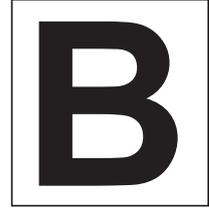


Test Code  
02031526



परीक्षण पुस्तिका अनुक्रम

अनुभव-2026

# ALL INDIA OPEN MOCK TEST

GENERAL STUDIES PAPER-I

(15<sup>th</sup> March, 2026)

*Answer Key*

1. (d)	21. (a)	41. (a)	61. (b)	81. (d)
2. (b)	22. (c)	42. (a)	62. (b)	82. (a)
3. (d)	23. (c)	43. (d)	63. (b)	83. (b)
4. (c)	24. (c)	44. (b)	64. (a)	84. (d)
5. (a)	25. (c)	45. (a)	65. (c)	85. (b)
6. (a)	26. (c)	46. (b)	66. (b)	86. (b)
7. (a)	27. (d)	47. (b)	67. (c)	87. (a)
8. (c)	28. (a)	48. (a)	68. (c)	88. (d)
9. (c)	29. (a)	49. (a)	69. (a)	89. (b)
10. (a)	30. (a)	50. (a)	70. (b)	90. (b)
11. (b)	31. (a)	51. (c)	71. (b)	91. (c)
12. (b)	32. (b)	52. (b)	72. (a)	92. (b)
13. (c)	33. (a)	53. (c)	73. (c)	93. (d)
14. (a)	34. (d)	54. (a)	74. (d)	94. (c)
15. (d)	35. (a)	55. (d)	75. (b)	95. (c)
16. (c)	36. (c)	56. (d)	76. (b)	96. (c)
17. (a)	37. (c)	57. (c)	77. (b)	97. (c)
18. (a)	38. (b)	58. (b)	78. (d)	98. (c)
19. (a)	39. (b)	59. (b)	79. (a)	99. (b)
20. (c)	40. (a)	60. (d)	80. (b)	100. (d)

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## anubhav-2026

All India OPEN Mock Test | GENERAL STUDIES PAPER-I  
(15<sup>th</sup> March, 2026)

1. (d)

**Statement I is correct:** A digital twin is a detailed, virtual replica of a real-world object, system or process. It can represent almost anything: a car, a factory, a city's traffic network and even a human heart. Digital twins can help many kinds of organizations simulate real situations and their outcomes, ultimately allowing them to make better decisions

**Statement II is correct:** Digital twins are linked to real data sources from the environment, which means that the twin updates in real time to reflect the original version. Sensors on physical objects continuously feed information — such as temperature, pressure, movement, wear and energy demand — into the digital model, ensuring it reflects real-world conditions in real time.

**Statement III is correct:** Modern digital twins are interactive and bidirectional: not only do they mirror the physical system, but they can also influence it. By combining real-time data with advanced mathematical models, a digital twin can simulate performance, test designs, explore “what-if” scenarios and control the physical object — helping users make smarter decisions and even automate responses.

**Additional information:** Applications of digital twin include:

- Testing traffic patterns, evaluating urban layout and planning energy or water distribution in cities.
- Monitoring factory operations to identify vulnerabilities, resolve bottlenecks and optimize productivity without halting production.
- Assessing the safety, durability and energy efficiency of structures like bridges, buildings and aircraft under different conditions.
- Personalizing medical treatments and streamlining clinical trials for safer drug and device development.

- Simulating high-risk or expensive experiments, such as particle collisions, fluid dynamics or materials under extreme conditions.

2. (b)

**Statement I is correct:** Small modular reactors (SMRs) are advanced nuclear reactors that have a power capacity of up to 300 MW(e) per unit, which is about one-third of the generating capacity of traditional nuclear power reactors.

**Statement II is correct:** Due to their smaller footprint and modular nature, SMRs can be manufactured in a factory and transported to a site for installation. This makes them ideal for remote off-grid locations.

**Statement III is correct:** SMR designs typically rely on **passive safety systems**. This means the reactor can shut down and cool itself safely without human intervention or external power/pumps during an emergency, relying instead on natural forces like gravity or natural convection.

**Statement IV is not correct:** India's Three-Stage Nuclear Power Programme, drafted by Dr. Homi J. Bhabha in 1954, is a sequential plan designed specifically to solve India's resource mismatch: little Uranium, but massive Thorium reserves. India's third stage of the nuclear programme is based on utilising thorium using Advanced Heavy Water Reactors (AHWRs) and molten salt reactors. While India is showing a strong interest in SMRs for decarbonizing industry and expanding its energy mix, they are not part of India's third stage of nuclear programme.

**Additional information:**

- SMRs are designed as factory-fabricated units, unlike traditional nuclear plants which are built entirely on-site. This leads to reduced construction time.
- SMRs, due to their smaller size require lower initial investment

- SMRs have reduced fuel requirements. Power plants based on SMRs may require less frequent refuelling, every 3 to 7 years, in comparison to between 1 and 2 years for conventional plants

As of now, two SMR projects are operational globally:

- **Russia's Akademik Lomonosov:** world's first floating nuclear power plant
- **China's HTR-PM:** A **demonstration SMR project** based on high-temperature gas-cooled reactor technology.
  - ◆ Department of Atomic Energy (DAE), India has undertaken design and development works on indigenous SMRs namely;
- 220 MWe Bharat Small Modular Reactor (proposed at Tarapur Atomic Power station site)
- 55 MWe Small Modular Reactor (proposed at Tarapur Atomic Power station site)
- Up to 5 MWth High temperature gas cooled reactor meant for hydrogen generation.

3. (d)

**Context:** In a significant breakthrough that can have profound implications for digital and online security, an Indian research group has developed new quantum techniques to generate and certify truly random numbers.

**True Random Numbers (TRNs):** These are numbers generated from inherently random physical processes (like quantum phenomena), not by algorithms. Hence, they are completely **unpredictable and cannot be reproduced.**

**Option (d) is correct:** Truly random numbers are **critical for encryption systems** as they form the basis of secure keys. Since they are completely unpredictable, they **significantly enhance digital security and make systems resistant to hacking.**

**Additional information:**

- Modern systems mostly use **pseudorandom numbers** (algorithm-based), which may become vulnerable with advances in quantum computing.

4. (c)

Biomanufacturing is defined as the use of biological systems, including microorganisms, cells, enzymes,

plants, or animal tissues, to produce commercially important products like medicines, chemicals, and materials.

**Statement I is correct:** Vaccines are produced using biological systems such as weakened/ inactivated pathogens or recombinant DNA technology.

**Statement II is correct:** Industrial enzymes, widely used in food processing and detergents, are produced by feeding specific nutrients to engineered microbes in bioreactors.

**Statement III is correct:** Biofuels, such as bioethanol, are created through the biological fermentation of plant sugars by microorganisms like yeast and algae.

**Statement IV is correct:** Biodegradable plastics (bioplastics) are produced by certain bacteria that naturally synthesize and store plastic-like polymers as energy reserves.

**Statement V is correct:** Antibiotics (e.g., penicillin) are produced using microorganisms through fermentation.

**Additional information:**

- **BioE3 Policy Framework:** The Union Cabinet recently approved the BioE3 (Biotechnology for Economy, Environment, and Employment) Policy to industrialize biology and scale up biomanufacturing in India.
- **Advanced Infrastructure:** To foster high-performance biomanufacturing, the government is rolling out a network of "Mulankur" enablers. This includes establishing national Biofoundries, Biomanufacturing Hubs, and Bio-AI centers to accelerate the scale-up from lab to market.

5. (a)

**Circadian Rhythm and Melatonin:** The circadian rhythm is the human body's internal 24-hour clock that regulates various physiological processes, most notably the sleep-wake cycle. Melatonin is a naturally occurring hormone produced by the brain that signals the body it is time to rest. Its secretion is intrinsically tied to light exposure; it rises after sunset and drops in the morning.

**Option (a) is the correct answer:** The short-wavelength blue light emitted by digital screens closely mimics daylight. When viewed in the evening, this light tricks the brain into staying alert by actively suppressing and delaying the natural production of melatonin. A 'blue light filter' mitigates this by shifting the display's color profile to warmer, reddish tones. By reducing blue light exposure, the filter prevents the suppression of melatonin secretion, thereby allowing the body to maintain its natural circadian rhythm and transition into sleep.

6. (a)

The given paragraph describes Amoghavarsha I

- Amoghavarsha I (814-878 CE) was one of the greatest of Rashtrakuta monarchs.
- Despite frequent wars with neighbouring kingdoms, including those of the dynasties we surveyed above, he managed to ensure peace and prosperity in his empire — and stability, since his reign lasted for 64 years!
- Amoghavarsha I, took on the title 'Nripatunga' or 'peak of kings'. He also took the following titles: Atishayadhavala, Maharaja-shanda, and Vira-Narayana
- Amoghavarsha Nripatunga is sometimes called a 'Jain king' as he was strongly drawn to Jainism; however, he also patronised Hindu temples. He was not only an author himself but also a patron of authors. Jinasena, the author of Adipurana, was among the Jaina preceptors of Amoghavarsha I.
- He was a fine poet too, who composed works in Sanskrit and Kannada. He wrote the Kavirajamarga, the earliest extant literary work in Kannada, and Prashnottara Ratnamalika, a religious work in Sanskrit.

7. (a)

**Statement I is correct:** Following Lord Mountbatten's departure in 1948, C. Rajagopalachari (Rajaji) served as the Governor-General of India. He holds the unique distinction of being the first and only Indian to ever hold the office before the position was permanently abolished when India became a republic in 1950.

**Statement II is correct:** Rajaji formed the Swatantra Party in 1959 which actively campaigned for a market economy. Swatantra Party, according to Rajaji, was less of a political party and more of a movement. He was convinced that various controls affected the nation adversely. As the Chief Minister of Madras State, one of his first acts was to decontrol the distribution of foodgrains and their prices.

**Statement III is incorrect:** J.B. Kripalani was the President of the Indian National Congress during the time of India's independence in 1947. Following independence, Pattabhi Sitaramayya became the first elected President of the Congress in 1948.

**Additional information:** More about C. Rajagopalachari:

- In 1916, he joined Annie Besant's Home Rule League and organised a unit in Salem.
- He was nominated as the Chairman of the Salem Municipality in 1917.
- C Rajagopalachari was among Mahatma Gandhi's closest associates. One of the earliest movements he supported was the Rowlatt Satyagraha in 1919.
  - ◆ Yet, during the Quit India Movement in 1942, he publicly disagreed with Gandhi. "There is no reality," CR declared, "in the fond expectation that Britain will leave the country in response to a Congress slogan."
  - ◆ In April 1930, he led the Salt Satyagraha in the South, marching from Trichy to Vedaranyam on the Tanjore seaboard.
  - ◆ In 1937, Rajagopalachari assumed the office of the Prime Minister of the then Madras Province.
  - ◆ After Independence, Rajagopalachari was appointed the Governor of West Bengal.
  - ◆ After the death of Sardar Patel in December 1950, Rajagopalachari was appointed the Home Minister.
  - ◆ He was the first recipient of India's highest civilian award, the Bharat Ratna, in 1954.

8. (c)

**Option (c) is the correct answer:** The correct north-to-south arrangement of the given sites is Shortugai, Harappa, Mohenjo-daro, and Surkotada.

- **Shortugai (III):** This is the northernmost site of the IVC, located in the Takhar Province of northern Afghanistan.
- **Harappa (IV):** Moving south, Harappa is situated in the Punjab province of present-day Pakistan, historically located along the old course of the Ravi River.
- **Mohenjo-daro (I):** Further south lies Mohenjodaro, located in the Sindh province of Pakistan, situated near the banks of the Indus River.
- **Surkotada (II):** The southernmost site among the given options is Surkotada, located in the Kutch district of Gujarat, India.

9. (c)

**Statement I is correct:** Article 215 of the Constitution declares every High Court to be a court of record, inherently vesting it with all the powers of such a court, including the constitutional power to punish for contempt of itself. (Similarly, Article 129 grants this power to the Supreme Court).

**Statement II is correct:** Under Article 19(2) of the Constitution, the State is explicitly empowered to impose reasonable restrictions on the fundamental right to freedom of speech and expression [Article 19(1)(a)] in relation to the contempt of court.

**Statement III is correct:** Under Section 15 of the Contempt of Courts Act, 1971, if a private citizen wishes to initiate a motion for criminal contempt in the Supreme Court, they must mandatorily obtain the prior written consent of the Attorney General or the Solicitor General. This acts as a necessary filter to save judicial time from frivolous petitions.

**Statement IV is incorrect:** Wilful disobedience to any judgment, decree, direction, order, writ, or other process of a court is specifically defined as **Civil Contempt** under Section 2(b) of the Act, not criminal contempt.

10. (a)

**Statement I is incorrect:** Under Article 25(1), the freedom of conscience and the right to freely profess, practice, and propagate religion are guaranteed to **all persons**. This constitutional right is available to both Indian citizens and non-citizens (foreigners) residing within the territory.

**Statement II is incorrect:** Article 26 grants the right to establish and maintain institutions for religious and charitable purposes, and to own and acquire property, to **every religious denomination** or any section thereof. It is a universal right for all religious denominations, not a special provision restricted only to minority groups.

**Statement III is correct:** Article 25(2)(a) explicitly empowers the State to make laws regulating or restricting any economic, financial, political, or other secular activity which may be associated with religious practice.

11. (b)

**Demands for Grants and Appropriation Bill:**

Under the Indian constitutional framework, no money can be withdrawn from the Consolidated Fund of India without explicit legal authorization. A Demand for Grant is the government's formal proposal to the Lok Sabha for allocating funds to specific ministries. Once these grants are voted upon and approved, the Appropriation Bill is introduced to give the government the legal authority to actually withdraw those approved funds from the Consolidated Fund.

**Statement I is incorrect:** While Demands for Grants do contain the estimates of expenditure to be met from the Consolidated Fund of India, the Appropriation Bill does *not* deal with taxation. It strictly authorizes expenditure. The legislative proposals relating to the levy, abolition, or alteration of taxes are contained exclusively within the **Finance Bill**.

**Statement II is correct:** According to Article 114 of the Constitution, the Appropriation Bill can be introduced in the Lok Sabha *only after* all the Demands for Grants under Article 113 have been discussed and successfully voted upon by the House. It consolidates all the voted grants and the expenditure charged directly on the Consolidated Fund into a single legal instrument.

12. (b)

**Option (b) is the correct answer:** Both the Prime Minister and the Chief Ministers are members in only two of the given bodies: the Inter-State Council and the Governing Council of NITI Aayog.

**Body I includes both:** The **Inter-State Council** is a constitutional body established under Article 263. It is chaired by the Prime Minister, and its members include the Chief Ministers of all States and Union Territories with legislative assemblies.

**Body II does not include both:** The **Zonal Councils** are statutory bodies established under the States Reorganisation Act, 1956. They are chaired by the Union Home Minister. While the Chief Ministers of the respective zones serve as members (acting as Vice-Chairman by rotation), the Prime Minister is not included.

**Body III does not include both:** The **North Eastern Council** is a statutory advisory body chaired by the Union Home Minister. Its members include the Governors and Chief Ministers of the eight North Eastern states, but not the Prime Minister.

**Body IV does not include both:** The **GST Council** is a constitutional body (Article 279A) tasked with making recommendations on GST rates and policies. It is chaired by the Union Finance Minister. Its members are the State Finance or Taxation Ministers, excluding both the Prime Minister and Chief Ministers (unless a Chief Minister holds the state finance portfolio).

**Body V includes both:** The **Governing Council of NITI Aayog** is the premier policy-making body of the think tank. It is chaired by the Prime Minister and its members directly include the Chief Ministers of all States and Union Territories with legislatures.

13. (c)

**Protection of Children from Sexual Offences (POCSO) Act, 2012:** The POCSO Act is a comprehensive, gender-neutral legislation enacted to protect children from offences of sexual assault, sexual harassment, and pornography, while establishing a child-friendly judicial process.

**Statement I is correct:** Section 2(1)(d) of the Act unambiguously defines a “child” as any person below the age of eighteen years, ensuring uniform protection across the country.

**Statement II is correct:** Section 19 imposes a strict legal duty on any person, including institutions, who has knowledge or apprehension of an offence under the Act, to report it to the Special Juvenile Police Unit or the local police. Failure to report is a punishable offence under Section 21.

**Statement III is correct:** The Act establishes the age of legal consent at 18 years. Consequently, any sexual activity with a minor is a criminal offence, and the minor’s consent is legally invalid and immaterial to the prosecution.

Additional information:

- **Supreme Court on “Romeo-Juliet” Cases (Jan 2026):** In the recent *State of UP v. Anurudh* case, the Supreme Court formally acknowledged that the POCSO Act is frequently weaponized by disapproving families to criminalize consensual adolescent relationships. The Court urged the Union Government to consider introducing a “Romeo-Juliet clause” (or close-in-age exemption) to protect genuine consensual relationships between adolescents from criminal action.

14. (a)

**Adversarial Legal System:** An adversarial legal system is a procedural framework inherited from English common law where two opposing parties advocate their respective cases, evidence, and arguments before an impartial judge or jury.

**Statement I is correct:** In an adversarial system, the judge acts as a neutral arbiter or umpire. Their primary role is to ensure that the rules of procedure and evidence are strictly followed, listening passively to both sides before pronouncing a judgment based on the presented facts.

**Statement II is incorrect:** The practice of the court independently investigating facts to determine the truth is the defining feature of an **inquisitorial system** (followed in civil law countries like France or Germany). In India’s adversarial setup, the burden of investigating crimes and gathering evidence lies squarely on the police, the prosecution, and the contesting parties.

15. (d)

**Statement I is correct:** Under the Rules of Procedure of Lok Sabha, the Speaker nominates a Panel of Chairpersons (maximum 10 members). Any one of them can preside over the House when both the Speaker and the Deputy Speaker are absent.

**Statement II is correct:** According to Article 112 of the Constitution, the salaries and allowances of the Speaker and Deputy Speaker are charged upon the Consolidated Fund of India, making them non-votable by Parliament to ensure independence.

**Statement III is correct:** Article 94(c) states the Speaker can be removed by a resolution passed by a majority of all the then members of the House (effective majority). However, the Constitution does not mention any specific grounds for this removal.

**Statement IV is correct:** While notices for removal resolutions have been moved in the past (the first being against G.V. Mavalankar in 1954), none have ever been successfully passed. Consequently, no Speaker has been removed from office.

16. (c)

**Statement I is correct:** The first formal unit of the Arya Samaj was established by Swami Dayanand Saraswati in Bombay on April 10, 1875. The headquarters was later relocated to Lahore in 1877, which became the epicentre of the movement.

**Statement II is correct:** The movement actively championed progressive social reforms. It heavily promoted women's education, widow remarriage, and inter-caste marriages to dismantle the rigid orthodoxies and caste hierarchies of the 19th century.

**Statement III is incorrect:** Swami Dayanand Saraswati passed away in 1883. He did not found the DAV College himself. The Dayanand Anglo-Vedic (DAV) Trust and Management Society was established later in 1886 by his devoted followers, including Mahatma Hansraj and Lala Lajpat Rai, as a memorial to carry forward his educational vision.

**Statement IV is correct:** In 1893, the Arya Samaj experienced a major ideological split. The 'College

Party' (led by Lala Lajpat Rai and Mahatma Hansraj) favoured English education alongside Vedic studies and was relatively tolerant of meat-eating. The opposing 'Gurukul or Mahatma Party' (led by Swami Shradhanand and Pandit Lakh Ram) advocated for strict vegetarianism and a traditional Vedic education system imparted in Hindi and Sanskrit.

17. (a)

The twelfth century witnessed the emergence of a new movement in Karnataka, led by a Brahmana named Basavanna (1106-68) who was a minister in the court of a Kalachuri ruler. His followers were known as Virashaivas (heroes of Shiva) or Lingayats (wearers of the linga).

**Statement I is correct, but Statement II is not correct:** One of the most important steps taken by Basavanna to popularise this movement was the establishment of the Anubhava Mandapa (Hall of Discussion of Experience) at Kalyana. Members drawn from various social and economic backgrounds met here and discussed many things, mainly the various aspects of Veerashaivism. The discussion was carried on under the guidance of leaders and conducted in Kannada, the local language of the people. The ideological format of Veerashaivism was drawn from these discussions held at the Anubhava Mandapa.

**Additional information:** 'Anubhav Mandapam' of Bhagwan Basaveshwara is the inspiration behind the name 'Bharat Mandapam'.

18. (a)

**Pair I is correctly matched:** Rig Veda gives the northwest region of the Subcontinent the name 'Sapta Sindhava', that is, the 'land of the seven rivers'. The word 'Sindhava' comes from 'Sindhu', which refers to the Indus River, or at times to a river in general

**Pair II is correctly matched:** The Mahābhārata uses the terms 'Bhāratavarṣa' and 'Jambudvīpa', and scholars generally agree that this long poem was written from a few centuries BCE onward.

- The first term, 'Bhāratavarṣa', clearly extends to the entire Subcontinent, and the text includes

the names of numerous rivers and peoples. 'Bhāratavarṣha' means 'the country of the Bharatas'. 'Bharata' is a name that first appears in the R̥ig Veda, where it refers to one of the main Vedic groups of people. In later literature, several kings named 'Bharata' are mentioned.

- The second term, 'Jambudvīpa', means 'the island of the fruit of the jamun tree'. This is indeed a common tree native to India, also called 'jambul tree', 'Malabar plum tree', etc. 'Jambudvīpa' came to mean the Indian Subcontinent

**Pairs III and IV is not correctly matched:**

- The first foreigners to mention India were the Persians, the ancient inhabitants of Iran. Persians referred to India as 'Hind', 'Hidu' or 'Hindu', which are adaptations in their language of 'Sindhu'.
- Based on these Persian sources, the ancient Greeks named the region 'Indoi' or 'Indike'. They dropped the initial letter 'h' of 'Hindu' because this letter did not exist in their Greek language.

**Additional information:**

- The ancient Chinese also interacted with India. In several texts, they refer to India as 'Yintu' or 'Yindu'.
- Another Chinese word, also derived from 'Sindhu', was 'Tianzhu'; but this word could also be understood as 'heavenly master'. This reflects the respect the ancient Chinese had for India as the land of the Buddha.
- The term, 'Hindustān' was first used in a Persian inscription some 1,800 years ago
- Mahabharat lists many regions, such as Kāsh̥mīra (more or less today's Kashmir), Kurukṣhetra (parts of Haryana today), Vanga (parts of Bengal), Prāgjyotiṣha (roughly today's Assam), Kaccha (today's Kutch), Kerala (more or less today's Kerala), and so on.

**19. (a)**

**Shruti Literature:** In Hindu traditions, *Shruti* (meaning "that which is heard") refers to the most authoritative, ancient religious texts comprising the central canon of Hinduism. They are considered *apaurusheya* (not created by humans) and represent

direct divine revelations transmitted strictly through an oral tradition from teacher to disciple.

**Option (a) is the correct answer:** Statements I, II, and III belong to Shruti literature, while Statement IV belongs to Smriti literature.

**Statement I is correct:** The Vedas (Rig, Yajur, Sama, and Atharva) form the foundational core of Shruti literature, containing divine hymns and ritualistic formulas.

**Statement II is correct:** The Upanishads, forming the concluding philosophical part of the Vedas (often called Vedanta), explore the metaphysical concepts of the soul and the ultimate reality, and are an integral component of the Shruti canon.

**Statement III is correct:** The Brahmanas, which serve as detailed prose commentaries on the Vedic hymns to explain the mechanics of sacrificial rituals, are formally classified under Shruti.

**Statement IV is incorrect:** The Puranas belong to the *Smriti* ("that which is remembered") tradition.

**20. (c)**

**Chamber of Princes (Narendra Mandal):** Instituted in 1920 by a Royal Proclamation of King Emperor George V following the Montagu-Chelmsford Reforms, this was a formal assembly representing the rulers of the semi-autonomous princely states of India.

**Option (c) is the correct answer:** The Chamber of Princes was created as an advisory and consultative forum. It provided a platform for the princes to debate and voice their collective concerns on matters of common imperial interest directly to the British Viceroy. It did not possess any executive or legislative authority over the internal affairs of individual states or British India.

**21. (a)**

**Statement 1 is not correct :** The Indian army was carefully reorganised after 1858, most of all to prevent the recurrence of another revolt. Domination of the army by its European branch was guaranteed. The crucial branches of the army like artillery, tanks and armored corps were put exclusively in European hands. **The older policy**

of excluding Indians from the officer corps was strictly maintained. Till 1914, no Indian could rise higher than the rank of a subedar.

**Statement 2 is not correct:** The organization of the Indian section of the army was based on the policy of ‘balance and counterpoise’ or ‘divide and rule’ so as to prevent its chance of uniting again in an anti-British uprising. **Discrimination on the basis of caste, region and religion was practised in recruitment to the army.** Indian regiments were made up of a mixture of various castes and groups which were so placed as to balance each other. Communal, caste, tribal and regional loyalties were encouraged among the soldiers so that the sentiment of nationalism would not grow among them.

**Statement III is correct:** Through Queen Victoria’s Proclamation of 1858, the Crown formally abandoned Lord Dalhousie’s highly controversial ‘Doctrine of Lapse’. The British explicitly assured native princes that their existing territories would not be annexed and officially recognized their right to adopt heirs, provided the rulers acknowledged the paramountcy of the British Crown.

22. (c)

**Types of Goods:**

- **Final good:** Goods that are meant for final use and will not pass through any more stages of production or transformations is called a final good. They are further divided into **consumption goods** (which directly satisfy human wants) and **capital goods** (durable assets like machinery used by firms for further production).
- **Intermediate goods:** Goods used as raw material or inputs for production of other commodities.

**Pair I is correctly matched:** A computer purchased by a company for its daily office use is a final good because it has crossed the production boundary. Since it is a durable asset that helps facilitate business operations and generate future revenue over several years, it is classified as a final capital good.

**Pair II is not correctly matched:** Sugar purchased by a bakery is not a final consumption good. It acts

as a raw material that will be completely used up and transformed in the process of baking cakes or bread. Therefore, it is an intermediate good.

**Pair III is correctly matched:** Steel purchased by an automobile manufacturer is an **intermediate good**, as it is used to produce cars.

**Pair IV is correctly matched:** A car purchased by a family for personal transport has reached its ultimate consumer and will not be used as an input for commercial production. It directly satisfies the consumer’s wants, making it a final consumption good (specifically, a consumer durable).

23. (c)

**Coking Coal:** Also known as metallurgical coal, coking coal is characterized by its low ash content, low moisture, and high swelling index. When heated in the absence of oxygen, it forms ‘coke’, a porous, carbon-rich material that acts as a primary fuel and reducing agent essential for smelting iron ore in blast furnaces.

**Statement I is incorrect:** The primary usage of coking coal is in the metallurgical industry, specifically for manufacturing steel. It is **non-coking coal** (often called thermal coal) that is primarily used in thermal power plants for electricity generation.

**Statement II is incorrect:** While India is the second-largest producer of coal overall, it is heavily deficient in the domestic production of high-quality coking coal. China and Australia are the leading global producers. Due to high ash content in domestic reserves, India meets approximately 95% of its steel sector’s coking coal requirements through imports.

**Statement III is correct:** Recognizing its strategic role in national mineral security and the heavy reliance on imports, the Government of India formally notified Coking Coal as a Critical and Strategic Mineral under the Mines and Minerals (Development and Regulation) Act, 1957. . This status exempts its mining from public consultation requirements and permits the utilization of degraded forest land for compensatory afforestation to accelerate private exploration.

24. (c)

**RBI Integrated Ombudsman Scheme:** Launched under the “One Nation One Ombudsman” approach, this scheme integrates the erstwhile grievance mechanisms (for banks, NBFCs, and digital transactions) into a single, centralized, and jurisdiction-neutral platform to protect consumers in the financial sector.

**Statement I is correct:** The scheme provides a completely cost-free, apex-level grievance redressal mechanism. Customers can file complaints regarding any deficiency in services rendered by RBI-regulated entities—including all commercial banks, NBFCs, Payment System Participants, most Primary (Urban) Cooperative Banks, and Credit Information Companies.—if their issue is not resolved by the entity within 30 days.

**Statement II is correct:** An RBI Ombudsman (along with a Deputy Ombudsman) is a senior official appointed directly by the Reserve Bank of India.

**Additional information:**

- **Revised Scheme (2026):** In January 2026, the RBI issued a revised Integrated Ombudsman Scheme, which will come into effect on July 1, 2026. The updated framework enhances consumer protection by allowing the Ombudsman to award compensation up to ₹30 lakh for consequential losses, and an additional ₹3 lakh for harassment or mental anguish caused by the financial entity.

25. (c)

**Futures derivatives:** A futures contract is a standardized, legally binding agreement traded on an exchange to buy or sell a specific underlying asset (such as commodities, currencies, or market indices) at a predetermined price at a specified time in the future.

**Statement-I is correct:** Futures derivatives are utilized by corporations, agricultural producers, and institutional investors for hedging. This strategy effectively mitigates the severe financial risks associated with sudden, adverse price fluctuations in volatile markets.

**Statement-II is correct and correctly explains**

**Statement I:** The primary mechanism by which a futures contract manages risk is by allowing the involved parties to firmly lock in a specific price today for a future transaction. This guaranteed future price neutralizes the uncertainty of interim market volatility.

**Statement-III is incorrect:** A futures contract imposes a strict legal obligation on both the buyer and the seller to execute the transaction on the expiration date, regardless of the prevailing spot market price. The flexibility of having the “right but not the obligation” to execute a trade is the defining characteristic of an **Options** contract, not a futures contract.

26. (c)

**Capital Gains:** In the Indian taxation system, a capital gain refers to any profit or yield that arises from the sale or transfer of a ‘capital asset’ (such as real estate, gold, stocks, or mutual funds). This profit is classified as a distinct category of income and is strictly taxed under the head ‘Capital Gains’ in the financial year the asset is transferred.

**Option (III) is the correct answer:** Statements II and III represent capital gains, while Statements I and IV fall under different income taxation heads.

**Statement I is incorrect:** Dividend received from holding shares in a company is treated as regular income. It is taxed under the specific head “Income from Other Sources” at the applicable individual slab rate, not as a capital gain.

**Statement II is correct:** Gold jewellery is legally classified as a capital asset under the Income Tax Act. Therefore, selling it at a price higher than the initial purchase price generates a taxable capital gain.

**Statement III is correct:** Equity shares traded in the stock market are capital assets. The profit realized from selling them above their purchase price directly results in a capital gain (categorized as either short-term or long-term depending on the holding period).

**Statement IV is incorrect:** Regular rent received from a house property is taxed under the distinct

head “Income from House Property.” A capital gain on real estate only arises when the underlying property itself is sold or transferred.

**Additional information:**

- **Union Budget 2024-25 Rationalization:** The Union Budget significantly overhauled the capital gains tax structure to simplify compliance. The Long-Term Capital Gains (LTCG) tax rate on all financial and non-financial assets was rationalized to a uniform 12.5% (without indexation), while Short-Term Capital Gains (STCG) on specified financial assets was increased from 15% to 20%.

27. (d)

**Most Favoured Nation (MFN):** Under the World Trade Organization (WTO) framework, the MFN principle (Article I of GATT) requires a country to provide any concession, privilege, or immunity granted to one nation to all other WTO member countries. Despite its name suggesting special treatment, MFN essentially ensures non-discrimination among trading partners.

**Statement I is incorrect:** The MFN principle dictates equal treatment among all WTO members. However, Free Trade Agreements (FTAs) and Customs Unions are explicit exceptions to the MFN rule under Article XXIV of GATT. Therefore, granting MFN status to a country does not automatically entitle it to the deeper, preferential tariff cuts that India specifically negotiates with its FTA partners.

**Statement II is incorrect:** The requirement to treat imported goods equally with domestically produced goods (such as levying the same internal taxes) is known as the **National Treatment** principle (Article III of GATT). It is a distinct concept from the MFN principle, which only governs discrimination *between* different foreign countries at the border.

**Additional information:**

- **Switzerland Withdraws MFN Status:** Switzerland recently suspended the MFN treatment for India under their 30-year-old Double Taxation Avoidance Agreement (DTAA).

- **India-EU FTA Negotiations:** In the ongoing Free Trade Agreement negotiations, India and the European Union have agreed to activate MFN obligations for a specific number of sectors upon the agreement’s entry into force.

28. (a)

**Statement I is not correct:** India’s largest trading partner is the United States (US). But India is not the largest trading partner of the USA. Countries like Canada, Mexico, and China have higher trade volumes with the USA.

**Statement II is correct:** The USA is one of the few major global economies with which India consistently enjoys a substantial trade surplus. For instance, in 2025, India maintained a significant bilateral goods trade surplus of approximately \$58 billion with the US.

**Statement III is correct:** India’s major exports to the US include engineering goods, electronic goods, gems and jewellery, pharmaceutical products, light crude oil and petroleum, electrical, and others.

**Statement IV is correct:** India’s imports from the US include mineral fuels, mineral oils and products of their distillation (US\$ 14.34 billion); natural or cultured pearls, precious or semiprecious stones, pre.metals, clad with pre.metal and articles (US\$ 5.31 billion), nuclear reactors, boilers, machinery and mechanical appliances (US\$ 4.42 billion), electrical machinery and equipment and parts (US\$ 3.38 billion), etc. in FY25.

29. (a)

**Statement 1 is correct:** The primary function of Carbon Capture, Utilisation, and Storage (CCUS) is to capture carbon dioxide (CO<sub>2</sub>) directly from large, stationary point sources—such as fossil fuel power plants, cement factories, and steel mills—before it can be released into the atmosphere.

**Statement 2 is correct:** Blue hydrogen is produced by reforming natural gas, a process that naturally emits CO<sub>2</sub>. By applying CCUS to capture and store these emissions, the resulting hydrogen is considered “low-carbon” (blue hydrogen), making CCUS a critical bridge technology for developing a broader hydrogen economy.

**Statement 3 is incorrect:** In fact, CCUS is considered vital specifically for **hard-to-abate sectors** (like cement, steel, fertilizers, and heavy transportation). These industries require high-heat processes or have chemical emissions where direct electrification using renewables is currently not technologically or economically feasible.

**Statement 4 is incorrect:** Ocean fertilization is a type of geoengineering approach where nutrients (like iron) are added to oceans to stimulate phytoplankton growth, which can absorb CO<sub>2</sub> through photosynthesis. It is not a CCUS technique. It does not involve direct capture from emission sources like CCUS.

30. (a)

**Option (a) is the correct answer:** Launched in May 2023 at the 8th International Wildland Fire Conference, the Global Fire Management Hub (or “Fire Hub”) is an initiative designed to assist countries in shifting their strategic focus from merely reacting to wildfires to proactively preventing them. The hub was officially established by the Food and Agriculture Organization (FAO) of the United Nations and the United Nations Environment Programme (UNEP).

**Additional information:**

- India’s Resolution at UNEA-7: India successfully moved a landmark resolution titled “Strengthening the Global Management of Wildfires” at the 7th Session of the United Nations Environment Assembly (UNEA-7) in Nairobi. The resolution received widespread global support and officially acknowledged the FAO-UNEP Global Fire Management Hub as a critical mechanism for coordinating international wildfire resilience

31. (a)

**Statement I is correct:** The latitudinal gradient of biodiversity—where species richness is highest at the equator and declines toward the poles—is one of the most fundamental patterns in ecology.

**Statement II is correct and explains Statement I:** Lower latitudes (the tropics) receive more direct solar energy throughout the year. Higher

solar energy leads to higher primary productivity (photosynthesis), which can support a more complex food web and a greater number of species.

**Statement III is correct and explains Statement I:** Tropical regions have remained relatively stable and undisturbed for millions of years, allowing species more “time” to evolve and diversify. In contrast, temperate and polar regions were frequently subjected to glaciations (ice ages) in the past, which wiped out existing species and forced the process of colonization and speciation to restart repeatedly.

32. (b)

The **Convention on the Protection and Use of Transboundary Watercourses and International Lakes** (commonly known as the **UN Water Convention**) was originally adopted in Helsinki in 1992. It serves as a unique legal and intergovernmental framework for the sustainable management of shared water resources.

**Statement 1 is correct:** The Convention is built on three pillars: preventing, controlling, and reducing transboundary impacts; ensuring that transboundary waters are used in a **reasonable and equitable way**; and ensuring their **sustainable management** through cooperation.

**Statement 2 is correct:** It is a **legally binding** international instrument. While it started as a regional agreement for Europe (UNECE), it was amended to allow accession by all UN Member States, becoming a global convention in 2016.

**Statement 3 is incorrect: India is not a party** to the UN Water Convention. India has traditionally preferred bilateral arrangements (such as the Indus Waters Treaty with Pakistan or the Ganges Water Sharing Treaty with Bangladesh) rather than adhering to global multilateral water conventions.

**Additional information:** Recently, Bangladesh officially joined the UN Water Convention (Convention on the Protection and Use of Transboundary Watercourses and International Lakes), becoming the first South Asian nation and 56th globally to do so.

33. (a)

Diatoms are a major group of microalgae and are among the most common types of phytoplankton. They are unique for their cell walls made of transparent, opaline silica, known as a **frustule**.

**Statement 1 is correct:** Diatoms are ubiquitous photosynthetic organisms. They are found in almost every aquatic environment, including oceans (marine), lakes, and rivers (freshwater), and even in moist soils.

**Statement 2 is correct:** Diatoms are powerhouses of the planet's life-support system. They are responsible for approximately **20% to 25% of the total oxygen produced** on Earth annually—a contribution comparable to that of all the world's tropical rainforests combined.

**Statement 3 is incorrect:** Most diatom species are actually **highly sensitive to changes in water quality**. Because different species have specific tolerances for pH, salinity, and nutrient levels, they are widely used by scientists as “bioindicators” to monitor the health and ecological status of water bodies. Heavy pollution often leads to a decline in diatom diversity.

34. (d)

Bhitarkanika, located in the Kendrapara district of Odisha, is India's second-largest mangrove ecosystem after the Sundarbans. It is a unique network of creeks and rivers that creates a perfect sanctuary for the Saltwater Crocodile (*Crocodylus porosus*).

**Option (d) is the correct answer:** The Bhitarkanika mangrove wetland is formed by the deltaic deposits of the Brahmani and Baitarani rivers. The Dhamra River is formed by the confluence of these two major rivers before it empties into the Bay of Bengal. This estuarine environment, where fresh water meets the sea, provides the high salinity and muddy banks essential for saltwater crocodiles to thrive and nest.

35. (a)

While the term “big cats” is often used colloquially for any large feline, biologically it refers primarily to members of the genus *Panthera*.

**Statement 1 is incorrect:** Lions are actually the **only truly social** animals among the big cats. They live in family groups called “prides.” Most other big cats, such as tigers, leopards, and jaguars, are strictly solitary hunters.

**Statement 2 is incorrect:** Snow leopards are among the **smallest** of the big cats. The **Tiger (*Panthera tigris*)** is the largest and heaviest of all living cat species, followed by the Lion.

**Statement 3 is correct:** The Cheetah is the fastest land animal.

**Statement 4 is incorrect:** Not all big cats can roar. The ability to roar is linked to a specially adapted larynx and a flexible hyoid bone. This is present in Lions, Tigers, Leopards, and Jaguars. However, the **Snow Leopard cannot roar**; neither can the **Cheetah**, which is famous for its bird-like chirps and purring.

36. (c)

**1, 2, 3 and 5 are correct:** Union Budget 2026–27 announced Dedicated Rare Earth Corridors in Odisha, Kerala, Andhra Pradesh, and Tamil Nadu for mining, processing, research, and manufacturing of Rare Earth Permanent Magnets (REPMs). Maharashtra (4) is not part of the dedicated rare earth corridors.

37. (c)

Northern Sea Route (NSR) is a strategic shipping lane that has gained immense global attention due to the receding Arctic ice, offering a viable alternative to traditional maritime corridors.

**Statement 1 is correct:** Northern Sea Route (NSR): It is a shipping route along the Arctic coast of Russia, connecting the Atlantic Ocean (via Barents Sea) to the Pacific Ocean (via Bering Strait).

**Statement 2 is correct:** The NSR can **significantly reduce travel distance and time** between East Asia and Europe compared to the traditional route via the **Suez Canal**, especially during ice-free months. NSR can reduce shipping distance by up to ~30–40%, lowering fuel costs and transit time.

38. (b)

**Statement I is not correct:** It is **not the first international criminal justice treaty under the**

UN. The UN has earlier conventions like the **UN Convention against Transnational Organized Crime (UNTOC)**.

**Statement II is correct:** A core objective of the treaty is to create a streamlined framework for **international cooperation**. It allows member states to request and share digital evidence, track electronic data across borders, and cooperate in the extradition of suspects involved in cyber offenses.

**Statement III is correct:** As a formal UN Convention, once a country deposits its instrument of **ratification**, the provisions become **legally binding** under international law. This requires the country to align its domestic laws with the treaty’s standards.

**Statement IV is not correct:** It does **not replace the Budapest Convention**. The Budapest Convention (Council of Europe) continues to exist independently; the UN Convention is a **separate global framework**.

39. (b)

**Pair I is correct:** **AIKosh** is a **repository of datasets, models, and tools** aimed at supporting AI innovation and research in India.

**Pair II is correct:** **BharatGen** focuses on developing **India-centric multilingual generative AI models**, aligned with India’s linguistic diversity.

**Pair III is not correct:** **Bharat-VISTAAR**(Virtually Integrated System to Access Agricultural Resources), a multilingual Artificial intelligence (AI) powered tool, has been announced in the Union Budget 2026–27. It is conceived as an integrated and unified Digital Public Infrastructure platform designed to provide farmers with reliable, real-time, and location-specific personalized agricultural advisories while ensuring seamless access to a comprehensive range of allied agricultural and support services.

40. (a)

**Option (a) is the correct answer:** The Anti-Coercion Instrument (ACI), often nicknamed the “Trade Bazooka” by policymakers and the media, is a powerful trade defense tool adopted by the

European Union to protect its member states from economic intimidation by non-EU countries. Its objective is to counter economic pressure from other countries by enabling retaliatory trade measures.

41. (a)

The length of India’s coastline of 7516.6 km has been re-assessed to 11098.81 km by National Hydrographic Office (NHO) in coordination with Survey of India (SoI) as per the latest terms of references provided by National Security Council Secretariat (NSCS).

The correct decreasing order of coastline is 1 – 4 – 3 – 2.

State / UT	Old Coastline (km)	Revised Coastline (km)
Gujarat	1,214.70	2,340.62
Tamil Nadu	906.9	1,068.69
Andhra Pradesh	973.7	1,053.07
Maharashtra	652.6	877.97

42. (a)

**The assertion is correct:** The tropopause (the boundary separating the troposphere from the stratosphere above it) is characterised by nearly constant temperature. It is colder over the equator (around  $-80^{\circ}\text{C}$ ) than over the poles (around  $-50^{\circ}\text{C}$ ).

**The reason is correct:** Intense surface heating at the equator drives vigorous convection (upward movement of warm air), pushing the tropopause much higher, about 16–18 km over the equator versus only about 8 km over the poles.

**Reason explains Assertion** because **temperature decreases with altitude in the troposphere at approximately  $6.5^{\circ}\text{C}$  per km**. A tropopause at greater altitude over the equator is naturally far colder than one occurring at a lower altitude over the poles. Greater altitude directly produces a colder tropopause temperature, **making Reason the correct explanation of Assertion**.

43. (d)

**Statement 1 is correct:** **Heavy rainfall causes intense leaching, which is the downward washing**

of soluble minerals through the soil by percolating rainwater. Lime ( $\text{CaCO}_3$ ), being soluble, is among the first minerals removed. **Humid-region soils are therefore acidic and low in lime content.**

**Statement 2 is correct:** In arid regions, rainfall is insufficient to carry calcium carbonate out of the soil. As water evaporates, capillary action (the upward movement of water through narrow soil pores against gravity) brings dissolved  $\text{CaCO}_3$  to the upper layers, where it deposits and accumulates. **This process is called calcification, and the hardened calcium-rich layers it produces are known as caliche.**

**Statement 3 is correct:** Both laterisation and podzolisation produce iron and aluminium-rich soils in forest regions, but through different processes and in different climatic settings.

- **Laterisation occurs in tropical and subtropical forests** under high temperature and heavy rainfall. Intense chemical weathering leaches silica and soluble bases out of the entire soil profile, leaving iron and aluminium oxides accumulated throughout - giving laterite its characteristic red colour.
- **Podzolisation occurs in cool temperate coniferous forests.** Organic acids from decomposing conifer needles leach iron and aluminium downward from the upper E horizon (eluviation horizon -where minerals are removed) and redeposit them in the lower B horizon (illuviation horizon -where leached materials accumulate), forming a dense reddish-brown spodic layer rich in iron and aluminium sesquioxides.

44. (b)

**Statement 1 is not correct.** La Niña (the cool phase of ENSO - El Niño–Southern Oscillation, the recurring climate pattern driven by sea surface temperature anomalies in the equatorial Pacific) **strengthens the Walker circulation** (the large-scale east–west atmospheric circulation over the equatorial Pacific, driven by the temperature difference between the warm western and cool eastern Pacific). It is El Niño, the warm phase of ENSO, that weakens and disrupts the Walker circulation.

**Statement 2 is correct.** La Niña enhances the temperature contrast between the warm western Pacific and the cool eastern Pacific, which intensifies the Walker circulation and in turn strengthens the trade winds (the persistent east-to-west surface winds across the equatorial Pacific). **Stronger trade winds push more warm water westward, further reinforcing La Niña conditions, a positive feedback cycle.**

**Statement 3 is correct.** La Niña is defined by anomalously cool sea surface temperatures in the central and eastern equatorial Pacific ( $0.5^\circ\text{C}$  or more below the long-term average) and anomalously warm temperatures in the western Pacific. This east–west temperature contrast is the opposite of El Niño conditions.

45. (a)

December 22 is the winter solstice, when the Sun is directly overhead at the Tropic of Capricorn ( $23.5^\circ\text{S}$ ). The Southern Hemisphere is tilted toward the Sun, resulting in longer days progressively southward.

The Equator always receives exactly 12 hours of daylight on every day of the year because it is always bisected symmetrically by the circle of illumination (the boundary dividing the sunlit and dark halves of the Earth), regardless of season.

$15^\circ\text{S}$  lies in the Southern Hemisphere, which is in summer on this date, so it receives more than 12 hours of daylight.

The Tropic of Cancer ( $23.5^\circ\text{N}$ ) is in the Northern Hemisphere, which is tilted away from the Sun on December 22. It receives the shortest days of the year - well under 12 hours.

The Antarctic Circle ( $66.5^\circ\text{S}$ ) experiences the midnight sun on this date that is 24 continuous hours of daylight because the Sun does not set at all at this latitude during the Southern Hemisphere summer solstice.

46. (b)

**Statement 1 is not correct.** The Aravallis, one of the world's oldest fold mountain systems extending approximately 800 km through Rajasthan, Haryana,

and Delhi, are in fact **rich in non-ferrous minerals** (metals other than iron). **The Khetri Copper Belt** in Rajasthan is a major **copper-producing zone** located within the Aravallis, and the Zawar mines near Udaipur are among Asia's largest zinc-lead mining operations. **The range also hosts deposits of mica, feldspar, and marble.**

**Statement 2 is correct.** The Aravalli Green Wall Project is a large-scale ecological restoration initiative **modelled on Africa's Great Green Wall.** It aims to create a **continuous belt of green cover along the Aravalli range to halt the eastward advance of the Thar Desert and combat desertification**, which is the process by which fertile land progressively degrades into desert due to drought, deforestation, or unsustainable land use.

**Statement 3 is correct.** **Mangar Bani, located in the southern Aravalli foothills near Faridabad and Gurugram in Haryana,** is one of the last surviving sacred groves in the Aravalli region. Sacred groves are traditional community-protected forest patches preserved through religious significance and community taboos against tree felling. Mangar Bani shelters indigenous species such as Dhau (*Anogeissus pendula*) in an otherwise heavily degraded landscape.

47. (b)

**Assertion is correct:** Geomagnetic reversals, in which the magnetic north and south poles switch positions, are well documented through paleomagnetism — the study of ancient magnetic signatures preserved in the orientation of iron-bearing minerals in rocks. **The alternating bands of normal and reversed magnetic polarity found in mid-ocean ridge basalts provide clear evidence of numerous reversals throughout geological history.**

**Reason is correct:** The geodynamo mechanism in which electrically **conducting liquid iron flows through the outer core**, driven by Earth's rotation and thermal convection, generating the magnetic field through electromagnetic induction - **correctly explains how the geomagnetic field is produced and sustained.**

**However, Reason does not explain Assertion:** Reason tells us how the field is generated, not why it reverses. **Geomagnetic reversals are believed to result from instabilities and chaotic changes in the convection patterns of liquid iron within the outer core**, causing the dynamo to briefly collapse and re-establish with opposite polarity. This specific reversal mechanism is not addressed in Reason at all.

48. (a)

**Statement I is correct:** In tropical humid climates, limestone dissolves rapidly through chemical reactions, while granite — composed of interlocked quartz, feldspar, and mica — resists most chemical weathering due to its stable crystalline structure.

**Statement II is correct and explains Statement I:** Rainwater absorbs CO<sub>2</sub> from the atmosphere and soil to form carbonic acid (H<sub>2</sub>CO<sub>3</sub>), which reacts with limestone as follows:  $\text{CaCO}_3 + \text{H}_2\text{CO}_3 \rightarrow \text{Ca}(\text{HCO}_3)_2$ . The product, calcium bicarbonate, is soluble and gets carried away in solution. **This process is called carbonation and proceeds most vigorously in warm, humid conditions.** It is precisely limestone's calcium carbonate composition that makes it reactive and far more susceptible to chemical weathering than granite.

49. (a)

**Haifa (Israel)** is Israel's **principal commercial deep-water port**, located on the eastern shore of the Mediterranean Sea.

**Duqm (Oman)** is a rapidly expanding strategic deep-water port on Oman's southeastern coast, directly facing the Arabian Sea. Its strategic importance **lies in its location outside the Strait of Hormuz** (the narrow passage connecting the Persian Gulf to the Arabian Sea), making it **accessible even during potential tensions in the Gulf.**

**Anzali (Iran)**, also called Bandar Anzali, is **Iran's most important port on the Caspian Sea, the world's largest landlocked body of water.** It is a key node on the INSTC (International North-South Transport Corridor), the multimodal freight route linking India, Iran, and Russia.

**Rotterdam (Netherlands)** is located at the **mouth of the Rhine-Meuse-Scheldt delta opening into the North Sea**. It is the largest and busiest port in Europe by cargo throughput and serves as the primary gateway for **goods entering and leaving the European continent**

50. (a)

**Statement I is correct:** Prebiotics are indeed **non-digestible food components** (mostly specialized plant fibers). Because the human body lacks the enzymes to break them down in the stomach or small intestine, they pass through to the lower digestive tract.

**Statement II is incorrect:** Prebiotics do not “kill” harmful bacteria directly. Instead, they act as a **selective food source** for beneficial bacteria (probiotics) already living in your gut.

**Statement III is incorrect:** *Bacillus subtilis* is a **probiotic** (a live beneficial bacterium), not a prebiotic. Common examples of **prebiotics** include inulin, fructooligosaccharides (FOS), and galactooligosaccharides (GOS), found in foods like garlic, onions, bananas, and whole grains.

51. (c)

**Pair I is correct:** Iron Beam is a laser-based air defence system developed by Israel to intercept short-range threats like rockets and drones. It complements the Iron Dome.

Pair II is not correct: Arrow-3 is developed by Israel (with US collaboration), not China. It is designed to intercept ballistic missiles in space (exo-atmospheric interception).

**Pair III is correct:** THAAD (Terminal High Altitude Area Defense) is developed by the USA and intercepts ballistic missiles in the terminal phase.

Pair IV is correct: S-400 is a long-range air defence system developed by Russia, capable of targeting aircraft, drones, and missiles.

52. (b)

**Statement I is correct:** Malaria is caused by **Plasmodium protozoan parasites**. These parasites are transmitted to humans through the bites of

infected female *Anopheles* mosquitoes. The most lethal species in humans is *Plasmodium falciparum*.

**Statement II is incorrect:** The World Health Organization (WHO) has actually recommended **two** malaria vaccines for use. The first was **RTS,S/AS01 (Mosquirix)** in 2021, and the second, more cost-effective **R21/Matrix-M** (developed by the University of Oxford and manufactured by the Serum Institute of India), was recommended in late 2023 and is being rolled out globally as of 2024–2026.

**Statement III is correct:** The Government of India, under the **National Framework for Malaria Elimination (NFME)**, has set a clear goal to eliminate malaria (achieving zero indigenous cases) throughout the country by **2030**. This aligns with the WHO Global Technical Strategy for Malaria.

53. (c)

**Statement I is not correct:** GNSS spoofing does **not merely disrupt signals**. That is the function of **jamming**. Spoofing actually **misleads the receiver with false signals**, causing incorrect positioning.

**Statement II is not correct:** GNSS jamming does **not transmit false signals**. Instead, it transmits **noise or interference** that blocks real signals. Transmitting false signals is the function of **spoofing**

54. (a)

**Option (a) is correct:** Next-Generation Sequencing (NGS) is a modern DNA sequencing technology that allows massively parallel sequencing, meaning many DNA fragments are sequenced at the same time. NGS can sequence **millions of DNA fragments simultaneously**, making it **fast, high-throughput, and cost-effective** compared to older methods like Sanger sequencing.

55. (d)

**Statement I is correct:** Artificial General Intelligence (AGI) is a theoretical form of AI that can perform any intellectual task like a human, including learning, reasoning, and transferring knowledge across domains. AGI is expected to have **general intelligence**, meaning it can **transfer**

**learning across domains** (e.g., learn maths and apply logic in economics).

**Statement II is correct:** Generative AI systems (like large language models, image generators) are designed to **generate new content** using learned patterns.

**Statement II is correct: Generative AI** refers to a specific class of AI models (like Large Language Models or Diffusion Models) that use deep learning to analyze existing data patterns and use that information to **generate new, original content**—whether it be text, images, music, or code.

**Statement III is correct:** Generative AI is a reality today. **AGI, however, remains hypothetical.** While there is significant debate among researchers about how close we are to achieving it, no existing system currently possesses the full autonomous reasoning, consciousness, or generalized problem-solving capabilities required to be classified as AGI.

56. (d)

**Pair I is correct:** A Blood Moon occurs during a total lunar eclipse, when Earth blocks direct sunlight and the Moon appears reddish due to Rayleigh scattering.

**Pair II is correct:** A Supermoon happens when the Full Moon is closest to Earth (perigee), making it appear larger and brighter.

**Pair III is correct:** A Blue Moon refers to the second Full Moon in a single calendar month

57. (c)

**Statement I is correct:** When interest rates rise, people prefer to **invest in interest-bearing assets (like bonds)** rather than hold idle money. Hence, **demand for money falls.**

**Statement II is correct:** If demand for money increases (people want to hold more cash) and **money supply remains constant**, there will be **excess demand for money**, pushing **interest rates upward.**

58. (b)

The **16th Finance Commission (16th FC)**, chaired by Dr. Arvind Panagariya, submitted its report in

late 2025 to cover the award period from **April 1, 2026, to March 31, 2031.**

**Statement I is correct:** The Commission maintained the **Vertical Devolution** (the share of states in the divisible pool of central taxes) at **41%**. This is the same percentage recommended by the 15th Finance Commission (after the adjustment for the creation of the Union Territories of Jammu & Kashmir and Ladakh).

**Statement II is incorrect:** The weight assigned to Demographic Performance has actually been decreased, not increased. The 15th FC assigned it a weight of 12.5%, whereas the 16th FC has reduced this weight to 10%.

**Statement III is correct:** In a major shift toward rewarding economic efficiency and formalization, the 16th FC introduced **“Contribution to Gross Domestic Product (GDP)”** as a new parameter for **Horizontal Devolution**

59. (b)

**Row I is correct:** Export of IT services falls under ‘Invisibles’ in the Current Account. Receiving payment brings foreign exchange into the country, marking an Inflow (Credit).

**Row II is incorrect:** Foreign Institutional Investment (FII) in Indian equities is a Capital Account transaction. However, it brings foreign exchange into India, making it an Inflow, not an Outflow.

**Row III is correct:** Outward Foreign Direct Investment (FDI), like acquiring a plant abroad, falls under the Capital Account. It involves capital moving out of India, constituting an Outflow (Debit).

**Row IV is incorrect:** The principal investment in bonds is a Capital Account transaction. However, the interest paid on those investments is considered factor income. This falls under the Current Account as an Outflow.

60. (d)

The term **“Mother of All Deals”** was widely used by the political leaders to describe the landmark Free Trade Agreement (FTA) finalized between

India and the European Union (EU) in January 2026. The FTA delivers unprecedented market access for more than 99% of India’s export by trade value, while preserving policy space for sensitive sectors and reinforcing India’s developmental priorities.

61. (b)

**Statement I is correct:** The scheme was introduced by the RBI based on the recommendations of the **Gadgil Study Group** and the **Nariman Committee** (1969). The Nariman Committee specifically suggested that each district be “adopted” by a bank to act as a leader in credit expansion.

**Statement II is correct:** Under LBS, a **lead bank is assigned to each district** to coordinate:

Credit planning

Banking expansion

Activities of financial institutions

**Statement III is incorrect:** While the Lead Bank helps in financial inclusion, its primary objective is **credit planning and coordination**, not specifically to “channel government subsidies.”

62. (b)

**Statement I is correct:** The base year is the reference point used to calculate **Real GDP**. By using the prices of a specific base year (constant prices) instead of current prices, economists can determine if the economy is actually producing more or if the GDP is simply increasing due to rising prices (inflation).

**Statement II is incorrect:** A change in the base year is likely to change **both** GDP at market prices and GVA at basic prices. This is because a new base year usually involves updated data sources, new methodology, and a more modern “basket” of goods and services.

**Statement III is correct:** When the base year changes, relative prices and sectoral contributions change, altering the weightage of primary, secondary, and tertiary sectors.

63. (b)

**Goldilocks Economy:** It refers to a situation where the economy is “**just right**”—neither too

hot (high inflation) nor too cold (slow growth). It is characterised by **balanced growth and stable macroeconomic conditions**.

**Option (b) is correct:** A Goldilocks phase involves **moderate economic growth with low and stable inflation**, which is ideal for sustainable expansion.

64. (a)

**Statement 1 is correct:** The **97th Constitutional Amendment Act, 2011**, formally accorded constitutional status and protection to cooperative societies. It added **Part IXB** to the Constitution (Articles 243ZH to 243ZT), which dictates how these societies should be run.

**Statement 2 is correct:** This amendment modified **Article 19(1)(c)** of the Fundamental Rights. It added the words “or co-operative societies” after “unions,” making the right to form them a protected **Fundamental Right**. Additionally, it inserted **Article 43B** in the Directive Principles of State Policy (DPSP), urging the state to promote voluntary formation and autonomous functioning of cooperatives.

**Statement 3 is incorrect:** “Cooperative societies” is a subject under the **State List** (Entry 32 of List II). However, Multi-State Cooperative Societies (those operating in more than one state) fall under the **Union List** (Entry 44 of List I), not the Concurrent List.

65. (c)

**Statement 1 is correct:** Under **Article 176(1)** of the Constitution of India, the Governor is mandated to address the Legislative Assembly (and the Legislative Council, where it exists) at:

- The commencement of the **first session after each general election** to the Legislative Assembly.
- The commencement of the **first session of each year**

**Statement 2 is correct:** Although the address is delivered by the Governor, the **text is prepared by the State Cabinet**. Since the Governor is the constitutional head and acts on the “aid and advice” of the Council of Ministers, the speech reflects the

performance, plans, and policies of the elected government, not the Governor's personal views.

66. (b)

**Article 20 (Protection in respect of conviction for offences):** It provides safeguards against arbitrary punishment and includes protection against **ex post facto laws, double jeopardy, and self-incrimination.**

**Statement I is not correct:** Article 20 prohibits **retrospective operation only of criminal laws** (i.e., no person can be punished for an act that was not an offence at the time of commission). It does **not prohibit retrospective operation of all types of laws** (civil laws can be retrospective).

**Statement II is correct:** The protection against self-incrimination applies to **“testimonial compulsion”**. However, giving **specimen signatures, fingerprints, handwriting samples, etc. is considered physical evidence**, not testimonial in nature. Hence, such compulsion is **not barred under Article 20(3).**

67. (c)

**Statement I is incorrect:** A Bill for altering the name of a State can be introduced in **either House of Parliament** (Lok Sabha or Rajya Sabha). It is not exclusive to the Rajya Sabha.

**Statement II is correct:** Under Article 3, no such Bill can be introduced in Parliament except on the **prior recommendation of the President.**

**Statement III is correct:** Before recommending the Bill, the President **must refer** it to the legislature of the State concerned for expressing its views within a specified period. However, the Parliament is **not bound** by the views of the State Legislature and can proceed even if the State opposes the change.

**Statement IV is correct:** According to **Article 4**, any law made under Article 2 or 3 (like changing a State's name) is **not** to be considered an amendment of the Constitution for the purposes of **Article 368**. This means such a Bill can be passed by a **simple majority** in Parliament, rather than a special majority.

68. (c)

**Ordinary Bill:** These can be introduced in either House of Parliament by any member (Minister or Private Member). They deal with any matter other than financial subjects or constitutional amendments.

**Constitution Amendment Bill:** Under **Article 368**, these bills can be introduced in either the Lok Sabha or the Rajya Sabha. They do not require the prior recommendation of the President and can be introduced by a Private Member.

**Financial Bill (Category II) under Article 117(3):** This is a unique type of bill. Unlike a Money Bill or a Financial Bill (I), it **does not** require the prior recommendation of the President for *introduction*. It only requires the President's recommendation for *consideration*. It can be introduced in **either House** by any member, including a Private Member of the Rajya Sabha.

69. (a)

**Statement I is correct:** The **91st Constitutional Amendment Act, 2003**, inserted **Article 164(1A)**, which sets both limits for the State Council of Ministers (including the Chief Minister):

**Maximum Strength:** It shall not exceed **15%** of the total number of members of the Legislative Assembly of that State.

- **Minimum Strength:** It shall not be less than **12** members.

**Statement II is not correct:** Article 164(1) mandates a Minister in charge of tribal welfare specifically for the states of Chhattisgarh, Jharkhand, Madhya Pradesh, and Odisha. While these states have Fifth Schedule areas, the constitutional mandate for a Tribal Welfare Minister is linked to these four specific named states, not to all states that have Fifth Schedule areas (such as Rajasthan, Gujarat, or Himachal Pradesh).

70. (b)

**Statement I is incorrect:** Under Article 356, the powers of the State Legislature are not exercisable by the President. Instead, the proclamation declares that the powers of the Legislature of the State

shall be exercisable **by or under the authority of Parliament**. The President handles executive powers, while Parliament handles legislative powers.

**Statement II is correct:** Any law made by Parliament (or the President/other specified authority) during President's Rule continues to be in force even after the proclamation has ceased to operate. However, it is **not permanent**. The State Legislature has the power to **repeal, alter, or re-enact** such laws once the state government is restored.

**Statement III is correct:** According to Article 356(1)(a), the President may **assume to himself all or any of the functions** of the Government of the State and all or any of the powers vested in or exercisable by the **Governor** or any body or authority in the State other than the State Legislature.

71. (b)

**I is correct:** Under Article 169, if a State Legislative Assembly passes a resolution by a special majority, Parliament can pass a law to create or abolish the Legislative Council. Critically, Article 169(3) explicitly states that such a law shall not be deemed to be an amendment of the Constitution for the purposes of Article 368, meaning it requires only a Simple Majority in Parliament.

**II is not correct:** The Ninth Schedule was created to protect laws from judicial review. To add a new law to this Schedule, the Constitution itself must be amended under Article 368. This requires a Special Majority (a majority of the total membership of each House and a majority of not less than two-thirds of the members of that House present and voting).

**III is correct:** The Sixth Schedule deals with the administration of Tribal Areas in Assam, Meghalaya, Tripura, and Mizoram. Paragraph 21 of the Schedule states that Parliament may, from time to time, amend any of the provisions of this Schedule. Like Article 169, it specifies that such amendments shall not be deemed to be an amendment under Article 368 and thus only require a Simple Majority.

**IV is not correct:** Unlike the Supreme Court (where Parliament increases the number of judges by law/simple majority), the number of judges in a High Court is determined by the President of India from time to time, based on the workload and arrears of cases. It does not require a Bill to be passed by Parliament at all.

72. (a)

**Paika Rebellion (1817):** It was an early armed uprising against the British in Odisha, involving the **Paikas (traditional warrior militia)** of the Khordha kingdom.

**Statement 1 is correct:** The rebellion took place in the **Khordha region of present-day Odisha** against the policies of the **British East India Company**.

**Statement 2 is correct:** The revolt was led by **Bakshi Jagabandhu**, who was the military chief (Bakshi) and leader of the **Paikas**, the traditional militia of the Khordha rulers.

**Statement 3 is not correct:** The Doctrine of Lapse was introduced by Lord Dalhousie in the late 1840s, three decades after this rebellion. The Paika Rebellion was triggered by immediate economic grievances, specifically the British takeover of their rent-free lands, extortionist land revenue policies, and a steep rise in the price of salt due to a newly imposed British monopoly.

73. (c)

**A-1-II:**

- Anekantavada means **reality has multiple aspects/perspectives**.
- It is a core doctrine of **Jainism**.

**B-2-III:**

- Kshanikavada means **momentariness**—all phenomena exist only for a moment and are constantly changing.
- It is associated with **Buddhism**.

**C-3-I:**

- Dvaitavada (Dualism) holds that **individual soul (Jiva) and supreme being (Brahman) are eternally distinct**.
- It is a school under **Vedanta philosophy** (associated with Madhvacharya).

74. (d)

**Mandalam:** It was the **largest administrative unit**, roughly equivalent to a province.

**Valanadu:** It was a **sub-division of Mandalam**, consisting of several Nadus.

**Nadu:** It was a **smaller unit**, comprising a group of villages and functioning as an important unit of local administration.

Therefore, descending order (largest → smallest):  
Mandalam → Valanadu → Nadu (2 – 3 – 1)

75. (b)

Most of Ashoka's inscriptions refer to him as "**Devanampiya Piyadasi**" (**Beloved of the Gods, He who looks with affection**). His personal name "Ashoka" is rarely mentioned.

**Option (b) is correct:** The **Maski Rock Edict (Karnataka)** is one of the few inscriptions where the name "**Ashoka**" **explicitly appears**, helping historians identify Devanampiya Piyadasi with Ashoka.

76. (b)

**Pair 1 is not correct:** **Konark Sun Temple** was built by **Narasimhadeva I** of the **Eastern Ganga dynasty**, not Anantavarman. (Anantavarman Chodaganga is associated with Jagannath Temple, Puri)

**Pair 2 is not correct:** **Modhera Sun Temple** was built by **King Bhimdev I**, but he belonged to the **Solanki (Chaulukya) dynasty**, not the Gurjara-Pratihara dynasty.

**Pair 3 is correct:** **Martand Sun Temple** was built by **Lalitaditya Muktapida** of the **Karkota dynasty** in Kashmir.

77. (b)

**Statement I is correct:** Biostimulants represent a new class of eco-friendly agricultural inputs. Defined as substances or micro-organisms that stimulate natural plant processes, independent of nutrient content. Their role is to enhance nutrient uptake, boost stress tolerance, improve crop quality, and support resilience under dynamic climate stressors.

**Statement II is incorrect:** This is the key distinction between a fertilizer and a biostimulant. Fertilizers function by **directly supplying** essential nutrients (like Nitrogen, Phosphorus, Potassium). Biostimulants, however, work by **stimulating the plant's own physiological processes** to better absorb the nutrients already present in the soil or to better withstand environmental stresses like drought or salinity.

**Statement III is correct:** To regulate the quality of these products and prevent the sale of "spurious" substances, the Government of India issued the **Fertilizer (Inorganic, Organic or Mixed) (Control) Amendment Order, 2021**. This brought biostimulants under the **Schedule VI of the Fertilizer Control Order (FCO), 1985**, requiring manufacturers to register their products and prove their efficacy.

78. (d)

**Photochemical Smog & Secondary Pollutants:** Photochemical smog forms when **primary pollutants (NO<sub>x</sub> and VOCs)** react in the presence of sunlight to produce **secondary pollutants**.

**Statement 1 is correct:** **Ozone (O<sub>3</sub>)** is a major **secondary pollutant**, formed by reactions between nitrogen oxides and volatile organic compounds under sunlight.

**Statement 2 is correct:** **Peroxyacetyl nitrate (PAN)** is a secondary pollutant formed during photochemical reactions and is a key component of smog.

**Statement 3 is correct:** **Aldehydes** (like formaldehyde) are also produced as **secondary pollutants** in photochemical smog reactions.

79. (a)

India has 18 notified Biosphere Reserves covering approximately 91,425 sq. km, of which 13 are recognized by UNESCO's World Network of Biosphere Reserves (WNBR).

Among the given options, only Nokrek Biosphere Reserve (recognized in 2009) is part of UNESCO's World Network of Biosphere Reserves (WNBR).

The Great Rann of Kutch, Dibru-Saikhowa, and Seshachalam Hills are not included in the WNBR, though they are listed as Indian Biosphere Reserves

80. (b)

**Statement 1 is correct:** The **BBNJ Agreement** (also known as the “High Seas Treaty”) was adopted in 2023 and opened for signature as the third “implementing agreement” under the framework of UNCLOS. It aims to address the conservation and sustainable use of marine biological diversity in areas beyond national jurisdiction (the High Seas).

**Statement 2 is correct:** UNCLOS established the **International Tribunal for the Law of the Sea (ITLOS)**, located in Hamburg, Germany. It is an independent judicial body specifically designed to settle disputes arising from the interpretation and application of the Convention.

**Statement 3 is incorrect:** India is an active **State Party** to UNCLOS. India signed the convention in 1982 and ratified it in 1995. India also recently became one of the first major economies to sign the BBNJ Agreement in late 2024.

**Statement 4 is correct:** Under Article 156 of UNCLOS, all States Parties are *ipso facto* (by that very fact) members of the **International Seabed Authority (ISA)**.

81. (d)

**Winter Migratory Birds to India:** These are birds that migrate from colder regions (Central Asia, Siberia, etc.) to India during winter for **favourable climate and food availability**.

**Statement 1 is correct:** **Bar-headed Goose** migrates from Central Asia and Tibet to India in winter; famous for crossing the **Himalayas**.

**Statement 2 is correct:** **Amur Falcon** holds the record for one of the longest over-water migrations. They breed in Southeastern Siberia and Northern China, stop over in Nagaland and Manipur (India) in massive numbers during October-November, and then fly across the Arabian Sea to Southern Africa.

**Statement 3 is correct:** **Siberian Crane** historically migrated to India (Keoladeo National Park), though now **critically endangered and rarely sighted**.

**Statement 4 is correct:** **Rosy Starling** migrates from Eastern Europe and Central Asia to India during winter.

82. (a)

**Statement I is correct:** The Perform, Achieve and Trade (PAT) scheme is a regulatory instrument under the Bureau of Energy Efficiency (BEE). It assigns Specific Energy Consumption (SEC) reduction targets to energy-intensive industries. Facilities overachieving their targets earn tradable Energy Saving Certificates (ESCerts).

**Statement II is correct:** The Carbon Credit Trading Scheme (CCTS) establishes India’s domestic carbon market. It targets direct decarbonization by issuing tradable Carbon Credit Certificates (CCCs) against verified reductions in greenhouse gas (GHG) emissions.

**Statement III is incorrect:** The PAT scheme does not operate on an absolute cap. It is an intensity-based mechanism. It targets energy efficiency per unit of production. If a plant’s overall production increases, its total energy consumption and absolute emissions can still rise while remaining compliant.

83. (b)

**Dioxins and Furans:** These are highly toxic **Persistent Organic Pollutants (POPs)** that persist in the environment, bioaccumulate in the food chain, and pose serious health risks.

**Statement 1 is correct:** Dioxins and furans are classified as **persistent organic pollutants**, regulated under the **Stockholm Convention** due to their long-lasting and toxic nature.

**Statement 2 is not correct:** They are **not intentionally produced for commercial use** like pesticides. Instead, they are **unintentional by-products** of processes such as waste incineration, industrial activities, and combustion.

**Statement 3 is correct:** They can also be released through **natural processes** like **volcanic eruptions and forest fires**, although anthropogenic sources are more significant.

84. (d)

In a major step toward achieving its Net Zero goals, India recently signed a Memorandum of

Cooperation (MoC) with **Japan** to implement the **Joint Crediting Mechanism (JCM)**. This agreement is structured under **Article 6.2** of the Paris Agreement, which allows for voluntary cooperation between countries to meet their Nationally Determined Contributions (NDCs). The JCM is a system initiated by Japan to facilitate the diffusion of leading low-carbon technologies, products, systems, services, and infrastructure to partner countries.

85. (b)

**Abraham Accords:** These are agreements brokered in 2020 to **normalize diplomatic relations between Israel and certain Arab countries**, marking a significant shift in West Asian geopolitics.

**Statement I is correct:** The Accords aim at **normalization of relations between Israel and Arab nations** such as the UAE, Bahrain, Morocco, and Sudan.

**Statement II is not correct:** The initial agreement involved **Israel, the**

86. (b)

The **Comprehensive Nuclear-Test-Ban Treaty (CTBT)** is a multilateral treaty that aims to ban all nuclear explosions, for both civilian and military purposes, in all environments.

**Statement I is correct:** The CTBT is “comprehensive” because it prohibits **all** nuclear explosions. Unlike the Partial Test Ban Treaty (PTBT) of 1963, which only banned tests in the atmosphere, outer space, and underwater, the CTBT also bans **underground** explosions.

**Statement II is correct:** The treaty establishes the **CTBTO**, headquartered in Vienna. Even though the treaty is not technically “in force,” the CTBTO’s **International Monitoring System (IMS)** is fully operational, using seismic, hydroacoustic, infrasound, and radionuclide technologies to detect any nuclear tests worldwide.

**Statement III is correct:** India is not a signatory to the CTBT.

**Statement IV is incorrect:** Although the treaty was opened for signature in 1996 (nearly 30 years ago), it has **not yet entered into force**. Under

**Article XIV**, the treaty requires ratification by all **44 specific states** listed in Annex 2 (countries that possessed nuclear power or research reactors at the time). Several of these “Annex 2” states, including the **USA, China, Egypt, Iran, and Israel**, have signed but not ratified, while **India, Pakistan, and North Korea** have neither signed nor ratified.

87. (a)

Pair 1 is correct: Natanz is a major nuclear facility located in Iran and has been frequently in news due to nuclear tensions.

Pair 2 is not correct: Bondi Beach is located in Sydney, Australia, not New Zealand.

Pair 3 is not correct: Donbas is a region in eastern Ukraine (partly under Russian control), not Israel.

88. (d)

**Statement I is correct:** The CWC is a comprehensive disarmament treaty. It strictly prohibits the development, production, acquisition, stockpiling, retention, transfer, and use of chemical weapons by States Parties. It also mandates the destruction of existing stockpiles and production facilities.

**Statement II is correct:** The **Organisation for the Prohibition of Chemical Weapons (OPCW)**, based in The Hague, Netherlands, is the implementing body for the CWC. It oversees the global endeavor to permanently eliminate chemical weapons and was awarded the **Nobel Peace Prize in 2013** for its efforts.

**Statement III is correct:** A unique feature of the CWC is the “**Challenge Inspection.**” Any State Party that has concerns about the compliance of another State Party can request the Technical Secretariat of the OPCW to conduct an inspection.

**Statement IV is correct:** In India, the **National Authority Chemical Weapons Convention (NACWC)** was established under the Chemical Weapons Convention Act, 2000. It is an office in the **Cabinet Secretariat**.

89. (b)

Department of Telecommunications (DoT) has developed Financial Fraud Risk Indicator (FRI)

which is a risk-based metric that classifies a mobile number to have been associated with Medium, High, or Very High risk of financial fraud. FRI empowers stakeholders-especially banks, Non-Banking Financial Companies (NBFCs) and Unified Payment Interface (UPI) service providers to prioritize enforcement and take additional customer protection measures in case a mobile number has high risk. FRI is available through Digital Intelligence Platform (DIP) to the stakeholders.

90. (b)

**Statement I is correct:** BhU-Aadhaar assigns a **14-digit alphanumeric unique ID** to every surveyed land parcel in the country. This serves as the “Aadhaar for land,” ensuring that each plot has a distinct identity that cannot be duplicated or falsified.

**Statement II is correct:** It is a flagship initiative of the **Department of Land Resources** (Ministry of Rural Development) under the Digital India Land Records Modernization Programme (DILRMP).

**Statement III is incorrect:** This is the primary purpose of the system. BhU-Aadhaar integrates land parcel data with **ownership details**, land use, and area. By linking this ID with the owner’s Aadhaar, the government aims to provide a clear, undisputed record of title, which helps in reducing land disputes and litigation.

**Statement IV is correct:** The 14-digit ID is not random; it is generated using **geo-coordinates (latitude and longitude)** of the vertices of the land parcel. This is based on the Electronic Commerce Code Management Association (ECCMA) standard and the Open Geospatial Consortium (OGC) standards.

91. (c)

**Unified Pension Scheme (UPS):** Recently approved for central government employees as an option under the National Pension System (NPS), combining **defined contribution + assured pension features**.

**Statement I is not correct:** UPS does **not cover all government employees compulsorily**. It is an **optional scheme** available to central government employees under NPS.

**Statement II is correct:** Both **employee and government contribute** to the pension account (similar to NPS structure).

**Statement III is correct:** The scheme provides an **assured minimum pension after a minimum qualifying service (10 years)**.

**Statement IV is correct:** The assured pension is **indexed to inflation (Dearness Relief)**, ensuring protection against rising prices.

92. (b)

**Sodium-ion vs Lithium-ion Batteries:** Sodium-ion batteries use **sodium (Na)** instead of lithium (Li) as the charge carrier. They are emerging as an alternative due to resource availability and cost considerations.

**Statement I is correct:** Sodium is **much more abundant and widely available** (e.g., in seawater) compared to lithium, making supply more secure.

**Statement II is correct:** Due to abundant raw materials and lower extraction costs, sodium-ion batteries are generally **cheaper than lithium-ion batteries**.

**Statement III is not correct:** Sodium-ion batteries currently have **lower energy density** than lithium-ion batteries, meaning they store less energy for the same weight.

**Statement IV is correct:** Sodium-ion batteries are considered **safer**, as they exhibit **better thermal stability** and lower risk of overheating or fire.

93. (d)

**Statement I is correct:** Trans fats are widely regarded by health organizations (like the WHO) as the most harmful type of fat. They are linked to a significantly increased risk of heart disease, systemic inflammation, and insulin resistance.

**Statement II is incorrect:** Trans fats are actually a type of **unsaturated fat**. They are formed when liquid vegetable oils are chemically altered through **hydrogenation** to become solid at room temperature. This process changes the chemical bond from a natural “cis” configuration to a “trans” configuration.

**Statement III is correct:** Saturated fats (found in butter, red meat, and coconut oil) generally raise

both Low-Density Lipoprotein (LDL, or “bad” cholesterol) and **High-Density Lipoprotein (HDL, or “good” cholesterol)**. While the rise in LDL is a concern, the concurrent rise in HDL is a distinct metabolic characteristic of saturated fats compared to trans fats.

94. (c)

**Israel** has no coastline on the Persian Gulf. **Its only maritime access is through the Mediterranean Sea and the Gulf of Aqaba** (an arm of the Red Sea).

**Jordan** similarly has no access to the Persian Gulf. Its only sea outlet is the Gulf of Aqaba at the port of Aqaba.

**Iran** has the **longest coastline among all littoral states** (countries bordering the Persian Gulf) and **holds vast offshore petroleum and natural gas reserves within the Gulf basin, making it one of the most significant hydrocarbon producers in the region.**

**Iraq** has a short but strategically important coastline at the northwestern tip of the Persian Gulf, centred on the Shatt al-Arab waterway (the confluence of the Tigris and Euphrates rivers). **Its major southern oil fields, including the giant Rumaila field, extend toward the Gulf basin.**

95. (c)

**Sclerophyllous** vegetation (from Greek -skleros meaning hard, phyllon meaning leaf) is the defining vegetation type of Mediterranean-type climates, which are characterised by warm, dry summers and cool, wet winters. Its key adaptations are hard waxy evergreen leaves, thick cuticles, and deep root systems

**Xerophytic is too broad a category**, it describes any drought-adapted plant in desert regions and is not specific to this wet-dry seasonal pattern.

**Epiphytes are plants growing on other plants in humid tropical forests**, which is incompatible with summer drought.

**Boreal vegetation refers to subarctic coniferous forests** where the challenge is extreme frost and cold, not summer drought.

96. (c)

**Statement I is correct.** The northern Indian Ocean is unique among ocean basins in that its current system **completely reverses with the seasons**, driven by the monsoon. During summer, **the powerful Southwest Monsoon Current takes over entirely and suppresses the equatorial counter current.** As a result, **no counter equatorial current exists in the northern Indian Ocean during summer.**

**Statement II is incorrect.** In summer, **the northern Indian Ocean is dominated by southwest monsoon winds**, which blow strongly from the southwest toward the northeast. Northeast trade winds (which blow from the northeast during winter, from November to February) **are completely displaced during summer.**

97. (c)

**Factor 1 does not promote productivity.** Coconut palms require uniformly high temperatures throughout the day and night with minimal diurnal temperature range (the daily difference between maximum and minimum temperatures). Large temperature swings cause physiological stress in the plant and are characteristic of continental interiors, **not the humid coastal conditions that coconuts require.**

**Factor 2 promotes productivity.** **High relative humidity** (the moisture content of air expressed as a percentage of its maximum capacity at that temperature), ideally above 70–80%, reduces water stress and supports vigorous vegetative growth. **Coconut is naturally suited to humid coastal environments.**

**Factor 3 promotes productivity.** Coconut is a heliophytic crop, meaning it requires full direct sunlight for optimal photosynthesis, flowering, and nut development. **Abundant sunshine throughout the year, as found in the tropical coastal belt, is essential for high yields.**

**Factor 4 does not promote productivity.** Coconut requires well-drained soils. **Persistent water stagnation leads to waterlogging, which creates anaerobic** (oxygen-deficient) conditions around roots, causing root rot and significantly **reducing both growth and nut production.**

98. (c)

**Varkala Cliff and Kerala** are correctly matched. Varkala Cliff is a dramatic formation of hardened laterite (iron-rich rock formed by intense tropical weathering) overlooking the Arabian Sea near Thiruvananthapuram in Kerala. It is protected as a National Geological Monument by the Geological Survey of India.

**Tirumala Hills and Tamil Nadu** are incorrectly matched. **The Tirumala Hills are located in Andhra Pradesh, in Tirupati district**, where they form part of the Seshachalam Hills of the Eastern Ghats. They are famous as the site of the Sri Venkateswara Temple at Tirupati.

**St. Mary's Island and Karnataka** are correctly matched. **St. Mary's Island is a small cluster of islands off Malpe beach near Udupi in Karnataka**. It is renowned for its columnar basalt formations -hexagonal rock columns formed by the slow cooling and contraction of volcanic lava, a geological phenomenon called columnar jointing. **It is also a National Geological Monument.**

**Erra Matti Dibbalu and Andhra Pradesh** are correctly matched. **Erra Matti Dibbalu means "red sand dunes" in Telugu**. These are rare ancient stabilised red lateritic sand dunes located near Rajahmundry in East Godavari district of Andhra Pradesh, and they are recognised as a National Geological Monument.

99. (b)

**Statement 1 is not correct.** The principal agents of scattering are **nitrogen and oxygen molecules**, which cause Rayleigh scattering, responsible for the blue colour of the sky and also by **dust and aerosol particles**.

- Water vapour molecules are **extremely small and in their pure gaseous form**, their direct contribution to scattering is minimal. However, **water vapour does scatter indirectly in two ways** - first, by attaching to dust particles to form **hygroscopic nuclei** (composite particles far more effective at scattering than water vapour or dust alone), and second,

by condensing around these nuclei to form cloud droplets and ice crystals, which are among the most powerful scattering agents in the atmosphere.

- So water vapour contributes to scattering, **but only indirectly through hygroscopic nuclei and clouds, not in its pure gaseous form**. This is precisely why it cannot be called the principal agent of scattering. Thus **water vapour is principally an absorbing agent, not a scattering agent**.

**Statement 2 is correct.** Water vapour is the most significant greenhouse gas. It absorbs outgoing longwave terrestrial radiation (infrared heat emitted by the Earth's surface) and re-emits it in all directions, including back toward the surface. This is the core mechanism of the greenhouse effect.

**Statement 3 is correct.** When water vapour condenses into cloud droplets, it releases latent heat, which is the energy originally absorbed during evaporation and stored in the vapour. This released heat fuels convective systems, thunderstorms, and tropical cyclones.

100. (d)

**Statement I is not correct.** Winds blow parallel to isobars (lines of equal atmospheric pressure) only when a condition called geostrophic wind is achieved, **where the Coriolis force** (the apparent deflective force acting on moving air due to Earth's rotation) exactly **balances the pressure gradient force** (the force that drives air from high pressure to low pressure). However, **the Coriolis force is zero at the equator** because it is proportional to the sine of the latitude, and  $\sin 0^\circ$  equals zero. With no Coriolis force to create a balance, **winds at the equator flow directly across isobars toward low pressure, not parallel to them**.

**Statement II is correct.** This accurately defines geostrophic wind, **the idealised wind that results when the Coriolis force and pressure gradient force are in exact balance in the absence of friction**, producing flow along isobars. This condition applies at latitudes away from the equator.

■■■■