake, not freshwater.

14) Which of the following best describes the unique features of Dal Lake?

- (a) A lake with no islands or notable scenic landmarks
- (b) Known for its expansive sand dunes and minimal water flow
- (c) Famous for floating gardens, shikara markets, and Mughal gardens along its shore
- (d) A dry lake located in the desert region of Jammu and Kashmir

Solution: C

Dal Lake, often called the “Jewel in the crown of Kashmir,” is famous for its floating gardens, vibrant floating market, and scenic Mughal gardens along the shoreline. It also has iconic houseboats and historical islands.

Option a) is incorrect, as Dal Lake is not a dry lake.

Option b) is incorrect as Dal Lake lacks sand dunes and features ample water flow.

Option d) is incorrect since Dal Lake contains notable islands like Char Chinari and Sone Lank.

15) Consider the following statements:

1. Strike-slip faults always produce vertical displacement of land.
2. The Indian Plate is moving southward relative to the Eurasian Plate.
3. The epicentre is the point of origin of the earthquake beneath the Earth’s surface.

How many of the above statements is/are correct?

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

Solution: D

- **Statement 1** is incorrect because **strike-slip faults** involve **horizontal displacement** of tectonic plates rather than vertical. In such faults, the plates slide past each other sideways. Famous examples include the **San Andreas Fault** in California. **Vertical movement** is typically associated with **normal** or **reverse (thrust)** faults, not strike-slip faults.
- **Statement 2** is also incorrect. The **Indian Plate is moving northward**, not southward, colliding with the **Eurasian Plate**. This northward movement is what led to the formation of the **Himalayan mountain range**, and it continues to cause seismic activity across the region due to ongoing tectonic stress.
- **Statement 3** is incorrect due to a common confusion in terminology. The **epicentre** is the point **on the Earth's surface** located directly above the **focus (or hypocentre)**, which is the actual **point of origin of the earthquake** beneath the surface.

INSIGHTSIAS
SIMPLIFYING IAS EXAM PREPARATION

4. Government Schemes and Programmes

- 1) Which of the following statements accurately reflects the Bharat Tech Triumph Program (TTP)?
- A government-led initiative aimed at digitizing India's MSME sector through AI-driven solutions.
 - A program under the 'Create in India' initiative to promote the gaming industry globally.
 - A public-private partnership to develop gaming hardware infrastructure in India.
 - An incubation program for promoting blockchain-based gaming startups in India.

Solution: B

The **Bharat Tech Triumph Program (TTP)** is a national initiative under 'Create in India' aimed at promoting India's gaming industry, developers, and startups on global platforms like GDC 2025 and WAVES Summit.

About [Bharat Tech Triumph Program \(TTP\)](#):

- **What is the Bharat Tech Triumph Program?**
 - A national initiative to **promote India's gaming industry, innovation**, and interactive entertainment sector.
 - Provides global exposure to Indian game developers, startups, and tech companies.
- **Ministry & Organizers:**
 - **Ministry of Information & Broadcasting (MIB)** – Government body overseeing the initiative.
 - **Interactive Entertainment and Innovation Council (IEIC)** – Organizing partner.
- **Aim of the Program:**
 - Identify and promote Indian gaming talent on global platforms.
 - Support innovation in gaming, animation, and immersive technologies (Artificial Reality, [Virtual Reality](#), Metaverse).
 - Encourage startups and studios to develop world-class games under the 'Create in India' initiative.
- **Key Features of Bharat Tech Triumph Program:**
 - Open to developers, studios, startups, and tech firms with a working prototype.
 - 3-stage selection process: Game submission, expert evaluation, and final showcase.
 - Winners get fully sponsored opportunities to present at GDC 2025 and WAVES.
 - Encourages cross-border collaborations, with 1,078 total registrations, including 12 international entries.

- 2) Which of the following is NOT a key objective of the Namami Gange Programme?
- Establishing sewage treatment infrastructure along the Ganga basin
 - Promoting afforestation to improve river ecosystem health
 - Regulating the use of hydroelectric dams along the Ganga River
 - Restoring biodiversity, including the conservation of the Gangetic Dolphin

Solution: C

The Namami Gange Programme focuses on sewage treatment, afforestation, and biodiversity conservation, including protecting the Gangetic Dolphin. However, **it does not regulate hydroelectric projects, as these fall under the jurisdiction of India's Ministry of Power and the Ministry of Environment, Forest and Climate Change (MoEFCC).**

About [Namami Gange Programme](#):

What is Namami Gange?

- A **comprehensive river conservation mission** aimed at **cleaning and rejuvenating River Ganga**.
- Approved as a **Flagship Programme** by the **Government of India in 2014**.

Launched In: June 2014, with a budget outlay of ₹20,000 crore, later expanded to ₹42,500 crore.

Ministry: Ministry of Jal Shakti, under the National Mission for Clean Ganga (NMCG).

Aim of Namami Gange:

- **Pollution abatement and ecological restoration** of the Ganga River.
- **Sustainable waste management** through modern [sewage treatment plants \(STPs\)](#).
- **Biodiversity conservation** and revival of aquatic ecosystems.
- **Public engagement and awareness** to promote community participation.

Key Features:

- **Sewage Treatment Infrastructure:** Over 200 sewage treatment projects have been launched to prevent wastewater from polluting the Ganga.
- **Riverfront Development:** Modernization of ghats and crematoriums along the river to enhance sanitation and tourism.
- **Biodiversity Conservation:** Efforts to restore aquatic life, leading to a rise in Gangetic Dolphin population and improved fish species diversity.
- **Afforestation & Eco-Restoration:** Over 1.34 lakh hectares of trees planted along the Ganga to prevent soil erosion and maintain water flow.
- **Ganga Gram Initiative:** Development of 1,674 villages along the river with better sanitation, waste management, and clean drinking water.
- **International Recognition & Collaboration:** Recognized as a Top 10 World Restoration Flagship Initiative (UN Decade on Ecosystem Restoration, 2022).

3) Consider the following statements regarding the Namami Gange Programme:

1. It is a 100% centrally funded scheme.
2. It follows a zero-liquid discharge policy, ensuring no untreated sewage enters the river.
3. It includes the Ganga Gram Initiative, aimed at improving sanitation in villages along the river.

How many of the above statements is/are correct?

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

Solution: B

- The Namami Gange Programme is a 100% centrally funded initiative under the Ministry of Jal Shakti, launched in 2014 (Statement 1 is correct).
- **The programme does not enforce a zero-liquid discharge policy; rather, it focuses on sewage treatment plant (STP) infrastructure to minimize pollution (Statement 2 is incorrect).**
- The Ganga Gram Initiative is part of the program, promoting sanitation, waste management, and clean water in rural settlements along the river (Statement 3 is correct).

4) Consider the following statements regarding the Central Electricity Authority (CEA):

1. CEA is a statutory body responsible for power sector planning and technical regulations.
2. CEA has the authority to enforce penalties on power distribution companies violating safety norms.
3. CEA advises the government on electricity policy and grid management.

How many of the above statements is/are correct?

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

Solution: B

Statement 2 is incorrect.

Statement 1 is correct as the CEA is a statutory body responsible for power sector planning and technical regulations in India.

Statement 2 is incorrect **because CEA does not enforce penalties on power distribution companies—such regulatory actions fall under the Central Electricity Regulatory Commission (CERC).**

Statement 3 is correct as CEA advises the government on electricity policy, grid stability, and transmission management.

About Central Electricity Authority (CEA):

The **Central Electricity Authority (CEA)** is a **statutory body** responsible for **power sector planning, development, and regulation** in India. It advises the **government on electricity policy and technical standards**.

- It was **established** under the **Electricity (Supply) Act, 1948** and was later reconstituted under the **Electricity Act, 2003**.

Nodal Ministry—Operates under the **Ministry of Power, Government of India**.

Headquarters— **New Delhi, India**.

Structure & Composition

- **Chairperson:** Heads the authority and oversees **policy implementation and technical regulations**.
- **Members:** Comprises **technical and regulatory experts** from different domains of the **power sector**.
- **Divisions:**
 - **Power Planning & Monitoring Division:** Oversees power sector development.
 - **Grid Operations & Transmission Division:** Manages **grid stability** and interconnectivity.
 - **Distribution & Regulatory Affairs:** Ensures **efficient electricity distribution and policy compliance**.
 - **Safety & Training Division:** Focuses on **workforce training, safety protocols, and best practices**.

5) Which of the following is a key feature of AI Kosha?

- Hosting personal datasets for AI research
- Providing a platform for AI model deployment in production environments
- Offering a repository of datasets, models, and use cases to enable AI innovation
- Enforcing data sharing policies for private enterprises

Solution: C

AI Kosha offers a repository of datasets, models, and use cases to enable AI innovation. It does not host personal datasets, focus on AI model deployment in production environments, or enforce data sharing policies for private enterprises.

What is AI Kosha?

AI Kosha is a **secure AI innovation platform** designed to provide **seamless access to datasets, models, and AI development tools**. It serves as a **centralized repository to enable AI research and innovation** in India.

Developed By- **Ministry of Electronics & Information Technology (MeitY)** under the **IndiaAI Mission**.

Key Features

- **AI Dataset Repository:** Hosts **over 300 datasets and 80+ AI models** for research and development.
- **AI Sandbox Environment:** Provides an **integrated development environment (IDE)** with **tools and tutorials** for AI model training.
- **Content Discoverability:** Uses **AI-readiness scoring** to help researchers **identify relevant datasets**.
- **Security & Access Control:** Features **data encryption** (at rest & in motion), **API-based secure access**, and **real-time malicious traffic filtering**.
- **Permission-Based Access:** Allows **tiered access** for different user groups like researchers, startups, and government bodies.

6) Which of the following is the primary objective of the Revised Livestock Health and Disease Control Programme (LHDCP) (2024-26)?

- Providing direct cash transfers to livestock farmers for veterinary expenses
- Developing a nationwide digital database for tracking livestock health using blockchain technology
- Promoting indigenous livestock breeds by limiting the use of imported genetic material
- Eradicating economically significant livestock diseases through vaccination, surveillance, and treatment

Solution: D

Option d is correct – LHDCP aims to control and eradicate major livestock diseases like **Foot and Mouth Disease (FMD), Brucellosis, and Classical Swine Fever (CSF)**.

Option a is incorrect – LHDCP focuses on **disease control**, not direct cash transfers.

Option c is incorrect – **Breed improvement** is not a core focus of LHDCP; it falls under other schemes like **Rashtriya Gokul Mission**.

Option b is incorrect – While digital tracking exists under **INAPH (Information Network for Animal Productivity and Health)**, **blockchain-based tracking is not yet implemented**.

About [Revised Livestock Health and Disease Control Programme \(LHDCP\)](#):

What is LHDCP?

- A **centrally sponsored scheme** aimed at improving **livestock health** through **vaccination, disease control, and veterinary infrastructure enhancement**.
- It ensures higher productivity, economic growth for farmers, and disease prevention in livestock.

Developed By: Department of Animal Husbandry & Dairying.

Aim:

- To **prevent, control, and eradicate major livestock diseases** through **vaccination, surveillance, and veterinary services**.
- To improve **veterinary healthcare accessibility** via **Mobile Veterinary Units (MVUs)**.

Diseases Covered:

- [Foot and Mouth Disease \(FMD\)](#), Brucellosis, Peste des Petits Ruminants (PPR), Classical Swine Fever (CSF), Lumpy Skin Disease (LSD), Anthrax, Rabies, and other livestock diseases.

Key Features:

- [National Animal Disease Control Programme \(NADCP\)](#): Focuses on **FMD and Brucellosis** eradication through mass vaccination.
- [Critical Animal Disease Control Programme \(CADCP\)](#): Targets **PPR and CSF** through 100% vaccination coverage.
- **Mobile Veterinary Units (MVUs)**: Doorstep veterinary care through **customized vehicles with diagnostic and treatment facilities**.
- **Pashu Aushadhi Initiative**: ₹75 crore allocated for providing **affordable generic veterinary medicines**.
- **Strengthening Veterinary Infrastructure**: Upgrading **veterinary hospitals, dispensaries, and diagnostic labs**.
- **Surveillance & Disease Reporting**: Strengthening **real-time disease monitoring** via the Information Network for Animal Productivity and Health (INAPH).
- **Public Awareness & Capacity Building**: Training farmers and veterinarians on disease prevention and biosecurity measures.
- **Central-State Fund Sharing**: 60:40 for states, 90:10 for Northeast & Himalayan states, 100% for UTs.

7) Which of the following is NOT a component of the Global Engagement Scheme?

- Grant-in-aid support for Indo-Foreign cultural societies
- Organization of virtual cultural programs with foreign artists
- Promotion of classical and contemporary Indian arts through global festivals
- International collaborations for academic research in Indian heritage

Solution: D

The scheme focuses on cultural promotion, performances, and exchanges, not academic research collaborations, which fall under the Ministry of Education or the Indian Council for Cultural Relations (ICCR).

What is the [Global Engagement Scheme](#)?

The Global Engagement Scheme, initiated by the **Ministry of Culture**, aims to promote India's diverse cultural heritage on the global stage and foster international cultural collaborations.

Nodal Ministry- Ministry of Culture, Government of India**Key Features of the Scheme**

- **Promoting Cultural Heritage:** Showcases India's rich cultural diversity, including folk, classical, and contemporary art forms.
 - **Strengthening Bilateral Cultural Ties:** Encourages collaboration with foreign nations to enhance India's cultural outreach.
 - **Festival of India (FOI):** Empanelled Indian artists perform abroad in cultural festivals organized by Indian Missions.
 - Covers folk music, dance, puppetry, theatre, classical music, experimental dance, etc.
 - Government funds travel and performances of selected artists.
 - **Grant-in-Aid for Indo-Foreign Friendship Societies:** Financial support to cultural societies fostering Indo-foreign cultural exchange.
- 8) Consider the following provisions related to Pradhan Mantri Fasal Bima Yojana (PMFBY)'s risk coverage:
1. It provides insurance coverage only for standing crops in the field and does not cover pre-sowing or post-harvest losses.
 2. It covers localized calamities such as hailstorms, landslides, and inundation.
 3. The scheme compensates farmers for mid-season crop losses if the yield is reduced by more than 50% due to adverse climatic conditions.

Which of the above statements are correct?

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

Solution: B

- Statement 1 is incorrect because **PMFBY does cover pre-sowing and post-harvest losses**. Post-harvest losses are covered for crops that have been harvested but are left in the field to dry for up to 14 days after harvest.
- Localized calamities like hailstorms, landslides, floods, and cloudbursts are covered under PMFBY (Statement 2 is correct).
- **Mid-season adversity losses are also covered if crop yield is reduced by more than 50% due to drought, floods, prolonged dry spells, or unseasonal rainfall (Statement 3 is correct).**

What is PMFBY?

- **PMFBY** is India's flagship crop insurance scheme, launched in Kharif 2016, to provide financial security to farmers against crop loss due to natural calamities.
- It aims to stabilize farm income, ensure credit flow, and promote sustainable agriculture.

Nodal Ministry

- **Ministry of Agriculture & Farmers' Welfare, Government of India.**

Key Features of PMFBY

1. **Affordable Premium Rates:** Farmers pay **2% for Kharif crops, 1.5% for Rabi crops, and 5% for commercial/horticulture crops**.
 - The remaining premium is **subsidized by the Central and State Governments**.
2. **Voluntary Participation:** Since **2020**, PMFBY is **optional for farmers** and States/UTs.
3. **Technology Integration:** **Remote sensing, drones, and AI-based yield estimation** enhance transparency.
 - **Digitized claim settlement via Direct Benefit Transfer (DBT)**.
4. **Grievance Redressal Mechanism**
 - **District (DGRC) and State (SGRC) Grievance Committees** handle disputes.
 - **Krishi Rakshak Portal (KRPH) & toll-free number (14447)** for real-time complaint resolution.
5. **Implementation at State Level:** States select **insurance companies through a transparent bidding process**.
 - **Joint assessment teams** determine crop loss estimates.

9) Match the following technological interventions under PMFBY with their respective features:

| Technology | Feature |
|--------------------------|---|
| A. YES-TECH | 1. Online grievance redressal |
| B. WINDS | 2. GIS-based satellite monitoring |
| C. Krishi Rakshak Portal | 3. AI-based yield estimation |
| D. BHUVAN | 4. Installation of automatic weather stations |

Select the correct option:

- (a) A-3, B-4, C-1, D-2
- (b) A-2, B-1, C-4, D-3
- (c) A-1, B-2, C-3, D-4
- (d) A-4, B-3, C-2, D-1

Solution: A

- YES-TECH (Yield Estimation System using Technology) – Uses AI-based yield estimation to predict crop output.
- WINDS (Weather Information Network Data System) – Focuses on automatic weather stations (AWS) for real-time weather monitoring.
- Krishi Rakshak Portal – Provides an online grievance redressal mechanism for farmers to track complaints.
- BHUVAN – Developed by ISRO, it utilizes GIS-based satellite monitoring to assess crop losses.

10) Consider the following statements regarding PM-YUVA 3.0:

1. The scheme offers a mentorship program where selected young authors receive training from renowned writers.
2. It is implemented by Prasar Bharati to promote regional language literature in India.
3. Selected books under the scheme will be translated into multiple Indian languages and promoted internationally.

How many of the above statements is/are correct?

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

Solution: B

- Statement 1 is correct – The mentorship program provides training to young authors from renowned writers and literary experts.
- Statement 2 is incorrect – The scheme is implemented by the National Book Trust (NBT), India, not Prasar Bharati.
- Statement 3 is correct – The scheme includes translation of selected works into multiple Indian languages, helping promote them internationally.

About PM's Scheme for Mentoring Young Authors (PM-YUVA 3.0):

- **Established in:** First launched in 2021; now in its third edition (2025).
- **Ministry involved:** Ministry of Education, under the Department of [Higher Education](#).
- **Aim:**
 - To **mentor young authors** and develop a **new generation of writers**.
 - To promote **reading, writing, and book culture** in India.
 - To **showcase Indian heritage, culture, and knowledge systems globally**.
- **Key Features:**
 - **Age Limit:** Open to **authors below 30 years**.
 - **Mentorship Program:** Selected writers will get training from renowned authors.
 - **Focus Areas:**
 - Indian Diaspora in Nation Building

- Indian Knowledge System
- Makers of Modern India (1950-2025)
- **Execution:**
 - Implemented by the [National Book Trust \(NBT\)](#), India.
 - Books will be **published and translated into multiple Indian languages**.
 - Authors will engage in **literary festivals and cultural exchanges**.
- **Alignment with NEP 2020:** Supports **creative leadership development** among youth.
- **Coverage:**
 - Open to participants **across India**, covering **22 Indian languages + English**.
 - Encourages **regional language literature** to promote linguistic diversity.

11) Which of the following best explains the primary objective of Mission Amrit Sarovar?

- (a) To develop large-scale reservoirs for hydroelectric projects in Himalayan states.
- (b) To construct and rejuvenate ponds across India for water conservation and groundwater recharge.
- (c) To create artificial lakes in urban areas to promote tourism and biodiversity conservation.
- (d) To expand irrigation networks by linking major rivers through inter-basin water transfer.

Solution: B

- Option a is incorrect – The mission focuses on pond rejuvenation, not hydroelectric projects.
- **Option b is correct – The initiative aims to develop and revive 75 water bodies in each district to improve water security and sustainability.**
- Option c is incorrect – While urban water conservation is beneficial, the mission primarily focuses on rural areas.
- Option d is incorrect – The mission does not involve river-linking projects; it focuses on localized water conservation.
- **What is Mission Amrit Sarovar?**
 - A **nationwide water conservation program** to construct and rejuvenate ponds across India.
 - Aims to **ensure water sustainability** at the local level.
- **Launched in:** April 24, 2022, as part of Azadi Ka Amrit Mahotsav celebrations.
- **Ministry involved:** Led by the Ministry of Rural Development, with collaboration from eight other ministries.
- **Implemented by:** Bhaskaracharya National Institute for Space Applications and Geo-informatics ([BISAG-N](#)), providing geospatial data for site identification.
- **Key Features:**
 - **Target:** Construct or rejuvenate **75 ponds per district**.
 - **Community Participation (Jan Bhagidaari):** Involves **local communities** in water conservation.
 - **Climate Resilience:** Aims to strengthen groundwater levels and restore ecological balance.
- **Railways' Role:**
 - Identify and **excavate new waterbodies** near railway sites.
 - Utilize **excavated material** for railway embankment construction.
 - Coordinate with **State governments** for implementation.

12) Consider the following statements regarding National Cooperative Development Corporation (NCDC)'s contribution to India's cooperative sector:

1. NCDC plays a major role in funding FPOs (Farmer Producer Organizations) under the Cooperative Development Program.
2. NCDC has been instrumental in promoting digital platforms for cooperatives, enabling online marketing of cooperative products.
3. The Mission Sahakar 2022 aimed to double the cooperative sector's contribution to India's GDP.

How many of the above statements is/are correct?

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

Solution: C

- Statement 1 is correct – NCDC provides funding and capacity-building support to Farmer Producer Organizations (FPOs) under its cooperative financing schemes.
- Statement 2 is correct – NCDC has launched digital initiatives to help cooperatives market their products online through e-commerce platforms.
- Statement 3 is correct – The Mission Sahakar 2022 aimed at doubling the cooperative sector's contribution to India's GDP, aligning with the government's push for cooperative-led rural economic growth.

About National Cooperative Development Corporation (NCDC)

What is NCDC?

The **National Cooperative Development Corporation (NCDC)** is a statutory organization dedicated to promoting, financing, and supporting cooperative institutions in India.

- **Established in:** Founded in **1963** under the **National Cooperative Development Corporation Act, 1962**.
- **Nodal Ministry:** Functions under the **Ministry of Cooperation, Government of India**.
- **Headquarters:** **New Delhi, India**.

Functions of NCDC:

- **Financial Assistance:** Provides funds for cooperative development in agriculture, rural industries, and allied sectors.
- **Capacity Building:** Organizes training programs to enhance cooperative management skills.
- **Policy Implementation:** Supports government schemes for rural economic empowerment through cooperatives.
- **Project Development:** Assists in infrastructure creation, storage facilities, and marketing support for cooperatives.
- **Loan & Subsidy Disbursement:** Provides concessional loans and financial grants to cooperative societies.

13) Consider the following statements regarding the Price Deficit Payment Scheme (PDPS) under PM-AASHA?

1. Farmers are compensated when market prices fall below the MSP.
2. It involves procurement of crops by the government to stabilize market prices.
3. The scheme applies to non-MSP crops as well.

How many of the above statements is/are correct?

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

Solution: A

The **Price Deficit Payment Scheme (PDPS)**, under the **Pradhan Mantri Annadata Aay SanraksHan Abhiyan (PM-AASHA)**, compensates farmers when the **market price** of their produce falls below the **Minimum Support Price (MSP)**. This ensures that farmers receive financial assistance to make up for the difference between the MSP and the market price, making **statement 1 correct**.

However, unlike other schemes such as the **Price Support Scheme (PSS)**, **PDPS** does not involve the **procurement of crops** by the government to stabilize market prices. Instead, the focus is on compensating farmers for price shortfalls, making statement 2 incorrect.

The **PDPS** is limited to crops covered under the MSP, meaning it does not apply to non-MSP crops, making statement 3 incorrect.

14) Which of the following is a feature of the loans provided under the PM Mudra Yojana?

- (a) Loans are collateral-free
- (b) Loans require government guarantees

- (c) Loans are only available to established businesses
 (d) Loans are interest-free

Solution: A

Feature of the scheme

| Features | Description |
|-----------------------------------|--|
| Full name | Mudra – Micro Units Development & Refinance Agency Ltd |
| Launch Year | 2015 |
| Ministry | Department of Financial Services, Ministry of Finance |
| Aim | Providing loans up to Rs. 10 lakh to non-corporate , non-farm small/micro-enterprises |
| Three pillars of the scheme | <ol style="list-style-type: none"> Banking the Unbanked Securing the Unsecured Funding the Unfunded |
| Funding Provision | <p>MUDRA, a financial institution set up by the government, provides funding to the small business sector through institutions like Scheduled commercial banks, NBFCs, and MFIs.</p> <p>MUDRA is a refinancing Institution. MUDRA does not lend directly to micro-entrepreneurs / individuals.</p> |
| Loan Products | <ol style="list-style-type: none"> Shishu (up to Rs. 50,000) Kishore (above Rs. 50,000 and up to Rs. 5 lakh) Tarun (above Rs. 5 lakh and up to Rs. 10 lakh) |
| Collateral | Loans under this scheme are collateral-free loans |
| Target Beneficiaries | Disadvantaged sections of society such as women entrepreneurs, SC/ST/OBC borrowers, minority community borrowers, and new entrepreneurs |
| Products and Services | Loans can be used for income-generating activities in the manufacturing, trading, services sector, and agriculture |
| Expansion | PMMY has been expanded over time to cover activities related to agriculture, such as fishing, dairy, and food processing, and loans for tractors and power tillers, and two-wheelers for commercial use were included in PMMY |
| Steps taken to improve the scheme | udyamimitra portal (for online applications); End-to-end digital lending for automated sanctions under PMMY (by some banks); Nomination of Mudra Nodal Officers in PSBs ; Interest Subvention of 2% on prompt repayment of Shishu loans |

- 15) What role does the Atomic Energy Regulatory Board (AERB) play in the operation of nuclear reactors like KAPS-4?

- (a) It manages the day-to-day operations of nuclear power plants.
- (b) It provides funding for nuclear power projects.
- (c) It designs nuclear reactors for India.
- (d) It is responsible for regulating and approving the power levels and safety protocols of nuclear reactors.

Solution: D

The Atomic Energy Regulatory Board (AERB) is responsible for ensuring that nuclear power plants in India operate safely. **It regulates and approves power levels, as well as ensures that all safety protocols** are followed before allowing reactors like KAPS-4 to operate at full capacity.

- 16) The Public Liability Insurance Act (PLIA), 1991, mandates that:
- a) All industries must have insurance coverage for financial relief in case of industrial accidents involving hazardous substances.
 - b) The insurance is optional for small-scale industries.
 - c) Only government-run industries are required to obtain liability insurance.
 - d) Industries handling non-hazardous materials are exempt from having insurance.

Solution: A

The Public Liability Insurance Act, 1991 came into being in the aftermath of the Bhopal Gas Tragedy.

- **This law requires all enterprises that own or have control over handling of any hazardous substance, to subscribe to a “public liability insurance policy cover” whereby they are insured against the claims from third parties for death or injury or property damage caused by hazardous substances handled in their enterprise.**

- 17) Which of the following facilities is NOT provided under the Pradhan Mantri Jan Dhan Yojana (PMJDY)?
- a) Accidental insurance cover of ₹2 lakhs under PMSBY
 - b) Life insurance cover of ₹2 lakhs under PMJJBY
 - c) Overdraft facility of up to ₹10,000
 - d) Mandatory minimum balance requirement

Solution: D

The Pradhan Mantri Jan Dhan Yojana (PMJDY) does not require any mandatory minimum balance in the accounts. This scheme aims to ensure access to financial services, including savings accounts, credit, insurance, and pensions, without imposing the burden of maintaining a minimum balance. Additionally, interest is earned on deposits, and account holders are eligible for both life and accidental insurance covers.

- 18) Consider the following statements regarding the PM Mudra Yojana:
1. The scheme was launched by the Ministry of Rural Development.
 2. MUDRA directly lends to micro-entrepreneurs and individuals.
 3. The PM Mudra Yojana offers loans for income-generating activities in sectors such as manufacturing, trading, and agriculture.
 4. The udyamimitra portal has been introduced to facilitate online loan applications.

How many of the above statements is/are correct?

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

Solution: B

Statements 1 and 2 are incorrect.

Feature of the scheme

| Features | Description |
|-----------------------------------|--|
| Full name | Mudra – Micro Units Development & Refinance Agency Ltd |
| Launch Year | 2015 |
| Ministry | Department of Financial Services, Ministry of Finance |
| Aim | Providing loans up to Rs. 10 lakh to non-corporate , non-farm small/micro-enterprises |
| Three pillars of the scheme | <ol style="list-style-type: none"> Banking the Unbanked Securing the Unsecured Funding the Unfunded |
| Funding Provision | <p>MUDRA, a financial institution set up by the government, provides funding to the small business sector through institutions like Scheduled commercial banks, NBFCs, and MFIs.</p> <p>MUDRA is a refinancing Institution. MUDRA does not lend directly to micro-entrepreneurs / individuals.</p> |
| Loan Products | <ol style="list-style-type: none"> Shishu (up to Rs. 50,000) Kishore (above Rs. 50,000 and up to Rs. 5 lakh) Tarun (above Rs. 5 lakh and up to Rs. 10 lakh) |
| Collateral | Loans under this scheme are collateral-free loans |
| Target Beneficiaries | Disadvantaged sections of society such as women entrepreneurs, SC/ST/OBC borrowers, minority community borrowers, and new entrepreneurs |
| Products and Services | Loans can be used for income-generating activities in the manufacturing, trading, services sector, and agriculture |
| Expansion | PMMY has been expanded over time to cover activities related to agriculture, such as fishing, dairy, and food processing, and loans for tractors and power tillers, and two-wheelers for commercial use were included in PMMY |
| Steps taken to improve the scheme | udyamimitra portal (for online applications); End-to-end digital lending for automated sanctions under PMMY (by some banks); Nomination of Mudra Nodal Officers in PSBs ; Interest Subvention of 2% on prompt repayment of Shishu loans |

19) What does "PDS leakage" refer to in the context of the National Food Security Act (NFSA) 2013?

- The over-allocation of food grains to non-eligible households
- The amount of food grains released by the FCI that fail to reach the consumers
- The amount of money lost in maintaining the PDS system
- The wastage of food grains during transportation

Solution: B

"PDS leakage" refers to the proportion of food grains, such as rice and wheat, released by the Food Corporation of India (FCI) that fail to reach consumers, usually due to inefficiencies or corruption in the distribution process.

This issue was one of the major concerns addressed by the NFSA 2013, and reforms have significantly reduced leakages across many states.

20) Consider the following features of the Mission Saffron Initiative:

1. It promotes the use of drones for precision farming and climate monitoring in saffron fields.
2. The project is integrated with Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) for water-efficient irrigation methods.
3. The initiative mandates the use of genetically engineered saffron bulbs for high productivity.

How many of the above statements is/are correct?

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

Solution: B

- Statement 1 is correct – The use of drones for climate and soil monitoring is being explored under the initiative.
- Statement 2 is correct – The project integrates with PMKSY for irrigation efficiency, ensuring water conservation in saffron farming.
- Statement 3 is incorrect – Genetic engineering is not mandated; traditional saffron bulbs from Jammu & Kashmir are being used.

ABOUT MISSION SAFFRON INITIATIVE:



What is Mission Saffron?
A government initiative to expand saffron cultivation beyond Jammu & Kashmir, focusing on the Northeast region.

Implemented By:
North East Centre for Technology Application and Reach (NECTAR) under the Department of Science & Technology (DST), Government of India.

Launched In:
2021, with initial trials in Sikkim, Arunachal Pradesh, and Meghalaya.

Aim:
Boost saffron production in Northeast India, making it a new saffron hub after Pampore, J&K.
Enhance farmers' income by diversifying high-value crops.
Promote Agri-tech solutions for better yield and sustainability.

NSIGHTSIAS
SIMPLIFYING IAS EXAM PREPARATION

21) What is the primary purpose of the recall guidelines announced by the Drugs Controller General of India (DCGI)?

- (a) To regulate the pricing of pharmaceutical drugs
- (b) To promote international trade of Indian drugs
- (c) To improve the manufacturing process of drugs
- (d) To ensure quick removal of drugs that fail testing from the market

Solution: D

The recall guidelines announced by the DCGI are intended to safeguard public health by ensuring that drugs which fail quality tests in government laboratories are swiftly removed from the market. This step is critical in preventing harmful drugs from being consumed by the public, thus reducing the risk of adverse health effects and ensuring that only safe and effective medications are available to patients. The guidelines are a proactive measure to enhance drug safety standards in India.

22) Consider the following statements about Mission Mausam:

1. The mission focuses on enhancing India's maritime heritage through archaeological research.

2. The Ministry of Earth Sciences (MoES) is the nodal agency responsible for executing Mission Mausam.
3. The mission involves upgrading the infrastructure of organizations like the India Meteorological Department.
4. The mission includes the development of new weather models for seasonal and daily monsoon forecasts.

How many of the above statements is/are correct?

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

Solution: C

Statement 1 is incorrect. **Mission Mausam does not focus on maritime heritage but on upgrading weather and climate forecasting systems.**

Statement 2 is correct. The **Ministry of Earth Sciences (MoES) is the nodal agency** executing the mission.

Statement 3 is correct. The **mission includes upgrading the infrastructure of organizations such as the India Meteorological Department** and the National Centre for Medium Range Weather Forecasting.

Statement 4 is correct. Mission Mausam builds on earlier initiatives like the National Monsoon Mission and involves creating new **weather models for both daily and seasonal monsoon forecasts.**

23) Consider the following statements about the Bureau of Indian Standards (BIS) Act, 2016:

1. The BIS Act, 2016 gives BIS the authority to certify products and systems in India.
2. Under the BIS Act, 2016, standards established by BIS are mandatory for all industries.
3. The BIS Act, 2016 allows BIS to operate as an autonomous body under the Ministry of Consumer Affairs.
4. The ISI mark under BIS is a mandatory certification for all Indian manufacturers.

How many of the above statements is/are correct?

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

Solution: B

- Statement 1 is correct. The **BIS Act, 2016 empowers BIS to certify products and systems in India to ensure they meet the required standards.**
- Statement 2 is incorrect. The standards established by BIS are **not mandatory for all industries**, but some critical industries require mandatory compliance.
- Statement 3 is correct. BIS operates as an **autonomous body under the Ministry of Consumer Affairs**, with the power to develop and enforce standards.
- Statement 4 is incorrect. The **ISI mark is not mandatory for all Indian manufacturers** but is compulsory for certain categories of products, especially those related to safety and quality control.

24) Consider the following statements regarding PM-Janjatiya Unnat Gram Abhiyan (PMJUGA):

1. It ensures the saturation of existing schemes in Scheduled Tribe-majority villages.
2. The program is implemented solely by the Ministry of Tribal Affairs.
3. It includes sustainable agricultural practices for Forest Rights Act (FRA) patta holders.
4. PMJUGA aims to bring integrated development across all tribal villages in India.

How many of the above statements is/are correct?

- (a) Only one
- (b) Only two

- (c) Only three
- (d) All four

Solution: C

- The **PM-Janjatiya Unnat Gram Abhiyan (PMJUGA)** aims to ensure the **saturation of existing government schemes** in **Scheduled Tribe-majority villages**. This means it focuses on ensuring that all essential schemes reach these areas for the benefit of tribal communities, making **statement 1 correct**.
- Additionally, it incorporates **sustainable agricultural practices** for **Forest Rights Act (FRA) patta holders**, enabling them to engage in activities that support forest conservation and livelihood, making **statement 3 correct**.
- The program is not solely implemented by the **Ministry of Tribal Affairs**. Instead, it involves **17 different ministries**, working together to ensure the integrated development of **63,000 Scheduled Tribe-majority villages**, making **statement 2 incorrect**.
- Lastly, **PMJUGA** aims at **integrated development** of these villages, covering essential aspects such as agriculture, education, health, and infrastructure, making **statement 4 correct**.

25) Regarding the Indian government's AI initiatives, consider the following statements:

1. The National Supercomputing Mission aims to establish a network of high-performance computing systems in India.
2. FutureSkills PRIME focuses on developing digital skills related to AI, machine learning, cloud computing, and cybersecurity.
3. The India AI Mission emphasizes setting up AI centres of excellence in rural areas only.

How many of the above statements is/are correct?

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

Solution: B

- The **National Supercomputing Mission** aims to enhance India's computing power through high-performance computing infrastructure.
- **FutureSkills PRIME** is an initiative to equip professionals and students with skills in emerging technologies, including AI.
- The **India AI Mission** focuses on **establishing AI centres of excellence across the country**, not limited to rural areas. Thus **statement 3 is incorrect** here.

26) Consider the following statements regarding the inclusion of gig workers in India's labour laws:

1. The Code on Social Security, 2020 classifies gig workers within the traditional employer-employee relationship.
2. Gig workers are excluded from minimum wage protections under current labour laws.
3. The Industrial Relations Code, 2020 includes gig workers in its dispute resolution mechanisms.

How many of the above statements is/are correct?

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

Solution: A

Only Statement 2 is correct.

- The **Code on Social Security, 2020** places gig workers outside the traditional employer-employee relationship, creating ambiguity in their employment status.

- Gig workers are excluded from minimum wage protections, meaning they do not enjoy the same wage guarantees as formal employees.
- The **Industrial Relations Code, 2020** does not include gig workers in its dispute resolution mechanisms, leaving them without formal avenues to address grievances.

27) Consider the following statements about the TB Champion model:

1. TB Champions are typically healthcare professionals deployed to deliver door-to-door medication in urban slums.
2. The model focuses on peer-led advocacy by TB survivors to enhance treatment adherence.
3. It has been adopted effectively in Meghalaya, especially in hard-to-reach tribal belts.

How many of the above statements is/are incorrect?

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

Solution: A

- **Statement 1 is incorrect** — TB Champions are not health professionals but **trained TB survivors** who engage in **peer-led community awareness**, breaking stigma and encouraging early detection.
- Statement 2 is correct — these survivors serve as **reliable advocates**, motivating patients through shared experiences, a critical approach in behavior change communication.
- Statement 3 is also correct — **Meghalaya's implementation** of this model in **remote and tribal areas** underscores its utility in **last-mile healthcare outreach**.

What is a TB Champion?

- A TB Champion is a tuberculosis survivor trained and engaged by the government to promote TB awareness, early detection, and treatment adherence within the community.
- The Meghalaya government has successfully implemented the TB Champion model to combat TB, especially in remote and tribal areas.

Key Features:

- **Community Engagement:** Survivors act as reliable advocates for testing and treatment.
- **Stigma Reduction:** They help dispel myths and fears surrounding TB.
- **Last-Mile Outreach:** Reach far-flung, inaccessible regions to ensure no patient is left behind.
- **Motivational Role:** Encourage continuous treatment and promote government support schemes.
- **Support 100-day Campaigns:** Align efforts with national initiatives for TB elimination.

28) Automated Permanent Academic Account Registry (APAAR) consolidates all academic records, making them accessible via DigiLocker under the 'One Nation, One Student ID' initiative. Consider the following statements regarding APAAR.

Statement-I: APAAR will help prevent duplication and fraud in academic credentials.

Statement-II: APAAR mandates blockchain-based storage to secure academic records.

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

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

Solution: C

- Statement-I is **correct**. APAAR provides a **unique, Aadhaar-linked academic ID** with verified and centrally stored records, which **prevents fraud, duplication, and misrepresentation** of educational credentials. It promotes institutional credibility and easier cross-verification.
- However, Statement-II is **incorrect** — APAAR does **not currently mandate blockchain-based storage**. It uses **DigiLocker**, which is a secure digital document repository, but not blockchain-based. While blockchain is being explored for educational credentials globally, APAAR relies on **centralized digital infrastructure** and verified institutional inputs, not decentralized ledgers.
- **What is APAAR?**
 - APAAR stands for **Automated Permanent Academic Account Registry**, a unique 12-digit student identification number.
 - It consolidates all academic records, making them accessible via **DigiLocker** under the 'One Nation, One Student ID' initiative.
- **Ministry and Origin:**
 - Launched by the **Ministry of Education**, Government of India.
 - Introduced under **National Education Policy (NEP) 2020** and the **National Credit and Qualifications Framework (NCrF)**.
- **Aim:**
 - To streamline academic record-keeping and facilitate **seamless student transitions** between institutions.
 - To promote **multiple entry-exit systems**, track academic and co-curricular achievements, and enable transparent educational data management.
- **Key Features:**
 - **Permanent academic record** stored on DigiLocker.
 - Covers **school and higher education** students across India.
 - Generated through the **UDISE+ portal** with Aadhaar linkage and parental consent for minors.
 - Schools play a key role in verifying student data and assisting in the generation of the ID.
- **Who Are Covered:**
 - All **school and higher education** students in India, both from government and private institutions.
 - Mandatory Aadhaar authentication and parental consent for minors.
- **Is It Mandatory?**
 - Officially **voluntary**, but State governments (like Uttar Pradesh) and authorities (CBSE) are pushing for **100% adoption**, causing confusion.
 - **Parents can opt out** by submitting written consent.

29) Consider the following statements about the PM Internship Scheme:

1. The scheme aims to provide 1 crore youth with work experience over five years.
2. It offers internships in sectors like agriculture, pharmaceuticals, and automobiles.
3. The stipend is entirely funded by the companies offering the internships.

How many of the above statements is/are incorrect?

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

Solution: A

Statement 1 is correct; the PM Internship Scheme targets providing 1 crore youth with hands-on work experience over five years.

Statement 2 is also correct as the internships are offered across various sectors like agriculture, pharmaceuticals, and automobiles.

However, Statement 3 is incorrect because the stipend is not entirely funded by the companies. The government contributes ₹4,500 of the ₹5,000 monthly stipend, and the remaining ₹500 is provided by the companies.

30) Consider the following statements about the rights and autonomy of minority institutions in India:

1. Minority institutions cannot admit non-minority students under any circumstances.
2. Minority institutions are entirely exempt from educational quality standards set by the government.
3. The Pramati Educational and Cultural Trust v. Union of India (2014) ruling granted minority institutions exemption from RTE Act's reservation provisions.

How many of the above statements is/are incorrect?

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

Solution: B

Only statement 3 is correct. In Pramati Educational and Cultural Trust v. Union of India (2014), the Supreme Court ruled that minority institutions are exempt from the reservation provisions of the Right to Education (RTE) Act.

Statement 1 is incorrect because **minority institutions can admit non-minority students**, although they may have quotas or reserved seats for minority students based on the institution's founding purpose.

Statement 2 is also incorrect because **minority institutions must adhere to national standards of quality** to ensure they provide proper education, although they enjoy certain autonomies in administration and admissions.

31) Consider the following statements regarding 6G technology:

1. Terahertz frequencies in 6G enable faster data transfer but can only travel short distances.
2. Integrated Intelligent Reflecting Surfaces (IIRS) improve signal quality in areas with weak reception.
3. Massive MIMO (Multiple Input Multiple Output) technology uses multiple antennas to enhance data transmission, supporting numerous devices simultaneously.

Which of the above statements is/are correct?

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

Solution: D

Terahertz (THz) frequencies are extremely high-frequency waves that can carry massive amounts of data, though they suffer from **limited range**, making them suitable for specific, **localized applications or indoor environments**.

Integrated Intelligent Reflecting Surfaces (IIRS) help boost signal quality by reflecting signals towards areas with low coverage, ensuring stronger and more reliable connections.

Massive MIMO (Multiple Input Multiple Output) technology enhances the capacity and efficiency of wireless networks by using multiple antennas to support a higher number of simultaneous connections, which is crucial for the expansive connectivity needs of 6G.

32) Consider the following statements regarding Bharat 6G Vision and Strategy:

1. The Bharat 6G Vision aims to achieve affordable 6G technologies specifically for rural connectivity within India.
2. The core principles of Bharat 6G Vision is aligning with the national policy of "Make in India" to strengthen domestic telecom manufacturing.
3. Bharat 6G Vision focuses on enhancing global intellectual property contributions from India in 6G technologies.

How many of the above statements is/are incorrect?

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

Solution: B

Statement 1 is incorrect because the vision **extends beyond rural connectivity to include secure, intelligent, and widespread global connectivity.**

Statement 2 misrepresents the **core principles, which focus on affordability, sustainability, and ubiquity rather than the "Make in India" initiative specifically**, though it does align with the broader Atmanirbhar Bharat objective of self-reliance.

Bharat 6G Vision does **prioritize India's role in global intellectual property (IP) creation for 6G technologies**, which supports India's contributions in the 6G patent landscape.

33) Consider the following statements about CSR eligibility and compliance under the Companies Act, 2013:

1. CSR becomes mandatory for companies with a net worth of ₹500 crore or more.
2. Companies failing to meet CSR obligations may face monetary penalties, but responsible officers are not personally liable.
3. The law requires unspent CSR funds to be carried forward indefinitely if not utilized in the specified year.

Which of the above statements is/are correct?

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

Solution: A

Only Statement 1 is correct.

CSR compliance is mandatory for companies with a net worth of ₹500 crore or more, an annual turnover of ₹1,000 crore or more, or a net profit of ₹5 crore or more.

Statement 2 is incorrect because **both the company and responsible officers may face penalties for non-compliance.** Officers can be fined or even face imprisonment for failing to meet CSR obligations.

Statement 3 is also incorrect as per the 2019 amendment; **unspent CSR funds must be transferred to a specified fund by the end of the fiscal year and utilized within three years.** If unutilized, these funds must be deposited into a government-specified fund, ensuring timely and effective CSR expenditure.

34) Match the following TB-related initiatives with their primary focus:

| Initiative | Focus |
|------------------------------------|---|
| A. Nikshay Poshan Yojana | 1. Public participation through adoption of TB patients |
| B. TB Harega Desh Jeetega | 2. Nutritional support to TB patients via DBT |
| C. Pradhan Mantri TB Mukta Abhiyan | 3. National awareness and community participation |

Select the correct answer code:

- (a) A-2, B-3, C-1
- (b) A-3, B-1, C-2
- (c) A-1, B-2, C-3
- (d) A-1, B-3, C-2

Solution: a)

- **A-2: Nikshay Poshan Yojana** is a **direct benefit transfer (DBT)** scheme launched in 2018 to provide **nutritional support** of ₹500 per month to TB patients during their treatment, addressing malnutrition which weakens treatment outcomes.
- **B-3: TB Harega Desh Jeetega** is a **national campaign** aimed at **raising public awareness**, promoting **early diagnosis**, and ensuring **treatment adherence** through community engagement and behavior change communication. It is a broader strategic umbrella for India's TB elimination goals.
- **C-1: Pradhan Mantri TB Mukh Abhiyan** launched in 2022, focuses on **public participation** through the **Nikshay Mitra initiative**, where individuals, organizations, and corporates can adopt TB patients and support them with nutritional kits, diagnostic support, and vocational assistance. This model encourages **community ownership** in health outcomes.

5. Science and Technology

- 1) Which of the following is the most significant advantage of gene-editing in bananas over traditional genetic modification (GMO)?
- Gene-edited bananas have been widely accepted and approved for human consumption globally.
 - Gene-editing is faster but more unpredictable compared to traditional GMO methods.
 - Gene-edited crops require continuous application of chemical regulators to maintain their traits.
 - Gene-editing does not introduce foreign DNA, whereas GMO techniques do.

Solution: D

Unlike GMOs, CRISPR-based gene editing makes precise alterations within the plant's own genome without inserting foreign genes, making it more acceptable in regulatory frameworks.

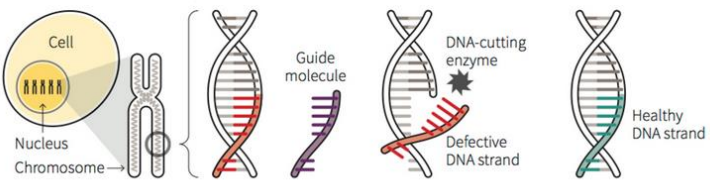
A UK-based biotech company, **Tropic**, has developed a [gene-edited banana](#) that remains fresh and yellow for **12 hours after peeling**, reducing food waste.

- This breakthrough in genetic modification could help curb **post-harvest losses and carbon emissions**, contributing to sustainability.

DNA editing

A DNA editing technique, called CRISPR/Cas9, works like a biological version of a word-processing programme's "find and replace" function.

HOW THE TECHNIQUE WORKS



The diagram shows a cell with a nucleus and chromosome. A guide molecule (red) and a healthy DNA copy (green) are introduced. The guide molecule binds to a target DNA strand (red). A DNA-cutting enzyme (starburst) cuts the target DNA strand. The defective DNA strand is then replaced with a healthy copy (green).

A cell is transfected with an enzyme complex containing:

- Guide molecule
- Healthy DNA copy

A specially designed synthetic guide molecule finds the target DNA strand.

An enzyme cuts off the target DNA strand.

The defective DNA strand is replaced with a healthy copy.

Sources: Reuters; Nature; Massachusetts Institute of Technology

Recent Advancements in [Gene-Editing Technology](#)

- **CRISPR-Cas9 Breakthroughs:** [CRISPR-Cas9](#) remains the most widely used gene-editing tool, enabling precise DNA modifications.

- Scientists have improved **base-editing techniques**, allowing for single-nucleotide changes without breaking DNA strands.
- **Prime Editing:** A more refined version of CRISPR, **Prime Editing**, can directly write new genetic sequences without cutting DNA entirely.
 - This technique enhances **safety and accuracy** in genetic modifications.
- **Gene-Edited Crops for Agriculture: Non-browning bananas** (Tropic) and **Arctic apples** (Okanagan Specialty Fruits) extend shelf life and reduce waste.
 - **Drought-resistant wheat, pest-resistant rice, and vitamin-enhanced tomatoes** are advancing agricultural productivity.
- **Therapeutic Applications:** Gene editing is revolutionizing **cancer treatment** (CAR-T cell therapy).
 - Ongoing trials aim to **cure genetic disorders** like **sickle cell anemia and cystic fibrosis**.

2) Consider the following applications of gene-editing technology:

1. Developing genetically engineered mosquitoes to prevent the spread of malaria.
2. Creating synthetic human embryos for organ transplantation.
3. Enhancing crop resistance to pests and environmental stress.

Which of the above are currently feasible using gene-editing techniques?

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

Solution: C

Gene-edited mosquitoes have been developed using CRISPR to suppress malaria transmission. Gene-editing is widely used in agriculture for developing pest-resistant and drought-tolerant crops.

Statement 2 is incorrect – Creating synthetic human embryos solely for organ transplantation is not yet feasible and raises ethical concerns.

SIMPLIFYING IAS EXAM PREPARATION

What is Gene Editing?

- Gene editing involves **modifying an organism's DNA** to enhance traits, eliminate defects, or develop resistance to diseases.
- Unlike traditional breeding, it allows **precise and controlled alterations** at the molecular level.

Methods Used

1. **CRISPR-Cas9** – Most common technique, cuts DNA at specific sites for modification.
2. **Zinc Finger Nucleases (ZFNs)** – Custom DNA-binding proteins used to alter genes.
3. **TALENs (Transcription Activator-Like Effector Nucleases)** – Precise cutting and editing of genetic sequences.

Regulatory Provisions in India

- **Genetic Engineering Appraisal Committee (GEAC)** under **MoEFCC** oversees gene-editing approvals.
- **The Food Safety and Standards Authority of India (FSSAI)** regulates genetically modified foods.
- India **approved GM Mustard** for commercial cultivation but has stricter regulations for gene-edited crops.

Current Status in India

- **India has not approved CRISPR-based crops for commercial use yet**, but research is underway.
- Gene-edited **rice, wheat, and bananas** are in developmental stages.
- The **Indian Council of Agricultural Research (ICAR)** is exploring gene-editing to improve **climate resilience and pest resistance** in crops.

3) Which of the following best explains why Starlink's satellite broadband is considered superior to traditional internet services?

- (a) Starlink's satellites orbit in geostationary orbit (GEO), allowing seamless global coverage.
- (b) It eliminates the need for ground stations, making it completely independent of terrestrial infrastructure.
- (c) Starlink uses a low-Earth orbit (LEO) satellite constellation, reducing latency compared to traditional satellite internet.

(d) It operates using fiber-optic communication in space, ensuring higher speeds than terrestrial broadband.

Solution: C

- Option a is incorrect – Starlink operates in low-Earth orbit (LEO), not geostationary orbit (GEO). GEO satellites remain fixed relative to Earth but suffer from high latency (~600 ms).
 - Option b is incorrect – Starlink still requires ground stations to relay data to the broader internet. While it reduces dependency on terrestrial infrastructure, it is not fully independent.
 - **Option c is correct – Starlink’s LEO satellites (550 km altitude) provide lower latency (25-50 ms) compared to GEO satellites (~600 ms), making it suitable for real-time applications.**
 - Option d is incorrect – Starlink does not use fiber-optic communication in space but relies on radio frequency (RF) signals and phased-array antennas for data transmission.
- **What is Starlink**
 - A satellite-based internet service operated by **SpaceX**, founded by **Elon Musk**.
 - Designed to provide **high-speed, low-latency broadband** globally, especially in remote areas.
 - **Developed by:** SpaceX
 - Launched in **2019**, aims to deploy **42,000 satellites** in **low-Earth orbit (LEO)**.
 - **How Does Starlink Work?**
 - Uses a **constellation of LEO satellites** to provide internet access.
 - A **Starlink dish** connects to the nearest satellite, which transmits data to and from **ground stations** connected to the internet.
 - Unlike fiber or cellular networks, Starlink does not depend on **terrestrial infrastructure**.
 - **Key Features:**
 - **Low Latency (25-50 ms):** Suitable for gaming, video calls, and HD streaming.
 - **Speeds up to 220 Mbps:** Varies by region, with average speeds of **50-100 Mbps**.
 - **Global Coverage:** Effective in areas with poor broadband infrastructure.
 - **Portability:** Works for **homes, businesses, vehicles, ships, and aircraft**.
 - **Easy Installation:** Self-installable **dish and router** for quick setup.

| Parameter | Starlink (LEO Satellite) | Traditional Broadband (Fiber/Cellular) |
|------------|-------------------------------|--|
| Latency | 25-50 ms | 1-10 ms (fiber) / 50-100 ms (cellular) |
| Speed | 50-220 Mbps | 100 Mbps - 1 Gbps (fiber) |
| Coverage | Global (even remote areas) | Limited to wired/cellular areas |
| Setup Time | Quick (self-install) | Time-consuming (fiber laying required) |
| Pricing | Costly hardware + monthly fee | More affordable in urban areas |

4) Consider the following statements:

1. India accounts for 2% of the global rare disease burden.
2. Thalassaemia and Muscular Dystrophy are examples of rare diseases in India.
3. Rare diseases in India are usually detected within two years of birth.

How many of the above statements is/are incorrect?

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

Solution: b)

Statement 1 is incorrect: **India accounts for 25% of the global rare disease burden**, with 9-10 crore people affected.

Statement 2 is correct: Thalassemia and Muscular Dystrophy are both listed as rare diseases in the image.

Statement 3 is incorrect because the average time to diagnose rare diseases in India is 4.8 years, much longer than two years.

5) Match the following rare diseases with their corresponding types:

- | Rare Diseases | Descriptions |
|------------------------------|---|
| 1. Thalassemia | a. Genetic disorder affecting oxygen transport in the blood |
| 2. Acquired Aplastic Anaemia | b. Condition where the bone marrow fails to produce blood cells |
| 3. Paediatric Cardiomyopathy | c. Disease affecting the muscles of the heart |
- a) 1-a, 2-c, 3-b
 b) 1-b, 2-c, 3-a
 c) 1-c, 2-b, 3-a
 d) 1-a, 2-b, 3-c

Solution: d)

Thalassemia is a genetic disorder that affects the oxygen-carrying capacity of red blood cells. Acquired Aplastic Anaemia is a condition where the bone marrow stops producing enough blood cells.

Paediatric Cardiomyopathy is a disease that affects the heart muscles in children, often leading to severe complications.

6) Consider the following statements about the functioning of atomic clocks:

1. Quartz crystal oscillators are essential components of atomic clocks.
2. Atomic clocks primarily depend on the vibration of caesium atoms for timekeeping.
3. Atomic clocks compare the vibrations of atoms with that of quartz oscillators to maintain precision.
4. Atomic clocks are less accurate than GPS satellites in time measurement.

How many of the above statements is/are correct?

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

Solution: c)

Quartz crystal oscillators are also essential components of atomic clocks, providing a base frequency that is later compared to the atomic transitions, so **statement 1 is correct.**

Atomic clocks rely on the vibration of **caesium atoms** (or other atoms like hydrogen or rubidium) for their precise timekeeping, making **statement 2 correct.**

Statement 3 is also correct, as atomic clocks compare the consistent frequency of atom vibrations with quartz oscillators to ensure precision in time measurement.

Statement 4 is incorrect because atomic clocks are more accurate than the clocks in GPS satellites. In fact, GPS satellites use atomic clocks to maintain the precision required for navigation.

| Topic | Information |
|-------|-------------|
|-------|-------------|

| | |
|------------------------|---|
| Atomic Clock | An atomic clock is a highly accurate timekeeping device that combines a quartz crystal oscillator with an atom , typically caesium or hydrogen, to measure time precisely. It uses the consistent frequency of atoms to maintain accurate time, making it more stable than conventional quartz clocks. |
| | It was Invented in 1955 by Louise Essen . It combines a quartz crystal oscillator with an atom for precise timekeeping. |
| Types of Atomic Clocks | Caesium and hydrogen maser atomic clocks |
| | Hydrogen maser clocks are more accurate and used in scientific research. |
| Working | Quartz crystal oscillators are commonly used in modern clocks, vibrating at a precise frequency when voltage is applied. However, they become slightly slow every hour and require frequent adjustments. |
| | Atomic clocks are like super accurate timekeepers . They use special atoms, usually caesium atoms , which vibrate at a very steady rate. By sending microwaves to these atoms, we can make them vibrate even more regularly . Then, we compare these vibrations with the vibrations of a quartz crystal in a regular clock . The most advanced atomic clocks lose just one second every 300 billion years . |

7) Consider the following statements regarding Unstructured Supplementary Service Data (USSD):

1. USSD works only in 4G and 5G networks.
2. USSD does not require an internet connection to function.
3. USSD messages are limited to 182 characters.
4. USSD can be used for various mobile services, including banking and call forwarding.

Which of the above statements is/are correct?

- a) 1 and 2 only
- b) 2, 3, and 4 only
- c) 1, 2 and 3 only
- d) 1, 2, 3 and 4

Solution: b)

Statement 1 is incorrect because USSD works on **2G, 3G, 4G, and 5G networks**, providing a versatile option that does not require the advanced data capabilities of 4G or 5G.

USSD is a technology that allows users to interact with service providers over a GSM network without needing an internet connection, making it accessible even on basic mobile phones. This makes **Statement 2 correct**.

Statement 3 is correct, as **USSD messages are limited to 182 characters**, which is enough for basic information exchange or quick commands.

Statement 4 is correct, since USSD is widely used for various mobile services such as **mobile banking, checking account balances, recharging prepaid accounts, and enabling features like call forwarding**.

8) Which of the following statements is incorrect about how a hydrogen fuel cell works?

- a) The only byproducts of the fuel cell reaction are water vapor and heat.
- b) Electrons flow from the anode to the cathode through the electrolyte, generating an electric current.
- c) Water is formed at the cathode by combining protons, electrons, and oxygen from the air.
- d) Hydrogen molecules are split into protons and electrons at the anode of the fuel cell.

Solution: b)

In a hydrogen fuel cell, **hydrogen molecules are split into protons and electrons at the anode** (Statement a). The electrons do not travel through the electrolyte; instead, they flow from the **anode to the cathode through an external circuit**, creating an electric current. The electrolyte selectively allows only the protons (positively charged particles) to pass through it to the cathode, ensuring that electrons take the external path to generate usable electricity.

At the **cathode**, protons, electrons, and oxygen from the air combine to form water (Statement c), producing **water vapor and heat as byproducts** (Statement d). This efficient process of generating electricity with minimal byproducts makes hydrogen fuel cells a promising clean energy source.

- 9) Consider the following statements regarding Gallium and germanium?
1. Both minerals are crucial for the production of semiconductors and solar cells.
 2. Gallium is known for its application in defense sectors, particularly in missile guidance systems.
 3. Germanium plays a vital role in fiber-optic systems and infrared technology.

Which of the above statements is/are correct?

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

Solution: B

Gallium and germanium are important for producing semiconductors and solar cells. Germanium is also used in fiber-optic systems and infrared technology. However, **gallium's primary role is not in defense sectors like missile guidance systems**, making **statement 2 incorrect**.

- 10) Consider the following statements regarding Remote Sensing.
1. It is the science of obtaining information about objects or areas from a distance, typically from aircraft or satellites.
 2. It collects data by detecting the reflected energy from the Earth.
 3. Hyperspectral imaging and seismograms are common application of the remote sensing.

How many of the above statements is/are incorrect?

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

Solution: D

Remote Sensing: It is the science of obtaining information about objects or areas from a distance, typically from aircraft or satellites. It collects data by detecting the reflected energy from the Earth. Hyperspectral imaging, sonar, and seismograms are common application of the remote sensing.

- 11) Consider the following statements regarding Listeria.
1. Listeria is a bacteria that can lead to an infection called listeriosis.
 2. It is found in soil, vegetation, water and even the faeces of animals and humans.
 3. Most people who ingest listeria-infected food will fall sick or develop symptoms immediately.

How many of the above statements is/are correct?

- (a) Only one

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

Solution: B

Statement 3 is incorrect.

Listeria or Listeria monocytogenes is a type of bacteria found in soil, vegetation, water, sewage and even the faeces of animals and humans. Listeria-contaminated food can lead to an infection called listeriosis.

Most people who ingest listeria-infected food do not fall sick or develop symptoms. The bacteria can be present in the infected person's system for up to two months until the symptoms present themselves, making it difficult to establish the connection between what was consumed and the infection.

Symptoms include vomiting, nausea, cramps, severe headache, constipation and fever.

People with compromised immune systems, pregnant persons and their offspring and the elderly (aged 65 and above) are vulnerable.

12) Consider the following statements.

1. Khanij Bidesh India Ltd is a private joint venture that aims to secure critical minerals globally.
2. Lithium is an alkali metal used in rechargeable batteries and medical devices like pacemakers.
3. Niobium is a silvery metal with a corrosion-resistant oxide layer on its surface.

How many of the above statements is/are correct?

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

Solution: B

Statement 1 is incorrect.

Initiatives for Critical Minerals exploration:

| Initiative | Details |
|--|--|
| Amendment to Mines and Minerals (Development and Regulation) Act | Amendment to MMRDA in 2023 delisted six minerals, including Lithium and Niobium, from the list of atomic minerals, thereby allowing private sector participation |
| | Provided for the auction of mining leases and composite licenses of 24 critical and strategic minerals by the central government |
| Khanij Bidesh India Ltd | It is a government joint venture that aims to secure critical minerals globally, with a focus on Australia and South America. |

| Mineral | Description | Common Uses |
|----------------|---|---|
| Lithium | An alkali metal used in rechargeable batteries for mobiles, laptops, electric vehicles, and medical devices like pacemakers. | Rechargeable batteries, energy storage. |

| | | |
|---------------------|--|---|
| Rare Earth Elements | A group of 17-odd minerals including scandium, yttrium, cerium, and more. | Catalysts, magnets, alloys, glass, electronics, petroleum extraction, electric motors, wind turbines. |
| Niobium | A silvery metal with a corrosion-resistant oxide layer on its surface. The main source of Niobium is the mineral columbite, which is found in countries such as Canada, Brazil, Australia, and Nigeria. | Alloys (stainless steel), jet engines, construction materials, superconducting magnets (particle accelerators, MRI scanners). |

13) Consider the following statements regarding White phosphorus.

1. White phosphorus is a highly toxic, wax-like substance known for its ability to burn at extremely high temperatures.
 2. It is used by militaries to create smokescreens due to its fast-spreading fires and thick smoke production.
 3. It is categorized as an “incendiary weapon” and is banned by international conventions.
- (a) Only one
(b) Only two
(c) All three
(d) None

Solution: B

Statement 3 is incorrect.

About White phosphorus:

- It is a **highly toxic, wax-like substance known for its ability to burn at extremely high temperatures**, exceeding 800 degrees Celsius (1,500 degrees Fahrenheit).
- It can **melt metal and is often used by militaries to create smokescreens** due to its **fast-spreading fires and thick smoke production** that can last for about seven minutes.
- White phosphorus is harmful to **humans and can cause severe burns, penetrating down to the bone**. The **chemicals can be absorbed by the body, leading to dysfunction in multiple organs**, including the **liver, kidneys, and heart**
- White phosphorus munitions can be delivered through artillery shells, bombs, rockets, or grenades. This substance is colourless, white, or yellow and emits a garlic-like odour.

While white phosphorus is not banned by international conventions, it is not categorized as an “incendiary weapon” intended to cause fires or burns.

Instead, it is considered a multipurpose munition. Protocol III of the 1980 Convention on Certain Conventional Weapons prohibits incendiaries or the use of other substances to attack civilian populations, but it allows militaries to argue that white phosphorus is used only as a smokescreen, signal, or to illuminate a target.

- 14) What physiological factor is primarily responsible for the athletic performance differences between men and women?
- (a) Bone density
(b) Muscle fiber type
(c) Chromosome count
(d) Circulating testosterone levels

Solution: D

Circulating testosterone is considered the primary factor responsible for athletic performance differences between men and women. Testosterone has been shown to increase muscle mass and strength, bone size and density, and circulating hemoglobin levels. These physiological changes contribute significantly to athletic performance advantages. While other factors like bone density and muscle fiber type are influenced by

testosterone, they are secondary effects rather than the primary cause. The hormone's direct impact on multiple physiological systems makes it the key differentiator in athletic performance between sexes.

15) Consider the following chromosomal combinations with their corresponding sex characteristics.

1. XX: Development of male sex organs
2. XY: Development of female sex organs
3. XY (with Swyer syndrome): Development of female reproductive organs despite XY chromosomes

How many of the above statements is/are incorrect?

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

Solution: B

Only Statement 3 is correct.

XX chromosomes result in the development of female sex organs (1-B), XY chromosomes result in the development of male sex organs (2-A), and individuals with Swyer syndrome have XY chromosomes but develop female reproductive organs (3-C).

16) Which biotechnology technique is used to increase the shelf life of food products?

- a) Tissue culture
- b) Gene therapy
- c) Edible vaccines
- d) Molecular diagnostics

Solution: A

Tissue culture is a technique used in biotechnology to regenerate disease-free plants in laboratories, ensuring the production of high-quality planting materials. **It also plays a crucial role in extending the shelf life of food products** by producing plants with desirable traits, reducing waste, and ensuring access to fresher produce. This application is critical for improving food security and reducing post-harvest losses.

17) Consider the following statements regarding the challenges associated with biotechnology:

1. Biotechnology can threaten the survival of certain species by interfering with their natural breeding processes.
2. The development of biotechnology has completely eliminated the risk of creating biological weapons.
3. There is a lack of public awareness about modern biotechnological tools, which poses a challenge to its acceptance and regulation.

How many of the above statements is/are incorrect?

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

Solution: A

Statement 1 is correct because biotechnology, particularly in the form of genetic modification, can interfere with natural breeding processes and ecosystems, potentially leading to the extinction of certain species if not managed properly.

Statement 2 is incorrect; biotechnology does not eliminate the risk of biological weapons—in fact, it can exacerbate this risk by providing tools to create more sophisticated biological weapons, raising concerns about biosecurity.

Statement 3 is correct as there is often a significant gap in public awareness and understanding of modern biotechnology, which can lead to resistance, fear, and challenges in the proper regulation and ethical use of these technologies. Public education and transparent regulatory frameworks are essential to address these concerns.

18) Consider the following statements about the nature and characteristics of quasars:

1. Quasars are primarily powered by the accretion of matter onto a supermassive black hole.
2. The energy output of a quasar can outshine its entire host galaxy.
3. Quasars are relatively common and can be found in many nearby galaxies.

How many of the above statements is/are correct?

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

Solution: B

- **Quasars are primarily powered by the accretion of matter onto a supermassive black hole**, where the gravitational energy released as matter spirals into the black hole generates intense radiation, making statement 1 correct.
- **The energy output of a quasar can indeed outshine its entire host galaxy**, making statement 2 correct as well.
- However, **quasars are not common in nearby galaxies; they are typically found in distant galaxies** and are considered to be active galactic nuclei from the early universe, making **statement 3 incorrect**.
- Quasars serve as important tools for understanding the early stages of galaxy formation and the growth of supermassive black holes.

19) Consider the following statements regarding food irradiation:

1. Food irradiation prevents spoilage by slowing down decay and delaying premature ripening.
2. Irradiation processing usually requires multiple treatments to achieve food safety.
3. It reduces the need for chemical preservatives, contributing to a more sustainable food supply chain.
4. The Codex Alimentarius Commission played a key role in setting global standards for food irradiation.

Which of the above statements is/are correct?

- (a) 1 and 2 only
- (b) 1, 3, and 4 only
- (c) 1, 2 and 3 only
- (d) 1, 2, 3 and 4

Solution: B

Statement 1 is correct because food irradiation prevents spoilage by slowing down the process of decay and delaying ripening, sprouting, or germination.

Statement 3 is also correct, as irradiation reduces the need for chemical preservatives, promoting a more sustainable food supply chain.

Statement 2 is incorrect because **irradiation typically requires just one exposure treatment to achieve the desired food safety effects, simplifying food safety practices**.

Statement 4 is also correct, as the Codex Alimentarius Commission established global standards for food irradiation.

20) Which of the following best explains the primary mandate of North East Centre for Technology Application and Reach (NECTAR)?

- (a) To establish large-scale industrial zones in Northeast India with foreign investments.
- (b) To promote research and development in space technology for ISRO's Northeast initiatives.
- (c) To bridge the gap between research institutions and grassroots innovations through technology-driven solutions.
- (d) To implement direct cash transfers for technology-based enterprises in Northeast India.

Solution: c)

- Option a is incorrect – NECTAR does not focus on industrial zones, but rather on technological applications in agriculture, infrastructure, and skill development.
- Option b is incorrect – NECTAR is not directly involved in space technology research for ISRO.
- **Option c is correct – NECTAR's core mission is to bridge the gap between research institutions and grassroots innovations, ensuring technology adoption in agriculture, drone mapping, and infrastructure development.**
- Option d is incorrect – NECTAR does not implement direct cash transfers but supports research-based technological interventions.
- **What is NECTAR?**
 - An autonomous body under the Department of Science and Technology (DST), Government of India.
 - Focuses on technological applications for the development of Northeast India.
- **Established In:** 2014, under the Ministry of Science & Technology.
- **Headquarters:** Shillong, Meghalaya.
- **Aim:**
 - Promote technological advancements for socio-economic development in Northeast India.
 - Bridge the gap between research institutions and grassroots innovations.
 - Encourage sustainable agricultural practices like [saffron](#) and [bamboo cultivation](#).
- **Functions & Features:**
 - **Technology Application in Agriculture:** Expanding saffron cultivation in Northeast India, similar to Lavender farming in J&K.
 - **Drone Technology for Land Mapping:** Supports the 'Swamitva' program for efficient land records management.
 - **Bamboo & Honey Production:** Boosts eco-friendly industries to generate sustainable livelihoods.
 - **Infrastructure & Connectivity Enhancement:** Works on scientific and technological interventions to improve rural accessibility.
 - **Skill Development & Research:** Establishing a Centre of Excellence in Shillong for advanced tech training and innovation.

21) Consider the following statements regarding North East Centre for Technology Application and Reach (NECTAR):

1. It is an autonomous body under the Department of Science and Technology (DST), Government of India.
2. One of its key projects includes the promotion of saffron cultivation in the Northeast, leveraging climate adaptation technology.
3. NECTAR primarily focuses on the renewable energy sector, funding solar and wind energy projects in the Northeast.

How many of the above statements are correct?

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

Solution: B

- Statement 1 is correct – NECTAR is an autonomous body under the DST, focusing on technology-based solutions.
- Statement 2 is correct – NECTAR has experimented with saffron cultivation in Northeast India, adapting the successful model from Jammu & Kashmir.
- Statement 3 is incorrect – While NECTAR supports renewable energy applications, its primary focus is on technology integration in agriculture, land mapping, and infrastructure, not just renewable energy.

22) Which of the following is not a notable feature of Saturn as compared to Jupiter?

- Longer orbital period
- Moon Titan
- Great Red Spot
- Spectacular ring system

Solution: C

The Great Red Spot is a notable feature of Jupiter, a giant storm that has been ongoing for centuries. Saturn, on the other hand, is known for its spectacular ring system with seven rings, and it also has the large moon Titan. Saturn has a longer orbital period of 29.5 Earth years compared to Jupiter's 11.9 years.

23) What is the role of Blockchain-as-a-Service (BaaS) in blockchain technology?

- It allows developers to mine cryptocurrencies more efficiently
- It replaces traditional blockchains with centralized cloud databases
- It centralizes the blockchain ecosystem by hosting all decentralized apps
- It provides infrastructure and tools to build blockchain applications without requiring users to manage the blockchain themselves

Solution: D

Blockchain-as-a-Service (BaaS) offers cloud-based infrastructure and tools that enable businesses and developers to build, deploy, and manage blockchain applications without the need for creating or maintaining the blockchain infrastructure themselves. Microsoft Azure's BaaS is an example, allowing businesses to quickly set up blockchain applications.

24) Consider the following statements about the moons of Jupiter and Saturn:

- Both Jupiter and Saturn have numerous moons due to their large size and gravitational influence.
- Jupiter has more moons than Saturn.
- Titan is the largest moon of Saturn.

How many of the above statements is/are correct?

- Only one
- Only two
- All three
- None

Solution: B

Statement 1 is correct as both Jupiter and Saturn have many moons due to their large size and strong gravitational influence.

Statement 2 is incorrect because **Saturn has more moons than Jupiter**, with 145 moons compared to Jupiter's 95.

Statement 3 is correct, as Titan is the largest moon of Saturn.

25) Consider the following statements regarding the importance of Aditya-L1's position at Lagrange Point 1 (L1):

Statement-I: L1 allows Aditya-L1 to continuously observe the Sun without any interruptions from Earth's shadow.

Statement-II: L1 is located within Earth's magnetosphere, which protects the spacecraft from solar radiation.

Which one of the following is correct?

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

Solution: C

Explanation:

- **Statement-I is correct** – The L1 point provides an **uninterrupted view of the Sun**.
- **Statement-II is incorrect** – **L1 is not within Earth's magnetosphere**; it is **outside its protective influence**.

About Aditya-L1 Mission:

- **Launched in:** September 2, 2023.
- **Developed by:** ISRO, with contributions from Indian academic institutions.
- **Mission Type:** India's first solar observation mission positioned at **Lagrange Point 1 (L1)**.
- **Distance from Earth:** 5 million km (1% of Earth-Sun distance).
- **Primary Aim:**
 - Study the **Sun's corona, chromosphere, and solar emissions**.
 - Monitor **solar wind, magnetic storms, and space weather impacts** on Earth.
- **Key Features:**
 - **Constant Solar Observation:** Uninterrupted view of the Sun due to L1 positioning.
 - **Indigenous Payloads:** 7 payloads designed for **spectroscopy, coronagraphy, and particle analysis**.
 - **Minimized Fuel Usage:** L1's **gravitational balance reduces orbital maintenance efforts**.
 - **Early Warning System:** Detects **solar radiation and storms before they reach Earth**.

26) Consider the following statements regarding the use of helium in rockets:

1. Helium is used to pressurize fuel tanks in rockets because it remains a gas even at very low temperatures.
2. Helium is highly reactive and ensures that the fuel burns efficiently in rocket engines.
3. Alternatives like argon and nitrogen are commonly used instead of helium due to their lower costs.

How many of the above statements is/are correct?

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

Solution: A

- Helium plays a **crucial role in rocketry**, particularly in **pressurizing fuel tanks**. Unlike most gases, **helium remains in a gaseous state even at extremely low temperatures**, making it ideal for maintaining pressure in cryogenic fuel tanks that store **liquid hydrogen and liquid oxygen**. This ensures a **steady and controlled flow of fuel** into the rocket engines, preventing tank collapse due to external pressure.
- **Statement 2 is incorrect** because **helium is an inert gas**—it does not react with fuel or contribute to combustion. Its primary role is **maintaining pressure and purging systems**, not enhancing fuel efficiency.
- **Statement 3 is also incorrect** because, despite its high cost, **helium remains the preferred choice** in the space industry due to its unique properties. While **argon and nitrogen** have been explored, they are **less effective** for critical space applications.

27) Consider the following statements regarding sickle cell disease:

www.insightsonindia.com

1. Sickle cell disease shortens the lifespan of patients to approximately 40 years.
2. It is caused by a genetic abnormality passed on when both parents carry the sickle cell trait.
3. Sickle cell disease can be treated with antiviral medications.

How many of the above statements is/are correct?

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

Solution: B

Statement 1 is correct, as **sickle cell disease typically reduces life expectancy to around 40 years** due to various complications like organ damage, infections, and pain.

Statement 2 is also correct, as the **disease is genetic, passed on when both parents carry the sickle cell trait**. Sickle cell disease is most prevalent in tribal and rural regions of India, not urban areas.

Statement 3 is incorrect because sickle cell disease is a genetic disorder, **not caused by a virus, and cannot be treated with antiviral medications**.

Hydroxyurea, a vital medicine for treating sickle cell disease, been included in the essential medicines list; this has increased access to it.

28) What does the term "Disease X" refer to?

- (a) A hypothetical pathogen that could cause a future pandemic
- (b) A known disease caused by mutations in genetic material
- (c) A bacterial infection caused by unknown sources
- (d) A new type of influenza virus

Solution: A

Disease X is a term coined by scientists and the World Health Organization (WHO) to describe a **hypothetical pathogen that has the potential to cause a major future pandemic**. It refers to a yet-unknown virus, bacterium, or fungus that could emerge with no existing treatment or cure. Disease X represents the unpredictability of future microbial threats to human health and emphasizes the need for preparedness.

29) Consider the following statements regarding Hantavirus:

1. Hantavirus Pulmonary Syndrome (HPS) is caused by the inhalation of aerosols containing the virus.
2. The virus is exclusively found in tropical regions, making it a low-risk infection for temperate climates.
3. Hemorrhagic Fever with Renal Syndrome (HFRS) is another disease caused by Hantavirus, primarily affecting kidney function.

How many of the above statements are correct?

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

Solution: B

Explanation:

- **Statement 1 is correct** – HPS occurs when individuals inhale aerosolized virus particles from rodent droppings or urine.
- **Statement 2 is incorrect** – Hantaviruses are **not restricted to tropical regions**; they are found **worldwide**, including **temperate zones like North America, Europe, and Asia**.

- **Statement 3 is correct** – HFRS is a severe form of Hantavirus infection that primarily affects the kidneys, leading to renal failure and internal bleeding.

About Hantavirus:

- **Caused By:**
 - Hantaviruses belong to the **Bunyaviridae** family and are transmitted by **infected rodents** such as **deer mice, rice rats, and cotton rats**.
- **How Does it Occur?**
 - Humans contract the virus through **contact with infected rodent urine, droppings, or saliva**.
 - **Aerosolization** occurs when **contaminated materials are disturbed**, making **inhalation the primary mode of transmission**.
 - No **human-to-human transmission** has been confirmed except in **Andes virus cases in [South America](#)**.
- **Symptoms:**
 - **Incubation Period:** Symptoms appear **1-8 weeks** after exposure.
 - **Initial Flu-like Symptoms:** Fever, muscle aches, fatigue, nausea, and dizziness.
 - **Severe Respiratory Phase:** Shortness of breath, coughing, chest tightness, and rapid fluid buildup in the lungs.
 - **Complications:** Can escalate to [acute respiratory distress syndrome](#) (ARDS), internal bleeding, and kidney failure.
- **Treatment & Prevention:**
 - **No Specific Cure:** Supportive medical care is the only option.
 - **Oxygen Therapy & Ventilation:** Used for patients with **severe respiratory distress**.
 - **Early Detection is Critical:** Prompt medical intervention improves survival chances.
 - **Rodent Control Measures:** Sealing homes, avoiding direct rodent contact, and proper sanitation **reduce risk**.
 - **High-Risk Groups:** Farmers, campers, construction workers, and individuals in rodent-prone areas should **exercise caution**.

30) What is the primary objective of ISRO's SpaDeX (Space Docking Experiment) mission?

- To test space-based refueling technology for future interplanetary missions.
- To demonstrate autonomous rendezvous and docking capabilities between two spacecraft.
- To test India's first modular space station design for long-duration human spaceflight.
- To establish an in-orbit debris collection system using robotic arms.

Solution: B

Explanation:

- **Option a is incorrect** – While docking could facilitate **future refueling**, SpaDeX is **not specifically designed for refueling experiments**.
- **Option b is correct** – SpaDeX **demonstrates autonomous docking and undocking**, a crucial step toward **India's future space station and human spaceflight missions**.
- **Option c is incorrect** – SpaDeX is **not a space station prototype** but a **technology demonstration mission**.
- **Option d is incorrect** – The mission **does not focus on space debris removal**.
- **What is SpaDeX?**
 - A **technology demonstration mission** by ISRO designed to test and validate **spacecraft rendezvous, docking, and undocking operations** in orbit.
 - Crucial for future **space station assembly, lunar sample return missions, and deep-space exploration**.
- **Satellites Involved:**
 - **SDX-01 (Chaser)** – The active satellite responsible for docking maneuvers.
 - **SDX-02 (Target)** – The passive satellite that facilitates docking.
- **Launched In: December 30, 2024**, aboard [PSLV-C60](#) from Satish Dhawan Space Centre, Sriharikota.
- **Aim:**

- To **develop and demonstrate docking, undocking, and power transfer technologies** in space.
- Establish a foundation for **future space station construction, human spaceflight, and interplanetary missions.**
- **Key Features:**
 - **First Indian Space Docking Demonstration:** Achieved successful docking on January 16, 2025, and undocking on March 14, 2025.
 - **Orbital Operations:** Performed in a 460 km circular orbit with 45-degree inclination.
 - **Autonomous Docking:** Showcased the capability of two satellites to autonomously dock and undock.
 - **Power Transfer Between Satellites:** Demonstrated the transfer of electric power between docked spacecraft, critical for future modular spacecraft and in-space servicing.
 - **Monitored via Global Ground Stations:** Operations tracked from Bengaluru, Lucknow, and Mauritius.
- **Significance of the Mission:**
 - **Paves the way for [India's Space Station](#):** Essential for assembling, maintaining, and operating an Indian Space Station.
 - **Supports Human Spaceflight:** Enables future Gaganyaan missions and lunar human exploration.
 - **Advances In-Space Robotics & Logistics:** Useful for autonomous docking, fuel transfer, and orbital repairs.
 - **Enhances India's Deep-Space Exploration:** Assists in sample return missions from the Moon and Mars.

31) Consider the following statements regarding the space weather implications of Flareless Coronal Mass Ejection (CME):

1. Unlike flare-associated CMEs, they have no effect on satellite operations.
2. They are harder to detect in advance, making space weather forecasting more challenging.
3. Their formation mechanism is completely independent of the Sun's magnetic field.

How many of the above statements are correct?

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

Solution: A

Explanation:

- **Statement 1 is incorrect** – Flareless CMEs **can still impact satellites and power grids** if directed toward Earth.
- **Statement 2 is correct** – They are **harder to detect**, making forecasting difficult.
- **Statement 3 is incorrect** – Their formation is **linked to solar magnetic field changes**.
- **What is a Flareless Coronal Mass Ejection?**
 - A **flareless CME** is a **massive ejection of plasma and magnetic field** from the Sun's corona that occurs **without an associated solar flare**.
 - Unlike typical CMEs, it does not release **intense electromagnetic radiation** before the eruption.
 - It challenges existing models of solar activity, requiring **new insights into magnetic instabilities**.
- **How Flareless CMEs Form?**
 - **Magnetic Reconnection:** Occurs when **magnetic field lines rearrange** in the Sun's atmosphere, leading to energy release.
 - **Gradual Magnetic Build-up:** Magnetic stress accumulates **over time**, eventually releasing plasma without a sudden energy burst.
 - **Flux Rope Eruption:** A pre-existing twisted magnetic structure in the corona slowly becomes **unstable and erupts outward**.
 - **No Preceding Flare:** Unlike typical CMEs, no strong **X-ray or UV burst** precedes the plasma ejection.

- **Sunspot Influence:** Often linked to regions with **weak or decaying magnetic fields**, where flare energy is insufficient.
- **Key Features of Flareless CMEs:**
 - **Low Energy Signature:** No significant **X-ray or radio emissions**, making early detection difficult.
 - **Slower Ejection Speeds:** Travels at **lower velocities (~400–1,000 km/s)** than flare-associated CMEs.
 - **Magnetically Driven:** Initiated by **gradual destabilization of coronal magnetic fields** rather than impulsive energy release.
 - **Space Weather Impact:** Can still **trigger geomagnetic storms** on Earth, affecting **satellites and communication systems**.
 - **Rare Phenomenon:** Less frequently observed compared to **flare-associated CMEs**, requiring **continuous solar monitoring**.

32) Consider the following statements about Hantavirus:

1. Hantavirus can be eradicated using mass vaccination programs similar to polio.
2. The disease is highly contagious and spreads rapidly in human populations.
3. People working in agriculture, construction, and forestry are at higher risk due to rodent exposure.

How many of the above statements is/are correct?

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

Solution: A

Statement 1 is incorrect – There is **no vaccine for Hantavirus**, unlike polio or smallpox. Prevention relies on **rodent control and hygiene measures**.

Statement 2 is incorrect – **Hantavirus does not spread between humans in most cases**, making it **non-contagious in typical outbreaks**.

Statement 3 is correct – Individuals in **agriculture, construction, and forestry work** are at a **higher risk** due to **frequent exposure to rodent habitats**.

33) Consider the following statements regarding hydrogen fuel cells in the transport sector:

1. Hydrogen fuel cell vehicles produce zero emissions, emitting only water vapour as a by-product.
2. Hydrogen fuel cells offer a longer range and faster refuelling compared to battery electric vehicles.
3. Hydrogen fuel cells increase energy consumption compared to traditional combustion engines.

How many of the above statements is/are incorrect?

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

Solution: A

Statements 1 and 2 are correct. **Hydrogen fuel cells in vehicles produce zero emissions, making them environmentally friendly**. They emit only water vapour as a by-product. Additionally, hydrogen fuel cells **provide longer driving ranges and faster refuelling times** compared to battery electric vehicles.

However, **statement 3 is incorrect** because hydrogen fuel cells increase energy efficiency compared to traditional combustion engines, not energy consumption.

34) Consider the following statements regarding the security and legal implications of autopen usage:

1. Autopen-generated signatures are universally accepted in all legal and financial transactions worldwide.
2. Autopen devices require biometric authentication before initiating a signature.

3. The use of an autopen automatically invalidates the authenticity of a document in legal cases.

How many of the above statements are correct?

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

Solution: D

Explanation:

- The **autopen** is a mechanical or electronic device that replicates a person's signature and is commonly used in administrative or official contexts, including by heads of state. However, its **legal and security implications** vary widely across jurisdictions.
- **Statement 1 is incorrect** — **Autopen-generated signatures are not universally accepted** in legal or financial transactions. While some countries and institutions may allow them in administrative contexts, **many require manual or digital signatures authenticated through secure processes**, especially in contracts or financial instruments.
- **Statement 2 is incorrect** — **Traditional autopen machines do not use biometric authentication**. They function mechanically or through stored electronic patterns of a signature. Some modern digital signature systems may use biometrics, but this is **not inherent to autopens**.
- **Statement 3 is incorrect** — **The use of an autopen does not automatically invalidate a document**, but in legal proceedings, its usage **may be challenged** and may require **further verification or authorization**.

35) Consider the following statements regarding Audible Enclaves:

1. Audible Enclaves emit sound omnidirectionally to surround the listener.
2. The technology has already been commercialized for long-range outdoor broadcasting.
3. Its functionality is unaffected by environmental noise or reflective surfaces.

How many of the above statements is/are correct?

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

Solution: D

All three statements are incorrect.

- Audible Enclaves emit **ultrasonic beams** that **only intersect at one precise point** where audible sound is generated — this is the opposite of **omnidirectional sound** (Statement 1).
- Statement 2 is false — while the **technology is promising**, it remains **experimental** and has **not yet been commercialized** for long-range or public broadcasting due to limitations in range, power, and clarity.
- Statement 3 is also wrong — the performance of Audible Enclaves can be **affected by environmental conditions**, particularly **reverberation, reflective surfaces, and background noise**, which may interfere with the **precise targeting** of ultrasonic beams.
- **What are Audible Enclaves?**
 - Localized pockets of sound heard only at precise intersection points of ultrasonic beams.
 - Enable private audio delivery to individuals in public spaces without disturbing others.
- **Principle Behind Audible Enclaves:**
 - **Nonlinear Acoustic Effect:** Two **ultrasonic waves** intersect and interact non-linearly to generate audible sound only at the intersection point.
 - **Use of Metasurfaces:** 3D-printed acoustic lenses bend ultrasonic beams along curved paths to meet at a controlled point.
- **How Audible Enclaves Work:**
 - **Ultrasonic Transducers:** Two devices emit ultrasonic beams at slightly different frequencies.

- **Self-Bending Beams:** Beams follow crescent-shaped paths due to metasurfaces' directional control.
- **Intersection Point:** Audible sound is produced only where beams intersect, isolating the audio zone.
- **Obstacle Navigation:** The beams can bend around human heads or objects, reaching the precise point without disturbance.
- **Key Features:**
 - **Privacy Listening:** Audio is only heard by the person within the sound beam intersection, ensuring confidentiality.
 - **Virtual Headset Effect:** Users can listen without headphones, with no sound leakage to others.
 - **Indoor and Outdoor Usability:** Tested in reverberant spaces, classrooms, vehicles, and open environments.
 - **Directional Sound Control:** Can direct sound beams to targeted locations even behind barriers.
- **Limitations:**
 - **Short Range:** Currently functional only up to 1 meter from the sound source.
 - **Low Sound Intensity:** Output is limited to around 60 decibels, equivalent to a normal conversation.
 - **Power Limitations:** Increasing range or volume requires higher ultrasonic beam intensity.
 - **Environmental Dependence:** Effectiveness may reduce in noisy or unpredictable outdoor conditions.

36) Consider the following statements regarding the Samarth Incubation Program:

1. It provides access to C-DOT labs and expert mentorship to selected startups.
2. It is implemented directly by the Department of Science and Technology.
3. Startups must be recognized by the Department for Promotion of Industry and Internal Trade (DPIIT) to be eligible.

Which of the above statements are correct?

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

Solution: B

- The **Samarth Incubation Program** is a focused initiative under the **Ministry of Communications**, implemented by the **Software Technology Parks of India (STPI)** with support from the **Centre for Development of Telematics (C-DOT)** and the **Department of Telecommunications (DoT)**. It aims to foster innovation in the telecom sector by nurturing early-stage startups and MSMEs.
- **Statement 1 is correct** — The program provides selected startups with **access to C-DOT's advanced telecom R&D labs**, mentorship from domain experts, funding support, and networking opportunities to scale commercially viable solutions.
- **Statement 2 is incorrect** — The program is **not implemented by the Department of Science and Technology (DST)**. Instead, it is driven by **STPI under DoT**, which focuses on telecom-specific innovation.
- **Statement 3 is correct** — To ensure alignment with India's formal startup framework, only **startups recognized by the Department for Promotion of Industry and Internal Trade (DPIIT)** are eligible to apply.

37) Consider the following statements about polio disease and its effects:

1. Polio primarily affects adults and is rarely seen in children under five.
2. Polio is highly infectious and affects the nervous system, potentially causing paralysis.
3. All types of polio infections lead to visible symptoms and paralysis in infected individuals.
4. Polio has no known impact on the respiratory system.

How many of the above statements is/are correct?

- (a) Only one
- (b) Only two
- (c) Only three

(d) All four

Solution: A

Statement 2 is correct, as polio is highly infectious and attacks the nervous system, which can result in paralysis or even death.

Statement 1 is incorrect; **polio primarily affects children under five years of age.**

Statement 3 is also incorrect, as many polio infections are asymptomatic, and only a small percentage of cases lead to visible symptoms or paralysis.

Statement 4 is incorrect because polio can affect the respiratory muscles, potentially causing respiratory complications in severe cases.

38) What is a primary limitation of millimeter wave (mmWave) transceiver technology in wireless communication?

- (a) It is incompatible with Internet of Things (IoT) devices due to its size.
- (b) It has limited range and is easily blocked by physical obstructions.
- (c) It can only transmit data at low speeds over long distances.
- (d) It is highly susceptible to interference from other wireless systems.

Solution: B

The key limitation of mmWave transceiver technology is its limited range, and its signals can be easily blocked by physical objects such as buildings, trees, and even rain.

Option (a) is incorrect because mmWave technology can be used with compact antennas, making it compatible with IoT devices.

Option (c) is incorrect because mmWave technology is designed for high-speed data transmission over short distances.

Option (d) is incorrect as mmWave technology actually has low interference with other systems due to its high frequency range.

39) Which of the following features in 6G technology allows for the creation of dedicated, smaller networks tailored for specific types of traffic?

- (a) Integrated Intelligent Reflecting Surfaces (IIRS)
- (b) Massive MIMO
- (c) Network Slicing
- (d) Terahertz (THz) Frequencies

Solution: C

- **Network Slicing is an essential feature in advanced networks like 5G and 6G that allows operators to create multiple virtual networks within a single physical network.** This enables customization of network resources to suit specific types of traffic and use cases, such as streaming high-definition video, managing IoT devices, or supporting industrial automation.
- Each slice can have different levels of latency, bandwidth, and security, tailored precisely to the needs of the application it serves.
- Network slicing improves network efficiency and responsiveness by allocating resources based on real-time demand, enabling dynamic scalability and cost efficiency.
- In 6G, this technology will likely be more granular, creating even more specialized slices.

40) Consider the following statements:

1. Fungi are considered prokaryotic organisms due to the absence of a nucleus.
2. Lichens are made solely of fungal species.
3. Some fungi have shown the ability to degrade synthetic plastic materials.

How many of the above statements is/are correct?

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

Solution: A

- **Statement 3 is correct**, making **only one statement accurate**. Certain fungal species, including some *Aspergillus* and *Penicillium* strains, have shown the **potential to degrade synthetic plastics**, such as polyurethane. This finding is significant in the context of **bioremediation and sustainable waste management**, as plastic pollution has become a global environmental crisis.
- **Statement 1 is incorrect** because fungi are **eukaryotic organisms**. They possess a **membrane-bound nucleus**, mitochondria, and other organelles, distinguishing them from prokaryotes like bacteria, which lack these features. Eukaryotic nature is a defining trait of the fungal kingdom.
- **Statement 2 is also incorrect** — **lichens are symbiotic associations** between a fungal partner (usually an ascomycete) and a **photosynthetic partner**, which may be either **green algae or cyanobacteria**. This mutualistic relationship allows lichens to colonize harsh environments by combining the fungus's structural support with the photosynthetic partner's energy production.

41) Which of the following best explains why photonic chips are considered superior for future technologies like 6G and quantum computing?

- (a) They require no electricity for operation
- (b) They rely solely on quantum bits (qubits) instead of classical bits
- (c) They offer ultra-high data transfer speeds and minimal heat generation
- (d) They can only be used in space applications

Solution: c)

- Photonic chips operate using photons—particles of light—rather than electrons, which makes them far more efficient for high-speed data transfer.
- Unlike electronic chips that suffer from resistive heating and limited bandwidth, **photonic chips offer ultra-fast transmission, high bandwidth, and very low energy loss**. This makes them well-suited for emerging data-intensive domains such as 6G communication, quantum computing, and AI.
- Moreover, photonic chips generate minimal heat and are immune to electromagnetic interference, significantly improving operational stability and efficiency in complex computing environments.

42) Consider the following statements regarding Gene banks.

Statement-I: Gene banks are crucial for India's climate-resilient agriculture.

Statement-II: Gene banks provide immediate high-yield varieties to farmers.

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

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

Solution: c)

- **Statement-I is correct**. **Gene banks** play a vital role in ensuring **climate-resilient agriculture**, especially in countries like India that face challenges such as **droughts, floods, soil salinity, and changing pest patterns**.

- These banks **conserve genetic material**—seeds, tissues, DNA samples—of diverse crop species and their wild relatives. Such genetic diversity is critical for **plant breeders and agricultural scientists** to develop crop varieties that are better adapted to extreme or shifting climate conditions. Thus, gene banks act as a foundational resource for agricultural resilience and food security.
- **Statement-II is incorrect.** While gene banks hold the genetic material necessary to **develop** high-yield or climate-resilient varieties, they do not **directly supply such varieties to farmers**.
- The process involves extensive research, cross-breeding, and field trials conducted by **plant breeding institutions**, which may take several years. Therefore, gene banks are **indirect contributors**, not immediate providers of improved crop varieties.

43) Consider the following statements regarding Parker Solar Probe

Statement-I: Parker Solar Probe helps improve forecasting of space weather.

Statement-II: Space weather has minimal effect on satellite communications and power grids on Earth.

Which one of the following is correct?

- Both Statement-I and Statement-II are correct and Statement-II is the correct explanation for Statement-I
- Both Statement-I and Statement-II are correct and Statement-II is not the correct explanation for Statement-I
- Statement-I is correct but Statement-II is incorrect
- Statement-I is incorrect but Statement-II is correct

Solution: c)

- **Statement-I is correct.** The **Parker Solar Probe (PSP)** is a groundbreaking NASA mission designed to study the **outer atmosphere of the Sun**, particularly the **solar corona**. By measuring the speed, density, and electric/magnetic fields of **solar wind particles**, PSP provides critical data that enhances our **understanding and forecasting of space weather**. This forecasting capability is vital for anticipating solar storms that can affect both space and Earth-based systems.
- **Statement-II is incorrect.** Contrary to the claim, **space weather does not have a minimal effect**—it can have **severe consequences** on **satellite communications, GPS navigation, power grids, aviation systems**, and even oil pipeline operations. **Solar flares, coronal mass ejections, and geomagnetic storms** can disrupt satellite electronics, induce currents in power lines, and lead to costly infrastructure failures. PSP's insights allow scientists to **model and predict** such events more accurately, enabling better preparedness.

44) Consider the following statements regarding xenotransplantation:

- It involves the transfer of live tissues or organs from one human to another.
- It can address organ shortages by providing alternative sources from animals.
- Gene editing in donor animals reduces the risk of organ rejection.

How many of the above statements are correct?

- Only one
- Only two
- All three
- None

Solution: b)

- **Statement 1 is incorrect** — **xenotransplantation** involves the **transplantation of live tissues, organs, or cells from a non-human animal to a human**, not from one human to another. The latter is called **allotransplantation**. Xenotransplantation represents a potential solution to the global shortage of human donor organs, especially for vital organs such as the heart, liver, and kidneys.
- **Statement 2 is correct** — this is the central promise of xenotransplantation. By using genetically modified animal organs (primarily from pigs due to their physiological similarities to humans), the technique could significantly **reduce wait times and mortality rates** for patients on transplant lists.
- **Statement 3 is also correct** — **gene-editing tools** such as **CRISPR-Cas9** are used to **eliminate or modify specific pig genes** that trigger immune responses in humans. These genetic alterations reduce the likelihood of **hyperacute or delayed rejection**, increasing the viability of animal-to-human transplants.

45) Consider the following statements

Statement-I: Fungi are vital to the ecosystem because they are primary producers of organic matter.

Statement-II: Fungi break down organic material and recycle nutrients.

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

- Both Statement-I and Statement-II are correct and Statement-II is the correct explanation for Statement-I
- Both Statement-I and Statement-II are correct and Statement-II is not the correct explanation for Statement-I
- Statement-I is correct but Statement-II is incorrect
- Statement-I is incorrect but Statement-II is correct

Solution: d)

- Statement-I is incorrect** because **fungi are not primary producers**. Primary producers, such as green plants, algae, and certain bacteria, generate organic matter through **photosynthesis**, using sunlight to convert carbon dioxide and water into glucose. Fungi lack chlorophyll and the ability to photosynthesize, so they **cannot produce their own food**. Instead, they are **heterotrophic organisms** that absorb nutrients from organic material.
- Statement-II is correct**. Fungi play a **critical ecological role as decomposers**. They **break down complex organic matter**—including dead plants, animals, and waste products—into simpler compounds. Through this process, fungi **release nutrients** such as nitrogen, phosphorus, and carbon back into the soil and atmosphere, supporting nutrient cycling and soil fertility. This makes fungi **essential to ecosystem functioning**, particularly in forests, grasslands, and compost-rich environments.

6. International Relations and Organisations

1) Consider the following statements regarding the Beijing Declaration and Platform for Action (1995):

- It called for the elimination of all forms of discrimination against women and girls in public and private spheres.
- It led to the formation of the United Nations Entity for Gender Equality and the Empowerment of Women (UN Women).
- The declaration introduced a quota system requiring at least 33% representation of women in all political institutions.
- It recognized violence against women as a public health issue, not just a human rights concern.

Which of the statements given above are correct?

- 1, 2, and 4
- 2, 3, and 4
- 1 and 3 only
- 1 and 4 only

Solution: A

- The Beijing Declaration advocated for the elimination of all forms of discrimination against women, including economic, political, and social inequalities (Statement 1 is correct).
- The document influenced the formation of UN Women (2010), which consolidated multiple UN bodies working on gender issues (Statement 2 is correct).
- It also recognized violence against women as a global public health issue, linking it to maternal health, reproductive rights, and overall well-being (Statement 4 is correct).
- However, **it did not mandate a 33% political quota (Statement 3 is incorrect—such quotas exist in some countries but were not mandated by Beijing)**.

What is the Beijing Declaration?

- The **Beijing Declaration and Platform for Action (1995)** is a **global framework** adopted by **189 governments** at the **Fourth World Conference on Women** in **Beijing, China**.
- It remains **the most comprehensive roadmap** for **gender equality and women's empowerment**.
- It focuses on **12 critical areas**, including **women's rights, economic participation, political leadership, education, health, and freedom from violence**.

2) Consider the following statements regarding Strategic Bitcoin Reserve

Statement-I: The Strategic Bitcoin Reserve is designed to enhance U.S. leadership in the global cryptocurrency market.

Statement-II: The U.S. government actively purchases Bitcoin using tax revenues to maintain the reserve.

Which of the following is correct?

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

Solution: C

The Strategic Bitcoin Reserve enhances U.S. dominance in digital finance (Statement-I is correct). However, the U.S. does not buy Bitcoin using tax revenue; it acquires Bitcoin through seizures (Statement-II is incorrect).

What is the Strategic Bitcoin Reserve?

- A U.S. government-backed reserve that will hold Bitcoin and select other cryptocurrencies as strategic financial assets.
- Aims to enhance U.S. leadership in digital currency markets and ensure long-term value retention of crypto assets.

Established by:

- President Donald Trump via an executive order in March 2025.
- Managed by the U.S. Department of Treasury and Department of Commerce.

How it works?

- **Bitcoin Seizure Utilization:** The reserve will be funded by Bitcoin and other digital assets seized from criminal and civil forfeiture cases.
- **No Immediate Sales Policy:** The government will hold Bitcoin as a long-term asset, preventing premature sell-offs that could destabilize markets.
- **Digital Asset Stockpile:** Apart from Bitcoin, other [cryptocurrencies](#) like Ethereum, XRP, Solana, and Cardano will also be part of the reserve.
- **Budget-Neutral Strategy:** Treasury and Commerce Departments are tasked with acquiring more Bitcoin without imposing costs on taxpayers.
- **Centralized Crypto Strategy:** The reserve aims to act as a digital equivalent of Fort Knox, positioning Bitcoin as a strategic national asset.

3) Consider the following statements regarding India's extradition laws:

1. The Extradition Act governs extradition procedures and allows India to seek extradition even without a formal treaty.
2. India has an extradition treaty with the United Nations, allowing it to request extradition from any UN member state.
3. Interpol Red Notices are legally binding requests that mandate extradition.

How many of the above statements is/are incorrect?

- (a) Only one
- (b) Only two
- (c) All three

(d) None

Solution: B

Statement 1 is correct – The Extradition Act, 1962, allows India to request extradition **even in the absence of a formal treaty**, based on diplomatic reciprocity.

Statement 2 is incorrect – India **does not have an extradition treaty with the UN**; extradition agreements exist **bilaterally** between sovereign nations.

Statement 3 is incorrect – Interpol Red Notices are **not legally binding**; they serve as international alerts but **do not mandate extradition**.

About [Extradition Treaty](#):

- An [extradition treaty](#) is a formal agreement between two countries to transfer individuals accused or convicted of serious crimes.
- It ensures that **fugitives cannot evade justice by crossing international borders**.

Countries with Which India Has an Extradition Treaty

- India has extradition treaties with **48 countries**, including:
 - United States, United Kingdom, Canada, Australia, UAE, France, Germany, Russia, and South Korea.
- India also has extradition arrangements with **12 additional countries**, allowing case-specific extradition.

[The Extradition Act, 1962](#):

- The Extradition Act, 1962, **governs extradition procedures** in India.
- It defines how fugitives can be **extradited from India and how India can request extradition** from other countries.

[Key Provisions of the Act](#)

- **Applicability:** Covers both **treaty-based and non-treaty extradition cases**.
- **Dual Criminality Principle:** The offense **must be a crime in both India and the requesting country**.
- **Extradition Offenses:** Covers **terrorism, organized crime, drug trafficking, and financial fraud**.
- **Bar on Political Offenses:** Individuals **cannot be extradited** for political offenses.
- **Rule of Specialty:** The fugitive **can only be tried for the crime they were extradited for**.
- **Human Rights Considerations:** No extradition if there is a **risk of torture or an unfair trial**.

[Nodal Authority for Extradition](#)

- **Ministry of External Affairs (MEA):** Processes **extradition requests from foreign governments**.
- **Central Bureau of Investigation (CBI):** Handles **extradition-related investigations**.
- **National Investigation Agency (NIA):** Pursues cases related to **terrorism and national security**.

[Implementation of the Act](#)

- India **initiates extradition through diplomatic channels** after verifying legal requirements.
- The **request is forwarded to the foreign country's** legal system for approval.
- If approved, **law enforcement agencies coordinate the fugitive's transfer** to India.

4) Consider the following statements regarding Vanuatu:

1. Vanuatu is located in the Pacific Ring of Fire, making it prone to frequent volcanic eruptions and earthquakes.
2. The country follows a strict policy of neutrality, refusing diplomatic relations with China or the United States.
3. The economy of Vanuatu is primarily based on agriculture, tourism, and offshore financial services.

How many of the above statements is/are correct?

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

Solution: B

Statement 1 is correct – Vanuatu is part of the **Pacific Ring of Fire**, experiencing **frequent volcanic eruptions, earthquakes, and cyclones**.

Statement 2 is incorrect – Vanuatu maintains diplomatic relations with both **China and the U.S.**; China is a major economic partner.

Statement 3 is correct – Vanuatu's economy relies on **agriculture (coconuts, kava), tourism, and offshore financial services**.



About [Vanuatu](#):

Geographical Location

- [Vanuatu](#) is an **island nation** in the **South Pacific Ocean**, situated approximately 1,750 km east of Australia.
- It consists of **83 volcanic islands**, covering a total land area of **12,189 sq. km**.
- **Capital:** [Port Vila](#)
- **Neighboring Countries:** **Australia, Fiji, New Caledonia, and Solomon Islands**.

Geographical Features

- **Major Islands:** Efate, Espiritu Santo, Malekula, Tanna, Pentecost.
- **Volcanic Activity:** Home to **active volcanoes like Mount Yasur (Tanna) and Ambae Volcano**.
- **Climate:** **Tropical climate** with frequent **cyclones and earthquakes** due to its location in the Pacific Ring of Fire.
- **Marine Ecosystem:** Rich in coral reefs, deep-sea fisheries, and marine biodiversity.

5) Consider the following statements regarding Stockholm International Peace Research Institute (SIPRI) and its functions:

1. SIPRI is an intergovernmental organization under the United Nations that tracks global arms transfers and military expenditure.
2. SIPRI publishes the “Trends in International Arms Transfers” report, which provides an analysis of major arms exporters and importers.
3. SIPRI’s research focuses solely on arms trade and does not include nuclear disarmament or geopolitical conflicts.

How many of the above statements is/are correct?

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

Solution: A

Statement 1 is incorrect – SIPRI is an independent research institute, not a UN-affiliated body. It was established in 1966 in Sweden.

Statement 2 is correct – SIPRI publishes the “Trends in International Arms Transfers” report to track major exporters and importers of arms.

Statement 3 is incorrect – SIPRI’s research covers arms trade, nuclear disarmament, conflicts, and international security.

Stockholm International Peace Research Institute (SIPRI)

What is SIPRI?

- SIPRI is an **independent international institute** focused on research in **conflict, armaments, arms control, and disarmament**.

Establishment

- Founded in **1966** in **Stockholm, Sweden**.

Functions & Significance

- **Analyzes trends in global arms trade** and their impact on international security.
- **Monitors military spending** of nations and their strategic implications.
- **Provides data-driven insights** for policymakers on global defence dynamics.

- 6) Which of the following best explains the primary objective of the No Money for Terror (NMFT) Conference?
- To promote cashless transactions to prevent illicit financial flows in developing countries.
 - To develop an international treaty that bans cryptocurrency usage in global financial systems.
 - To strengthen global cooperation in tracking and preventing terror financing.
 - To create a single global regulatory body for anti-money laundering (AML) compliance.

Solution: C

- Option a is incorrect – While cash transactions are a concern in terror financing, the NMFT Conference is focused on broader financial tracking mechanisms.
- Option b is incorrect – NMFT does not ban cryptocurrencies, but it discusses their potential misuse in financing terrorism.
- **Option c is correct – NMFT provides a platform for intelligence-sharing, legal cooperation, and policy formulation to curb terror financing globally.**
- Option d is incorrect – There is no single regulatory body under NMFT; rather, it works with FATF, UN agencies, and national governments.

About No Money for Terror (NMFT) Conference:

- **What is NMFT?**
 - **A global ministerial-level initiative** aimed at combating terrorist financing.
 - Platform for intelligence sharing, legal cooperation, and **policy formulation** against terror funding.
- **Established in:** 2018, first held in Paris.
- **Under control of:** Financial Action Task Force (FATF) & UN Counter-Terrorism Bodies.
- **Aim:**
 - Disrupt financial networks of terrorist organizations.
 - Strengthen global financial monitoring and regulatory frameworks.
 - Facilitate international cooperation in countering terror financing.
- **Functions & Features:**
 - **Intelligence Sharing:** Enhances real-time data exchange on financial transactions linked to terrorism.
 - **Legal Reforms & Regulations:** Encourages nations to update counter-terrorism laws and financial tracking systems.
 - **Monitoring Digital Transactions:** Addresses cryptocurrency risks, online crowdfunding, and emerging terror financing methods.
 - **Strengthening Banking & Financial Oversight:** Works with banks, fintech companies, and financial intelligence units to detect suspicious transactions.
 - **Capacity Building:** Provides training, technical expertise, and resources to nations for effective counter-terrorism operations.

- 7) Consider the following key provisions under the Immigration and Foreigners Bill, 2025:
1. The Bill introduces special visa categories for high-skilled workers and foreign investors.
 2. It strengthens penalties on carriers (airlines, shipping companies) for transporting unauthorized persons into India.
 3. The Bill allows the government to deny visas to individuals based on their country's diplomatic relations with India.

Which of the above statements is/are correct?

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

Solution: D

- Statement 1 is correct: The Bill introduces special visa categories to attract high-skilled professionals, researchers, and investors, aligning with India's economic growth and global talent needs.
- Statement 2 is correct: It increases penalties on carriers (airlines, shipping companies) for transporting unauthorized foreign nationals without proper documentation, ensuring better compliance with immigration laws.
- Statement 3 is correct: The Bill gives the Indian government the power to deny visas based on diplomatic relations with other countries, allowing it to block entries from nations that pose security or foreign policy risks.

About Immigration and Foreigners Bill, 2025:

What is the Immigration Bill?

- The bill aims to **consolidate and modernize existing immigration laws** in India.
- It seeks to **replace four existing laws**:
 - **The Passport (Entry into India) Act, 1920**
 - **The Registration of Foreigners Act, 1939**
 - **The Foreigners Act, 1946**
 - **The Immigration (Carriers' Liability) Act, 2000**

Nodal Ministry

- **Ministry of Home Affairs (MHA), Government of India**

Key Features of the Bill

- **Regulation of Foreign Nationals:** Mandates **passport and visa requirements** for entry and stay in India.
 - Establishes a **clear legal framework for deportation, detention, and registration**.
- **Centralized Database & Monitoring:** Introduces **digital tracking of foreigners**, ensuring **real-time immigration data**.
 - Makes **hospitals, universities, and institutions responsible** for reporting foreign nationals.
- **Streamlining Existing Laws:** Eliminates **redundant and outdated provisions** from pre-Constitution laws.
 - Brings **immigration regulations under a single comprehensive law**.
- **No Appeal Mechanism for Immigration Officers' Decisions:** Grants immigration officers **absolute authority** in deciding entry and stay.
 - Critics argue this **violates natural justice and constitutional rights**.

- 8) Which of the following statements about the Global Stocktake and its relation to nuclear energy is incorrect?
- a) Nuclear energy is seen as a key component in enhancing climate ambition by providing low-carbon electricity.
 - b) Nuclear energy was included in the Global Stocktake for the first time at COP28 in 2023.
 - c) The Global Stocktake's primary focus is on monitoring fossil fuel consumption and reducing coal usage.
 - d) The Global Stocktake assesses the progress of national contributions towards the Paris Agreement's goals.

Solution: c)

The Global Stocktake under the Paris Agreement aims to assess the collective progress of all nations in meeting the climate goals, not just fossil fuel consumption or coal reduction. While these are essential aspects, the Stocktake covers a broader scope, including evaluating low-carbon technologies such as nuclear energy, which was included in COP28 for its role in addressing climate change and providing stable low-carbon electricity.

- 9) Consider the following statements regarding the International Atomic Energy Agency (IAEA):
1. The IAEA is a United Nations based organisation responsible for promoting the peaceful use of nuclear energy.
 2. The Additional Protocol of the IAEA allows for more stringent inspections of nuclear facilities to ensure peaceful use.
 3. India is not a member of the IAEA as it is not a signatory to the Non-Proliferation Treaty (NPT).

How many of the above statements is/are incorrect?

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

Solution: A

- The IAEA is a UN-based international organization dedicated to promoting the peaceful use of nuclear energy (statement 1 is correct).
- It was established in 1957 as an autonomous organization within the United Nations system; though governed by its own founding treaty, the organization reports to both the General Assembly and the Security Council of the United Nations, and is headquartered at the UN Office at Vienna, Austria.
- The Additional Protocol allows the IAEA to conduct more intrusive inspections to ensure that nuclear materials are used for peaceful purposes (statement 2 is correct).
- However, despite India not being a signatory to the NPT, it is a member of the IAEA and works with the organization under its safeguards agreements (**statement 3 is incorrect**).

- 10) Consider the following statements about the United Nations (UN) and its structure:

1. The UN was established after World War I, with collective security and peacekeeping as some of its founding principles.
2. The General Assembly is the primary policymaking body of the UN, while the UNSC is responsible for peace and security.

Which of the above statements is/are correct?

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

Solution: B

- Statement 1: The **United Nations was established in 1945 after World War II**, with the primary goals of maintaining international peace and security, promoting disarmament, and engaging in peacekeeping activities.
- Statement 2 is correct. The General Assembly serves as the UN's main policymaking body, while the UNSC is specifically responsible for issues related to international peace and security.

- 11) Consider the following statements about Amnesty International:

1. Amnesty International is an international organization composed of volunteers who campaign for human rights.
2. The organization is known for publishing reports on human rights abuses worldwide.
3. Amnesty International is a governmental organization operating under the United Nations.

Which of the above statements is/are correct?

- (a) 1 only

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

Solution: C

Statement 3 is incorrect.

Statement 1 is correct as Amnesty International is indeed an international organization composed of volunteers who campaign for human rights.

Statement 2 is correct because Amnesty International is well-known for publishing detailed reports on human rights abuses around the world.

Statement 3 is incorrect because **Amnesty International is a non-governmental organization (NGO)** and operates independently, not under the United Nations.

12) Consider the following statements regarding Global Compact?

1. A Global Compact is an initiative that unites countries or organizations to commit to shared goals and principles.
2. It often focuses on sustainable development, human rights, and global cooperation.
3. The Global Compact is a legally binding agreement among participating countries.

Which of the above statements is/are correct?

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

Solution: A

Statement 1 is correct as a **Global Compact is an initiative that brings together countries or organizations to commit to shared goals and principles.**

Statement 2 is correct because the focus of Global Compacts often includes **sustainable development, human rights, and global cooperation.**

Statement 3 is incorrect because Global Compacts are generally not legally binding agreements; they are more about mutual commitments and cooperation.

13) Consider the following statements regarding India's visa regulations:

1. India follows an open-border policy with all its neighbouring countries, allowing visa-free entry.
2. India does not allow foreigners to apply for Indian citizenship through naturalization.
3. The Visa-on-Arrival policy is extended to citizens of all SAARC (South Asian Association for Regional Cooperation) countries.

How many of the above statements are correct?

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

Solution: D

- Statement 1 is incorrect – India follows an open-border policy only with Nepal and Bhutan, not all neighbouring countries.
- Statement 2 is incorrect – Foreigners can apply for Indian citizenship through naturalization under the Citizenship Act, 1955 (after fulfilling residence requirements).

- Statement 3 is incorrect – India’s Visa-on-Arrival policy is not available to all SAARC nations; it is granted to selected countries like Japan and South Korea under specific conditions.

14) Consider the following statements regarding India’s refugee policies:

1. India follows a formal Refugee Recognition Framework under the UNHCR (United Nations High Commissioner for Refugees).
2. The Citizenship Amendment Act (CAA), 2019, provides automatic citizenship to all persecuted minorities from Afghanistan, Bangladesh, and Pakistan.
3. Tibetan refugees in India are issued Registration Certificates instead of Indian passports.

How many of the above statements are correct?

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

Solution: A

- Statement 1 is incorrect – India does not have a formal legal framework for refugee recognition under UNHCR.
- Statement 2 is incorrect – The CAA, 2019, provides an accelerated pathway to citizenship, but not automatic citizenship.
- **Statement 3 is correct – Tibetan refugees in India are given "Registration Certificates" instead of Indian passports, making them legal residents, not citizens.**

15) India, along with Brazil, South Africa, and China, formed the BASIC Group in the 2000s. What was the main reason behind the formation of this group?

- (a) To create a coalition for nuclear disarmament
- (b) To safeguard their developmental and poverty reduction objectives in climate negotiations
- (c) To promote technological innovation in AI
- (d) To negotiate favourable trade policies

Solution: B

The formation of the BASIC Group by Brazil, South Africa, India, and China was a strategic move to **safeguard developmental and poverty reduction objectives during climate negotiations** in the 2000s. These countries recognized the need to balance their environmental responsibilities with their developmental needs, and they worked collectively to ensure that the global climate frameworks, such as the Kyoto Protocol, did not impose obligations that could hinder their economic growth and poverty alleviation efforts.

16) Consider the following statements regarding the UNESCO Tentative List:

1. It is a mandatory step before a site can be nominated for the World Heritage List.
2. A country can only submit one site per year for inclusion in the Tentative List.
3. The Tentative List is reviewed every 10 years, allowing for modifications.

How many of the above statements is/are correct?

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

Solution: B

Explanation:

- **Statement 1 is correct** – A site **must be on the Tentative List for at least one year** before being officially nominated.

- **Statement 2 is incorrect** – There is **no limit** on the number of sites a country can submit to the Tentative List.
- **Statement 3 is correct** – The list **undergoes periodic revisions every 10 years**.

What is the Tentative List?

- An **inventory of cultural and natural heritage sites** that a country **intends to nominate** for UNESCO World Heritage status.

How Are Sites Added?

- Countries submit **Tentative Lists** to the **World Heritage Centre**.
- A site must demonstrate **Outstanding Universal Value (OUV)**.
- The list must be submitted **at least one year before official nomination**.
- Periodic revisions are encouraged **every 10 years**.

17) Which of the following is not an initiative of BRICS?

- BRICS Payment System
- Contingent Reserve Arrangement (CRA)
- New Development Bank (NDB)
- Asian Infrastructure Investment Bank (AIIB)

Solution: D

The BRICS group has launched several initiatives, such as the **New Development Bank (NDB)**, the **Contingent Reserve Arrangement (CRA)**, the **BRICS Payment System**, and Customs Agreements. These initiatives aim to promote financial stability, cooperation, and development among BRICS nations. However, the **Asian Infrastructure Investment Bank (AIIB) is not a BRICS initiative** but a separate multilateral development bank led by China.

18) What is the primary focus of the Global Biofuel Alliance?

- Promoting the use of biofuels exclusively in the transportation sector
- Leading efforts to establish global standards for hydrogen production from biomass
- Funding the production of biofuels in developing countries
- Establishing global trade agreements for biofuel exports

Solution: B

The Global Biofuel Alliance is focused on establishing global standards for the production of hydrogen from biomass. This initiative is aimed at **creating uniform regulations and best practices for biofuel production, with a particular emphasis on sustainable and green hydrogen production**. By setting these standards, the alliance aims to facilitate international collaboration and promote the global adoption of biofuels derived from biomass as part of a broader clean energy transition.

19) Which of the following is not one of the primary focuses of the Quad's working groups?

- Critical and emerging technologies
- Maritime security
- Space exploration
- Climate change

Solution: C

While the Quad working groups focus on critical areas such as **climate change, maritime security, and emerging technologies**, space exploration is not explicitly listed as one of the Quad's primary agenda items. Instead, the Quad's efforts in space are more aligned with space-based climate warning systems and not exploration.

20) Consider the following statements regarding the dispute resolution mechanism under the Indus Waters Treaty:

1. The first step in resolving disputes is the involvement of a Neutral Expert, who adjudicates on technical issues.
2. The Permanent Indus Commission is required to meet at least once a year to discuss the implementation of the treaty and resolve any disputes.
3. If disputes persist after the Neutral Expert's decision, the matter can be referred to an arbitral tribunal, known as the Court of Arbitration, consisting of seven members.

Which of the above statements is/are correct?

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

Solution: C

Statement 1 is incorrect. The first step in the dispute resolution process is the Permanent Indus Commission (PIC), not the Neutral Expert. The PIC is responsible for resolving issues related to the implementation of the treaty through dialogue and cooperation. Only when the PIC fails to resolve the issue does a Neutral Expert get involved.

Statement 2 is correct. **The PIC is mandated to meet at least once a year to discuss the implementation of the treaty and resolve disputes.** The commission plays a crucial role in facilitating cooperation between the two countries.

Statement 3 is correct. If disputes persist after the involvement of a Neutral Expert, the matter can be referred to a Court of Arbitration, a seven-member tribunal tasked with providing a final, binding decision on the issue.

21) Consider the following statements about the FATF and its functions:

1. FATF is a legal body with the authority to impose sanctions directly on non-compliant countries.
2. The FATF works closely with regional organizations to monitor countries' progress in combating money laundering and terrorism financing.
3. The FATF's primary goal is to protect the global financial system from misuse by criminals and terrorist organizations.

How many of the above statements is/are correct?

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

Solution: B

Statement 1 is incorrect because the **FATF is not a legal enforcement body and cannot directly impose sanctions.** Instead, it works through its recommendations and member compliance. Countries that fail to comply with these recommendations may face indirect consequences, such as being placed on grey or black lists, which can lead to international financial isolation.

Statement 2 is correct because the **FATF works with regional bodies like the Asia/Pacific Group on Money Laundering (APG) and other entities to monitor and assist countries in implementing necessary reforms.**

Statement 3 is correct. **The FATF's overarching mission is to safeguard the global financial system by developing standards to combat money laundering, terrorist financing, and other related threats.**

22) Which of the following statements is true about the compliance component of the FATF Mutual Evaluation?

1. Compliance is assessed only once, during a country's first evaluation.
2. It ignores the legal framework and focuses entirely on field results.

3. It checks whether the country complies with international trade agreements.
4. It only examines how well countries enforce their laws.

Select the correct answer code:

- (a) 2 and 4 only
- (b) 1, 2 and 3 only
- (c) 1, 3 and 4 only
- (d) None of the above

Solution: D

- **The compliance component of the FATF Mutual Evaluation assesses both the presence and enforcement of a country's laws and regulations** related to combating money laundering and terrorism financing.
- **Compliance is assessed regularly**, not just during the first evaluation, as countries are subject to ongoing reviews.
- **It does not ignore legal frameworks**; in fact, it checks whether the country has established appropriate laws and regulations in line with FATF's international standards.
- **Compliance is not related to international trade agreements** but rather to FATF's specific Recommendations on anti-money laundering and combating terrorism financing.

23) Consider the following statements regarding the 'Pact of the Future':

1. It aims to make the UN Security Council more representative of the current global realities.
2. It proposes adding more non-permanent members to the Security Council to increase inclusivity.
3. The focus is on providing special privileges to under-represented regions like Europe and North America.

How many of the above statements is/are incorrect?

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

Solution: A

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The 'Pact of the Future' seeks to make the UN Security Council more representative of contemporary global realities and proposes adding more non-permanent members to increase inclusivity.

However, the focus is on under-represented regions like Africa, Asia-Pacific, and Latin America, not Europe or North America, making statement 3 incorrect.

24) Consider the following objectives of the UN80 Initiative:

1. Strengthening strategic planning and cost-effectiveness.
2. Enhancing collaboration among different UN bodies for better coordination.
3. Establishing a separate financial institution to oversee UN funding.
4. Encouraging timely financial contributions from member states.

Which of the above statements are correct?

- (a) 1, 2, and 3 only
- (b) 2, 3, and 4 only
- (c) 1, 2, and 4 only
- (d) 1, 3, and 4 only

Solution: C

Explanation:

- The **UN80 Initiative** is a recent reform-oriented effort within the United Nations framework, aimed at enhancing the **efficiency, coordination, and financial sustainability** of the global body in the run-up to its 80th anniversary.

- **Statement 1 is correct** — One of its core goals is to **strengthen strategic planning** and promote **cost-effective deployment of resources**, especially in humanitarian, development, and peacekeeping operations.
- **Statement 2 is correct** — The initiative stresses **greater inter-agency collaboration** among UN bodies, ensuring **synergy and cohesion** in global responses to crises, including climate change, pandemics, and conflict.
- **Statement 3 is incorrect** — The initiative does **not propose the creation of a separate financial institution**. Instead, it advocates for **internal financial reforms** within the current UN structure to ensure transparency, accountability, and efficiency.
- **Statement 4 is correct** — Timely **financial contributions from member states** are crucial to address **funding delays** that often hinder program implementation.

25) Consider the following statements regarding India's rights and obligations on the western rivers under the Indus Waters Treaty (IWT):

1. India can use the waters of the western rivers only for irrigation purposes.
2. India is allowed to develop hydroelectric projects on the western rivers.
3. India is obliged to conduct Environmental Impact Assessments (EIAs) for all hydroelectric projects on the western rivers.

How many of the above statements is/are correct?

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

Solution: A

- Under the Indus Waters Treaty (IWT) between India and Pakistan, India has specific rights and obligations concerning the western rivers (Indus, Jhelum, and Chenab).
- Statement 1 is incorrect because the **Treaty does not restrict India's use of the western rivers solely to irrigation**. India can also utilize these waters for hydroelectric generation and domestic use.
- Statement 2 is correct because **India is permitted to develop hydroelectric projects on the western rivers**, provided these projects meet certain design and operational restrictions to ensure they do not adversely impact the flow of water into Pakistan.
- Statement 3 is also incorrect; while conducting Environmental Impact Assessments (EIAs) is a recommended global practice, the **Treaty does not explicitly mandate them for hydroelectric projects on these rivers**.

26) Consider the following statements on the no-harm rule in international law:

1. The no-harm rule is an explicit provision in the Indus Waters Treaty.
2. It requires states to prevent all potential harm to neighbouring states from transboundary projects.
3. It is considered a due diligence obligation under customary international law.

How many of the above statements is/are incorrect?

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

Solution: B

- **The no-harm rule in international law is a principle that requires states to exercise due diligence to avoid causing significant harm to other states through activities within their jurisdiction, particularly when these activities have transboundary impacts.**
- **Statement 3 is correct** as this rule is considered a due diligence obligation under customary international law, meaning states must take reasonable steps to prevent significant harm to neighbouring states.
- Statement 1 is incorrect because the **Indus Waters Treaty (IWT) does not explicitly incorporate the no-harm rule**; it primarily focuses on water sharing rather than broader environmental obligations.

- Statement 2 is also incorrect since the **no-harm rule does not mandate the prevention of all potential harm**, only of “significant harm,” balancing state sovereignty with responsibilities to other states.

27) Consider the following statements on customary international law in transboundary water treaties:

1. The no-harm rule is automatically enforceable in all treaties.
2. Equitable and reasonable utilization (ERU) is a principle applied in international watercourse management.
3. Customary law obliges states to conduct Environmental Impact Assessments (EIAs) for projects with potential cross-border impacts.

Which of the above statements is/are correct?

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

Solution: C

Statement 1 is incorrect because, **while the no-harm rule is a foundational principle in international environmental law, it is not automatically enforceable in all treaties**. Its application depends on the specific terms agreed upon by the treaty parties. States may include the no-harm obligation explicitly in a treaty, making it binding for those parties.

Statement 2 is correct, as **equitable and reasonable utilization (ERU) is widely recognized in customary international law, particularly in the context of shared water resources**. ERU emphasizes balanced resource use, ensuring that no single state exploits shared watercourses to the detriment of others.

Statement 3 is also correct. **Customary law obliges states to conduct Environmental Impact Assessments (EIAs) for projects with potential cross-border impacts**, promoting transparency and minimizing risks to neighbouring states.

28) Consider the following statements on equitable and reasonable utilization (ERU) as per the UN Watercourses Convention:

1. ERU ensures that upstream states have exclusive rights to water usage.
2. ERU aims to allocate water resources based on social and economic needs of all riparian states.
3. ERU requires states to notify each other before utilizing shared water resources.

How many of the above statements is/are correct?

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

Solution: A

Only Statement 2 is correct.

- **The concept of equitable and reasonable utilization (ERU) under the UN Watercourses Convention aims to promote a fair distribution of shared water resources among all riparian states, considering their social, economic, and environmental needs.**
- **ERU does not provide exclusive rights to upstream states**; instead, it supports a balanced approach that prevents any single state from monopolizing the shared resource.
- This principle encourages cooperation and respect for each state’s needs while also acknowledging the importance of sustainable water use.
- **Although notifying other states of water usage activities can be a part of broader cooperative measures, it is not an explicit requirement within the ERU principle itself.**

7. Polity

- 1) Which of the following correctly describes the jurisdiction of Lokpal under the Lokpal and Lokayuktas Act, 2013?
- Lokpal can investigate only Ministers and Members of Parliament but not Group A officers.
 - Lokpal has jurisdiction over the Prime Minister in all matters, including national security.
 - Lokpal can initiate suo-motu investigations without a formal complaint or reference.
 - NGOs receiving foreign contributions above a prescribed limit also fall under Lokpal's jurisdiction.

Solution: D

NGOs receiving foreign contributions above ₹10 lakh annually come under Lokpal's jurisdiction.

Option a is incorrect because Lokpal covers **Ministers, MPs, and Group A, B, C, and D officials.**

Option b is incorrect as Lokpal can investigate the Prime Minister, but not in matters of national security, foreign relations, atomic energy, etc.

Option c is incorrect as Lokpal requires a complaint to initiate an inquiry.

- **What is Lokpal?**
 - Lokpal is an anti-corruption ombudsman established to investigate allegations of [corruption](#) against public officials, including the Prime Minister, Ministers, Members of Parliament, and government employees.
- **Establishment and Origin:**
 - **Origin:** The concept of an ombudsman originated in Sweden in 1809. In India, the idea was first proposed in Parliament by former Law Minister Ashok Kumar Sen in the 1960s.
 - **Term Coined:** Dr. L.M. Singhvi introduced the terms "Lokpal" and "Lokayukta" in 1963.
 - **Legislation:** The Lokpal and [Lokayuktas](#) Act was passed in 2013 following the Anna Hazare-led India Against Corruption (IAC) movement.
- **Structure of the Organisation:**
 - **Composition:** A chairperson and up to eight members, with 50% being judicial members.
 - **Selection Committee:** Includes the Prime Minister, Lok Sabha Speaker, Leader of Opposition, Chief Justice of India, and an eminent jurist.
 - **Jurisdiction:** Covers the Prime Minister, Ministers, MPs, and government employees (Groups A, B, C, D). It also includes officials of boards, corporations, and NGOs receiving foreign contributions above ₹10 lakh annually.
- **Powers and Functions:**
 - **Investigation:** Can refer cases to investigative agencies like the CBI and supervise their work.
 - **Preliminary Inquiry:** Conducts inquiries within 60 days and decides on further action.
 - **Search and Seizure:** Has powers under the Civil Procedure Code for investigations.
 - **Asset Attachment:** Can attach assets of accused public servants.
 - **Prosecution Sanction:** Grants sanction for prosecution based on investigation reports.
- **Exemptions:**
 - Sitting judges of constitutional courts require prior consultation with the [Chief Justice of India](#) (CJI) before any criminal proceedings.
 - The CJI is consulted if allegations involve a Supreme Court judge.

- 2) Consider the following statements regarding the Composition of Lokpal:
- Lokpal consists of a chairperson and a maximum of eight members.
 - At least 50% of the members must be judicial members.
 - The chairperson must be a retired Chief Justice of India.

How many of the above statements is/are correct?

- Only one
- Only two
- All three
- None

Solution: B

Statements 1 and 2 are correct as Lokpal consists of a chairperson and up to 8 members, with at least 50% being judicial members.

Statement 3 is incorrect because the chairperson can be a retired Chief Justice of India, a Supreme Court judge, or an eminent person with expertise in anti-corruption matters.

- 3) Which of the following states does NOT have Autonomous District Councils established under the Sixth Schedule of the Indian Constitution?
- Assam
 - Meghalaya
 - Mizoram
 - Nagaland

Solution: D

The Sixth Schedule of the Indian Constitution provides for the establishment of Autonomous District Councils (ADCs) in certain tribal areas of Assam, Meghalaya, Mizoram, and Tripura. **Nagaland, while having special provisions under Article 371A, does not have ADCs established under the Sixth Schedule.**

What is an **Autonomous District Council (ADC)?**

- ADCs are **self-governing tribal administrative bodies** established under **the Sixth Schedule of the Indian Constitution**.
- They provide **autonomy in governance, land management, and cultural preservation** for **Scheduled Tribes (STs)** in **Assam, Meghalaya, Mizoram, and Tripura**.

Membership of Autonomous Councils

- Elected Members:** The majority of members are **democratically elected** for a **five-year term**.
- Nominated Members:** The **Governor nominates** a limited number of members to ensure representation of marginalized groups.

Powers of ADCs

- Legislative Powers:**
 - Can frame laws on **land, forests, water resources, agriculture, public health, sanitation, and social customs**.
 - Have judicial powers to **settle disputes among tribal communities**.
- Executive Powers:**
 - Administer **village councils, traditional chiefs, policing, inheritance laws, and local governance**.
- Judicial Powers:**
 - Can establish **tribal courts** to handle disputes where both parties belong to **Scheduled Tribes**, provided the sentence is **under five years of imprisonment**.

Functions of ADCs

- Govern tribal areas** while preserving **traditional customs and practices**.
- Manage resources** such as **forests, water bodies, and minerals**.
- Develop local infrastructure**, including **education, healthcare, and rural roads**.
- Promote local governance** through the formation of **village councils**.

Revenue Sources of ADCs

- Power to **levy taxes, fees, and tolls** on:
 - Land, buildings, vehicles, boats, and animals**.
 - Goods entering the district**.
 - Ferries, roads, and employment-based income**.
 - General taxation for the maintenance of local infrastructure**.

- 4) Consider the following statements regarding D Voters and their legal challenges:
- Once a person is declared a D Voter, they permanently lose their right to apply for Indian citizenship.
 - D Voters are allowed to contest elections but cannot cast votes until their status is resolved.

3. The Election Commission of India (ECI) is the final authority in deciding the citizenship status of a D Voter.

How many of the above statements is/are correct?

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

Solution: D

Statement 1 is incorrect – A D Voter can regain citizenship through the Foreigners Tribunal if proven innocent.

Statement 2 is incorrect – D Voters cannot contest elections unless they regain full citizenship status.

Statement 3 is incorrect – The Election Commission does not decide citizenship status; that is the role of the Foreigners Tribunal.

Who are 'D' Voters?

- 'D' (Doubtful) voters are individuals whose **Indian citizenship is under question**, and they are barred from **voting or contesting elections**.
- The **Election Commission of India (ECI)** introduced this category in **1997** in Assam to identify those who failed to prove their citizenship.

Classification as 'D' Voters:

- Any person whose **citizenship status is in doubt** during electoral roll verification is marked as a 'D' voter.
- Cases are referred to **Foreigners Tribunals (FTs)**, which decide whether the person is an **Indian citizen or an illegal immigrant**.
- Families may have **some members recognized as citizens while others are marked as 'D' voters**, causing **legal and social distress**.

Rules Governing 'D' Voters:

- The [Citizenship Act, 1955](#), and the **Citizenship Rules, 2003**, do not define 'D' voters explicitly.
- The **2003 Citizenship Rules** mandate that details of individuals **whose citizenship is doubtful** be entered in the [National Population Register \(NPR\)](#) with a remark for **further verification**.
- They are **not allowed to vote** or contest elections until they get clearance from the **Foreigners Tribunal (FT)**.

Key Features of 'D' Voter Status:

- **Temporary Classification:** [The 'D' voter status](#) cannot be prolonged indefinitely, and a final decision must be taken within a definite period.
- **Legal Recourse:** Individuals can appeal to the Foreigners Tribunal and seek clearance for inclusion in NRC.
- **Detention & Deportation:** If declared a foreigner, the person may be deported or placed in a detention center.
- **Impact on Families:** Many cases involve split families, where some members are marked as 'D' voters while others hold Indian citizenship.
- **Plight of Detainees:** Many Indian citizens have been detained, with no clear mechanism for their release even after years.

5) Consider the following statements regarding the criteria for appointment of the Chief Justice of India (CJI):

1. The CJI can be appointed based on a rotation policy from different regional Supreme Court benches.
2. Merit and integrity are considered alongside seniority in CJI appointments.
3. The CJI is selected by a committee of sitting Supreme Court judges and then recommended to the President.

How many of the above statements is/are incorrect?

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

Solution: b)

Statement 1 is incorrect because **there is no rotation policy for appointing the CJI based on regional Supreme Court benches**. The appointment is based primarily on seniority and the outgoing CJI's recommendation.

Statement 2 is correct, as factors like merit and integrity, along with seniority, are considered when making the recommendation. This was evident in past appointments where the consideration of these factors led to certain judges being recommended or passed over.

Statement 3 is incorrect because the selection of the CJI is not made by a committee of Supreme Court judges. Instead, the outgoing CJI recommends the senior-most judge to the President, following established conventions.

- 6) Under Section 8(1) of the Representation of the People Act of 1951, which of the following offences can lead to disqualification of an MP.
1. Promoting enmity between two groups
 2. Bribery
 3. Undue influence or personation at an election
 4. Defamation

How many of the above options is/are correct?

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

Solution: C

Option 4 is incorrect.

The disqualification of an MP convicted for an offence can happen in two instances.

First, if the offence for which he is convicted is listed in **Section 8(1) of the Representation of the People Act of 1951**. This includes certain specific offences such as promoting enmity between two groups, bribery and undue influence or personation at an election. **Defamation does not fall under this list.**

Second, if the lawmaker is convicted for any other offence but is sentenced for a period of two years or more. Section 8(3) of the RPA mandates that an MP can be disqualified if convicted and sentenced to not less than two years of imprisonment.

- 7) Article 102 of the Indian Constitution deals with the disqualification of MPs from either house of the Parliament. The reasons under which an MP can be disqualified include:
1. if he has voluntarily acquired the citizenship of a foreign State.
 2. if he is an undischarged insolvent.
 3. if he holds any office of profit under the Government of India.
 4. if he is disqualified by the Election Commission of India.

How many of the above statements is/are correct?

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

Solution: C

Statement 4 is incorrect.

Article 102 deals with the disqualification of MPs from either house of the Parliament. Part (1) of the article lists the reasons why an MP can be disqualified. These include,

- (a) if he holds any office of profit under the Government of India or the Government of any State, other than an office declared by Parliament by law not to disqualify its holder;
- (b) if he is of unsound mind and stands so declared by a competent court;
- (c) if he is an undischarged insolvent;
- (d) if he is not a citizen of India, or has voluntarily acquired the citizenship of a foreign State, or is under any acknowledgment of allegiance or adherence to a foreign State;
- (e) if he is so disqualified by or under any law made by Parliament.
- 8) What did the Supreme Court rule in the 2023 case of Pankaj Bansal vs Union of India regarding the disclosure of 'grounds of arrest'?
- It is optional to disclose grounds of arrest
 - Grounds of arrest must be disclosed verbally within 48 hours
 - Disclosing grounds of arrest in writing at the time of arrest is mandatory
 - Grounds of arrest can be disclosed after the accused is produced before a magistrate

Solution: c)

The Supreme Court's ruling in this case established a crucial procedural safeguard for arrested individuals. By **mandating the written disclosure of arrest grounds at the time of arrest**, it ensures transparency in the arrest process and allows the accused to understand the basis of their detention immediately. This requirement serves multiple purposes: it protects against arbitrary arrests, enables the accused to prepare their defense promptly, and upholds the fundamental right to personal liberty. The immediacy of this disclosure is particularly significant in the context of laws like PMLA, where bail provisions are stringent, making the validity of the arrest itself a critical factor in potential legal challenges.

- 9) How is the 'creamy layer' determination different for children of government employees compared to those from the private sector?
- There is no difference in determination between the two sectors
 - Private sector employees' children are never in the creamy layer
 - For government employees, it's based on rank; for private sector, it's based on income
 - Government employees' children are always in the creamy layer

Solution: C

The determination of 'creamy layer' status differs between government and private sector employees' children. **For government employees, the criteria are primarily based on the rank or position of the parent in service.** For instance, children of Group A officers or those promoted to Group A before age 40 are considered part of the creamy layer. In contrast, **for private sector employees, the determination is based on the parents' income.** This distinction recognizes the different structures and compensation systems in government and private sectors, aiming to create a fair assessment of socio-economic status across various employment types.

- 10) How does Article 22(3) of the Indian Constitution affect the rights of individuals under preventive detention?
- It limits preventive detention to a maximum of 24 hours
 - It mandates immediate judicial review of preventive detention cases
 - It exempts preventive detention from the protections of Article 22(1) and 22(2)
 - It grants additional rights to those under preventive detention

Solution: C

- Article 22(3) of the Indian Constitution creates a significant exception to the fundamental rights typically afforded to arrested or detained individuals.
- By exempting preventive detention from the protections outlined in Article 22(1) and 22(2), it allows for a more expansive application of preventive detention laws.**
- This exemption means that individuals held under preventive detention may not have the right to be informed of the grounds of their arrest or the right to consult a legal practitioner of their choice.

- Additionally, the requirement to produce the detained person before a magistrate within 24 hours may not apply.
- This provision reflects the balance struck by the Constitution between individual rights and perceived needs for national security or public order, albeit at the cost of certain fundamental protections.

11) Consider the following statements regarding Statutory Bail in India:

1. Statutory bail is a right that becomes available to an accused when the police fail to complete their investigation within a specified period.
2. The time limit for statutory bail is uniformly 60 days across all types of cases.
3. Statutory bail is enshrined in the Code of Criminal Procedure (CrPC).

How many of the above statements is/are incorrect?

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

Solution: A

Statement 1 is correct because **statutory bail becomes a right when the police fail to complete the investigation within the stipulated time.**

Statement 2 is incorrect. **While 60 days is the standard time limit for statutory bail in most cases,** this period can extend to 90 or 180 days depending on the severity of the crime.

Statement 3 is correct as **statutory bail is provided for under the CrPC.**

12) Which doctrine allows for the invalidation of unconstitutional parts of a law while preserving the rest?

- (a) Doctrine of Substantive Due Process
- (b) Doctrine of Severability
- (c) Doctrine of Colorable Legislation
- (d) Doctrine of Eclipse

Solution: B

- **The Doctrine of Severability is a legal principle that allows courts to invalidate specific portions of a law that are deemed unconstitutional while keeping the remaining constitutional parts intact.**
- This doctrine is based on the presumption that the legislature would have enacted the valid parts of the statute without the invalid ones.
- It enables courts to strike down only the problematic sections of a law rather than nullifying the entire legislation, thus preserving the intent of the lawmakers to the extent possible while ensuring constitutional compliance.
- This approach helps in maintaining legislative integrity and prevents the unnecessary invalidation of entire laws due to partial unconstitutionality.

13) Consider the following statements:

1. The Supreme Court has the power to invalidate only those laws that are in direct violation of the Fundamental Rights.
2. The Doctrine of Severability allows the unconstitutional parts of a law to be invalidated while preserving the rest.
3. The Doctrine of Eclipse allows a law infringing Fundamental Rights to be suspended until it is brought in line with the Constitution.

How many of the above statements is/are correct?

- (a) Only one
- (b) Only two
- (c) All three

(d) None

Solution: C

The Supreme Court can invalidate laws that violate Fundamental Rights, the Doctrine of Severability allows unconstitutional parts of a law to be invalidated while preserving the rest, and the Doctrine of Eclipse allows laws infringing on Fundamental Rights to be temporarily suspended.

- 14) Which of the following cases reaffirmed the right to a speedy trial as a fundamental right under Article 21?
- Justice K.S. Puttaswamy vs. Union of India (2017)
 - Delhi Excise Policy Case (2024)
 - Shreya Singhal vs. Union of India (2015)
 - Maneka Gandhi vs. Union of India (1978)

Solution: B

The Delhi Excise Policy Case (2024) reaffirmed the right to a speedy trial as a fundamental right under Article 21, continuing the Supreme Court's role as the guardian of civil liberties.

- 15) Which committee or report first recommended the concept of lateral entry into the Indian civil services?
- Sarkaria Commission
 - First Administrative Reforms Commission
 - Punchhi Commission
 - Surinder Nath Committee

Solution: D

Committees' recommendations on lateral entry:

- The idea has been advocated by **Surinder Nath Committee (2003)**, Hota Committee (2004) and **Second ARC (2008)**.
- NITI Aayog, in its three-year Action Agenda (2017—2020), recommended the induction of personnel at middle and senior management levels in the central government.

- 16) Which of the following Articles of the Indian Constitution allows the Supreme Court to declare any law void if it contravenes Fundamental Rights?
- Article 142
 - Article 136
 - Article 13
 - Article 32

Solution: C

Article 13 of the Indian Constitution declares that any law which contravenes the Fundamental Rights shall be void. This empowers the Supreme Court to invalidate such laws.

- 17) Consider the following statements about Anticipatory Bail:
- Anticipatory bail is granted before the arrest of an accused person.
 - The concept of anticipatory bail is explicitly mentioned in the Indian Constitution.
 - Anticipatory bail can be granted by both Sessions Courts and High Courts.

How many of the above statements is/are incorrect?

- Only one
- Only two
- All three
- None

Solution: A

Statement 1 is correct. **Anticipatory bail is granted in anticipation of an arrest**, hence before the arrest takes place.

Statement 2 is incorrect. **Anticipatory bail is not mentioned in the Indian Constitution**; it is provided for under Section 438 of the CrPC.

Statement 3 is correct. **Anticipatory bail can be granted by both Sessions Courts and High Courts.**

18) Which of the following doctrines prevents the legislature from enacting laws indirectly that would violate constitutional limits?

- (a) Doctrine of Substantive Due Process
- (b) Doctrine of Eclipse
- (c) Doctrine of Colorable Legislation
- (d) Doctrine of Severability

Solution: C

The **Doctrine of Colorable Legislation** prevents the legislature from enacting laws indirectly that would violate constitutional limits, ensuring that the intent behind the law is constitutionally valid.

19) Consider the following statements regarding Article 142:

1. Article 142 empowers the Supreme Court to pass orders necessary for complete justice.
2. This article allows the Supreme Court to grant special leave to appeal against lower court decisions.
3. Article 142 can be used to protect civil liberties in cases where no specific law exists.

How many of the above statements is/are incorrect?

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

Solution: A

Statements 1 and 3 are correct. Article 142 empowers the Supreme Court to pass orders necessary for complete justice, including in cases where no specific law exists to protect civil liberties.

Statement 2 is incorrect because it relates to Article 136, not Article 142.

20) Consider the following statements about the Protection of Human Rights Act, 1993 (as amended in 2019):

1. The Act provided for the constitution of a National Human Rights Commission (NHRC) at the Union level.
2. The Act mandates the establishment of State Human Rights Commissions in every state.
3. The Act provides for the establishment of Human Rights Courts at the district level.

How many of the above statements is/are correct?

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

Solution: B

Statement 1 is correct as the Protection of Human Rights Act, 1993, provides for the constitution of the National Human Rights Commission (NHRC) at the Union level.

Statement 2 is incorrect because the **Act does not mandate the establishment of State Human Rights Commissions in every state**; it is up to the discretion of the state governments.

Statement 3 is correct as the Act provides for the establishment of Human Rights Courts at the district level for the protection of human rights.

21) Consider the following statements about the State Election Commissions (SECs):

1. SECs were established under the 73rd and 74th Constitutional Amendments.
2. SECs prepare a separate voter list for local body elections.
3. SECs can remove political parties from their registration in state-level elections.

How many of the above statements is/are correct?

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

Solution: B

Statement 1 is correct as the **SECs were established under the 73rd and 74th Constitutional Amendments** to conduct elections for Panchayats and Municipalities.

Statement 3 is also correct as **SECs have the authority to register and deregister political parties in state elections**.

Statement 2 is incorrect since **SECs do not prepare a separate voter list; they use the ECI's voter list with modifications for local elections**.

22) Consider the following statements regarding the legal provisions for foreigners in India:

1. The Foreigners Act, 1946, empowers the government to regulate the entry, exit, and presence of foreigners in India.
2. The Passport (Entry into India) Act, 1920, defines the conditions under which foreigners can obtain Indian citizenship.
3. The Citizenship Act, 1955, provides for naturalization, registration, and birthright citizenship as modes of acquiring Indian citizenship.

How many of the above statements are incorrect?

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

Solution: A

- Statement 1 is correct – The Foreigners Act, 1946, gives broad powers to the government to regulate, detain, and deport foreigners.
- **Statement 2 is incorrect – The Passport (Entry into India) Act, 1920, deals with visa and entry regulations, not citizenship acquisition.**
- Statement 3 is correct – The Citizenship Act, 1955, provides five pathways for citizenship: by birth, descent, registration, naturalization, and incorporation of territory.

Provisions for Immigration in India

- [The Citizenship Act, 1955](#): Governs **acquisition, renunciation, and termination** of Indian citizenship.
- [The Foreigners Act, 1946](#): Regulates the **entry and exit of foreigners** in India.
- **The Visa Regulations**: Issued under the **Passport Act, 1920**, defining entry conditions.

- **Refugee Policies:** Though **India is not a signatory** to the **1951 Refugee Convention**, it provides asylum on a **case-by-case basis** (e.g., Tibetans, Sri Lankan Tamils, Rohingyas).

23) Consider the following statements regarding the tenure and removal of the State Election Commissioner:

1. The tenure of the SEC is determined by the Election Commission of India.
2. The SEC can be removed only in the same manner as a High Court judge.
3. The conditions of the SEC's service can be varied to their disadvantage after appointment.

How many of the above statements is/are correct?

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

Solution: A

Statement 2 is correct. The **SEC can be removed only in the manner and on the grounds prescribed for a High Court judge**, ensuring their independence.

Statement 1 is incorrect because the **tenure of the SEC is determined by the Governor**, not the Election Commission of India.

Statement 3 is incorrect because the **conditions of the SEC's service cannot be varied to their disadvantage after their appointment**.

24) Consider the following statements regarding the Public Accounts Committee (PAC):

1. Ministers are allowed to serve as members of the PAC if they are not in charge of any financial ministry.
2. The Public Accounts Committee (PAC) was first established in 1950.
3. The primary role of the PAC is to scrutinize government expenditure and ensure compliance with parliamentary grants.

Which of the above statements is/are correct?

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

Solution: A

Statement 1 is incorrect because Ministers are not allowed to be members of the PAC, and if a member is appointed as a Minister, they must vacate their seat. Statement 2 is incorrect as the PAC was first established in 1921. Statement 3 is correct; the PAC scrutinizes government expenditure to ensure that spending aligns with parliamentary approvals.

About **Public Accounts Committee (PAC):**

| Aspect | Details |
|------------|--|
| Role | Audits government revenue and expenditure, examining C&AG audit reports after being presented in Parliament. |
| Assistance | Comptroller and Auditor General (C&AG) assists in investigations. |
| Function | Ensures government spending is within the scope of Parliament's grants. |
| Genesis | Established in 1921 , became a Parliamentary Committee under the Speaker's control in 1950. |

| | |
|-------------------|--|
| Membership | 22 members (15 from Lok Sabha, 7 from Rajya Sabha), elected annually. |
| Chairperson | Appointed from Lok Sabha, traditionally from the Opposition since 1967-68. |
| Exclusions | Ministers are not members; if a member is appointed a Minister, they must vacate their seat. |
| Key Functions | 1. Scrutinizes government accounts and C&AG reports. 2. Reviews legality, authority, and prudence of expenditure. |
| Examination Focus | Ensures appropriations are spent for the approved purpose, follow authority, and maintain economy and efficiency. |

25) Consider the following statements regarding electoral reforms in India:

1. The Model Code of Conduct (MCC) is legally enforceable and violators can be prosecuted under electoral laws.
2. The Supreme Court has mandated that candidates must disclose criminal records before elections.
3. The introduction of Voter Verifiable Paper Audit Trail (VVPAT) was directed by the Supreme Court to increase transparency in Electronic Voting Machines (EVMs).
4. The Election Commission has the power to disqualify a candidate if they fail to disclose their assets and liabilities.

How many of the above statements are correct?

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

Solution: C

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Explanation:

- **Statement 1 is incorrect** – The **Model Code of Conduct (MCC) is not legally binding**. It is a set of ethical guidelines issued by the ECI, but **violations are not punishable under electoral laws unless they overlap with existing laws** (e.g., bribery, hate speech).
- **Statement 2 is correct** – The **Supreme Court mandated that all candidates must disclose criminal antecedents** in their nomination forms.
- **Statement 3 is correct** – The **introduction of VVPAT was directed by the Supreme Court** to increase transparency and allow voters to verify that their votes were cast correctly.
- **Statement 4 is correct** – Candidates **must disclose their assets and liabilities**, and failure to do so **can lead to disqualification by the ECI under the Representation of the People Act, 1951**.

26) Which of the following committees was the first to recommend partial state funding of elections in India?

- (a) Dinesh Goswami Committee (1990)
- (b) Vohra Committee (1993)
- (c) Second Administrative Reforms Commission (2007)
- (d) Indrajit Gupta Committee (1998)

Solution: D

Explanation:

- The **Indrajit Gupta Committee (1998)** was the first to formally **advocate partial state funding of elections** in India, arguing that it would reduce the influence of money in politics.
- The **Dinesh Goswami Committee (1990)** also discussed **state funding**, but it was not the primary focus of its recommendations.

- The **Vohra Committee (1993)** was concerned with the **nexus between crime and politics**, and the **Second Administrative Reforms Commission (2007)** focused on **ethics and transparency** rather than state funding.

Key Committees on Electoral Reforms:

- Dinesh Goswami Committee (1990): Recommended state funding of elections and stricter MCC enforcement.
- Vohra Committee (1993): Highlighted the nexus between crime and politics.
- Indrajit Gupta Committee (1998): Advocated partial state funding of elections.
- Second Administrative Reforms Commission (2007): Focused on ethics in governance and electoral transparency.
- Tankha Committee (2010): Proposed reforms in election laws, including EVM and VVPAT improvements.

27) Consider the following statements regarding the powers and responsibilities of the CAG:

1. The CAG audits all transactions from the Consolidated Fund of India, State funds, and government undertakings.
2. The CAG submits audit reports directly to Parliament, bypassing the President and Governors.
3. The CAG has discretionary powers to initiate audits of private companies receiving significant government funds.
4. The CAG acts as an agent of Parliament in ensuring accountability in public financial management.

How many of the above statements are correct?

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

Solution: C

Explanation:

- **Statement 1 is correct** – The **CAG audits all financial transactions of the Union, States, and PSUs.**
- **Statement 2 is incorrect** – The **CAG submits reports to the President or Governors, who then present them to Parliament or State Legislatures.**
- **Statement 3 is correct** – The **CAG can audit private companies if they receive significant government funds.**
- **Statement 4 is correct** – The **CAG functions as an agent of Parliament, ensuring financial accountability.**
- **What is the CAG?**
 - The **CAG is India's apex constitutional audit authority, known as the watchdog of the public purse.**
 - It oversees the **financial accountability** of both **Union and State governments** and reports to Parliament.
- **Constitutional Article: [Articles 148 to 151 \(Part V\)](#) of the Indian Constitution define the **appointment, powers, duties, and audit reporting process** of the CAG.**
- **Appointment Process:**
 - The **President of India appoints the CAG by warrant under his hand and seal** (Article 148).
 - Current practice is executive-controlled; **calls for reform suggest an independent panel including the Prime Minister, Leader of Opposition, and Chief Justice of India.**
- **Term of Office:**
 - **Six years or until the age of 65, whichever is earlier.**

- The CAG is **ineligible for any future office under the Government of India or any State** after demitting office.
- **Service Conditions:**
 - **Salary is equal to that of a Supreme Court judge**, determined by **Parliament**.
 - Administrative expenses are **charged on the Consolidated Fund of India**, ensuring financial independence.
 - **Service conditions for staff are prescribed by the President in consultation with the CAG.**
- **Removal Process:**
 - Can be removed only by the **President**, following the **same grounds and process as a Supreme Court judge**.
 - Removal requires a **special majority resolution in both Houses of Parliament** for proven **misconduct or incapacity**.
- **Powers and Functions:**
 - **Audit Authority:**
 - Audits **all expenditures from the Consolidated Fund of India and State funds**.
 - Audits accounts of **government corporations, PSUs, and government-funded bodies**.
 - **Reporting Role:**
 - Submits **audit reports to the President or Governors**, who lay them before **Parliament or State Legislatures**.
 - Reports are scrutinized by the **Public Accounts Committee (PAC)**.
 - **Fiscal Oversight:**
 - Certifies the **net proceeds of taxes and duties**.
 - Reviews government transactions related to **debts, advances, and suspense accounts**.
 - **Legal and Discretionary Audits:**
 - Conducts **compliance audits, performance audits, and financial audits**.
 - Can conduct **propriety audits** to evaluate the **wisdom, faithfulness, and economy** in government spending.
 - **Role in Accountability:**
 - Acts as an **agent of Parliament**, ensuring **public funds are used legally and efficiently**.
 - Does not control fund issuance (unlike Britain's CAG), functioning solely as **Auditor-General**.

28) Which of the following correctly describes the historical origin of the Comptroller and Auditor General (CAG) in India?

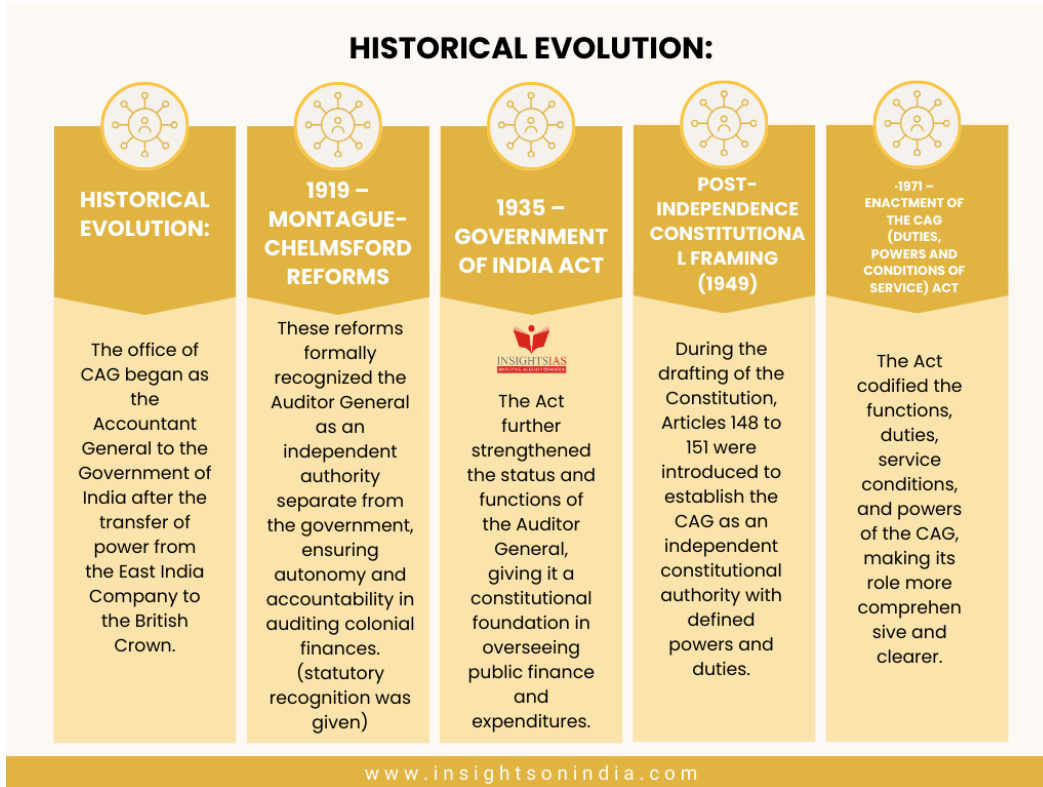
- (a) The CAG's office was established through the Montague-Chelmsford Reforms of 1919, which made it a constitutional authority.
- (b) The Government of India Act, 1935, formally provided constitutional status to the Auditor General for overseeing financial accountability.
- (c) The office of CAG originated from the British colonial setup, evolving from the position of Accountant General to the Government of India.
- (d) The CAG was established as an independent constitutional authority only after the enactment of the 1971 CAG Act.

Solution: C

Explanation:

- The **CAG's office began as the Accountant General** to the Government of India after power transferred from the **East India Company to the British Crown**.
- The **Montague-Chelmsford Reforms (1919)** and the **Government of India Act (1935)** strengthened its **autonomy**, but it **did not gain constitutional status until the framing of the Indian Constitution in 1949**.
- The **CAG Act of 1971** codified the powers of CAG but **did not establish it**.

HISTORICAL EVOLUTION:



29) With reference to the National Commission for Women (NCW), consider the following statements:

1. NCW is a non-statutory body that works toward raising awareness about gender-based violence.
2. One of its roles is to address workplace harassment faced by women.
3. The NCW has the power to legislate policies to protect women's rights.

Which of the above statements is/are correct?

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

Solution: A

The NCW plays a vital role in advocating for women's rights, **raising awareness on issues like gender-based violence**, and contributing to policy changes such as the Protection of Women from Domestic Violence Act. Its main focus is not legal representation in courts but rather addressing systemic issues related to gender discrimination and inequality.

NCW is indeed a **statutory body** formed under the 1990 Act, and one of its roles is to address workplace harassment through advocacy, awareness, and support mechanisms. However, the **NCW does not have the authority to legislate policies. It can only recommend and advocate for changes to existing laws.**

30) The Law Commission of India is primarily:

- (a) An executive body with judicial powers
- (b) A non-statutory advisory body
- (c) A constitutional body
- (d) A statutory body under the Indian Constitution

Solution: B

The Law Commission of India is a non-statutory advisory body established by the Ministry of Law and Justice. It is tasked with conducting research and recommending legal reforms but **does not possess any statutory or**

constitutional status. Its role is purely advisory, focusing on legal review, codification, and reforms to improve the legal framework of the country.

31) Consider the following statements regarding the structure of the Law Commission of India:

1. The Law Commission consists only of full-time members appointed by the President of India.
2. The Chairperson of the Law Commission is always a retired Chief Justice of India.
3. Ex officio members of the Law Commission include the Secretaries of Legal Affairs and Legislative Affairs.

How many of the above statements is/are correct?

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

Solution: A

The Law Commission includes not only full-time members but also part-time members (Statement 1 is incorrect).

The Chairperson is usually a retired judge or legal expert, but it is not mandatory for the person to be a retired Chief Justice of India (Statement 2 is incorrect).

Ex officio members include the Secretaries of Legal Affairs and Legislative Affairs (Statement 3 is correct).

32) With reference to the electoral processes for Presidents in the United States and India, consider the following statements:

1. Both the U.S. and India use an Electoral College system for the election of their Presidents.
2. In the U.S., electors are selected by popular vote in each state, while in India, electors are Members of Parliament (MPs) and Members of Legislative Assemblies (MLAs).
3. The U.S. Presidential election employs a "winner-takes-all" system in most states, whereas India uses proportional representation with a single transferable vote.

How many of the above statements is/are correct?

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

Solution: C

- Both the United States and India utilize an Electoral College system to elect their Presidents. In the U.S., the Electoral College consists of electors from each state. In India, the Electoral College comprises elected MPs and MLAs.
- In the U.S., electors are chosen by popular vote during the Presidential elections. Voters in each state cast ballots for a slate of electors pledged to a candidate. In India, the President is elected indirectly by an Electoral College consisting of elected MPs and MLAs; there is no direct public voting for the President.
- The U.S. uses a "winner-takes-all" system in all states except Maine and Nebraska, where the candidate who wins the popular vote in a state receives all its electoral votes. India employs a system of proportional representation by means of a single transferable vote. This ensures that the value of each MP's and MLA's vote varies according to the population they represent, promoting a more proportionate representation.

33) Consider the following statements regarding Form 17C used in the Indian electoral process:

1. Form 17C is legally required to be signed by both polling agents and the presiding officer at the close of polling.
2. It contains information about tendered votes and discrepancies in voter turnout.
3. Form 17C is governed by the Representation of the People Act, 1950.

How many of the above statements is/are correct?

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

Solution: B

- Statements 1 and 2 are correct. **Form 17C Part I** records key polling day data such as **votes cast, EVM serial numbers, tendered votes**, and any **discrepancies** observed. It must be **signed by the Presiding Officer and polling agents** for validity, ensuring **transparency and consensus** on the recorded numbers.
- Statement 3 is incorrect — **Form 17C is governed under the Conduct of Election Rules, 1961**, framed under the **Representation of the People Act, 1951**, not 1950.

About Form 17C:

- **What it is:**
 - Form 17C is a mandatory election document that records booth-wise voter turnout and election results.
- **Its parts:**
 - **Part 1:** Account of Votes Recorded — includes booth-wise data on the number of electors, votes cast, Electronic Voting Machine (EVM) identification, tendered ballots, and discrepancies.
 - **Part 2:** Result of Counting — provides candidate-wise vote counts obtained by pressing the result button on the [EVM](#).
- **Law governed under:**
 - Governed by the [Conduct of Election Rules, 1961](#), framed under the Representation of the People Act, 1951.
- **Procedures laid down:**
 - **Part 1** is filled by the **Presiding Officer** after polling, signed by polling agents, and sealed in a 'Strong Room.'
 - **Part 2** is filled by the **Returning Officer** on counting day, verified, signed by counting agents, and officially declared.
- **Functions and powers of Form 17C:**
 - Ensures transparency and accountability of votes recorded and counted.
 - Enables cross-verification of voter turnout and vote counts.
 - Helps address discrepancies and strengthens trust in the electoral process.
 - Legally binding for polling and counting officials, with signatures mandatory for validation.

34) Consider the following statements regarding Secret Sitting in Parliament:

1. The Constitution of India explicitly provides for secret sittings of both Houses of Parliament.
2. Lok Sabha Rules of Procedure permits secret sittings when recommended by the Leader of the House and approved by the Speaker.
3. The proceedings of secret sittings are published in the official records only if the House resolves to do so.

How many of the above statements is/are correct?

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

Solution: B

- Statement 1 is incorrect — The **Constitution of India does not explicitly provide** for secret sittings. Instead, it allows Parliament to make **its own rules of procedure** under **Article 118**, under which the **Rules of Procedure and Conduct of Business** for both Houses have been framed.
- Statement 2 is correct — Under **Rule 248 of the Lok Sabha Rules**, the **Leader of the House may request** a secret sitting, and the **Speaker may approve it**.

- Statement 3 is also correct — the **proceedings of a secret sitting are not automatically published**; they are only published **if the House later resolves** to make them public.

About Secret Sitting of Lok Sabha:

- **What it is**
 - A secret sitting is a closed-door parliamentary session where discussions are held confidentially, without public or media access.
- **Constitutional Provision:**
 - The Constitution of India does not directly mention secret sittings, but it empowers Parliament to frame its own rules under Article 118.
 - **Chapter 25 of the Rules of Procedure and Conduct of Business in Lok Sabha**, specifically **Rule 248** mention about Secret Sitting.
- **History:**
 - Though permitted by law, India has never conducted a secret sitting.
 - In 1962, during the Chinese aggression, the proposal for secret sitting was suggested but declined by PM Jawaharlal Nehru.
- **Who can declare a secret sitting:**
 - The **Leader of the House** can request it.
 - The **Speaker of the Lok Sabha** has the authority to approve and schedule the secret sitting.
 - **Secret sitting is allowed in Rajya Sabha** as well.
 - It is provided under **Rule 266 of the Rules of Procedure and Conduct of Business in the Council of States (Rajya Sabha)**, where the Chairman can permit a secret sitting on a request made by the Leader of the House.
- **Features of Secret Sitting:**
 - No visitors or outsiders are allowed in the chamber, lobby, or galleries.
 - Proceedings are recorded and published only with the Speaker's approval.
 - Any unauthorized disclosure is considered a **gross breach of privilege**.
- **Limits:**
 - Participants cannot keep notes or publish any part of the discussion.
 - Revealing secret sitting proceedings is considered a **gross breach of privilege** of the House, leading to disciplinary action.
 - Only with the **Speaker's consent** and a passed motion can such information be officially disclosed.

35) Consider the following statements.

1. Parliament has never officially exercised the provision of secret sitting despite having the authority.
2. The only near-instance was in 1962 during the Indo-China war, where the idea was proposed but not executed.

Which of the above statements is/are correct?

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

Solution: C

Both statements are **accurate**:

- Though **provisions exist**, India has **never officially held a secret sitting** in either House.
- During the **1962 Indo-China conflict**, the idea of secret sitting was **proposed**, but **Prime Minister Nehru rejected it**, favoring transparency. This event is cited as the **closest India came to a secret sitting**, which explains the non-use of the provision.

36) Consider the following statements regarding the Representation of the People Act, 1950 (RPA 1950):

1. It provides for the preparation of electoral rolls and the qualifications of voters.
2. It deals with the conduct of elections and the removal of disqualified members from legislatures.

3. It lays down provisions related to the allocation of seats in Parliament and State Legislatures.

How many of the above statements are correct?

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

Solution: B

Explanation:

- **Statement 1 is correct** – The **Representation of the People Act, 1950** primarily deals with the **preparation of electoral rolls, voter qualifications, and seat allocation for Parliament and state legislatures.**
- **Statement 2 is incorrect** – The **conduct of elections, corrupt practices, and disqualification of members** fall under the **Representation of the People Act, 1951**, not the 1950 Act.
- **Statement 3 is correct** – The RPA 1950 also provides for the **allocation of seats in the Lok Sabha and State Assemblies**, as well as delimitation of constituencies.

37) Consider the following statements regarding the CAG's audit powers:

1. The CAG can audit only those financial transactions that involve tax revenues.
2. The CAG conducts three types of audits: compliance audit, financial audit, and propriety audit.
3. The CAG directly advises the Prime Minister on financial matters related to policy decisions.

How many of the above statements are correct?

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

Solution: A

Explanation:

- **Statement 1 is incorrect** – The **CAG audits all government expenditure, including non-tax revenues and debt transactions.**
- **Statement 2 is correct** – The **CAG conducts compliance audits, financial audits, and propriety audits.**
- **Statement 3 is incorrect** – The **CAG does not advise the PM on policy matters**; it is only responsible for **auditing financial records.**

38) Which of the following Articles of the Indian Constitution allows the State to make special provisions for backward classes?

- (a) Article 14
- (b) Article 15(4) and Article 16(4)
- (c) Article 21
- (d) Article 19(1)(a)

Solution: B

Article 15(4) and Article 16(4) of the Indian Constitution empower the State to make special provisions for the advancement of socially and educationally backward classes, including Scheduled Castes (SCs) and Scheduled Tribes (STs). These provisions serve as a basis for affirmative action and reservations, enabling governments to create policies that promote equity and social justice.

Articles 14, 21, and 19(1)(a) address other fundamental rights such as equality, personal liberty, and freedom of speech, but they do not specifically provide for backward classes.

39) Consider the following statements about minority educational institutions:

1. The National Commission for Minority Educational Institutions Act, 2004, provides minority institutions with absolute immunity from state interference.
2. Only institutions established post-Independence are eligible for minority status under the Constitution.
3. The Supreme Court in T.M.A Pai Foundation v. State of Karnataka (2002) laid down guidelines to identify minority status and autonomy in administration.

Which of the above statements is/are correct?

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

Solution: A

Only statement 3 is correct. In T.M.A Pai Foundation v. State of Karnataka (2002), the Supreme Court laid down guidelines to determine the minority status of institutions and the extent of their administrative autonomy.

Statement 1 is incorrect as the **National Commission for Minority Educational Institutions Act, 2004, provides safeguards and legal recognition but does not grant absolute immunity from state regulation.**

Statement 2 is also incorrect because institutions established before the Constitution came into force can also claim minority status if they meet the criteria.

8. History, Art and Culture

- 1) Match the following movements with their corresponding leaders or key contributions of Sardar Vallabhbhai Patel:

Movements

- A. Kheda Satyagraha
- B. Bardoli Satyagraha
- C. Quit India Movement
- D. Non-Cooperation Movement

Contributions by Sardar Patel

1. Mobilized significant funds for Khadi promotion
2. Gained the title "Sardar" for successful leadership
3. Called for mass protests against British Salt Laws
4. Supported farmers during a famine against tax collection

Select the correct match:

- (a) A-4, B-3, C-2, D-1
- (b) A-4, B-2, C-1, D-3
- (c) A-2, B-4, C-1, D-3
- (d) A-4, B-2, C-3, D-1

Solution: D

- In the Kheda Satyagraha (A-4), Patel led the protest against tax collection from farmers suffering from a famine.
- The Bardoli Satyagraha (B-2) was where Patel earned the title "Sardar" after successfully opposing unfair revenue assessments.
- During the Quit India Movement (C-3), he called for extensive protests, showing his commitment to independence.
- In the Non-Cooperation Movement (D-1), he played a crucial role by mobilizing people, funds, and promoting Khadi, underscoring his support for economic self-reliance and resistance to British goods.

- 2) Consider the following statements.

1. Protohistory is the period where people didn't develop writing but were mentioned in the written records of a contemporary group.

2. Harappans were literate people, and their written materials were completely deciphered by historians.
3. For the Vedic period, there are no written records but have orally transmitted literature.

How many of the above statements is/are incorrect?

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

Solution: A

Statement 2 is incorrect.

Protohistory is the period between prehistory and history and refers to the people who didn't develop writing but were mentioned in the written records of a contemporary group.

Although the **Harappans were literate people, their written materials could not be deciphered by historians. For the Vedic period, we don't have written records but orally transmitted literature** (the Vedas).

3) Consider the following statements about Ashokan Edict Sites included in the UNESCO Tentative List:

1. These sites include rock edicts and pillar inscriptions commissioned by Emperor Ashoka.
2. The edicts are primarily written in Tamil and Sanskrit, reflecting Mauryan influence in South India.
3. The purpose of these edicts was to promote Dhamma (moral values) and governance policies.

How many of the above statements is/are correct?

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

Solution: B

Explanation:

- **Statement 1 is correct** – Ashokan edicts were **inscriptions on rocks and pillars** across the Mauryan Empire.
- **Statement 2 is incorrect** – The edicts were **primarily written in Prakrit and Brahmi script**, not Tamil or Sanskrit.
- **Statement 3 is correct** – The edicts **spread the message of Dhamma (moral governance) and non-violence**.

4) Consider the following statements about Periyar's Self Respect Movement:

1. It was primarily aimed at empowering women and promoting gender equality.
2. The movement sought to eliminate caste-based discrimination and promote rational thinking.
3. The Self Respect Movement encouraged individuals to reject rituals and superstitions.

How many of the above statements is/are correct?

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

Solution: B

Statement 1 is incorrect.

The Self Respect Movement, founded by Periyar in 1925, was **aimed at eliminating caste-based discrimination, promoting rationalism, and encouraging people to reject rituals and superstitions associated with religion and caste**.

Although gender equality was a part of the movement, its primary focus was to uplift the non-Brahmin and backward castes. The movement challenged the hegemony of Brahmins and religious orthodoxy, emphasizing the need for social justice and individual dignity through rational thought and self-respect.

5) Match the following Indus Valley Civilization sites with their corresponding features:

| Site | Feature |
|-----------------|---|
| a) Harappa | 1. Discovery of a Great Bath |
| b) Mohenjo-daro | 2. Known for granaries and evidence of trade with Mesopotamia |
| c) Dholavira | 3. Evidence of a dockyard and bead-making industry |
| d) Lothal | 4. Known for a large water reservoir |

Select the correct answer code:

- (a) a-4, b-1, c-2, d-3
- (b) a-1, b-3, c-4, d-2
- (c) a-3, b-4, c-1, d-2
- (d) a-2, b-1, c-4, d-3

Solution: D

Harappa is known for its granaries and trade links with Mesopotamia, Mohenjo-daro for the Great Bath, Dholavira for its large water reservoir, and Lothal for its dockyard and bead-making industry.

6) Consider the following statements about Sardar Patel's contributions to the Indian administration and civil services:

1. He was instrumental in the creation of the Indian Administrative Service (IAS).
2. Patel envisioned the IAS as a robust administrative framework to maintain governance stability in India.
3. He viewed the civil services as temporary structures for post-independence governance.
4. Patel's model of civil services was inspired by the British administrative structure but aimed to serve India's needs.

How many of the above statements is/are correct?

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

Solution: C

Statements 1, 2, and 4 are correct. Patel was central to establishing the IAS, which he famously termed the “steel frame” of India, envisioning it as a stable and efficient structure essential for governance. He based the IAS on the British model but adapted it to meet India's administrative needs.

Statement 3 is incorrect, as Patel saw the civil services as a permanent framework vital for India's governance, not merely a temporary solution. His foresight helped establish a **solid bureaucratic structure** that continues to serve India's governance effectively.

7) Consider the following statements about Maulana Abul Kalam Azad's contributions to education in India:

1. He played a major role in establishing the Indian Institutes of Technology (IITs).
2. He founded the Indian Statistical Institute.
3. He advocated for liberal and universal education in post-independent India.

How many of the above statements is/are correct?

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

Solution: B

Statement 2 is incorrect.

Maulana Abul Kalam Azad was instrumental in the establishment of premier educational institutions like the IITs and also promoted liberal, universal education for a progressive India.

However, he was not the founder of the Indian Statistical Institute, which was founded by Prasanta Chandra Mahalanobis. Azad's efforts in education significantly shaped India's academic landscape.

9. Agriculture

1) Consider the following statements regarding the APEDA's export promotion initiatives:

1. APEDA provides financial assistance to exporters under the Agriculture Export Promotion Fund to enhance international competitiveness.
2. APEDA promotes the Geographical Indication (GI) tagging of agricultural products for brand recognition in global markets.

Which of the above statements is/are correct?

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

Solution: C

Statement 1 is correct – APEDA provides financial assistance to exporters under various schemes, such as the Agriculture Export Promotion Fund and the Market Development Assistance (MDA) Scheme, to improve international competitiveness.

Statement 3 is correct – APEDA promotes the Geographical Indication (GI) tagging of agricultural products such as Alphonso mangoes, Basmati rice, and Darjeeling tea to enhance their global market recognition and branding.

What is APEDA?

- **APEDA (Agricultural and Processed Food Products Export Development Authority)** is a **statutory body** established under the **APEDA Act, 1985**.
- It functions under the **Ministry of Commerce & Industry**, Government of India.
- **Headquarters: New Delhi, India.**

Structure of APEDA

- **Chairman:** Appointed by the **Government of India**.
- **Advisory Board:** Comprises **exporters, farmers, industry experts, and government representatives**.
- **Regional Offices:** Located in **Mumbai, Kolkata, Bangalore, Hyderabad, Guwahati** to support exporters.

Functions of APEDA

- **Export Promotion & Development:** Facilitates **agricultural and processed food exports**.
 - Supports **market research, branding, and export certification**.
- **Quality Standards & Certification:** Regulates **quality control and packaging** of export products.
 - Implements **Good Agricultural Practices (GAP) and Organic Farming Standards**.
- **Financial Assistance to Exporters:** Provides subsidies and incentives for **exporters and food processors**.
 - Supports **cold chain infrastructure development**.
- **Market Expansion & Global Trade:** Organizes **international trade fairs and buyer-seller meets**.
 - Strengthens **bilateral trade relations for agricultural exports**.

- 2) What is the primary objective of the Digital Agriculture Mission?
- To increase the number of agricultural exports
 - To eliminate human intervention in farming practices
 - To replace traditional farming methods with automated agriculture
 - To enhance farm productivity and management using digital tools

Solution: D

- **The Digital Agriculture Mission is focused on modernizing Indian agriculture by leveraging digital technologies such as data analytics, geospatial information, and artificial intelligence (AI).**
- The aim is to improve farm management, increase productivity, and offer better services to farmers by integrating various data sets and technologies.
- It is not about eliminating human intervention but rather about making agriculture more efficient and informed through data-driven decisions.

- 3) Which of the following is not a focus area of AgriSURE – Agri Fund for Start-Ups & Rural Enterprises?
- Rural enterprises
 - Technology-driven start-ups
 - Traditional irrigation methods
 - Farm mechanization

Solution: C

While AgriSURE focuses on innovation in agriculture, farm mechanization, and technology-driven start-ups, it **does not emphasize traditional irrigation methods**, which are not part of its high-impact focus areas.

| Aspect | AgriSURE – Agri Fund for Start-Ups & Rural Enterprises |
|-------------|---|
| Established | Following the 2022-23 Budget announcement by India's Finance Minister. |
| Purpose | To support innovative, high-risk, and high-impact agricultural start-ups. |
| Focus Areas | Investment in agriculture, technology-driven start-ups, farm mechanization, and rural enterprises. |
| Objectives | – Foster investment in agriculture. |
| | – Create employment opportunities. |
| | – Encourage youth participation in agriculture. |
| | – Strengthen the agricultural value chain. |

- 4) What is the main environmental benefit of nano-fertilizers compared to traditional fertilizers?
- Nano-fertilizers are entirely organic and biodegradable
 - Nano-fertilizers increase nutrient runoff into water bodies, enhancing aquatic ecosystems
 - Nano-fertilizers completely eliminate the need for chemical fertilizers
 - Nano-fertilizers reduce nutrient wastage and pollution, cutting fertilizer use by 50%

Solution: D

The main environmental advantage of nano-fertilizers is their high nutrient use efficiency (NUE), with over 85% efficiency, as plants absorb nitrogen more effectively due to the nano-sized particles. This results in reduced nutrient wastage, with fertilizer usage cut by up to 50%, thereby minimizing soil, water, and air pollution.

Nano-fertilizers do not completely eliminate traditional fertilizers or promote nutrient runoff. Instead, they help reduce the environmental fallout of conventional fertilizer use by improving nutrient delivery to crops and minimizing waste.

5) Consider the following statements regarding the use of green hydrogen in agriculture:

1. Green hydrogen can be used to produce carbon-free ammonia, reducing reliance on fossil fuels for fertilizer production.
2. Green hydrogen-powered farm machinery, such as tractors and harvesters, can help reduce greenhouse gas emissions in the agriculture sector.
3. Green ammonia produced from green hydrogen increases soil acidity, making it less efficient than traditional fertilizers.

How many of the above statements is/are correct?

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

Solution: B

Statements 1 and 2 are correct. Green hydrogen can be used to produce carbon-free ammonia, reducing the agricultural sector's dependence on fossil fuels for fertilizer production. This also helps in reducing greenhouse gas emissions. Additionally, green hydrogen can be used to power farm machinery, further decreasing the carbon footprint.

However, statement 3 is incorrect—**green ammonia does not increase soil acidity but rather offers improved efficiency compared to traditional ammonia.**

6) With reference to jute trade and production, consider the following statements:

1. Jute is known as the 'golden fibre' due to its high commercial value.
2. Bangladesh has more acreage under jute cultivation than India.
3. The Jute Corporation of India (JCI) is responsible for promoting jute cultivation in India.

How many of the above statements is/are correct?

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

Solution: C

Jute is referred to as the 'golden fibre' due to its versatility and economic importance, making statement 1 correct.

Bangladesh has more acreage under jute cultivation, making statement 2 correct.

The Jute Corporation of India (JCI) plays a role in promoting jute production and ensuring farmers receive a fair price, making statement 3 correct.

7) Consider the following statements regarding MSP determination:

1. "A2" costs include all cash and in-kind expenses incurred by the farmer.
2. "A2 + FL" adds the imputed value of unpaid family labor to "A2" costs.
3. "C2" costs exclude any interest on fixed capital assets like farm machinery.

How many of the above statements is/are incorrect?

- (a) Only one
- (b) Only two
- (c) All three

(d) None

Solution: A

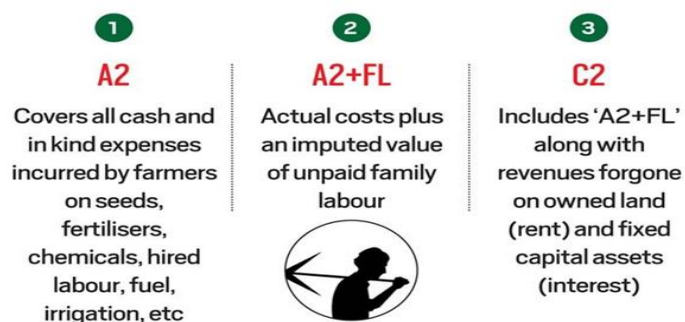
Statements 1 and 2 are correct. "A2" costs cover all expenses incurred by the farmer, and "A2 + FL" includes the imputed value of unpaid family labor.

However, statement 3 is incorrect because "C2" costs include interest on fixed capital assets, making it the most comprehensive cost component.

EXPRESS explained. | HOW ARE MSPs DETERMINED?

The Centre fixes MSPs for every kharif and rabi cropping season based on recommendations of the Commission for Agricultural Costs and Prices (CACP)

● When a farmer grows a crop, he incurs costs, some of it explicit and some implicit or unpaid. The CACP considers the following costs:



#QUIXPLAINED

2

SIGHTSIAS
IFYING IAS EXAM PREPARATION

10. Defence and Security

- 1) Which of the following best describes the primary objective of the Convention on Cluster Munitions (CCM)?
- To regulate the production and distribution of cluster munitions
 - To impose financial penalties on countries that manufacture cluster bombs
 - To prohibit the use, production, transfer, and stockpiling of cluster munitions due to their humanitarian impact
 - To allow the use of cluster munitions only in defensive military operations

Solution: C

The Convention on Cluster Munitions (CCM), adopted in 2008, completely bans the use, production, transfer, and stockpiling of cluster munitions due to their long-term humanitarian risks, particularly the danger of unexploded submunitions harming civilians post-conflict.

What is the Convention on Cluster Munitions (CCM)?

- The CCM is an international treaty that prohibits the **use, transfer, production, and stockpiling** of cluster munitions due to their long-term humanitarian risks.
- Adopted in 2008**, the treaty entered into force on 1 August 2010.
- It aims to eliminate cluster bombs, which pose a grave threat to civilians even after conflicts end.

Members & Non-Members:

- 112 states are parties to the convention**, with 12 additional signatories yet to ratify it.

- **India**, the U.S., Russia, China, Ukraine, and Israel have not signed the treaty, citing military and strategic concerns.

Key Features of the CCM

- **Comprehensive Ban:** Prohibits the use, development, stockpiling, transfer, and production of cluster munitions.
- **Assistance to Affected Areas:** Requires members to clear contaminated areas and provide aid to victims.
- **Destruction of Stockpiles:** Signatories must destroy existing cluster munition stockpiles within eight years of joining.
- **Prevention of Assistance:** Member states cannot assist, encourage, or induce any nation to engage in banned activities.
- **International Cooperation:** Promotes collaboration in demining, victim support, and destruction of stockpiles.

What are Cluster Munitions?

- **Cluster munitions** are explosive weapons that release multiple smaller bomblets (submunitions) over a wide area.
 - They are used to **target dispersed military assets like tanks, infantry, and artillery formations.**
 - **Features of Cluster Munitions:**
 - **High Submunition Count:** A single cluster bomb can contain several to 600+ bomblets.
 - **Delivery Mechanisms:** Launched via aircraft, artillery, or missiles, they scatter bomblets mid-air before impact.
 - **Lack of Precision:** Most bomblets are free-falling and unguided, leading to widespread unintended destruction.
 - **Unexploded Ordnance (UXO) Risk:** Many bomblets fail to detonate on impact, remaining dangerous for decades, similar to landmines.
- 2) Which of the following statements best explains why INS Imphal is considered a significant advancement in India's naval capabilities?
- (a) It is the first Indian warship to be powered entirely by nuclear propulsion.
 - (b) It is India's first warship to be capable of deploying supersonic cruise missiles.
 - (c) It has been designed with stealth features to reduce radar cross-section.
 - (d) It is India's first aircraft carrier capable of operating fifth-generation fighter jets.

Solution: C

INS Imphal features a low radar cross-section design, reducing its detectability.

It is not nuclear-powered, nor an aircraft carrier.

While it carries BrahMos, India already had other warships capable of deploying supersonic cruise missiles.

What is INS Imphal?

- **INS Imphal** is a **Visakhapatnam-class (Project 15B) guided-missile destroyer** of the Indian Navy.
- It is the **third indigenous stealth destroyer**, commissioned in **December 2023**.
- **Built by:** Mazagon Dock Shipbuilders Limited (MDL), Mumbai.

Key Features of INS Imphal

1. **State-of-the-Art Weaponry**
 - Equipped with **BrahMos supersonic cruise missiles.**
 - **Barak-8 surface-to-air missiles** for aerial defense.
 - **76mm Super Rapid Gun Mount (SRGM) and AK-630 CIWS** for close-range combat.
2. **Advanced Sensor & Radar Systems:** Features **Multi-Function Surveillance and Threat Alert Radar (MF-STAR).**
 - Includes **electronic warfare suites and towed array sonar** for underwater surveillance.
3. **Stealth Capabilities:** Designed with **low radar cross-section** for stealth operations.
 - Reduces detectability in enemy radar systems.
4. **Enhanced Mobility & Endurance:** Powered by **four gas turbines**, capable of reaching **over 30 knots.**
 - Operational range: **4,000 nautical miles.**

5. **Helicopter & UAV Operations:** Can carry **two multi-role helicopters**, including **MH-60R Seahawks**.
- Supports **unmanned aerial vehicle (UAV) operations** for reconnaissance.

3) Consider the following statements regarding protections and legal recourse for victims of Digital Arrest Scams in India:

1. The Information Technology Act, 2000, punishes cheating by impersonation through electronic means.
2. Victims can report incidents on the National Cyber Crime Reporting Portal or call the cybercrime helpline.
3. Indian Cyber Crime Coordination Centre (I4C) actively blocks accounts linked to digital arrest scams.
4. Cyber awareness platforms like "Cyberdost" offer real-time legal aid to scam victims.

How many of the above statements is/are correct?

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

Solution: C

- Digital arrest scams in India are addressed under **Section 66D of the Information Technology Act, 2000, which penalizes acts of impersonation through digital mediums**, making statement 1 correct.
- Victims have resources such as the National Cyber Crime Reporting Portal and the helpline (1930) to report incidents, as stated in statement 2.
- The Indian Cyber Crime Coordination Centre (I4C) also plays a proactive role in blocking accounts associated with scams, including accounts on communication platforms like Skype used by scammers, making statement 3 correct.
- **Statement 4 is incorrect**, however, as the "**Cyberdost**" platform focuses on awareness and prevention tips, not real-time legal aid. It educates the public on common cyber threats, providing preventive measures rather than direct legal support.

SIMPLIFYING IAS EXAM PREPARATION

4) Consider the following statements regarding Territorial Army (TA).

1. The Territorial Army (TA) is a military reserve force composed of part-time volunteers who provide support services to the Indian Army.
2. They are requested by ministries and state governments for various roles, including plantation drives, petroleum supply, oil exploration, and protection of critical infrastructure.
3. They have participated in all of India's wars since the country's independence.

How many of the above statements is/are correct?

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

Solution: C

The **Indian Territorial Army, established in 1949**, is an auxiliary military organization of the Indian Army, often requested **by ministries and state governments for various roles, including plantation drives, petroleum supply, oil exploration, and protection of critical infrastructure**.

The primary role of the TA is to "relieve the regular army from static duties and assist civil administration in dealing with natural calamities and maintenance of essential services" and to "provide units for the regular army as and when required".

The TA has participated in all of India's wars since the country's independence.

5) Consider the following statements.

1. The Dharma Guardian exercise is a joint military exercise between the armies of India and Japan.

2. The Malabar exercise, which involves the navies of India and Japan, also includes other Quad nations.
3. Veer Guardian is a military exercise conducted between the naval forces of India and Japan.

How many of the above statements is/are correct?

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

Solution: B

Statement 1 is correct: **Dharma Guardian is a joint military exercise between the armies of India and Japan.**

Statement 2 is correct: The Malabar exercise is a naval exercise involving India, Japan, and other Quad nations, such as the United States and Australia.

Statement 3 is incorrect: **Veer Guardian is an air force exercise**, not a naval exercise, conducted between India and Japan.

- 6) What is the primary advantage of the Astra Beyond Visual Range Air-to-Air Missile (BVRAAM) over conventional air-to-air missiles?
- (a) It has an unlimited range due to satellite-based guidance.
(b) It can engage both aerial and ground targets using an advanced multi-mode seeker.
(c) It has a longer range and higher speed, reducing the risk to the launching aircraft.
(d) It is equipped with a nuclear warhead option, enhancing deterrence capabilities.

Solution: C

- Option a is incorrect – The Astra missile has a range of 100+ km, but it is not unlimited; it relies on radar and inertial navigation systems, not satellites.
 - Option b is incorrect – Astra is strictly an air-to-air missile, and cannot engage ground targets.
 - **Option c is correct – Astra BVRAAM provides a stand-off capability, allowing the launching aircraft to engage targets from a safe distance beyond visual range.**
 - Option d is incorrect – Astra is not a nuclear-capable missile; it carries a high-explosive fragmentation warhead.
- **What is Astra Missile?**
 - An advanced Beyond Visual Range **Air-to-Air Missile (BVRAAM)** designed for fighter aircraft.
 - Enables aircraft to **engage targets beyond 100 km without direct visual contact.**
 - **Developed by:**
 - Defence Research and Development Organisation (**DRDO**), India.
 - Manufactured by Bharat Dynamics Limited (BDL) under a ₹2,971 crore contract.
 - **Key Features:**
 - **Altitude:** Can engage targets at **20 km altitude.**
 - **Range:** Over 100 km, with high-speed precision targeting.
 - **Guidance System:** Equipped with **inertial navigation, mid-course updates, and active radar homing** for precise hits.
 - **Speed:** Capable of **Mach 4.5 (4.5 times the speed of sound).**
 - **Integration:** Already deployed on **Su-30MKI**, now being integrated with **LCA Tejas & MiG-29.**
 - **Combat Advantage:** Provides **large stand-off range**, reducing pilot risk from enemy air defense.

7) Match the following military exercises with their respective features:

| Exercise | Feature |
|---------------------|--|
| A. Bongosagar 2025 | 1. Aerial combat training between India and France |
| B. Khanjar-XII 2025 | 2. Enhancing Indo-Pacific military synergy |

| Exercise | Feature |
|-------------------------|---|
| C. Dharma Guardian 2025 | 3. Strengthening maritime security in the Bay of Bengal |
| D. Exercise Garuda 2025 | 4. Urban warfare and counter-terrorism in Kyrgyzstan |

Select the correct option:

- (a) A-1, B-2, C-3, D-4
- (b) A-2, B-1, C-4, D-3
- (c) A-3, B-4, C-2, D-1
- (d) A-4, B-3, C-1, D-2

Solution: C

About Military Exercise in News:

- **Exercise Bongosagar 2025**
 - **Nations Involved:** India and Bangladesh
 - **Host:** Bay of Bengal
 - **Aim:** Strengthening maritime security, tactical planning, and operational coordination.
- **Exercise Khanjar-XII 2025**
 - **Nations Involved:** India and Kyrgyzstan
 - **Host:** Tokmok, Kyrgyzstan
 - **Aim:** Enhancing special forces interoperability, focusing on urban warfare and counter-terrorism under the UN mandate.
- **Exercise Dharma Guardian 2025**
 - **Nations Involved:** India and Japan
 - **Host:** East Fuji Training Area, Japan
 - **Aim:** Improving joint counter-terror operations, disaster relief drills, and military synergy in the Indo-Pacific.

- 8) What makes the Pratibimb Module a significant tool in India's fight against cybercrime?
- (a) It allows real-time hacking of cybercriminal networks to prevent fraud.
 - (b) It integrates geospatial mapping and analytics to track cybercrime activities.
 - (c) It provides end-to-end encryption services for law enforcement communication.
 - (d) It operates independently without requiring coordination with other law enforcement agencies.

Solution: B

Explanation:

- **Option a is incorrect** – Pratibimb **does not hack networks**; it **tracks and analyzes cybercrime**.
- **Option b is correct** – The module **uses geospatial mapping and analytics** to pinpoint cybercrime hotspots.
- **Option c is incorrect** – Pratibimb is **not an encryption service**, but a **cybercrime tracking tool**.
- **Option d is incorrect** – It **coordinates with multiple agencies** through 'Samanvaya', ensuring collaborative cyber policing.

About Pratibimb Module:

- **What is the Pratibimb Module?**
 - A **crime-mapping tool** that tracks **cybercriminals and crime infrastructure** across India.
 - Developed under the **Indian Cyber Crime Coordination Centre (I4C)** by the **Union Home Ministry**.
- **How Does It Work?**
 - Uses **geospatial mapping** to pinpoint **cybercrime hotspots**.
 - Helps **jurisdictional officers** with **real-time intelligence** on cybercriminals.
 - Provides **techno-legal assistance** to **Law Enforcement Agencies (LEAs)**.
 - Facilitates **data sharing** and analytics via 'Samanvaya', a coordination platform for LEAs.
- **Significance of the Pratibimb Module:**
 - **Enhanced Cyber Policing:** Strengthens **law enforcement capabilities** in tackling cybercrime.

- **Faster Crime Resolution:** Assists in **swift arrests and cyber investigations**.
- **Interstate Crime Tracking:** Identifies **linkages between cybercriminals** across States/UTs.
- **Tech-Driven Governance:** Enables **data-driven policymaking** to curb cyber threats.
- **Boosts National Security:** Helps **prevent digital frauds, financial scams, and data breaches**.

- 9) Which of the following best describes the strategic significance of the Tavasya stealth frigate?
- It is India's first indigenous aircraft carrier designed for blue-water operations.
 - It enhances India's coastal surveillance network through radar integration with satellites.
 - It forms part of India's ballistic missile submarine fleet to deter nuclear threats.
 - It strengthens India's surface and sub-surface maritime combat capability.

Solution: D

- **Tavasya**, as a **stealth frigate under Project 1135.6**, is equipped for **surface, sub-surface, and aerial combat operations**, playing a vital role in **multi-dimensional naval warfare**.
- It includes **BrahMos missiles**, advanced sonar, and torpedo systems, enhancing India's **strike and surveillance** capacities in the Indo-Pacific.
- It is **not an aircraft carrier** (like INS Vikrant), nor is it part of the **nuclear submarine fleet**. It also does not serve primarily as a satellite-linked coastal surveillance vessel.

About Tavasya:

- **What it is:** A Krivak-class stealth frigate designed for multi-dimensional naval combat.
- **Project under:** Built under Project 1135.6 Additional Follow-on Ships.
- **Built by:** Goa Shipyard Limited ([GSL](#)), with technology transfer from Russia.
- **Aim:** To strengthen India's maritime security and promote self-reliance in shipbuilding.

Key Features:

- **Length:** 8 meters; **Width:** 15.2 meters; **Displacement:** 3600 tons.
- **Speed:** Up to 28 knots.
- Advanced sensors, sonar, and BrahMos missile system.
- Indigenous torpedo launchers and auxiliary control systems.
- Capable of surface, sub-surface, and air combat operations.
- Named after Bhima's mace, symbolizing strength and resilience.

11. Reports and Indices

- 1) Consider the following reports published by the National Statistics Office (NSO):
- Index of Industrial Production (IIP)
 - Annual Survey of Industries (ASI)
 - Periodic Labour Force Survey (PLFS)
 - Consumer Confidence Survey (CCS)

Which of the above are published by the NSO?

- 1 and 2
- 1, 2, and 3
- 1, 3, and 4
- All of the above

Solution: B

The Index of Industrial Production (IIP), ASI, and PLFS are published by NSO.
The Consumer Confidence Survey (CCS) is conducted by the RBI, not NSO.

About [National Statistics Office \(NSO\)](#)

What is NSO?

- NSO is India's premier statistical body under the [Ministry of Statistics & Programme Implementation \(MoSPI\)](#).
- It is responsible for **conducting surveys, data collection, and statistical analysis** for economic and social indicators.

Established In

- **Formed in 2019**, after merging the [Central Statistics Office \(CSO\) and National Sample Survey Office \(NSSO\)](#).

Chaired By

- The **Secretary, MoSPI**, heads the NSO.

Organizational Structure

- **Survey Division:** Conducts **household and enterprise surveys**.
- **Economic Division:** Estimates **national income, inflation, and industrial production**.
- **Field Operations Division:** Collects **data from households and businesses**.

Functions & Powers

- Conducts **large-scale surveys**, including **National Sample Surveys (NSS), Periodic Labour Force Survey (PLFS), and Household Consumption Expenditure Survey (HCES)**.
- Publishes **GDP data, Consumer Price Index (CPI), and Index of Industrial Production (IIP)**.
- Provides **statistical inputs for government policies and economic planning**.
- Ensures **data accuracy, transparency, and compliance with global statistical standards**.

2) Which of the following is a major objective of the Household Consumption Expenditure Survey (HCES) 2023-24

- To estimate inflation trends by analyzing changes in household spending patterns.
- To forecast GDP growth based on consumer sentiment analysis.
- To track foreign direct investment (FDI) in consumer goods and its impact on household consumption.
- To evaluate banking penetration in rural areas through household financial expenditures.

Solution: A

SIMPLIFYING IAS EXAM PREPARATION

The HCES provides data essential for revising the Consumer Price Index (CPI) and inflation estimation. It does not directly analyze GDP, FDI, or banking penetration.

About [Household Consumption Expenditure Survey \(HCES\) 2023-24](#)

- **Data Collection & Methodology**
 - Conducted between **August 2023 – July 2024** by NSO under MoSPI.
 - Digital data collection via **Computer Assisted Personal Interview (CAPI)** for **accuracy and real-time validation**.
 - Survey covered **405 items** across food and non-food categories.
 - **Rural sampling based on land possession**, while **urban sampling considered car ownership** as a classification criterion.
- **Broad Consumption Categories**
 - **Food items:** Cereals, pulses, dairy, vegetables, fruits, eggs, meat, edible oil, beverages.
 - **Non-food items:** Fuel, medical expenses, education, rent, clothing, consumer services, entertainment.
- **[New Items Added in 2023-24 Survey](#)**
 - **Food & Beverages:** Almonds, pistachios, breakfast cereals, nachos, mayonnaise, cup noodles.
 - **Personal Care:** Handwash, facewash, body oil, deodorants, aftershave balm.
 - **Clothing & Apparel:** Joggers, jumpsuits, sleepwear, lehengas, shrugs.
 - **Consumer Electronics:** Bluetooth speakers, headphones, air purifiers, geysers, food processors.
 - **Sports & Medical Equipment:** Treadmills, fitness cycles, wheelchairs, weighing machines.

3) Which of the following indicators is NOT included in the National Multidimensional Poverty Index (MPI)?

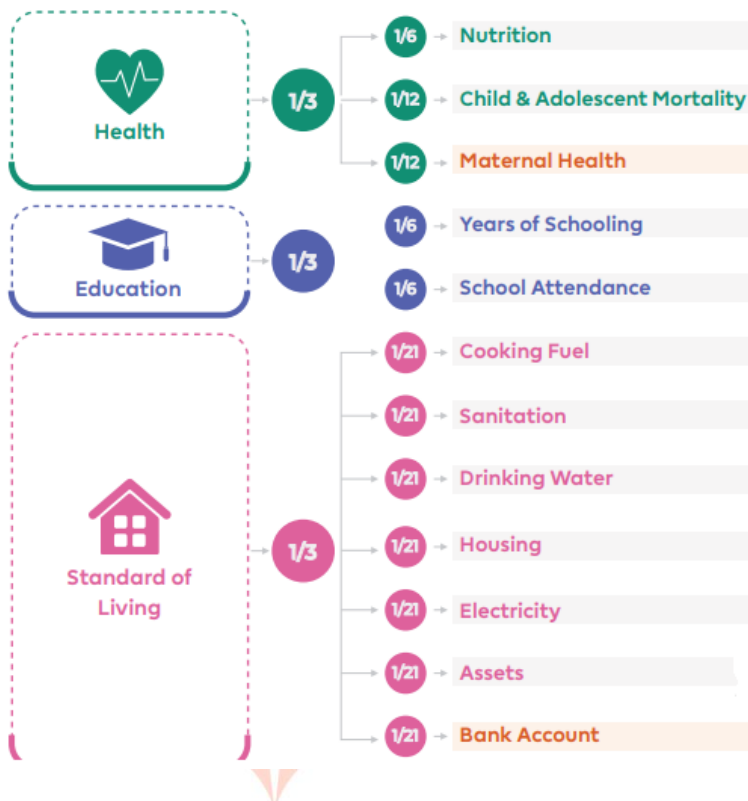
- Access to clean drinking water
- School attendance

- c) Per capita income
d) Child mortality

Solution: C

The National MPI focuses on multidimensional aspects of poverty, such as **health, education, and standard of living**, but it **does not include per capita income** as one of its 12 indicators. Instead, it looks at indicators like **child mortality, school attendance, and access to clean drinking water**.

Indicators and their weights



- 4) Consider the following statements regarding the National Multidimensional Poverty Index (MPI):
1. The National MPI uses data from the National Family Health Survey (NFHS).
 2. The National MPI includes indicators such as health, education, and standard of living.
 3. The Global MPI is published by the World Bank in collaboration with the International Monetary Fund (IMF).

How many of the above statements is/are correct?

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

Solution: B

Statement 1 is correct: The National MPI uses data from the National Family Health Survey (NFHS) to estimate multiple deprivations at the household level.

Statement 2 is correct: The National MPI includes indicators related to health, education, and standard of living.

Statement 3 is incorrect: The Global MPI is published by the Oxford Poverty and Human Development Initiative (OPHI) in collaboration with the United Nations Development Programme (UNDP), not by the World Bank and IMF.

12. Maps / Places

1) Match the following key aspects of Djibouti with their respective characteristics and significance:

| Aspect | Characteristic | Significance |
|-------------------------------|-------------------------|--|
| A. Bab el Mandeb Strait | 1. U.S. military base | i. Facilitates Ethiopian imports and exports |
| B. Camp Lemonnier | 2. Trade route | ii. Counterterrorism operations in Africa |
| C. Djibouti-Ethiopia Corridor | 3. Strategic chokepoint | iii. Controls access to the Red Sea |

Which of the following is the correct match?

- a) A-1-i, B-2-ii, C-3-iii
- b) A-2-iii, B-1-i, C-3-ii
- c) A-3-iii, B-1-ii, C-2-i
- d) A-1-ii, B-3-i, C-2-iii

Solution: C

Bab el Mandeb is a key maritime chokepoint, controlling Red Sea access.

Camp Lemonnier is a U.S. military base focused on counterterrorism in Africa.

The Djibouti-Ethiopia Corridor is a critical trade route supporting Ethiopian imports and exports.

2) The North Sea is bordered by which of the following water bodies?

- 1. Norwegian Sea
- 2. English Channel
- 3. Baltic Sea
- 4. Bay of Biscay

Select the correct answer using the codes below:

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

Solution: A

The North Sea is connected to the Norwegian Sea, the English Channel, and the Baltic Sea.

The Bay of Biscay is located southwest of France and is not connected to the North Sea.



3) Consider the following statements regarding the Strait of Gibraltar:

- 1. The Strait of Gibraltar connects the Mediterranean Sea to the Atlantic Ocean.

- 2. It lies between the southern tip of Spain and northern Morocco.
- 3. It plays a key role in connecting the Black Sea with the Mediterranean Sea.

How many of the above statements is/are correct?

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

Solution: b)

Statements 1 and 2 are correct. **The Strait of Gibraltar connects the Mediterranean Sea to the Atlantic Ocean** and lies between Spain and Morocco. Statement 3 is incorrect because the Bosphorus Strait, not the Strait of Gibraltar, connects the Black Sea with the Mediterranean Sea.

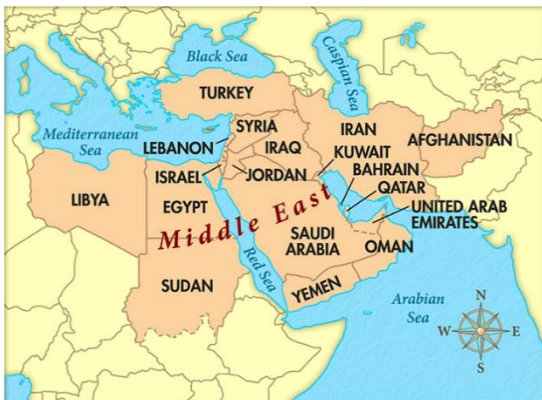


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- 4) Which country in the Middle East shares borders with the most seas and water bodies?
- a) Iran
 - b) Turkey
 - c) Saudi Arabia
 - d) Egypt

Solution: b)

Turkey shares borders with the Black Sea, Mediterranean Sea, and Aegean Sea, giving it access to multiple water bodies.



- 5) Morocco shares its bored with which of the following water bodies?
1. Mediterranean Sea
 2. Atlantic Ocean
 3. Caspian Sea

How many of the above options is/are correct?

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

Solution: B

Option 3 is incorrect.

Morocco, a North African country bordering the **Atlantic Ocean and the Mediterranean Sea**, is distinguished by its Berber, Arabian and European cultural influences.



6) The Nagorno-Karabakh region is internationally recognized as a part of which country?

- (a) Armenia
- (b) Azerbaijan
- (c) Russia
- (d) An independent entity recognized by the United Nations

Solution: B

- **Option a is incorrect** – Although the majority of the population in Nagorno-Karabakh is **ethnic Armenian**, it is **not internationally recognized as part of Armenia**.
- **Option b is correct** – Nagorno-Karabakh is **legally recognized as part of Azerbaijan**, even though it had **de facto control by ethnic Armenian forces** for decades.
- **Option c is incorrect** – Russia **plays a mediatory role** but does not claim the territory.
- **Option d is incorrect** – The **UN does not recognize Nagorno-Karabakh as an independent entity**.

About Nagorno-Karabakh:

- **Location:** A landlocked mountainous region in the Caucasus between the Black Sea and the Caspian Sea.
- **Political Status:**
 - Internationally recognized as part of Azerbaijan but populated mostly by ethnic Armenians.
 - It had an unrecognized separatist government closely linked to Armenia.
- **Historical Conflict:**
 - Declared **independence from Azerbaijan in the late 1980s**, leading to the **First Nagorno-Karabakh War (1988-1994)**.
 - In **September 2023, Azerbaijan regained full control** after a **24-hour military operation**, forcing **120,000 ethnic Armenians** to flee.

7) Armenia is a landlocked country located in which geographical region?

- (a) The Balkans
- (b) The Central Asian Steppe

- (c) The Levant
- (d) The South Caucasus

Solution: D

- **Option a is incorrect** – The Balkans refer to **Southeastern Europe**, while Armenia is located in **Eurasia**.
- **Option b is incorrect** – Armenia is **not part of Central Asia**, as it lies **west of the Caspian Sea**.
- **Option c is incorrect** – The **Levant** covers countries like **Lebanon, Syria, Jordan, and Israel**, not Armenia.
- **Option d is correct** – Armenia is part of the **South Caucasus region**, bordered by **Turkey, Georgia, Azerbaijan, and Iran**.

About [Armenia](#):

- **Location:** A landlocked country in the South Caucasus.
- **Border nations:** Turkey, Georgia, Azerbaijan, and Iran
- **Capital:**
- **Geographic Features:**
 - **Mountains:** A highly mountainous country, dominated by the Lesser [Caucasus Mountains](#).
 - **Highest Peak:** Mount Aragats (4,090 meters).
 - **Rivers:** The **Aras River**, forming the southern border with **Turkey and Iran**.
 - **Lakes:** **Lake Sevan**, one of the **largest freshwater lakes in the region**.



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- 8) Azerbaijan is strategically located between which major bodies of water?
- (a) The Black Sea and the Mediterranean Sea
 - (b) The Caspian Sea and the Persian Gulf
 - (c) The Caspian Sea and the Black Sea
 - (d) The Red Sea and the Arabian Sea

Solution: c)

- **Option a is incorrect** – Azerbaijan does **not border the Mediterranean Sea**.
- **Option b is incorrect** – The **Persian Gulf is far south**, and Azerbaijan does not reach it.
- **Option c is correct** – Azerbaijan is **situated between the Caspian Sea and the Black Sea**, making it a **critical transit hub for trade and energy exports**.
- **Option d is incorrect** – The **Red Sea and Arabian Sea are much farther south**, near the Arabian Peninsula.

About [Azerbaijan](#):

- **Location:** Located in **eastern Transcaucasia**.
- **Bordered by:** Russia, Georgia, Armenia, Iran, and Caspian Sea.
- **Capital:** Baku, a major oil-rich city on the Caspian Sea coast.
- **Geographic Features:**
 - **Mountains:** The **Greater Caucasus Mountains** dominate the **north**, with **Mount Bazardüzü (4,466 meters)** as the highest peak.
 - **Rivers:** Major rivers include the **Kura and Aras**, supporting **agriculture and hydroelectric power**.
 - **Caspian Sea Coastline:** Azerbaijan has a **large coastline along the Caspian Sea**, playing a **crucial role in trade and energy exports**.

- 9) Which of the following geographical features is unique to Balochistan compared to other regions of Pakistan?
- The Indus River Delta, supporting extensive mangrove forests
 - The Potwar Plateau, rich in fossil remains and oil reserves
 - The Salt Range, known for its vast rock salt deposits
 - The Bolan Pass, an ancient trade route connecting the Indian subcontinent to Central Asia

Solution: D

- **Option a is incorrect** – The Indus River Delta is **not in Balochistan** but in **Sindh**.
- **Option b is incorrect** – The Potwar Plateau is in **northern Pakistan**.
- **Option c is incorrect** – The Salt Range is located in **Punjab**, not Balochistan.
- **Option d is correct** – The **Bolan Pass** is a crucial trade route in **Balochistan**, historically connecting **South Asia to Central Asia**.

About **Balochistan**:

- **Situated in:** Western Pakistan, forming its largest and most sparsely populated province.
- **Borders:** Iran (west), Afghanistan (northwest), Khyber Pakhtunkhwa and Punjab (northeast and east), Sindh (southeast), and the Arabian Sea (south).

Historical Background

- **Ancient Inhabitants:** Passed through the **Stone and Bronze Ages** and was part of **Alexander the Great's empire**.
- **Baloch Migration:** The Baloch people arrived in the **14th century CE**, integrating with existing populations.
- **Colonial & Post-Colonial Era:** Became part of British India and later **Pakistan in 1947**. Balochistan was formally declared a **separate province in 1970**.

Geographical Features:

- **Mountains:**
 - **Sulaiman Range:** Forms the eastern boundary, extending into Afghanistan.
 - **Toba Kakar Range:** Located in the northwest, forming a natural border.
 - **Makran, Kharan, Chagai Ranges:** Predominantly in western Balochistan, extending towards Iran.
- **Rivers & Water Bodies:**
 - **Hingol River:** Largest River in Balochistan, draining into the [Arabian Sea](#).
 - **Dasht River:** Major River in southwestern Balochistan.
- **Deserts & Plains:**
 - **Chagai & Kharan Deserts:** Arid, barren regions in northwestern Balochistan.
 - **Makran Coastal Belt:** Extends along the Arabian Sea, known for **Gwadar Port** and strategic importance.
 - **Bolan Pass:** A historically significant route connecting **Balochistan to Afghanistan**.

13. Miscellaneous

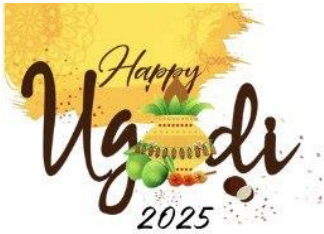
- 1) Which of the following statements correctly describes the significance of the Digital Transformation Award 2025?
- It is exclusively awarded to central banks in developed countries for their digital innovation.
 - The Reserve Bank of India (RBI) won the 2025 award for its digital initiatives 'Saarathi' and 'Pravaah'.
 - The award is presented by the International Monetary Fund (IMF) for excellence in digital banking reforms.
 - It is given annually to private financial institutions for their role in digital payment innovations.

Solution: B

- **Option a is incorrect** – The award is **not restricted to developed countries**; it recognizes **central banks globally**.
 - **Option b is correct** – RBI won the **2025 Digital Transformation Award** for 'Saarathi' and 'Pravaah' digital initiatives.
 - **Option c is incorrect** – The award is **presented by Central Banking, London**, not the IMF.
 - **Option d is incorrect** – It is **awarded to central banks and regulators**, not private institutions.
- 2) Which of the following best defines subtle gender discrimination?
- Complete exclusion of women from decision-making roles
 - Legal restrictions placed on women's rights in society
 - Unspoken and indirect forms of bias that are difficult to detect
 - A clear and open bias against women in hiring processes

Solution: C

Subtle gender discrimination refers to indirect, often unnoticed, and less obvious forms of bias, which can manifest in behaviors or attitudes that appear normal but reinforce gender inequality. Unlike overt discrimination, subtle bias might involve stereotypes or perceptions like women being "too emotional" or "less assertive," particularly in professional settings.



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