ANSWERS & EXPLANATIONS
GENERAL STUDIES (P) TEST – 4156 (2024)

Q 1.D

- In India, there are some regulations and restrictions for establishing industries in certain categories. This is done by making it essential to get an Industrial License before setting up such an industry.
- **Industrial licenses are issued under the Industrial Development and Regulation Act (IDRA), 1951** and are approved by the Secretarial of Industrial Assistance (SIA) on the recommendation of the industrial licensing committee.
- The provisions of the IDRA Act explain that the industries need to obtain a new license for manufacturing the new products. Industries that require industrial licensing for manufacturing in India include:
  - Industries under compulsory licensing,- Industrial undertakings attracting locational restrictions. Note: The licensing provision also applies to the expansion of the existing industrial units
- **Businesses planning to establish industries to produce any of the following items in India must obtain a compulsory license:**
  - **Distillation and brewing of alcoholic drinks**
  - **Electronics and aerospace and defence equipment**
  - **Cigars, cigarettes of tobacco and manufactured tobacco substitutes**
  - **Industrial explosives including detonating fuses, safety fuses, gun powder, nitrocellulose and matches**
  - Hazardous chemicals including products hazardous to human safety and health hydrocyanic acid and its derivatives- Phosgene and its derivatives- Isocyanates and diisocyanates of hydrocarbon not elsewhere specified (example methyl Isocyanate).
- These industries are under compulsory licensing mainly because of environmental, safety, and strategic considerations. Compulsory licensing is regulated by the Ministry of Industrial Development.
- **Hence option (d) is the correct answer.**

Q 2.A

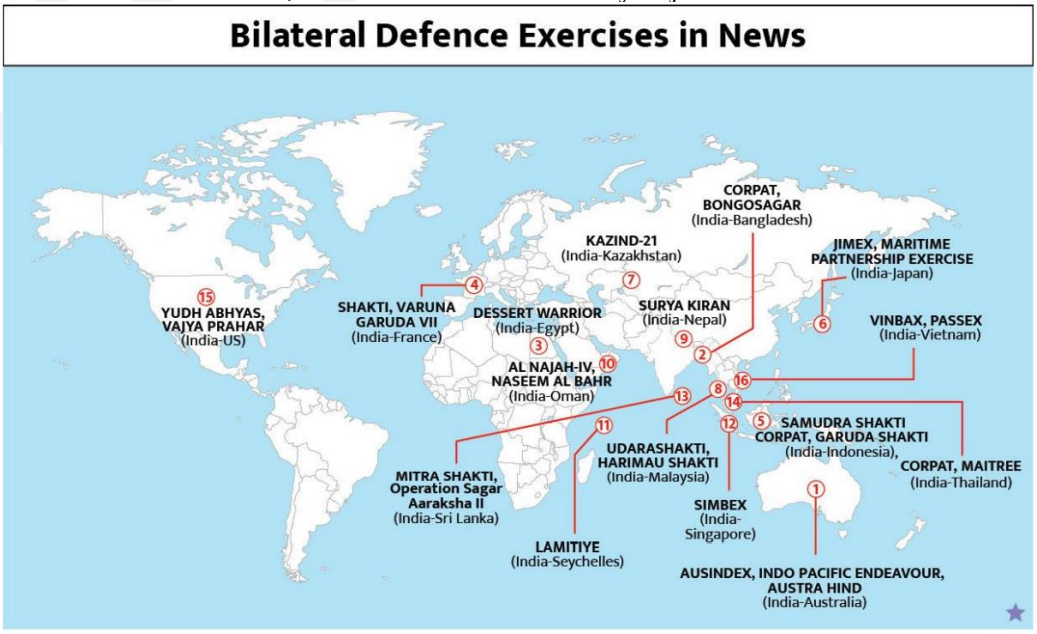
- The Constitution Bench of the Hon'ble Supreme Court of India vide its judgment dated October 17, 2023, in Supriyo @Supriya Chakraborty and Anr v. Union of India has **declined to recognize the right of same-sex couples to marry or have civil unions.** Also, **there is no absolute right to marriage, and same- sex couples cannot assert it as a fundamental right.** The Supreme Court also **unanimously rejected the challenge to provisions of the Special Marriage Act. Hence statements 1 and 2 are not correct.**
- **Implications of the Supreme Court's ruling on same-sex marriage in India:**
  - The ruling means that marriages between persons of the same sex are not legally recognized in India.
  - Same-sex couples cannot access the legal rights and benefits that come with marriage, such as inheritance, property ownership, and adoption.
- **Legal Status of Marriage in India:**
  - **Hindu Marriage Act, 1955:** This law governs marriages between Hindus and sets out specific conditions for a valid marriage, such as age, consent, and the absence of prohibited relationships.
  - **Special Marriage Act, 1954:** This law allows individuals of different religions or castes to marry under a civil ceremony. However, it does not override the restrictions imposed by the Hindu Marriage Act for Hindus.
- **The Special Marriage Act, 1954**
  - **Provides for the solemnization of marriages between persons of different religions, castes, and states. Hence, statement 3 is correct.**
  - It was enacted to address the issue of inter-caste and inter-religious marriages, which were often opposed by conservative societal norms and religious groups.

Q 3.B

- **Clay and Pottery Work:**
- Pottery has been known as the '**Lyric of handicrafts**' as it is molded like poetic compositions and has a sensual appeal to the senses.
- Making objects out of clay has been **one of the earliest crafts begun by humans**.
- The earliest evidence has been found in the **Neolithic site of Mehrgarh**, now situated in Pakistan.
- The remnants show that the art of clay pottery making was highly developed in **6000 BC**. The most famous pottery from the ancient period is the **Painted Grey Ware pottery,** which is typically grey in colour and was related to **Vedic period (1000-600 BC).**
- Another type of ancient pottery was the **Northern Black Polished Ware**, which was made in two phases: first in **700-400 BC** and next during **400-100 BC**.
- These phases partially coincided with the **Mauryan period**. Various Pottery types from different parts of the country:
  - **Khurja Pottery -**Uttar Pradesh - Colourful and sturdy, used to make household items. **Hence pair 2 is not correctly matched.**
  - **Black Pottery - Azamgarh, UP -** Special dark tint.
  - **Blue Pottery - Jaipur -** Made of **Multani Mitti.**
  - **Kagzi Pottery - Alwar,Rajasthan -** Delicate pottery, **thin** and **slightly brittle. Hence pair 1 is correctly matched.**
  - **Pokhran Pottery - Pokhran, Rajasthan - Used for household items**
  - **Dalgate Pottery -Jammu and Kashmir -Uses special glaze.**
  - **Surai - West Bengal - Common jugware. Hence pair 3 is correctly matched.**
  - **Black Pottery - Ukhrul Manipur** - Special black tint in the glaze
  - **Gopichandan - Saurashtra - Art objects made of clay**

Q 4.A

- **Pair 1 is correctly matched: Ekuverin** meaning 'Friends' is a bilateral annual exercise conducted alternatively **in India and Maldives.** The 12th edition of joint military exercise "Ex Ekuverin" between the Indian Army & the Maldives National Defence Force has commenced at Chaubatia, Uttarakhand in June 2023.
- **Pair 2 is not correctly matched: The first edition of India-Mozambique-Tanzania Trilateral Exercise (IMT TRILAT),** a joint maritime exercise among the Indian, Mozambique and Tanzanian navies took place at Dar Es Salaam, Tanzania in October 2022. The second edition of this joint maritime trilateral exercise -- IMT TRILAT is scheduled from March 21-29, 2024.
- **Pair 3 is not correctly matched: Surya Kiran is a joint military exercise between the Indian and Nepalese armies** that takes place annually. The exercise is hosted alternately by each country, and the 17th edition was held in Pithoragarh, Uttarakhand from November 24 to December 7, 2023. The exercise aims to: Improve interoperability in jungle warfare, Counterterrorism operations in mountainous terrain, Humanitarian Assistance and Disaster Relief (HADR) under UN mandate, Strengthen bilateral ties between the two countries, and Achieve shared security objectives.



Q 5.A

- **The Mpemba effect:**
  - The modern term for **hot water freezing faster than cold water is the Mpemba effect,** named after Erasto Mpemba, a Tanzanian teenager who, along with the physicist Denis Osborne, conducted the first systematic, scientific studies of it in the 1960s. **Hence option (a) is the correct answer.**
  - Over the past few years, as the controversy continues about whether the Mpemba effect occurs in water, the phenomenon has been spotted in other substances — crystalline polymers, icelike solids called clathrate hydrates, and manganite minerals cooling in a magnetic field.
  - The effect has been observed in a variety of liquids, including water, ethanol, and glycerine.
  - The Mpemba effect has some potential applications.
  - **For example,** it could be used to speed up the freezing of food or other liquids.

Q 6.B

- All Thermal Power Plants are required to comply with the emission norms as notified by the Ministry of Environment, Forest and Climate Change (MoEF&CC) and directions given by the Central Pollution Control Board (CPCB) from time to time. MoEF&CC through a notification dated 05.09.2022 has specified the following timelines for SO2 compliance for non-retiring Thermal Power Plants for compliance with emission norms:

Sl. No.	Category	Location/Area	Timelines for compliance
1	Category A	Within 10 km radius of National Capital Region (NCR) or cities having million plus population (as per 2011 census of India)	Upto 31st December 2024
2	Category B	Within 10 km radius of Critically Polluted Areas or Non-attainment cities (as defined by CPCB)	Upto 31st December 2025
3	Category C	Other than those included in category A and B	Upto 31st December 2026

- **Hence statement 1 is not correct.**
- For compliance to Sulphur dioxide (SO2) emission norms, Thermal Power Plants are installing Flue Gas Desulphurisation (FGD) equipment. Flue gas desulfurization is the process of removing sulfur compounds from the exhaust emissions of fossil-fueled power stations. This is done through the addition of absorbents, which can remove up to 95% of the sulfur dioxide from the flue gas. Flue gas is the emitted material produced when fossil fuels such as coal, oil, natural gas, or wood are burned for heat or power. **Hence statement 2 is correct.**
- **Hence option (b) is the correct option.**

Q 7.A

- **The judiciary, particularly the Supreme Court and High Courts, play a crucial role in safeguarding and upholding fundamental rights enshrined in the Constitution.** Individuals can approach the courts through writ petitions if they believe their fundamental rights have been violated by any governmental or non-governmental entity. **The courts have the authority to issue writs under Articles 32 and 226 of the Constitution, such as habeas corpus, mandamus, prohibition, certiorari, and quo warranto, to protect these rights and ensure their enforcement.**
- **While the Parliament plays a crucial role in making laws, it does not directly enforce Fundamental Rights.** However, it can pass amendments to the Constitution, including those related to Fundamental Rights, subject to certain conditions.
- **The Executive (which includes bodies like the police, administrative agencies, etc.) is responsible for implementing and enforcing laws made by the Parliament. While they play a role in protecting rights by enforcing laws, they do not directly enforce Fundamental Rights.**
- Constitution: The Constitution of India provides for Fundamental Rights under Articles 12-35. It guarantees these rights to all citizens without discrimination. However, **the Constitution itself does not enforce these rights. It provides the framework for their enforcement, primarily through the courts.**
- **Hence option (a) is the correct answer.**

Q 8.B

- After Australia and New Zealand, India became the third country in the world to have such a system when in 2010 it enforced the then newly enacted National Green Tribunal (NGT) Act.
- **Establishment: The NGT was established on October 18, 2010, under the National Green Tribunal Act. Hence, the NGT is a statutory body. While it draws inspiration from Article 21 of the Indian**

Constitution, which assures the right to a healthy environment, it is not a constitutional body. It was established to handle cases and disputes pertaining to environmental protection, conservation of forests, and other natural resources. **Hence statement 1 is not correct.**

- **Jurisdiction:** The NGT has jurisdiction over matters related to environmental protection and conservation, including cases involving forest conservation, air and water pollution, biodiversity conservation, waste management, and climate change.
- **Composition: The NGT consists of both judicial and expert members.** The tribunal is headed by a Chairperson, who is either a retired Chief Justice of a High Court or a Judge of the Supreme Court of India. It also includes judicial members who are retired judges of High Courts and expert members with expertise in environmental matters.
- The **NGT has the power to hear all civil cases (not criminal) relating to environmental issues and questions that are linked to the implementation of laws listed in Schedule I of the NGT Act. Hence statement 2 is not correct.**
- **Powers: The NGT has been vested with extensive powers to adjudicate environmental disputes and enforce environmental laws.** It has the authority to hear and dispose of cases relating to environmental protection and conservation, issue directions to government authorities and private entities, and award compensation for environmental damage.
- **Hierarchy: The NGT operates as a specialized quasi-judicial body and is not part of the regular court system.** Its decisions can be appealed to the Supreme Court of India.
- **Fast-track Mechanism: One of the key objectives of the NGT is to provide a fast-track mechanism for resolving environmental disputes**. It aims to ensure swift justice in environmental matters and prevent further harm to the environment.
    - The Tribunal is **mandated to make and endeavor for disposal of applications or appeals finally within 6 months of the filing of the same. Hence statement 4 is correct.**
- Initially, the NGT is proposed to be set up at five places of sittings and will follow circuit procedure for making itself more accessible. **New Delhi is the Principal Place of Sitting of the Tribunal and Bhopal, Pune, Kolkata, and Chennai shall be the other four places of sitting of the Tribunal.**
- **While passing Orders/decisions/awards, the NGT will apply the principles of sustainable development, the precautionary principle and the polluter pays principles. Hence statement 3 is correct.**
- However, it must be noted that if the NGT holds that a claim is false, it can impose costs including lost benefits due to any interim injunction.
- **Public Participation: The NGT encourages public participation in environmental decision-making processes.** It allows individuals, non-governmental organizations (NGOs), and other stakeholders to file petitions and participate in hearings related to environmental issues.

Q 9.B

- The 19th century British India witnessed a rise in the number of publications, newspapers (dailies), periodicals, etc. Many newspapers emerged during these years under distinguished and fearless journalists. These included
    - The Hindu and Swadesamitran under G. Subramania Aiyar,
    - Bengalee under Surendranath Banerjee,
    - Voice of India under Dadabhai Naoroji,
    - Amrita Bazar Patrika under Sisir Kumar Ghosh and Motilal Ghosh. Due to the Vernacular Press Act, it converted overnight from Bengali to English. **Hence pair 1 is correctly matched.**
    - East Indian (daily) Henry Vivian Derozio. **Hence pair 2 is not correctly matched.**
    - Indian Mirror under N.N. Sen. **Hence pair 3 is not correctly matched.**
    - Kesari (in Marathi) and Mahratta (in English) under Bal Gangadhar Tilak,
    - Sudharak under Gopal Ganesh Agarkar,
    - Hindustan and Advocate under G.P. Verma.

Q 10.D

- Home Minister Amit Shah said the **1,643 km India-Myanmar border** would soon be fenced. He also said the **Free Movement Regime (FMR) agreement** with Myanmar would be **reconsidered to stop border residents from moving into each other's country without any paperwork.**
- Wary of increasing Chinese influence in Myanmar, New Delhi began working on improving diplomatic ties with the Myanmar government a decade ago. After almost a year's delay, the FMR came about in **2018 as part of the Narendra Modi government's Act East policy.** The Rohingya refugee crisis that began in August 2017 caused the delay. **Hence statement 2 is not correct.**

- The FMR **allows people living on either side of the border to travel up to 16 km inside each other's country without a visa**. **Hence statement 2 is not correct.**
- A **border resident needs to have a border pass, valid for a year,** to stay in the other country for about **two weeks** per visit. **Hence statement 3 is not correct.**

Q 11.B

- **Recent context: The New Development Bank (NDB), the Shanghai-based multilateral bank of the Brics countries, will open its first regional office in India at the Gujarat International Finance Tec-City (GIFT City)** to cater to infrastructure and sustainable development needs of the country. **Hence statement 3 is not correct.**
- At the fourth BRICS Summit in New Delhi (2012), the leaders of Brazil, Russia, India, China and South Africa considered the possibility of setting up a new Development Bank to mobilize resources for infrastructure and sustainable development projects in BRICS and other emerging economies, as well as in developing countries.
  - During the sixth BRICS Summit in Fortaleza (2014), the leaders signed the Agreement establishing the New Development Bank (NDB).
  - In the **Fortaleza Declaration**, the leaders stressed that the NDB will strengthen cooperation among BRICS and will supplement the efforts of multilateral and regional financial institutions for global development, thus contributing to collective commitments for achieving the goal of strong, sustainable and balanced growth. **Hence statement 1 is correct.**
- NDB's work complements the efforts of multilateral and regional financial institutions, toward global growth and development.
  - In 2018, the New Development Bank received observer status in the UN General Assembly, establishing a firm basis for active and fruitful cooperation with the United Nations.
- The Bank's membership is open to members of the United Nations. NDB commenced the admission of its first new member countries in the second half of 2021. **Hence statement 2 is not correct.**
- **The initial subscribed capital of the bank was equally distributed among the founding members (Brazil, Russia, India, People's Republic of China, South Africa).** The Agreement on the NDB specifies that every member will have one vote no one would have any veto powers. **Hence statement 4 is correct.**

Q 12.C

- **The National Human Rights Commission (NHRC) of India is a statutory body established in 1993 under the Protection of Human Rights Act, 1993. Therefore, it does not derive its powers from an executive order but from a legislative enactment. Hence statement II is not correct.**
- Here are a few key details about the NHRC:
  - **Establishment: The NHRC was established based on the recommendations of the United Nations and in accordance with the Paris Principles,** which provide guidelines for the establishment and functioning of national human rights institutions.
  - **Composition: The Commission consists of a Chairperson and four members, including a retired Chief Justice of India as the Chairperson and a sitting or retired judge of the Supreme Court of India or a Chief Justice of a High Court as one of the members. Other members include individuals with knowledge and experience in human rights matters.**
  - **Mandate:** The NHRC's primary mandate is to protect and promote human rights in India. It is empowered to inquire into complaints of human rights violations, investigate incidents of rights abuse, and take suo motu cognizance of human rights violations. **The Commission has jurisdiction over violations committed by public servants as well as violations arising from the actions of non-state actors. Hence statement I is correct.**
  - **Functions:** The NHRC performs various functions to safeguard human rights, including conducting inquiries, visiting jails and detention centers, promoting human rights awareness, and recommending measures for the effective implementation of human rights safeguards.
  - **Powers: The Commission has the powers of a civil court,** such as summoning witnesses, examining witnesses on oath, and compelling the production of documents. It can also recommend compensation or other remedial measures for victims of human rights violations.
  - **Autonomy: While the NHRC is funded by the central government, it functions autonomously and independently.** It submits annual reports to the President of India and presents its findings and recommendations to the Parliament.
- **Hence option (c) is the correct answer.**

Q 13.B

- **The organisms that feed on the dead and decaying organisms are called saprotrophs. These organisms perform external digestion where they break down the complex nutrients in the dead organism by releasing enzymes outside.** The broken down simpler form of nutrients are absorbed by the organism resulting in an absorptive mode of nutrition.
- **Mushrooms:** They are advanced members of a fungi group which belong to class Basidiomycetes. They grow on the dead and decaying matter like dung, old rotten logs which are rich in the organic matter. Therefore, they are saprophytic fungi. **Hence option 1 is correct.**
- **Nematodes:** Most nematodes feed on bacteria, fungi, or other microscopic creatures. As such, they are a major component of soil and sediment ecosystems. A small fraction of all nematode species are parasites of humans, livestock or agricultural crops. **Hence option 2 is correct.**
    - Saprophytic nematodes' feeding habits differ from their parasitic counterparts. These nematodes primarily feed on bacteria, protozoa, fungal spores, and decaying organic matter. They draw in and grind the particles of food they consume.
- **Spirogyra:** It is an autotrophic filamentous chlorophyte green algae. It is named so due to the presence of spirally arranged chloroplasts. When there are enough sunlight and warmth, Spirogyra produces large amounts of oxygen which adhere as bubbles in between the tangled filaments. **Hence option 3 is not correct.**
- **Arthropods:** Arthropods function on two of the three broad levels of organization of the soil food web: they are plant litter transformers or ecosystem engineers. Litter transformers fragment, or comminute, and humidify ingested plant debris, which is deposited in feces for further decomposition by micro-organisms, and foster the growth and dispersal of microbial populations.
- **Cyanobacteria:** The cyanobacteria are commonly called blue-green algae. They are photosynthetic autotrophs that have chlorophyll pigments. **Hence option 4 is not correct.**

Q 14.C

- **Each trophic level has a certain mass of living material at a particular time called as the standing crop.** The standing crop is measured as the mass of living organisms (biomass) or the number in a unit area. The biomass of a species is expressed in terms of fresh or dry weight. **Hence option (c) is the correct answer.**
- The number of trophic levels in the grazing food chain is restricted as the transfer of energy follows 10 per cent law – only 10 per cent of the energy is transferred to each trophic level from the lower trophic level. In nature, it is possible to have so many levels – producer, herbivore, primary carnivore, secondary carnivore in the grazing food chain

Q 15.B

- The revolutionary activity in the northwestern India region was dominated by the Hindustan Republican Association/Army or HRA (later renamed Hindustan Socialist Republican Association or HSRA). **The HRA was founded in October 1924 in Kanpur by Ramprasad Bismil, Jogesh Chandra Chatterjee, and Sachin Sanyal, with an aim to organize an armed revolution to overthrow the colonial government and establish in its place the Federal Republic of United States of India** whose basic principle would be an adult franchise. The most important action of the HRA was the Kakori robbery. Government crackdown after the Kakori robbery led to arrests of many, of whom 17 were jailed, 4 transported for life and 4—Bismil, Ashfaqullah, Roshan Singh, and Rajendra Lahiri—were hanged. Kakori proved to be a setback. **So, option 1 is correct.**
- The HSRA Determined to overcome the Kakori setback, the younger revolutionaries, inspired by socialist ideas, set out to reorganize the Hindustan Republic Association at a historic meeting in the ruins of Ferozshah Kotla in Delhi (September 1928). Under the leadership of Chandrashekhar Azad, the name of HRA was changed to Hindustan Socialist Republican Association (HSRA). The participants included Bhagat Singh, Sukhdev Thapar (who was always known as Sukhdev), Bhagwati Charan Vohra from Punjab and Bejoy Kumar Sinha, Shiv Verma, and Jaidev Kapur from the United Provinces. The HSRA decided to work under a collective leadership and adopted socialism as its official goal. **So, option 3 is incorrect.**
- Surya Sen, also known as Surya Kumar Sen (22 March 1894 – 12 January 1934), was an Indian revolutionary who was influential in the independence movement against British rule in India and is best known for leading the 1930 Chittagong armory raid. Sen was a school teacher by profession and was popularly known as Master Da ("da" is an honorific suffix in Bengali language). **So, option 2 is incorrect.**
- **Hence option (b) is the correct answer.**

Q 16.C

- **A constitutional government is a system of governance where a constitution, often written, serves as the supreme law of the land. The constitution defines the structure of the government, the rights and responsibilities of citizens, and the limits of governmental power.**
- In a constitutional government, the constitution effectively controls the exercise of political power. The essence of constitutionalism is the control of power by its distribution among several state organs or offices in such a way that they are each subjected to reciprocal controls and forced to cooperate in formulating the will of the state.
- Several factors contribute to ensuring accountability in government within a constitutional framework. Here are some of the key factors:
    - **Judicial Review: This refers to the power of the judiciary to review and determine the validity of a law or an order**. It is the power of the courts to consider the constitutionality of acts of government and declare them unconstitutional if they violate or are inconsistent with the basic principles of the Constitution. **This ensures accountability as it checks the actions of the legislative and executive branches of the government**. **Hence option 1 is correct.**
    - **Separation of Powers:** This is a doctrine of constitutional law under which the three branches of government (executive, legislative, and judicial) are kept separate. This is also known as the system of checks and balances, because each branch is given certain powers so as to check and balance the other branches. **This ensures accountability as it prevents the concentration of power in one branch and promotes cooperation and balance among the different branches**. **Hence option 2 is correct.**
    - **Rule of Law:** The rule of law ensures that government actions are subject to legal constraints and are consistent with established laws and constitutional principles. It holds government officials accountable for their actions and prevents arbitrary exercise of power.
    - **Elected Government**: An elected government is directly accountable to the people through periodic elections. **In a democratic system, citizens have the opportunity to hold their elected representatives accountable for their actions and decisions.** The electoral process allows voters to express their preferences and remove incumbents who fail to meet their expectations. As such, an elected government is the most direct and effective mechanism for ensuring government accountability in a constitutional government. **Hence option 4 is correct.**
    - **Transparency and Access to Information:** Transparency in government operations and access to information empower citizens to scrutinize government actions, hold officials accountable for their decisions, and participate effectively in the democratic process. Openness in governance fosters public trust and reduces opportunities for corruption and abuse of power.
    - **Independent Media and Civil Society:** A free and independent media, along with active civil society organizations, play a crucial role in holding government accountable by investigating and reporting on government actions, advocating for transparency and accountability, and representing the interests of citizens.
- **Flexible Constitution:** A flexible constitution is one that can be easily amended or changed through ordinary legislative processes. While flexibility in the constitution can facilitate necessary reforms, it does not directly ensure accountability. **In fact, a constitution that is too flexible may undermine the rule of law and stability, potentially weakening mechanisms for accountability. Hence option 3 is not correct.**

Q 17.B

- The Government of India has accorded its approval for India's participation in the international mega-science project, Square Kilometer Array (SKA), at an estimated cost of ₹ 1250 Cr. This approval covers funding support for the construction phase of the international SKA Observatory (SKAO) spread over the next 7 years. The project will be jointly funded by the Department of Atomic Energy (DAE) and the Department of Science and Technology (DST), with DAE as the lead agency.
- **SKAO is a new intergovernmental organization dedicated to radio astronomy and is headquartered in the UK. At the moment, organizations from ten countries are a part of the SKAO. These include Australia, Canada, China, India, Italy, New Zealand, South Africa, Sweden, the Netherlands and the UK. Hence, statement 2 is correct.**
- SKA is a state-of-the-art, mega-science international facility to build the world's biggest and most sensitive radio telescope for addressing a wide variety of cutting-edge science goals. The SKAO is expected to revolutionize radio astronomy while driving the growth of many important new state-of-the-art technologies. Subsequent to this approval, India will be signing the SKAO treaty to become a full-fledged member of the SKA Observatory and thus join the growing list of countries participating in the project.

- The Square Kilometer Array will not be a single large telescope, but a collection of thousands of dish antennas operating as a single unit. The name, Square Kilometer Array, comes from the original intention to create one square kilometer (one million square metre) of effective area for collecting radio waves. This was meant to be achieved by installing thousands of smaller antennas in a specific array design that would make them function like a single radio telescope. **The antennas, about 200 of them in South Africa and more than 130,000 in Australia are being installed in sparsely populated locations, chosen to ensure they are as far away from human activities as possible. This has been done in order to minimize signal interference from undesirable Earth-based sources. Hence, statement 1 is not correct.**
- Some of the questions that scientists hope to address using this telescope include the beginning of the universe, how and when the first stars were born, the life-cycle of a galaxy, exploring the possibility of detecting technologically-active civilizations elsewhere in our galaxy and understanding where gravitational waves come from. **As per NASA, the telescope will accomplish its scientific goals by measuring neutral hydrogen over cosmic time, accurately timing the signals from pulsars in the Milky Way, and detecting millions of galaxies out to high redshifts. Hence, statement 3 is correct.**

Q 18.B

- **The species that invade a bare area are called pioneer species. Common examples of pioneer species include bacteria, lichen, mosses, and fungi. In the ocean they can be phytoplankton, zooplankton, and algae.**
    - **The two main classes of phytoplankton are dinoflagellates and diatoms. Hence option (b) is the correct answer.**
- In primary succession on rocks these are usually lichens which are able to secrete acids to dissolve rock, helping in weathering and soil formation. These later pave way to some very small plants like bryophytes, which are able to take hold in the small amount of soil. They are, with time, succeeded by higher plants, and after several more stages, ultimately a stable climax forest community is formed. The climax community remains stable as long as the environment remains unchanged. With time the xerophytic habitat gets converted into a mesophytic one.
- In primary succession in water, the pioneers are the small phytoplanktons, which are replaced with time by rooted-submerged plants, rooted-floating angiosperms followed by free-floating plants, then reed-swamp, marsh-meadow, scrub and finally the trees. The climax again would be a forest. With time the water body is converted into land.

Q 19.B

- **Quantitative Easing (QE) is an occasionally used novel form of monetary policy that came into wide application after the financial crisis of 2007–2008. Hence, statement 1 is correct.**
- **(QE) is a form of cheap monetary policy where a central bank infuses a pre-determined quantity of money into the economy by buying financial assets from commercial banks and private entities.** This leads to an increase in banks' reserves. **Hence, statement 2 is not correct.**
- **Central banks usually resort to quantitative easing when their nominal interest rate target approaches or reaches zero. Very low-interest rates induce a liquidity trap,** a situation where people prefer to hold cash or very liquid assets, given the low returns on other financial assets. This makes it difficult for interest rates to go below zero; monetary authorities may then use quantitative easing to further stimulate the economy rather than trying to lower the interest rate further. However, these policies can backfire heavily, leading to very high levels of inflation. In case commercial banks fail to lend excess reserves, it may lead to an unbalance in the money market. **Hence, statement 3 is correct.**
- **Hence, option (b) is the correct answer.**

Q 20.A

- **SONAR, which stands for Sound Navigation and Ranging, is primarily a technology used for detecting and locating objects underwater.** It involves the transmission of sound waves into the water, which then bounce off after striking the objects and return to a receiver. By analyzing the time, it takes for these sound waves to travel and return, SONAR systems can determine the distance, direction, and depth of underwater objects. **SONAR has many applications, including marine navigation, fishing, oceanography, underwater exploration, and military purposes such as submarine detection and mine detection. Hence, statement 1 is correct.**
- **Passive and active sonar are two different techniques used in SONAR technology for detecting and locating objects underwater.** Active SONAR systems emit pulses of sound waves into the water and then listen for the echoes reflected from underwater objects. Passive sonar relies on listening to the sounds produced by underwater objects or sources without actively emitting any sound waves.

- **The acoustic frequencies used in sonar systems vary from very low (infrasonic) to extremely high (ultrasonic). Hence, statement 2 is not correct.**
- **SONAR technology** is primarily associated with underwater applications due to its effectiveness in detecting and locating objects submerged in water. However, it **can also be adapted for use in other environments, including air and solid materials.**
- In the air, SONAR can be utilized for applications such as acoustic imaging and surveillance. For example, airborne SONAR systems can be employed for geological surveys, detecting underground structures, or monitoring atmospheric conditions.
- In solid materials, SONAR technology, often referred to as "ultrasonic testing," is widely used for non-destructive testing (NDT) purposes. **Hence, statement 3 is not correct.**

Q 21.A

- **Thermoregulation is the thermophysiological process responsible for homeostasis,** in which it is responsible for the balance between heat gain and loss through heat exchange with the environment (latent or sensible) to maintain a relatively constant body temperature.
- **Thermoregulation is energetically expensive for many organisms. This is particularly true for small animals like shrews and hummingbirds. Since small animals have a larger surface area relative to their volume, they tend to lose body heat very fast when it is cold outside. Hence both statements I and II are correct.**
- Hence, they must expend much energy to generate body heat (a lot of food energy goes into heat generation) through metabolism. This is the main reason why very small animals are rarely found in polar regions. **Hence option (a) is the correct answer.**

Q 22.C

- **The family 'Orchidaceae' constitutes one of the largest families of flowering plants or angiosperms. They are a highly evolved family, with 600-800 genera and 25,000-35,000 species all over the globe.**
  - **Theophrastus (370-285 BC), known as the 'Father of Botany', gave the name 'Orchids' to these plants,** based on the resemblance of paired underground tubers of the plants to male anatomy (the testes). These plants are perennial herbs with simple leaves.
  - The Botanical Survey of India (BSI) has undertaken a study on 'Orchidaceae', only recently. There are 1,256 species of orchids in India, the BSI estimates.
  - Of the 1,256 species belonging to 155 genera, 388 species are endemic to India. Of the 388 endemic species, about one-third (128) species have been found to be growing in the Western Ghats.
  - **The Himalayas possess the maximum orchid species among the ten bio-geographic zones of India. They are followed by the North East, Western Ghats, Deccan Plateau and Andaman & Nicobar Islands, respectively. Hence statement 3 is correct.**
  - Orchids are classified into three categories, namely epiphytic (plants that grow on another plant and rock boulders), terrestrial (plants that grow on land and climbers) and mycoheterotrophic (plants that derive nutrients from mycorrhizal fungi that are attached to the roots of a vascular or flowing plant).
  - Some 757 orchid species are epiphytic, 447 are terrestrial and 43 are mycoheterotrophic in India.
  - **Till now, only Blue Vanda, Red Vanda and Ladies slipper orchids have been included under Schedule VI of the Wild (Life) Protection Act, 1972, restricting collection from forests. Orchid sanctuaries can also be formed as is the case in Arunachal Pradesh and Sikkim. Arunachal Pradesh, also known as 'Orchid Paradise', is the first to establish the Sessa orchid Sanctuary exclusively for orchids. Assam is the second state that has set up the Deorali Orchid Sanctuary.**
- **Almost one of every four species of flowering plants found in India is endemic to the country,** a recent publication by the Botanical Survey of India (BSI) has revealed. Of these, Tamil Nadu accounts for the highest number of species with 410, followed by Kerala with 357 and Maharashtra with 278. **Hence statement 1 is correct.**
  - Of the 18,259 flowering plants reported in the country, 4,303 (over 23 per cent) are found only in India, as per scientific data in a recently released book, Endemic Vascular Plants of India.
  - When it comes to spices, the endemic species list is no less interesting. This includes 45 species belonging to the common black pepper family, 19 species of ginger and 13 different kinds of large cardamom. There are also 40 species of bamboos (Bambusoideae), which are endemic to India.
  - As far as endemism regarding vascular plants in India is concerned, the publication reveals that of the 19, 635 vascular plants found in the country, 4,381 are endemic. This includes 4,303 angiosperms or flowering plants, 12 gymnosperms - mostly Cycads, and 66 ferns and fern allies which come under the group Pteridophytes.

- **Around 53 per cent of all endemic flowering plants are herbs, 20 per cent are shrubs and 15 per cent are trees. Hence statement 2 is correct.**

- Scientists from India and six other countries have come up with an inventory of 241 plants, which were introduced in south Asian countries and have over the years become Invasive Alien Species (IAS). India tops the list with 185 such plant species

Q 23.D

- Macaulay in his Minutes of 1835 instituted an education policy in support of the British Raj which denigrated Indian languages and knowledge, established the hegemonic influence of English as medium of colonial 'instruction' (not education) in order to "form a class who may be interpreters between us and the millions whom we govern". **Macaulay rejected both the native languages- Arabic and Sanskrit,** as against English, because he considered that English was better than both of them. **Hence statement 1 is not correct.**
- English education was also seen as an important basis for expanding the British market in India by harnessing English values and tastes. So, Macaulay wanted the government **to spend money only on imparting Western education and not on oriental education**. He advocated the shutting down of all colleges where only Eastern philosophy and subjects were taught. **Hence statement 2 is not correct.**
- The Macaulayian system was a systematic effort on the part of the British Government to educate the upper classes of India through the medium of the English language. Education of the masses was not the aim of Macaulay. This Minute gave birth to a new class division — English knowing class and English not knowing class among Indians. **Hence statement 3 is not correct.**

Q 24.C

- **Article 2 of the Constitution of India vests in the Indian Parliament the exclusive power to admit or establish new states** into the Indian Union on such terms and conditions as the Parliament may provide for. This authority is with the Indian Parliament only and the **State legislatures have no power to frame laws on this subject matter. Hence statement 1 is correct.**
- **Article 3 of the Constitution of India dives and defines further and authorises the Indian Parliament to form new states; alter the area, boundaries or names of existing states by legislation.**
  - The parliament, under this Article, is empowered to form a new state by separating a territory from any state or by uniting states or parts of States or by uniting any territory to a part of any state. It is also empowered to increase or diminish the area of any state or to alter the boundaries or the name of any state. It should be noted that in clauses from (a) to (e) under Article 3, the expression 'State' includes a Union Territory.
- **Article 4 declares that laws made for admission or establishment of new states (under Article 2) and formation of new states and alteration of areas, boundaries or names of existing states (under Articles 3) are not to be considered as amendments of the Constitution under Article 368.** This means that such laws can be passed by a simple majority and by the ordinary legislative process. **Hence statement 2 is correct.**
- The **First Schedule of the Indian Constitution enlists the names of the States and the Union Territories which are included in the expression 'Union of States'. Hence statement 3 is correct.**

Q 25.A

- **The traditional Rod puppet of Bihar is known as Yampuri(Not Rajasthan). Hence pair 1 is not correctly matched**.
  - These puppets are made of wood. Unlike the traditional Rod puppets of West Bengal and Orissa, these puppets are in one piece and have no joints. As these puppets have no joints, the manipulation is different from other Rod puppets and requires greater dexterity
- **The traditional marionettes of Rajasthan are known as Kathputli(Not Bihar). Hence pair 2 is not correctly matched.**
  - Carved from a single piece of wood, these puppets are like large dolls that are colourfully dressed. Their costumes and headgears are designed in the medieval Rajasthani style of dress, which is prevalent even today. The Kathputli is accompanied by a highly dramatized version of the regional music. Oval faces, large eyes, arched eyebrows, and large lips are some of the distinct facial features of these string puppets. These puppets wear long trailing skirts and do not have legs. Puppeteers manipulate them with two to five strings which are normally tied to their fingers and not to a prop or a support.

- **Puppets from Tamil Nadu, known as Bommalattam combine the techniques of both rod and string puppets. Hence pair 3 is correctly matched.**
    - They are made of wood and the strings for manipulation are tied to an iron ring which the puppeteer wears like a crown on his head. A few puppets have jointed arms and hands, which are manipulated by rods. The Bommalattam puppets are the largest, heaviest and the most articulate of all traditional Indian marionettes. A puppet may be as big as 4.5 feet in height weighing about ten kilograms. Bommalattam theater has elaborate preliminaries which are divided into four parts – Vinayak Puja, Komali, Amanattam and Pusenkanattam.

Q 26.C

- **In recent years, with the increased acceptance of cryptocurrency cryptocurrency creators are adapting to changes with more security, authenticity mechanisms and more environmentally friendly nature. For example, Ethereum made a transition from a Proof-of-Work (PoW) to a Proof-of-Stake (PoS) consensus mechanism essentially planning to consume about 99 percent less energy.**
- Cryptocurrencies use enormous amounts of electricity to secure their networks. This is done via something called crypto mining. Mining cryptocurrency is not just a way of adding or creating new coins. Crypto mining also involves validating cryptocurrency transactions on a blockchain network and adding them to a distributed ledger. This mining process is energy-guzzling. Under the new PoS mechanism, Ethereum would not need miners and mining farms to authenticate transactions anymore which means less energy consumption.
- **Proof-of-stake is a cryptocurrency consensus mechanism for processing transactions and creating new blocks in a blockchain. A consensus mechanism is a method for validating entries into a distributed database and keeping the database secure. In the case of cryptocurrency, the database is called a blockchain—so the consensus mechanism secures the blockchain.**
- Proof-of-stake (POS) was created as an alternative to proof-of-work (POW), the original consensus mechanism used to validate transactions and open new blocks.While PoW mechanisms require miners to solve cryptographic puzzles, PoS mechanisms require validators to hold and stake tokens for the privilege of earning transaction fees. **Hence, option (c) is the correct answer.**

Q 27.A

- **In finance, "alpha" represents the excess return of an investment compared to its benchmark. In other words, it is the difference between the investment return and the benchmark return (e.g. NSE Nifty). Hence, statement 1 is correct.**
- **For active funds, the alpha value is non-zero** and used to assess the fund manager's ability to generate returns above the market benchmark after accounting for risk. **A positive alpha indicates that the fund has outperformed its benchmark, while a negative alpha suggests underperformance.**
- **For passive funds,** such as index funds, the goal is to match the performance of the benchmark index. Therefore, **the alpha value for passive funds is typically close to zero** since these funds aim to replicate the benchmark's returns rather than outperforming it. **Hence, statement 2 is not correct.**

Q 28.C

- Recently, the Reserve Bank of India (RBI) revised the timeline for the completion of various stages of a Regulatory Sandbox (RS) to nine months from the previous seven months.
- R**egulatory sandbox refers to the live testing of new products or services in a controlled regulatory environment. It acts as a "safe space" for business as the regulators may or may not permit certain relaxations for the limited purpose of testing.**
- The sandbox allows the regulator, the innovators, the financial service providers, and the customers to conduct field tests to collect evidence on the benefits and risks of new financial innovations, while carefully monitoring and containing their risks.
- Entities are allowed to experiment with fintech solutions in a live environment and on a limited set of real users for a limited time frame.
- **In India, financial regulators such as the Reserve Bank of India, the Securities and Exchange Board of India, the Insurance Regulatory and Development Authority, and the International Financial Services Centres Authority run their own sandboxes.**
- Telecom Sandbox: The government introduced a "Millennium Spectrum Regulatory Sandbox" initiative. This includes a Spectrum Regulatory Sandbox (SRS) and Wireless Test Zones (WiTe Zones).
- **Hence, option (c) is the correct answer.**

Q 29.B

- Megathenes was a Greek historian who came to India in the fourth century B.C. as a representative or ambassador of Seleukus Nicator. He lived in the court of Chandragupta Maurya for about five years (302-298 B.C.). He has written an account of India and also that of Chandragupta's reign in his book entitled 'INDIKA'. **Hence statement 1 is not correct.**
- Megasthenes says Indians were divided into seven castes, with Brahmins, the smallest in number, being engaged by others to perform sacrifices, and Kshatriyas, among others. But he doesn't have a word for the Vaish, probably because the economy didn't have much trade or banking at the time (he says that lending was unknown in India). He divides the rest of the castes into peasants, herdsmen, artisans, administrators and councillors. The justice system had no jail but amputation of limbs or death. **Hence statement 2 is correct.**
- According to Megasthenes, the Indians were very truthful people. The theft was very rare. They had faith in each other and litigation was not so common. The Brahmans occupied a high place in the society and they were respected everywhere. The people were happy and prosperous. They led a very simple life and did not lock their houses. The slave system was not then known in India. But he writes that the people had no fixed hours of meals, and they went on eating all the time. They took wine very rarely, and that too on certain occasions and sacrifices. **Hence statement 3 is not correct.**
- **Hence option (b) is the correct answer.**

Q 30.B

- The Bombay Mill Hands Association (BMHA) was a labour union representing textile workers in Bombay, India. It was founded in 1884 by Narayan Meghaji Lokhande, a prominent labour leader and social reformer.
- During 1918 the Madras Labour Union, the first union in India to be formed on modern lines, was established under the leadership of B.P. Wadia, with the objective of ventilating the grievances of workers of the Buckingham and Carnatic mills.
- The first major rift in the All India Trade Union Congress came to the forefront in its tenth annual session held at Nagpur in 1929, under the presidentship of Pandit Jawahar Lal Nehru. There were two controversial issues: a) Affiliation of AITUC to the 3rd International, dominated by socialist ideology and its relation to ILO, and b) Boycott of the Royal Commission on Labour. The leftists, having enjoyed a narrow majority in the conference, were successful in getting the above resolutions passed. As a result, the moderates led by N.M. Joshi walked out and formed another Central Organisation called the All India Trade Union Federation.
- The Indian National Trade Union Congress (INTUC) is a national trade union centre in India. Founded on 3 May 1947 and is affiliated with the International Trade Union Confederation. The INTUC claims a membership of over 30 million.
- **Hence option (b) is the correct answer.**

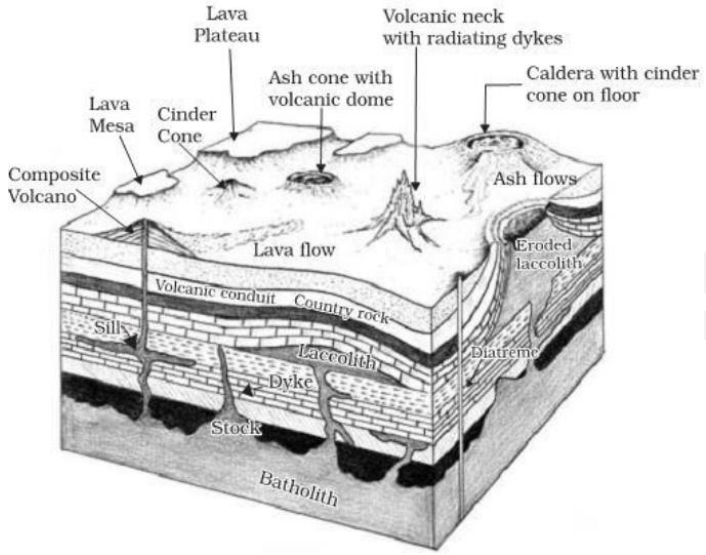
Q 31.B

- Under Soil Health Cards (SHCs) Scheme introduced in the year 2014-15, a massive programme of soil sampling, testing and generation of SHCs was launched to assist State Governments to issue soil health cards to all farmers in the country. Soil health card provides information to farmers on nutrient status of their soil along with recommendation on appropriate dosage of nutrients to be applied for improving soil health and its fertility.
- **The Ministry of Agriculture and Farmers' Welfare introduced the scheme** on December 5, 2015. **Hence statement 2 is not correct.**
- **Soil Health Card (SHC) is a printed report which contains nutrient status of soil with respect to 12 nutrients**: pH, Electrical Conductivity (EC), Organic Carbon (OC), Nitrogen (N), Phosphorus (P), Potassium (K), Sulphur (S), Zinc (Zn), Boron (B), Iron (Fe), Manganese (Mn) and Copper (Cu) of farm holdings. **Hence statement 3 is correct**
- **SHC is provided to all farmers in the country at an interval of 3 years** to enable the farmers to apply recommended doses of nutrients based on soil test values to realize improved and sustainable soil health and fertility, low costs and higher profits. Farmers can track their soil samples and also obtain their Soil Health Card report. **Hence statement 1 is correct.**
- It is a field-specific detailed report of soil fertility status and other important soil parameters that affect crop productivity.
- The Soil Health Card portal has been revamped and integrated with a Geographic Information System (GIS) system so that all the test results are captured and seen on a map.

- **Soil Health Card scheme has been merged in Rashtriya Krishi Vikas Yojana (RKVY) cafeteria scheme** as its one component under name 'Soil Health & Fertility' from the year 2022-23.

Q 32.C

- Volcanic landforms are divided into intrusive and extrusive landforms based on magma cools within the crust and above the crust respectively. Extrusive landforms include- Cinder or ash cones, composite cones, shield volcanoes, craters, etc. Intrusive landforms include batholith, laccoliths, phacoliths, sills, dykes etc.
- **Cinder:** It is formed due to the accumulation of loose practicals around the vent. It is a steep circular or oval-shaped hill due to highly viscous lava that solidifies after a short distance.
- **Composite cones:** Lava and fragmented materials accumulate in the vicinity of the vent opening leading to the formation of layers. Lava acts as the cementing material.
- **Crater:** It is an inverted cone-shaped vent through which the magma flows out. When water from rainwater or melted snow accumulates in the crater, it becomes a crater Lake.
- Whereas **phacolith and sills** are intrusive landforms. Phacoliths are formed when magma solidifies in shallow basins into a saucer shape. Sills are rocks usually parallel to the bedding planes of sedimentary rocks.
- **Hence option (c) is the correct answer.**



Q 33.D

- **Primary producers:** including bacteria, phytoplankton, and algae — form the lowest trophic level, the base of the aquatic food web. Primary producers synthesize their own energy without needing to eat. Many photosynthesize, using the sun's energy to build carbohydrates. However, some primary producers can create energy without sunlight using chemosynthesis to metabolize chemicals released from hydrothermal vents, methane seeps, and other geological features.
    - **The two main classes of phytoplankton are dinoflagellates and diatoms**. Dinoflagellates use a whip-like tail, or flagella, to move through the water and their bodies are covered with complex shells. Diatoms also have shells, but they are made of a different substance and their structure is rigid and made of interlocking parts.
- **Consumers:** Zooplankton feed on microscopic plant-like organisms called phytoplankton, which get their energy from the sun. **Tiny crustacean zooplankton called "copepods" are like cows of the sea, eating the phytoplankton and converting the sun's energy into food for higher trophic levels in the food web.** Copepods are some of the most abundant animals on the planet.
- **Predators** more actively feed on other animals. There are many kinds of predators that feed on many kinds of prey. Pursuit predators like sharks, box jellyfish, sunflower sea stars, and many fish like **herring**, cod, and tuna hunt for their prey. Ambush predators like mantis shrimp, some octopuses, some eels, and scorpionfish, capture their prey by hiding and suddenly attacking.
- **Hence option (d) is the correct answer.**

Q 34.A

- **Article 30(1) of the Indian Constitution guarantees the right of religious and linguistic minorities to establish and administer educational institutions of their choice.** This right extends to the establishment of educational institutions based on cultural and social identity, including minority educational institutions for religious minorities.
- **Key Features of Minority Educational Institutions:**
  - They have the right to establish and administer their own educational institutions without interference from the government.
  - They can admit students of their own community on a preferential basis.
  - They can appoint teachers and staff belonging to their own community.
  - They can prescribe their own syllabus and curriculum, subject to certain guidelines from the government.
  - They receive government funding and support, but they must adhere to the national education policy and other relevant regulations.
  - **They are not required to follow the rule of reservation for Scheduled Caste (SC), Scheduled Tribe (ST), and Other Backward Class (OBC) students. Hence, statement 1 is correct.**
- **The National Commission for Minority Educational Institutions (NCMEI),** established under the National Commission for Minority Educational Institutions Act of 2004, **has the exclusive authority to cancel the recognition of an educational institution as a minority educational institution. Hence, statement 2 is not correct.**
- **State governments cannot revoke the minority status of educational institutes.**
- The Right to Education Act (RTE), 2006, guarantees the right to quality education for children between the ages of 6 and 14.
- **RTE Act states that the provisions of the Act shall not apply to "the minority educational institutions referred to in clause (1) of article 30 of the Constitution.**
  - **The exemption under Section 12(1)(c) of the RTE Act applies to all minority educational institutions, regardless of whether they receive government funding or not. It covers both unaided and aided minority institutions. Hence, statement 3 is not correct.**

Q 35.B

- FERA stands for the Foreign Exchange Regulation Act, was introduced with the primary aim of facilitating and simplifying the foreign exchange system in India. This regulatory act had several key objectives, including: Regulating foreign exchange and securities transactions. Controlling the import and export of currencies. Managing transactions that indirectly affected foreign exchange. However, as India's economic growth was hindered by the rigid regulations of FERA, this act was eventually abolished and replaced by FEMA.
- **Key Highlights of FEMA- Enactment**: The Foreign Exchange Regulation Act was passed by the Indian Parliament in 1973.- **Objective**: FERA aimed to regulate foreign payments, currency import/export, securities, and the purchase of fixed assets by foreigners.- **Context**: It was introduced when India's foreign exchange reserves were low.- **Focus**: Conservation of foreign exchange was the primary goal.
- **Key Differences Between FERA and FEMA:**
  - FERA did not allow any investment by foreign firms beyond 40% shareholding. Under FEMA, 100% foreign subsidiaries are allowed.
  - FERA did not allow External Commercial Borrowings (ECBs). Under FEMA, ECBs including Masala Bonds is permitted. **Hence statement 3 is correct.**
  - Violation of the rules laid down by FERA was considered a criminal offense while **violation of rules laid down by FEMA is now considered a civil offense. Hence statement 1 is not correct.**
- **Under FERA, in case of a violation, there was no scope for tribunals as appeals were sent directly to the state High Courts.** Special Directors (Appeals) and Special Tribunals can be provided in case of any violation of rules under FEMA. **Hence statement 2 is correct.**
  - FERA stipulated compulsory retrieval of foreign earnings of exporters within 3 weeks. Under FEMA, there is no such restrictions.(9 month rule for exporters with subsidies).
  - Under FERA, individual accounts were not permitted to carry more than $500 on a foreign tour. Under FEMA, up to $250000 is allowed.

Q 36.D

- Incident and Trafficking Database (ITDB) is the International Atomic Energy Agency's (IAEA's) information system for incidents of unauthorized activities and illicit trafficking involving radioactive materials outside the purview of regulatory control. **Hence statement 1 is not correct.**

- The ITDB was established in 1995 to help participating States and selected international organizations to combat illicit nuclear trafficking and strengthen nuclear security. It facilitates information exchange and provides material that can be used to analyze patterns and trends, thereby helping identify potential security threats and vulnerabilities. The ITDB is also an essential component of the information platform supporting the IAEA's Nuclear Security Plan 2022-2025. **Hence statement 2 is not correct.**
- **Hence option (d) is the correct option.**

Q 37.D

- **Indian secularism deals not only with religious freedom of individuals but also with religious freedom of minority communities.** Within it, an individual has the right to profess the religion of his or her choice. Likewise, religious minorities also have a right to exist and to maintain their own culture and educational institutions. **Hence statement 1 is not correct.**
- **The secular character of Indian state is established by virtue of the fact that it is neither theocratic nor has it established any one or multiple religions**. Beyond this it has adopted a very sophisticated policy in pursuit of religious equality. This allows it either to disengage or engage with it if required. The Indian state may engage with religious negatively to oppose religious tyranny. This is reflected in such actions as the ban on untochability. It may also choose a positive mode of engagement. **Thus, the Indian constitution grants all religious minorities the right to establish and maintain their own culture and educational institutions which may receive assistance from the state. Hence statement 2 is not correct.**

Q 38.A

- In a first, an international team of physicists from the Anti-hydrogen Experiment: Gravity, Interferometry, Spectroscopy (AEgIS) collaboration has achieved a breakthrough by demonstrating the laser cooling of Positronium.
- **Positronium, comprising a bound electron (e-) and positron (e+), is a fundamental atomic system. It is a so-called exotic atom consisting of both matter and antimatter.** Matter is what the world around us is made from, including the stars, the planets and us. Antimatter is the opposite. It was created in equal amounts when the Universe was born but exists only fleetingly in nature now, with very little of it occurring naturally in the cosmos. **Hence, statement 1 is correct.**
- **Due to its very short life, it annihilates with a half-life of 142 nano-seconds**. Its mass is twice the electron mass and enjoys the unique distinction of being a pure leptonic atom. This hydrogen-like system, with halved frequencies for excitation, makes it a great contender for attempting laser cooling and thereby performing tests of fundamental theories in physics. **Hence, statement 2 is not correct.**
- **It was first detected by scientists in the US in 1951. But it has been difficult to study because the atoms move around a lot because it is the lightest known atom. But cooling it slows the atoms down, making it easier for scientists to study. Hence, statement 3 is not correct.**
- Positronium can generate huge amounts of energy. It can shed light on 'antimatter' which existed at the beginning of the Universe, and studying it could revolutionize physics, cancer treatment, medical imaging and maybe even space travel.

Q 39.B

- **Energy Efficiency Services Limited (EESL), a joint venture of Public Sector Undertakings under the Ministry of Power has launched its groundbreaking National Efficient Cooking Programme (NECP) and Energy Efficient Fans Programme (EEFP)**. These initiatives are aimed at revolutionizing cooking practices in India and emphasizing the importance and urgency of energy-efficient fans. As part of these programs, EESL will distribute 1 crore efficient BLDC fans and 20 Lakh energy-efficient induction cook stoves nationwide. **Hence statement 1 is not correct.**
- **The National Efficient Cooking Programme (NECP) introduces induction-based cookstoves**, offering a cost advantage of 25-30% over traditional cooking methods, promising both energy savings and cost-effective cooking solutions. By deploying 20 Lakh Induction cook-stoves across India, EESL seeks to reduce the environmental impact of cooking methods, ensuring cleaner air and improved health for citizens. EESL has also partnered with Modern Energy Cooking Services (MECS) for the large-scale deployment of induction cooktops. The deployment is expected to accelerate the acceptance and large-scale adoption of modern electric cooking devices in Indian kitchens. **Hence statement 2 is correct.**
- **Hence option (b) is the correct option.**

Q 40.A

- Garba is performed in a circle (concentric circles when there are many people). The circle represents the Hindu view of time. In Hinduism, time is cyclical. As the cycle of time revolves, from birth to life to death to rebirth, the only thing that is constant is the Goddess, an unmoving symbol in the midst of all of this unending and infinite movement. The dance symbolizes that God, represented in feminine form in this case, is the only thing that remains unchanging in a constantly changing universe (jagat). **Hence statement 1 is correct.**
- Garba is a community circle dance from the northwestern Indian state of Gujarat. The word "garba" is also used to refer to the event at which the garba is performed. The dance form originated in the villages of Gujarat, where it was (and continues to be) performed in communal gathering spaces in the center of the village with the entire community participating. As with many social events that happen in rural areas, garba also has religious significance. while garba is central to Navratri observances in Gujarat, it is not exclusively performed only during Navratri. Garba also is performed during social events such as weddings and parties. **Hence statement 2 is not correct.**
- Garba is played by hands and involves various hand and foot movements with occasional clapping. Dandiya is played with colourful dandiya sticks. Several Dandiya steps are performed with an even number of people, while Garba does not have any such requirements. In Dandiya, The performers hold sticks in both their hands and strike them together on the beats of the musical instruments. Dandiya Ras involves a huge number of people at a time. **Hence statement 3 is not correct.**
- **Hence option (a) is the correct answer.**

Q 41.D

- **Red blood cells, or erythrocytes,** are **specialized cells in the blood responsible for transporting oxygen from the lungs to the body tissues** and removing carbon dioxide from the tissues to the lungs for exhalation. **During their maturation process, RBCs undergo enucleation, which means they expel their nucleus. This enucleation allows RBCs to have more space to carry hemoglobin, the protein responsible for binding oxygen and carbon dioxide. Hence Statement I is correct and Statement II is not correct.**
- As a result, mature RBCs circulating in the bloodstream are devoid of a nucleus. This lack of a nucleus means that RBCs cannot undergo processes like DNA replication or protein synthesis. However, **it also allows RBCs to have a biconcave shape, which enhances their flexibility and surface area for efficient gas exchange.**
- **Hence, option (d) is the correct answer.**

Q 42.A

- **Chromosomal karyotyping** involves **analyzing a cell's complete set of chromosomes to detect abnormalities such as aneuploidy (abnormal chromosome number) or structural rearrangements (such as deletions, duplications, inversions, or translocations)**.
- This technique is commonly used in genetic testing to diagnose chromosomal disorders and to assess the risk of genetic conditions.
- It involves visualizing and analyzing a person's entire set of chromosomes, typically using a sample of cells obtained from blood, amniotic fluid, or tissue.
- It is commonly used in prenatal screening to **detect genetic disorders such as Down, Edwards, and Patau syndrome.**
- **Hence option (a) is the correct answer.**

Q 43.B

- **Cloudbursts** are typically associated with **cumulonimbus clouds**, which are large, vertically developed clouds known for their potential to **produce thunderstorms and heavy rainfall. Hence statement 1 is correct.**
- The occurrence of cloudbursts is primarily **influenced by orographic lifting**, where moist air is forced to rise over elevated terrain, leading to the rapid cooling and condensation of water vapor, resulting in intense rainfall. **Hence statement 2 is correct.**
- Cloudbursts are more commonly **associated with regions of high humidity,** where there is ample moisture available to **fuel convective processes**. While **arid regions can experience intense rainfall events, they are not typically characterized as cloudbursts**. **Hence statement 3 is not correct.**
- There is evidence to suggest that climate change may be contributing to an **increase in the frequency and intensity of extreme weather events, including heavy rainfall events such as cloudbursts**. Warmer air temperatures can lead to increased evaporation and moisture in the atmosphere, providing more fuel for intense rainfall events.

Q 44.C

- **Treaty of Alinagar:**
  - The treaty of Alinagar (changed the name of Calcutta) was signed between Robert Clive of the British East India Company and the Nawab of Bengal, Mirza Muhammad Siraj Ud Daula. **Hence statement 1 is correct.**
- **Terms of the treaty:**
  - The Nawab would recognize all the provisions of Mughal Emperor Farrukhsiyar's farman of 1717. **Hence statement 2 is correct.**
  - All British goods that passed through Bengal would be exempt from duties.
  - The British would not be hindered from fortifying Calcutta, as well as mint coins in Calcutta.
  - The signing of the treaty was one of the events leading up to the famous Battle of Plassey.
  - The Nawab was defeated and killed by Clive and his allies.
  - **Significance of the treaty:**
    - ✓ The Treaty strengthened the position of the British in Bengal.
    - ✓ It laid the foundations for the Battle of Plassey. **Hence statement 3 is correct.**
    - ✓ It set the stage for British colonial expansion in India, turning what was an economic enterprise into an imperial one.

Q 45.C

- **The Swiss Challenge method is an investment model that allows private players to accept contracts from the government through the process of bidding.**
- Under this model, any person/ entity with credentials can submit a development proposal to the government. That proposal is then made online and a second person/entity can give suggestions to improve and beat that proposal." An expert committee will accept the best proposal and the original proposer will get a chance to accept it if it is an improvement on his proposal.
- In case, the original proposer is not able to match the more attractive and competing counter-proposal, the project will be awarded to the counter-proposal.
- **Hence, option (c) is the correct answer.**

Q 46.B

- **Muhammad Tughluq became the first Sultan to attempt to formulate an agricultural policy for promoting agriculture. He introduced the practice of giving agricultural loans named Sondhar for increasing the area under plough and for digging wells for irrigation. Hence statement 1 is correct.**
  - Barani says that 70 lakhs tankas (according to Afif 2 krors tankas) were given till 1346-7 in sondhar.
- **A new ministry designated Diwan-i amir-i kohi was established to promote agriculture**. Its two main functions were to extend the area under cultivation and to reclaim the land that went out of cultivation and improving the cropping pattern. It was recommended that wheat should be replaced by sugarcane and sugarcane by grapes and dates. **Hence statement 2 is correct**.
- Barani, however, says that all these measures were almost a complete failure.
- **Feroz Tughluq** (1351-88) abandoned these projects but abolished agrarian cesses, forbade levying of ghari and charai. But he is reported to have imposed a separate tax - jiziya - distinct from kharaj (land-tax) on the peasants.
  - **He also introduced an irrigation tax in Haryana where he dug canals. Hence statement 3 is not correct.**

Q 47.B

- In the Mauryan period, the political authority was concentrated in the hands of the king. But, the Gupta administration was decentralized in nature. It means that feudatories i.e. local Kings and smaller chiefs ruled a large part of their empire. The pompous titles such as maharajadhiraja, parambhattaraka, parameshvara etc were adopted by the imperial Guptas. **Hence statement 1 is correct.**
- Hereditary monarchy was the prevailing type of government in Gupta period. Son usually succeeded the father. In Gupta dynasty, it was not the custom that the eldest son of the monarch was to be crowned Yuvraj (crown prince). Princes of the royal family were supposed to prove their eligibility before the assembly in the presence of the monarch. Most importantly, popular sentiment for a prince also determined the selection of king in the Gupta dynasty. In accordance with this practice, Samudragupta and Chandragupta II Vikramaditya ascended the throne despite not being the eldest son. **Hence statement 2 is incorrect.**
- The Gupta bureaucracy was less elaborate compared to that of the Mauryas. The Mauryas had a vast empire and relied on a complex administrative structure with many officials. The Guptas, while still

having a well-organized system, relied more on local rulers and had a less bureaucratic central government. **Hence statement 3 is correct.**

- The king was the focus of the administration. Princes, ministers and advisors assisted him. The princes were also made the viceroys of the provinces. Provinces were known as desha, rashtra or bhukti and their head was called uparika. The provinces were divided into a number of districts called pradesha or vishaya. The administrative head of the vishaya was known as vishayapati. The vishayas were further divided into villages. The village headman called gramadhyaksha looked after the affairs of the village with the help of village elders. **Hence statement 4 is incorrect.**

Q 48.B

- The **Vijayanagara Empire was a powerful South Indian kingdom that flourished from the 14th to the 17th century. Founded in 1336 by Harihara I and Bukka Raya I,** two brothers who were generals in the Kakatiya dynasty, the Vijayanagara Empire became a major political and cultural force on the Deccan Plateau.
- The **capital of the Vijayanagara Empire was Vijayanagara (Hampi), situated on the banks of the Tungabhadra River in present-day Karnataka,** India. The empire reached its zenith under the rule of Krishnadevaraya (1509–1529), during which it became a center of art, culture, and architecture.
- The **Vijayanagar kings issued a large number of gold coins called Varaha (also called Pon in Tamil and Honnu in Kannada).**
  - These gold coins have the images of various Hindu deities and animals like the bull, the elephant and the fabulous gandaberunda (a double eagle, sometimes holding an elephant in each beak and claw).
  - The legend contains the king's name either in Nagari or in Kannada script.
- The Vijayanagara Kingdom played a crucial role in resisting the expansion of the Delhi Sultanate into the South and successfully thwarted invasions from the Bahmani Sultanate.
- The empire was known for its patronage of arts and literature, with significant contributions in the fields of sculpture, music, and literature. The architecture of Vijayanagara, characterized by intricate carvings and grand structures, is still visible in the ruins of Hampi, a UNESCO World Heritage Site.
- Despite its glorious period, the Vijayanagara Empire faced internal strife and external threats. **The Battle of Talikota in 1565 resulted in the defeat of Vijayanagara forces by the combined forces of the Deccan Sultanates, leading to the decline of the empire.**
- **Hence option (b) is the correct answer.**

Q 49.D

- Arya Samaj, vigorous reform movement of modern Hinduism, **founded in 1875 by Dayananda Sarasvati,** whose aim was to reestablish the Vedas, the earliest Hindu scriptures, as revealed truth. He rejected all later accretions to the Vedas as degenerate but, in his own interpretation, included much post-Vedic thought.
- **On 28 December 1885, the Indian National Congress** was founded at Gokuldas Tejpal Sanskrit College in Bombay, with 72 delegates in attendance. Hume assumed office as the General Secretary, and Womesh Chunder Bonnerjee of Calcutta was elected president.
- **At the Parliament of Religions held at Chicago in 1893,** Swami Vivekananda made a great impression on people by his learned interpretations. The keynote of his opening address was the need for a healthy balance between spiritualism and materialism. Envisaging a new culture for the whole world, he called for a blend of the materialism of the West and the spiritualism of the East into a new harmony to produce happiness for mankind. Vivekananda gave several lectures on Vedanta in the USA and in London before returning to India in 1897.
- **Hence option (d) is the correct answer.**

Q 50.D

- **Kodaikanal is one of the very popular holiday destination hill resorts in South India. This hill station stands 7200 feet above sea level and is situated in the upper Palani hills of the western ghats near Madurai in Tamil Nadu. Kodaikanal is also popularly known as the princes of Hill Stations.** Kodaikanal was established as a destination by British bureaucrats and Christian missionaries in the year of 1845. However, the earliest references to the stunning hill station can be found as early as the Sangam literature time. It has a star-shaped artificial lake known as the Kodaikanal Lake. The Kodaikanal Observatory of the Indian Institute of Astrophysics is located here. **Hence, pair 1 is not correctly matched.**

- **Yercaud is a hill station near Salem, in the Servarayan range of hills (anglicized as Shevaroys) in the Eastern Ghats (Tamil Nadu). It is at an altitude of 1515 meters (4969 feet) above the see level.** The name of the hill town has been derived from its geography. Due to the growth of a large number of trees around its main lake, the locals started calling the place 'Yeri-Kaadu', which literally translates into lake forest. Over the years, both words merged to make the name Yercaud. **Hence, pair 2 is not correctly matched.**
- **Udhagamandalam, popularly known as Ooty is a hill station is situated in the Nigiri hills in the western ghats. British named it the queen of hill stations and it served as the summer capital of the Madras presidency. Hence, pair 3 is not correctly matched.**

Q 51.C

STATUS OF CLASSICAL LANGUAGE

- In **2004**, the Government of India declared that languages that meet certain requirements would be accorded the status of a "**Classical Language of India".**
- **Criteria**
  - The following criteria were laid down to determine the eligibility of languages to be considered for classification as a "**Classical Language**": **High antiquity** of its early texts/recorded history over a period of **1500- 2000 years;**
  - A body of **ancient literature/texts, which is considered a valuable heritage by generations of speakers;**
  - The **literary tradition be original and not borrowed** from another speech community;
  - The classical **language and literature being distinct from modern**, **there may also be a discontinuity between the classical language and its later forms or its offshoots.**
- **Languages so far declared to be a Classical Language are:**
  - **Tamil** in the year **2004**. **Hence statement 1 is correct**
  - **Telugu** in the year **2008**
  - **Malayalam** in the year **2013**
  - **Sanskrit** in the year **2005**
  - **Kannada** in the year **2008**
  - **Odia** in the year **2014**
- **Languages in 8th schedule of the Indian constitution: 1) Assamese 2) Bengali 3) Bodo 4) Dogri 5) Gujarati 6) Hindi 7) Kannada 8) Kashmiri 9) Konkani 10) Maithili 11) Malayalam 12) Manipuri 13) Marathi 14) Nepali 15) Odia 16) Punjabi 17) Sanskrit 18) Santali 19) Sindhi 20) Tamil 21) Telugu 22) Urdu. Hence statement 2 is correct.**

Q 52.B

- The Ministry of Environment, Forests and Climate Change has launched the Indian Forest & Wood Certification Scheme. This national forest certification scheme offers voluntary third-party certification designed to promote sustainable forest management and agroforestry in the country. The scheme includes forest management certification, tree outside forest management certification, and chain of custody certification. **Hence statement 1 is not correct.**
- The Forest Management certification is based on the Indian Forest Management Standard, consisting of 8 criteria, 69 indicators, and 254 verifiers, which is an integral part of the National Working Plan Code 2023, launched earlier this year. A separate Trees Outside Forests Standard is now introduced as a part of the newly launched Indian Forest & Wood Certification Scheme. The Indian Forest and Wood Certification Scheme can provide market incentives to various entities that adhere to responsible forest management and agroforestry practices in their operations. This includes state forest departments, individual farmers, or Farmer Producer Organizations engaged in agroforestry and farm forestry, as well as other wood-based industries in the value chain. **Hence statement 2 is correct.**
- The Indian Forest and Wood Certification Scheme will be overseen by the Indian Forest and Wood Certification Council, which will act as a multistakeholder advisory body. The Council is represented by members from eminent institutions such as the Indian Council of Forestry Research and Education, Forest Survey of India, Quality Council of India, and Indian Institute of Forest Management including representatives from the Ministries of Agriculture and Farmers' Welfare and Ministry of Commerce and Industry, State Forest Departments, Forest Development Corporations, and representatives from wood-based industries. Indian Institute of Forest Management, Bhopal will act as the scheme operating agency and will be responsible for overall management of the Indian Forest and Wood Certification Scheme. The

National Accreditation Board for Certification Bodies under the Quality Council of India will accredit the certification bodies which will carry out independent audits and assess the adherence of various entities to the standards prescribed under the scheme. **Hence statement 3 is correct.**

- **Hence option (b) is the correct option.**

Q 53.D

- The Mediterranean climate supports various kinds of trees including everging trees such as oak. They are found in regions with rainfall over 25 inches. These trees are usually stunted with massive trunks and small leathery leaves. **Hence statement 1 is not correct.**
- **Sirocco: This is a hot dry dusty wind that originates in the Sahara Desert.** Though it may occur at any time of the year, it is most frequent in spring and normally lasts for only a few days. The Sirocco blows outwards in a southerly direction from the desert interiors into the cooler Mediterranean Sea. It is usually associated with depressions from the Atlantic passing from the coast eastwards inland.
- **Mistral: Mistral is a cold wind from the north of the Mediterranean Sea**, rushing down the Rhone valley in violent gusts between 40 and 80 miles per hour. The velocity of the Mistral is intensified by the funneling effect in the valley between the Alps and the Central Massif, and in extreme cases trains may be derailed and trees uprooted.
- **Chinook: Location- Rocky Mountains, Canada & USA, it is named after Native American tribes.** It is a warm and dry west wind (a type of foehn) that occurs on the eastern side of the Rocky Mountains. Its arrival is usually sudden, with a consequent large temperature rise and rapid melting of snow. **Hence statement 2 is not correct.**

Q 54.A

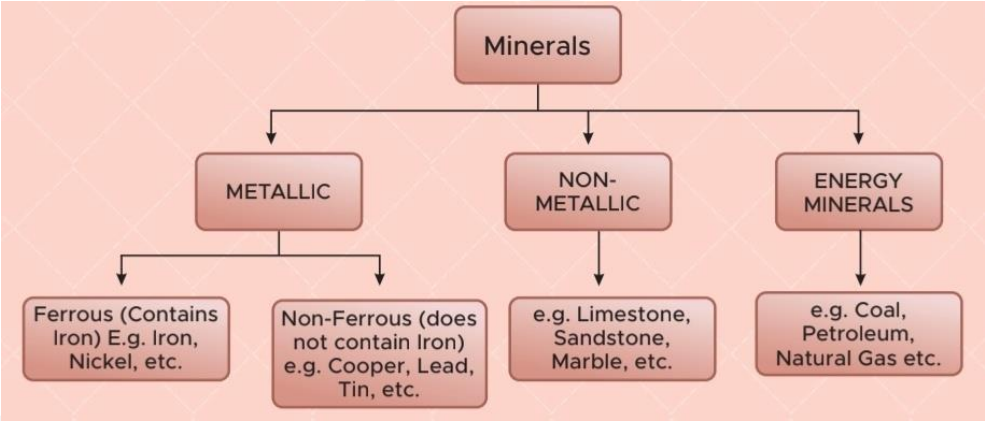
- **The Citizenship Amendment Act (CAA) 2019 enacted by the Indian government aims to amend the Citizenship Act of 1955**. Introduced and passed in December 2019, the CAA provides expedited citizenship to specific religious minority communities from some neighboring countries.
- Some **key provisions** of the Citizenship Amendment Act (CAA) 2019 are:
  - **Eligibility for Citizenship: The Act provides that Hindus, Sikhs, Buddhists, Jains, Parsis, and Christians from Afghanistan, Bangladesh, and Pakistan, who entered India on or before December 31, 2014, will not be treated as illegal migrants**. **Hence statement 1 is not correct.**
  - Exemption from Certain Acts: To get this benefit, these groups must have also been exempted from the Foreigners Act, 1946 and the Passport (Entry into India) Act, 1920 by the central government.
  - **Citizenship by Registration or Naturalisation: The Act allows a person to apply for citizenship by registration or naturalisation if they meet certain qualifications. For the specified class of undocumented immigrants, the number of years of residency has been relaxed from 11 years to five years. Hence statement 2 is correct.**
  - **Acquiring Citizenship:** On acquiring citizenship, such persons will be deemed to be citizens of India from the date of their entry into India, and all legal proceedings against them in respect of their illegal migration or citizenship will be closed.

Q 55.A

- The seats are allotted to the states in the Rajya Sabha on the basis of population. Hence, the number of representatives varies from state to state. For example, Uttar Pradesh has 31 members while Tripura has 1 member only.
- Though the Constitution has abandoned the system of communal representation**, it provides for the reservation of seats for scheduled castes and scheduled tribes in the Lok Sabha (and not Rajya Sabha) on the basis of population ratios. Hence statement 1 is not correct.**
- The **representatives of each union territory in the Rajya Sabha are indirectly elected by members of an electoral college specially constituted** for the purpose. This election is also held in accordance with the system of proportional representation by means of the single transferable vote. **Hence statement 2 is correct.**
- Out of the eight union territories, **only three (Delhi, Puducherry and Jammu & Kashmir)** have representation in Rajya Sabha. The populations of other five union territories are too small to have any representative in the Rajya Sabha. **Hence statement 3 is not correct.**

Q 56.B

- **Mineral is a naturally occurring organic and inorganic substance**, having an orderly atomic structure and a definite chemical composition and physical properties.
- Based on chemical and physical properties**, minerals may be grouped under two main categories metallic and non-metallic minerals.**
- Metallic minerals are the sources of metals. Metallic minerals can be further divided into two classes- **ferrous minerals and non-ferrous minerals.**
- **Ferrous minerals:** Minerals that have iron content. Examples are - iron, **nickel, cobalt**, tungsten, **manganese**, etc (Aluminium is not part of it). **Hence statement 1 is not correct.**
- **Non-ferrous minerals:** which don't have iron content. For example- **copper, bauxite, lead,** zinc, tin, etc. **Hence statement 2 is correct.**
- **Precious minerals: This is also a subcategory under metallic minerals. They include gold, silver, platinum, palladium etc. Hence statement 4 is correct.**
- **Non-metallic minerals:** They do not contain metals. They can be divided into fuel minerals (which are organic in origin) like coal, petroleum, etc., and other non-metallic minerals like **limestone, graphite,** mica, etc. **Chromium is a metallic mineral. Hence statement 3 is not correct.**



Q 57.C

- **Sora is a text-to-video model developed by the U.S.-based artificial intelligence research organization OpenAI.** It can generate videos based on descriptive prompts, extend existing videos forward or backward in time, and generate videos from still images.
- **A text-to-video model is a machine learning model** that takes as input a natural language description and produces a video matching that description. Video prediction on making objects realistic in a stable background is performed by using a recurrent neural network for a sequence-to-sequence model with a connector convolutional neural network encoding and decoding each frame pixel by pixel, creating a video using deep learning.
- **Several other text-to-video generating models** had been created before Sora, including **Meta's Make-A-Video, Runway's Gen-2, and Google's Lumiere,** the last of which, as of February 2024, is also still in its research phase.
- **OpenAI, the company behind Sora,** had released DALL·E 3, the third of its DALL-E text-to-image models, in September 2023.
- **Hence option (c) is the correct answer.**

Q 58.B

- **The International Treaty on Plant Genetic Resources for Food and Agriculture was adopted by the Thirty-First Session of the Conference of the Food and Agriculture Organization of the United Nations on 3 November 2001.** The Treaty's truly innovative solution to access and benefit sharing, the Multilateral System, puts 64 of our most important crops – crops that together account for 80 percent of the food we derive from plants – into an easily accessible global pool of genetic resources that is freely available to potential users in the Treaty's ratifying nations for some uses. **Hence statement 1 is correct.**
- The Treaty facilitates access to the genetic materials of the 64 crops in the Multilateral System for research, breeding, and training for food and agriculture. Those who access the materials must be from the Treaty's ratifying nations and they must agree to use the materials totally for research, breeding, and training for food and agriculture. The Treaty prevents the recipients of genetic resources from claiming intellectual property rights over those resources in the form in which they received them and ensures that access to genetic resources already protected by international property rights is consistent with international and national laws. Those who access genetic materials through the Multilateral System agree to share any benefits from their use through four benefit-sharing mechanisms established by the Treaty. **Hence statement 2 is not correct**.
- The Treaty recognizes the enormous contribution farmers have made to the ongoing development of the world's wealth of plant genetic resources. It calls for protecting the traditional knowledge of these farmers, increasing their participation in national decision-making processes, and ensuring that they share in the benefits from the use of these resources. **Hence statement 3 is correct.**
- **Hence option (b) is the correct answer.**

Q 59.A

- **The Chief Secretary is the administrative head of the state government, responsible for coordinating and supervising the work of all departments.**They serve as the principal advisor to the Chief Minister and the Governor.They are responsible for implementing state policies and ensuring smooth functioning of the government machinery.
- **Selection and Appointment:**
  - Chief Secretaries are selected from the Indian Administrative Service (IAS).
  - They are typically senior IAS officers with extensive experience in administration and policymaking.
  - **They are appointed by the Chief Minister (CM) of the state.**
- **They serves as the ex-officio head of their respective state Civil Services Board (CSB). Hence, statement 1 is correct.**
- The Indian order of precedence establishes a protocol hierarchy for various high-ranking officials. .
  - **According to this order, the Chief Secretaries of states in India rank 23rd, while the Cabinet Secretary ranks 11th. Hence, statement 2 is not correct.**
- **Cabinet Secretary:**
  - The Cabinet Secretary is the senior-most civil servant in India.
  - They are the head of the Indian Administrative Service (IAS).
  - They act as the principal advisor to the Prime Minister and the Union Cabinet on administrative matters.

Q 60.A

- **The Lokpal is an independent anti-corruption ombudsman in India.** It is a body that investigates complaints of corruption against public officials, including high-ranking government servants, ministers, and judges. The Lokpal has the authority to initiate investigations, impose penalties, and recommend prosecution.
- **The Lokpal is specifically established as an independent statutory body under the Lokpal and Lokayuktas Act, 2013. Hence, statement 1 is not correct.**
- **It has the following powers**:
  - **Jurisdiction over public servants:** The Lokpal has jurisdiction over all categories of public servants, **including the Prime Minister ,** ministers, members of Parliament and state legislatures, judges, and government officials. **Hence, statement 2 is correct**
  - **Powers to investigate:** The Lokpal is empowered to inquire into allegations of corruption against public servants, including the Prime Minister, upon receiving a complaint or on its own motion. It can summon witnesses, examine documents, and conduct searches and seizures.
  - **Recommendations for action:** Based on its investigation, the Lokpal can make recommendations for appropriate action, such as prosecution, dismissal from service, or confiscation of assets.

- **The Lokpal and Lokayuktas Act, 2013 mandates the Lokpal, an anti-corruption ombudsman, to present an annual report to the President of India.** This report provides a comprehensive overview of the Lokpal's activities and accomplishments in the preceding year. **Hence, statement 3 is not correct.**

Q 61.D

- Plastic Overshoot Day marks the point when the amount of plastic waste generated exceeds the world's capacity to manage it, resulting in environmental pollution. The plastic overshoot day report is compiled and released by Swiss-based research consultancy **Earth Action (EA)**. Of the 159 million tonnes of plastics (which can be used only for a short time) to be produced globally in 2023, 43 percent (68.5 million tonnes) will end up causing pollution, the report pointed out. India is among the 12 countries, along with China, Brazil, Indonesia, Thailand, Russia, Mexico, the United States, Saudia Arabia, the Democratic Republic of Congo, Iran, and Kazakhstan, which are responsible for 52 percent of the world's mismanaged plastic waste, it pointed out. **Hence statement 1 is not correct.**
- On **July 28, 2023**, the Earth saw its first Plastic Overshoot Day which is just four days ahead of **Earth Overshoot Day on August 2**, which is a wake-up call to the world. Plastic Overshoot Day sheds light on a critical aspect of the world's plastic consumption: Short-life plastics, encompassing plastic packaging and single-use plastics. Overshoot Day for India, or the date when the amount of plastic waste outweighed the country's ability to manage it, was January 6, 2023. Plastic Overshoot Day is determined based on a country's Mismanaged Waste Index (MWI). **Hence statement 2 is not correct.**
- **Hence option (d) is the correct answer.**

Q 62.A

- **Recent context:** The Supreme Court on Wednesday condemned the illegal felling of over 6,000 trees to construct buildings, ostensibly for "eco-tourism" at the Jim Corbett National Park in Uttarakhand, as a "classic case" of nexus between politicians and officials working to ransack the environment for short-term commercial ends.
- In order to manage and conserve biodiversity across the Protected Areas, Ministry of Environment, Forest and Climate Change (MoEF) notifies Eco-Sensitive Zones (ESZs)around the Protected Areas.
- The very purpose of declaring ESZ is to create some kind of **"Shock Absorber"** for the specialized Ecosystem, such as protected areas or other natural sites, to act as transition zone from areas of high protection to areas involving lesser protection. Besides, in order to protect the biodiversity in areas having ecological significance, Ministry also notifies Ecologically Sensitive Areas (ESA), which has unique biological resources, which require special attention for their conservation.
- **Activities Prohibited/Restricted/Allowed in ESZs:**
  - **Prohibited:** commercial mining, setting of sawmills and industries causing pollution, stone quarrying and crushing units, commercial use of firewood & major hydropower projects are prohibited in ESZ areas. It also bans tourism activities like flying over protected areas in an aircraft or hot air balloon and discharge of effluents and solid waste in water bodies or terrestrial areas.
  - **Regulated:** felling of trees, drastic change in agriculture systems and commercial use of natural water resources, including groundwater and setting up of hotels and resorts are the activities regulated in the areas.
  - **Permitted:** ongoing agriculture and horticulture practices by local communities, rainwater harvesting, organic farming, adoption of green technology and use of renewables. **Hence option (a) is the correct answer.**

Q 63.A

- **A hydropower project involves the harnessing of energy from flowing water to generate electricity.** The **West Seti Hydroelectric Project** (WSHEP) is a 750 MW storage scheme on the Seti River in the Far Western Development Region (FWDR) of **Nepal** by West Seti Hydro Limited (WSH), the project proponent. The **dam site is located 67 km upstream of the confluence of the Seti River with the Karnali River. Hence pair 1 is not correctly matched.**
- The **Nathpa Jhakri project,** located in the mountainous area of the state of **Himachal Pradesh** uses the waters of the upper reaches of the **Satluj River** for hydroelectric purposes. It is part of the program aimed at enhancing the already considerable hydroelectric power production of the northern Indian state. **Hence pair 2 is not correctly matched.**
- **Mettur Dam situated in Salem is one of the largest dam of Tamilnadu.** It was constructed in a gorge, where the Kaveri River enters the plains. **Hence pair 3 is correctly matched.**

- The **Chungthang dam of Sikkim** Urja Limited's 1,200 MW Teesta-III hydroelectric project on river Teesta. **A cloud burst over Lhonak Lake** in North Sikkim caused a flash flood in the Tessta River in **Lachen Valley** which washed away Chungthang dam. **Hence pair 4 is not correctly matched.**
- **Hence, option (a) is the correct answer.**

Q 64.C

- Modern India's first revolutionary, Phadke, is regarded as the 'Father of the Armed Struggle for India's Freedom'. Young Phadke, who considered Shivaji as his role model, is said to have been the inspiration for Bankimchandra's Anandamath. Phadke took a vow to use Khadi and Swadeshi. He founded the Aikyavardhini Sabha in order to ventilate popular grievances. In 1874, he also established the first school of national education in Pune.
- The unfair deposal of the Gaikwaad of Baroda by the British in 1875 hurt the sentiments of the people. The callousness of the British rulers in dealing with the death and devastation caused by a famine, too, angered the people. Phadke toured the Deccan fomenting disaffection against the British and pleading for Swaraj. He gathered a band of about 300 Bhils, Kolis, Ramoshis and Dhangras to attack the political and economic strongholds of the regime. Although, his attacks met with limited success. When the government offered a reward for his capture, Phadke countered by offering a higher reward for the capture of Governor of Bombay. He was captured in the Nizam's dominion in July 1879 and sent to Aden, where he died on 17 February 1883.
- **Hence option (c) is the correct answer.**

Q 65.C

- **A Super Blue Moon is a rare celestial event characterized by a combination of three astronomical phenomena: a full moon, a supermoon, and a blue moon.**
- **Full Moon**: The term **"Super Blue Moon" starts with a full moon**, which is the lunar phase when the **moon appears fully illuminated from the Earth's perspective. It occurs when the moon is directly opposite the sun, with its entire day side lit up.**
- **Supermoon**: The full moon coincides with the moon's closest approach to **Earth in its elliptical orbit, known as perigee.** During this time, the moon appears larger and brighter in the sky compared to its appearance at its farthest point from Earth (apogee). The term "supermoon" is used to describe this proximity, as the **moon can appear up to 14% larger and 30% brighter during this phase.**
- **Blue Moon:** The Super Blue Moon also involves the occurrence of a blue moon, which is the second full moon within a calendar month. **The lunar cycle is approximately 29.5 days, slightly shorter than the average month**. When a full moon takes place at the beginning of a month, there is enough time for a second full moon to happen within the same month, leading to the term "blue moon." **This event is relatively rare, happening every two to three years.**
- **A Super Blue Moon is an extraordinary event where a full moon**, a supermoon (due to its proximity to Earth), and a blue moon (the second full moon in a month) coincide, resulting in a visually stunning and unique lunar display.
- **Hence option (c) is the correct answer.**

Q 66.C

- Born in a 'modernist' family in 1838, Keshab inherited his grandfather's organizing ability and his father's 'spirit of vaisnava devotion'. His grandfather Ramkamal Sen (1783-1844) was the first Indian secretary of the Asiatic society.
- Keshab's father Peary Mohon Sen (1814-1848), though a student of Hindu College during the peak of the young Bengal Movement (1831-1843) was never attracted to this movement. Keshab Sen's work in the sphere of social reform left a deep imprint on the society in Bengal. As a religious and social reformer, Keshab Sen continually shifted his identity - from scientist of religion to exponent of Neo-Vaisnavism and Mother goddess, from revolutionary social reformer to restrained theoretician, from ardent constitutionalist to defender of authoritarianism, from an advocate of nationalism to a champion of 'providential' British rule.
- **Keshab's primary concern was the quest for universal religion. As a student of Hindu College (1854-56) he was deeply attracted to the Unitarian theological and social gospels propounded in the writings of Theodore Parker, FW Newman, RW Emerson, Miss Francis Cobbe and others. CHA Dall, the American Unitarian Missionary also convinced Keshab of the validity of the Unitarian social ideology. Under such influences, Keshab established in 1857 the 'Goodwill Fraternity', a Unitarian religious society for the students, where he was the main speaker.**

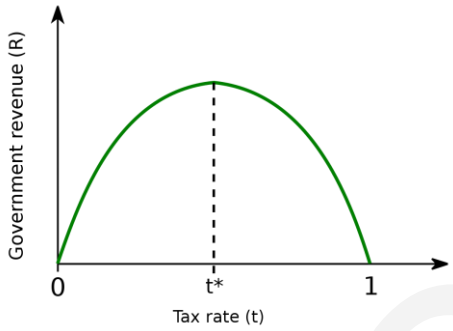
- In one of the meetings of this organization, Keshab first met Debendranath Tagore. Fascinated by monotheist Vedantism, as Debendranath propounded it, Keshab joined the Brahma Samaj in 1857 and became its central figure in 1858. Debendranath found in this brilliant orator and organiser a good leader of the Brahma Samaj. Debendranath ended his Autobiography in 1858 stating 'After that is Keshab's period'.
- **Hence option (c) is the correct answer.**

Q 67.A

- **Red soil contains a high percentage of iron content, which is responsible for its color.** This soil is deficient in nitrogen, humus, phosphoric acid, magnesium, and lime but fairly rich in potash, with its pH ranging from neutral to acidic.
- **Red soil develops on crystalline igneous rocks.** Red Soil is formed by the weathering of igneous rocks like granite and metamorphic rocks like gneiss.
- **Red Soil is usually formed in areas of low rainfall in the eastern and southern parts of the Deccan plateau**. Yellow and red soils are also found in parts of Odisha, Chhattisgarh, southern parts of the middle Ganga plain and along the piedmont zone of the Western Ghats. **Hence option (a) is the correct answer.**

Q 68.B

- **The Laffer Curve** is a theoretical concept developed by economist Arthur Laffer in the 1970s. **It illustrates the relationship between tax rates and tax revenue collected by governments.**



- It suggests that as tax rates increase from low levels, tax revenue initially increases as well, but at a certain point, further increases in tax rates lead to a decrease in tax revenue.
- This occurs because excessively high tax rates can discourage work, investment, and economic activity, thereby reducing the tax base and overall revenue. The Laffer Curve implies that there is an optimal tax rate that maximizes government revenue, beyond which increasing taxes becomes counterproductive.
- **Hence, option (b) is the correct answer.**

Q 69.B

- **Laser weapons are devices that use high-powered lasers to damage targets with an intense beam of light. Under Protocol on Blinding Laser Weapons (Protocol IV to the 1980 Convention), October 1995, Article 1:** It is prohibited to employ laser weapons specifically designed, as their sole combat function or as one of their combat functions, to cause permanent blindness to unenhanced vision, that is to the naked eye or the eye with corrective eyesight devices. The High Contracting Parties shall not transfer such weapons to any State or non-state entity. So, only laser weapons specifically designed are prohibited. **Hence statement 1 is not correct.**
- **Current laser weapons do have a limited range compared to conventional weapons.** Existing systems effectively engage targets within a few kilometers. Most of the systems, like Iron Beam, Stryker, and Zadira, are short-range systems capable of engaging small targets only. Conventional aerial targets like aircraft are beyond the capability of these systems and this drawback seriously undermines the suitability of existing laser weapons for use in air defence. **Hence statement 2 is correct.**

Q 70.B

- Mahabalipuram, a quiet town in Tamil Nadu, holds an important place within the portals of Indian history. It is here that the mighty Pallavas once ruled and built their beautiful monuments, starting from around the 3rd century CE. Among the forty heritage sites in Mahabalipuram, the Pancha Rathas hold a rather unique position. These Rathas temples are examples of South Indian Dravidian temple architecture and they marked a precursor to the modern Dravidian architecture. **Hence statement 1 is correct.**

- The five-ratha group is on a north-south axis with the Dharmaraja Ratha on the south, followed by the Bhima, Arjuna and Draupadi Rathas; the latter two share a common platform. There is a lion west of the Arjuna-Draupadi platform, a seated bull on its east and a standing elephant on its southwest. The Nakula and Sahadeva Ratha is northwest of Bhima Ratha and southwest of Arjuna Ratha, behind the elephant. The cross-sectional axis of the Nakula and Sahadeva Ratha is in the centre of the group. All the temples have a west entrance except the Nakula-Sahadeva Ratha, which has a south entrance. **Hence statement 2 is incorrect.**
- The Pancha Rathas are unique as they are among the earliest monuments of their type in India. Built under the patronage of Narasimhavarman I (630-668 CE), these rathas are a group of five monolithic free-standing temples that were cut out from solid granite and diorite rocks. **Hence statement 3 is correct.**

Q 71.B

- GDP is the final value of the goods and services produced within the geographic boundaries of a country during a specified period of time, normally a year. GDP growth rate is an important indicator of the economic performance of a country.
- It can be measured by three methods, namely,
  - **Output Method**: This measures the monetary or market value of all the goods and services produced within the borders of the country. In order to avoid a distorted measure of GDP due to price level changes, GDP at constant prices o real GDP is computed. GDP (as per output method) = Real GDP (GDP at constant prices) – Taxes + Subsidies.
  - **Expenditure Method**: This measures the total expenditure incurred by all entities on goods and services within the domestic boundaries of a country. GDP (as per expenditure method) = C + I + G + (X-IM) C: Consumption expenditure, I: Investment expenditure, G: Government spending and (X-IM): Exports minus imports, that is, net exports.
  - **Income Method**: It measures the total income earned by the factors of production, that is, labour and capital within the domestic boundaries of a country. GDP (as per income method) = GDP at factor cost + Taxes – Subsidies.
- There are a few points to be kept in mind while estimating national income by income method:
- 1) A distinction has to be made between factor and income transfer income. While factor incomes are earned by factors of production, transfer incomes are enjoyed by various economic agents without supplying factor services. It is only factor incomes that constitute national income. Accordingly, **transfer incomes are excluded from national income of an economy.**
- 2) The services of owner-occupied dwellings are equal to imputed rent of the dwelling. **Imputed rent adjusted for maintenance expenditure of dwellings is included in national income by production method. Hence statement 1 is correct.**
- 3) Income earned by the act of smuggling or gambling as well as **windfall gains like lotteries are not included in the estimation of national income. Hence statement 2 is not correct.**
- 4) National Income of an economy includes direct taxes like income tax and corporate tax. It may be useful to remember that compensation of employees includes income tax to be paid by them and are included in national income before deduction of corporate tax. Death duties, gift tax, wealth tax, etc., are supposed to be paid from the wealth or past savings of those persons who pay these taxes and not out of current income. Therefore, such taxes are not included in the estimation of national income.
- 5) **Sale and purchase of second-hand goods are not included in national income of an economy.** The sale proceeds of second-hand goods received by a person do not relate to any service rendered and, therefore, do not constitute a part of national income. **Hence statement 3 is not correct.**

Q 72.B

- **The National Aerospace Laboratories (NAL) in Bengaluru** has completed the first test of a solar-powered "pseudo satellite", a new-age unmanned aerial vehicle (UAV) that can significantly increase India's surveillance and monitoring capabilities in the border areas. **Hence, statement 1 is correct.**
- T**he high-altitude pseudo satellite vehicle, or HAPS, can fly at altitudes of 18-20 km from the ground**, almost double the heights attained by commercial airplanes, and, due to its ability to generate solar power, can remain in the air for months, even years, offering it advantages of a satellite. However, because it does not require a rocket to get into space, the cost of operating HAPS is several times lower than that of a satellite that is usually placed at least 200 km from the Earth**. Hence, statement 2 is correct.**
- **By standards of flying objects, and in comparison to UAVs for example, they move slowly, at just about 80-100 km per hour. That kind of slow speed 20 km above the ground means that objects on**

the ground pretty much don't move for it. They work like geostationary satellites but with added flexibility. They can be easily redeployed over another location or can be reequipped with a different payload, something that is not possible with a geostationary satellite. **Hence, statement 3 is not correct.**

- The technology is still in the developing stage. Although NASA has been using solar-powered engines for its Pathfinder series of aircraft for a long time, it is only now that other countries have got into developing more sturdy and nimble versions of solar aircraft for a variety of purposes. China, South Korea, and the UK are some of the other countries where this development is taking place. Some private companies are also developing HAPS, even in India.

Q 73.D

- **Terms of trade (TOT) represent the ratio between a country's export prices and its import prices**. TOT indexes are defined as the value of a country's total exports minus total imports. The ratio is calculated by dividing the price of the exports by the price of the imports and multiplying the result by 100. **Hence statement I is not correct.**
- An improvement or increase in a country's TOT generally indicates that export prices have gone up as import prices have either maintained or dropped. Conversely, export prices might have dropped but not as significantly as import prices. Export prices might remain steady while import prices have decreased or they might have simply increased at a faster pace than import prices. All these scenarios can result in an improved TOT.
- **Factors Affecting Terms of Trade:** A TOT is dependent to some extent on exchange and inflation rates and prices. A variety of other factors influence the TOT as well, and some are unique to specific sectors and industries.
    - Scarcity—the number of goods available for trade—is one such factor. The more goods a vendor has available for sale, the more goods it will likely sell, and the more goods that vendor can buy using capital obtained from sales.
    - The size and quality of goods also affect TOT. Larger and higher-quality goods will likely cost more. If goods sell for a higher price, a seller will have additional capital to purchase more goods.
- **Fluctuations in ToT:**
    - **A country can purchase more imported goods for every unit of export that it sells when its TOT improves. An increase in the TOT can thus be beneficial because the country needs fewer exports to buy a given number of imports. Hence statement II is correct.**
    - It might also have a positive impact on domestic cost-push inflation when the TOT increases because the increase is indicative of falling import prices to export prices. The country's export volumes could fall to the detriment of the balance of payments (BOP), however.
    - The country must export a greater number of units to purchase the same number of imports when its TOT deteriorates. The Prebisch-Singer hypothesis states that some emerging markets and developing countries have experienced declining TOTs because of a generalized decline in the price of commodities relative to the price of manufactured goods.

Q 74.A

- When there is a change in the species structure of an ecological community over a period, it is called ecological succession.
- The process continues until a stable community is formed, which is known as the climax community.
- Ecological Succession is of following two types:
    - **Primary Succession:** When the succession starts from an area that has not been previously occupied is referred to as primary succession. The pioneer species here include microorganisms, lichens, and mosses.
    - **Secondary Succession:** When the process of succession occurs in an area where species existed at some point in time is referred to as secondary succession.
- Grasses have one good trick to monopolise a place. In the dry season, the grasses dry up and cause fires which destroy other plant species and their seeds (autogenic succession). **Also, grasslands develop in regions with scanty rainfall where plant growth cannot be achieved. Hence option (a) is the correct answer.**
- Though forests form the climax community in most ecosystems, in the grassland ecosystem, grasses form the climax community. Thanks to fire and lack of water. Grasslands are almost irreversible once deforestation in water-scarce areas gives way to grasslands.

Q 75.B

- **Fiscal consolidation** refers to the process by which a government takes measures to reduce its budget deficit and stabilize its debt levels relative to its gross domestic product (GDP). The primary objective of fiscal consolidation is to improve the long-term sustainability of public finances, enhance macroeconomic stability, and create a favorable environment for sustainable economic growth.
- There are several strategies that governments typically employ as part of fiscal consolidation efforts:
- **Revenue Enhancement: Governments may aim to increase revenue by measures such as broadening the tax base, reducing tax exemptions, rationalizing tax rates, and combating tax evasion**. These measures help to boost government income without significantly increasing the tax burden on individuals or businesses. **Hence, statement 1 is correct.**
- **Expenditure Rationalization:** Governments can also focus on controlling and reducing expenditures to bring deficits under control. This may involve cutting unnecessary or inefficient spending, reforming entitlement programs, and optimizing government operations to improve efficiency.
- **However, providing subsidized food items** to consumers to check inflationary trends in the economy may address immediate concerns related to inflation, it may not directly contribute to fiscal consolidation. Subsidizing food items **can put pressure on government expenditure. Hence, statement 2 is not correct.**
- **Public Debt Management: Effective management of public debt is crucial for fiscal consolidation.** Governments may aim to reduce reliance on borrowing by implementing debt reduction strategies, refinancing high-cost debt with lower-cost alternatives, and improving debt maturity profiles to reduce refinancing risks.
- **However, increased off-budgetary borrowings can lead to fiscal imbalances and undermine fiscal consolidation efforts in the long run. Hence, statement 3 is not correct.**
- **Budgetary Discipline: Adherence to fiscal rules and targets, such as those outlined in Fiscal Responsibility and Budget Management (FRBM) acts or similar legislation, is essential for maintaining budget discipline** and ensuring that government spending remains sustainable over the long term. **Hence, statement 4 is correct.**

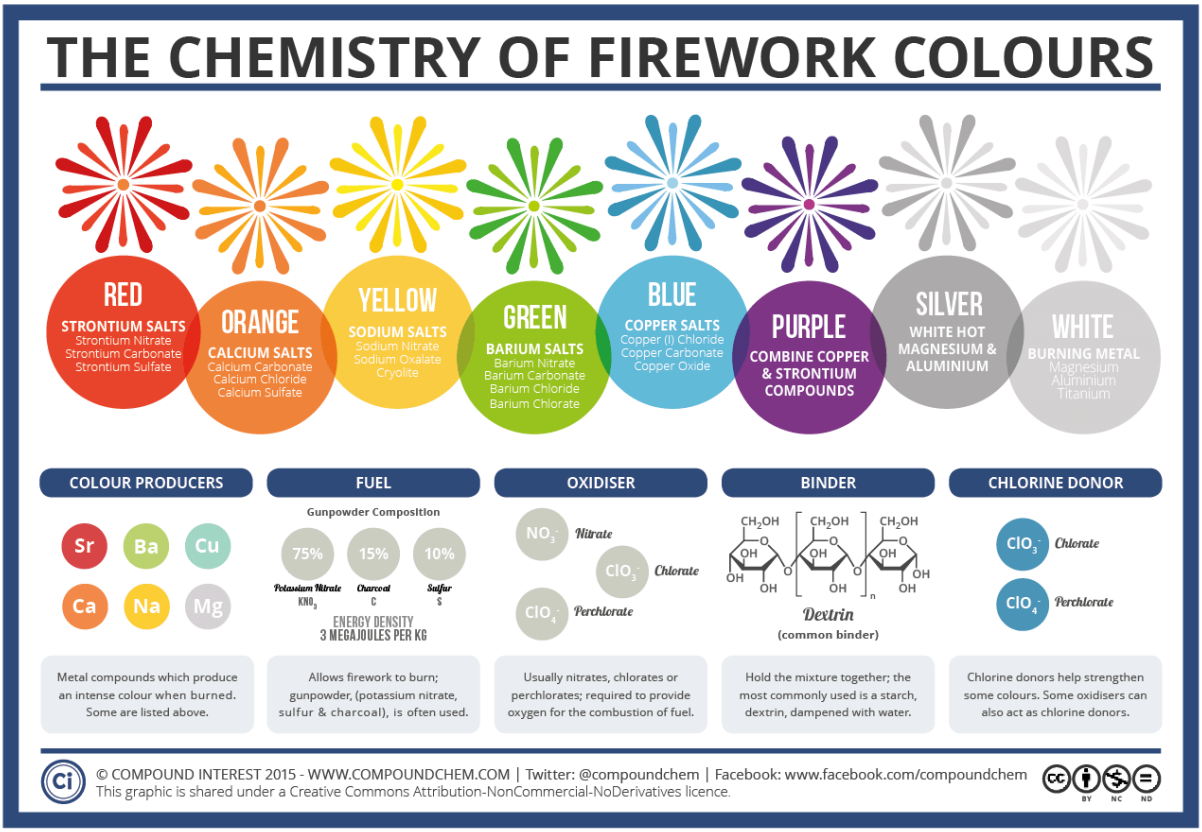
Q 76.B

- Consumer Price Index measures price changes from the perspective of a retail buyer. It is released by the National Statistical Office (NSO).
- The CPI calculates the difference in the price of commodities and services such as food, medical care, education, electronics etc, which Indian consumers buy for use.
- At present, India has five consumer price indexes (CPIs), three of which are working-class specific. These are: • CPI for Industrial Workers (IW).• CPI for Agricultural Labourer (AL).• CPI for Rural Labourer (RL).**These three indexes are compiled by the Labour Bureau in the Ministry of Labour and Employment. Hence statement 1 is not correct.**
- **CPI-AL is basically used for revising minimum wages for agricultural labour in different States. The present base of CPI-AL is 1986-87,** and as in the case of other consumer price indices, the consumption pattern of agricultural labourers has changed over the years. Therefore, the NSSO is presently conducting a family expenditure survey for agricultural labourers to get the present consumption pattern and to shift the present base of CPI-AL to a more recent year. **Hence statement 2 is correct.**
- **Wage rates for workers under the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), 2005 are notified and revised annually based on Consumer Price Index-Agricultural Labourers (CPI-AL)** by the Central Government in accordance with the provisions of Section 6(1) of the Mahatma Gandhi NREGA. **Hence statement 3 is correct.**

Q 77.A

- Noise standards for fire-crackers were notified under the Environment (Protection) Act, 1986). The broad requirements for measurement of noise from fire-crackers shall be-
  - The measurements shall be made on a hard concrete surface of minimum 5-meter diameter or equivalent.
  - The measurements shall be made in free field conditions i.e., there shall not be any reflecting surface up to 15-meter distance from the point of bursting.
  - The measurement shall be made with an approved sound level meter. **Hence statement 1 is not correct.**
- Recently, the Supreme Court stated that its order banning the use of barium and banned chemicals in firecrackers applies not just to the National Capital Region but to the entire country. During fireworks

interaction between the firecracker fuel and the oxidizer releases energy. Metals in the mix, which have a varying arrangement of electrons in shells outside their nucleus, produce different wavelengths of light in this reaction, generating spectacular colors. Barium compounds, for example, produce green light, and Strontium and Lithium salts, red. **Hence statement 2 is not correct.**



- Council of Scientific and Industrial Research, through its National Environmental Engineering Research Institute (CSIR-NEERI), Nagpur, has come out with "green firecrackers" that have "reduced emission light and sound" and 30% less particulate matter using Potassium Nitrate as oxidant. These crackers are named Safe Water Releaser, which minimizes Potassium Nitrate and Sulphur use but matches the sound intensity of conventional crackers, Safe Minimal Aluminium, where Aluminium use is low, and Safe Thermite Crackers with low Sulphur and Potassium Nitrate. These crackers are to be identified using unique QR codes to guide consumers. **Hence statement 3 is correct.**
- **Hence option (a) is the correct answer.**

Q 78.D

- The **Convention on Migratory Species (CMS)** is an **intergovernmental** treaty under **UNEP**, popularly known as the **Bonn Convention.** It was signed in 1979 and has been in force since 1983. India is a party to the CMS since 1983.
- It aims to **conserve terrestrial, marine, and avian migratory species throughout their range**.
- Recently, the **State of the World's Migratory Species 2024 repor**t was launched. It was the **first-ever State of the World's Migratory Species Report** launched by the CMS, at the opening of a major UN wildlife conservation conference (**CMS COP14**).
- The landmark report reveals:
  - Nearly half of the species population are showing population declines.
  - More than one-in-five of CMS-listed species are threatened with extinction.
  - **Nearly all (97 percent) of CMS-listed fish are threatened with extinction.**
  - Half (51 percent) of Key Biodiversity Areas identified as important for CMS-listed migratory animals do not have protected status, and 58 percent of the monitored sites recognized as being important for CMS-listed species are experiencing unsustainable levels of human-caused pressure.
- Until now, no such comprehensive assessment of migratory species has been carried out. The report provides a global overview of the conservation status and population trends of migratory animals, combined with the latest information on their main threats and successful actions to save them.
- **Hence option (d) is the correct answer.**

Q 79.C

- Federalism is a system of government in which power is divided between a central authority and constituent political units, such as states or provinces. Within this broad framework, several types or models of federalism have emerged, each with its own characteristics and variations. Some of the notable types of federalism include:
  - **Dual Federalism: Also known as "layer cake federalism," this model emphasizes a clear distinction between the powers of the central government and those of the states.**
    - ✓ Under dual federalism, each level of government operates within its own sphere of authority, with limited overlap or interference from the other level.
    - ✓ This approach was prominent in the early years of the United States, particularly during the 19th century, when the powers of the federal government were narrowly construed, and states retained significant autonomy.
  - **Cooperative Federalism: Cooperative federalism, often referred to as "marble cake federalism," emphasizes collaboration and joint decision-making between the central government and subnational units.**
    - ✓ In this model, **the lines between federal and state authority are blurred, and both levels of government work together to address common challenges and implement policies.**
    - ✓ Cooperative federalism often involves shared funding, cooperative programs, and overlapping responsibilities between the central government and states.
    - ✓ This approach gained prominence in the United States during the 20th century, particularly with the expansion of federal programs and initiatives aimed at addressing national issues such as infrastructure, education, and healthcare.
  - **Competitive Federalism: Competitive federalism focuses on fostering competition among subnational units, such as states or provinces, to attract investment, businesses, and residents.**
    - ✓ Under this model, states have significant autonomy in crafting policies and regulations to create favorable business environments and attract economic activity.
    - ✓ The idea is that competition between states will lead to innovation, efficiency, and better governance overall. Competitive federalism is often associated with decentralized decision-making and a limited role for the central government in economic and regulatory matters.
  - **Creative Federalism: Creative federalism involves a more active role for the central government in coordinating and directing policy initiatives at the state and local levels.**
    - ✓ In this model, the central government provides funding and resources to states and localities in exchange for compliance with federal priorities and guidelines.
    - ✓ Creative federalism often involves the use of grants-in-aid, where the central government provides financial assistance to states for specific purposes, such as education, healthcare, or transportation.
    - ✓ This approach was prominent in the United States during the mid-20th century, particularly during the administrations of Presidents Lyndon B. Johnson and Richard Nixon, as part of efforts to address social and economic inequalities.
- **These types of federalism are not mutually exclusive, and elements of each may be present in a particular federal system.** Additionally, the specific characteristics of federalism can vary depending on the country's constitutional framework, historical context, and political dynamics.
- **Hence option (c) is the correct answer.**

Q 80.B

- **Winter solstice, the two moments during the year when the path of the Sun in the sky is farthest south in the Northern Hemisphere (December 21 or 22) and farthest north in the Southern Hemisphere (June 20 or 21). At the winter solstice the Sun travels the shortest path through the sky, and that day therefore has the least daylight and the longest night.**
- **When the winter solstice happens in the Northern Hemisphere, the North Pole is tilted about 23.4° (23°27′) away from the Sun. Because the Sun's rays are shifted southward from the Equator by the same amount, the vertical noon rays are directly overhead at the Tropic of Capricorn (23°27′ S)**. Six months later the South Pole is inclined about 23.4° away from the Sun. On this day of the winter solstice in the Southern Hemisphere, the Sun's vertical overhead rays progress to their northernmost position, the Tropic of Cancer (23°27′ N). **Hence, option (b) is the correct answer.**
- According to the astronomical definition of the seasons, the winter solstice also marks the beginning of the season of winter, which lasts until the vernal equinox (March 20 or 21 in the Northern Hemisphere, or

September 22 or 23 in the Southern Hemisphere). After the solstice, the days get longer, and the day has thus been celebrated in many cultures as a time of rebirth.

Q 81.D

- **Tax expenditure refers to the revenue that a government foregoes or loses due to preferential tax provisions, such as exemptions, deductions, credits, and other special tax breaks.** These provisions are designed to encourage certain behaviours, promote specific industries, or achieve particular policy objectives. While they resemble government spending programs in their impact, tax expenditures are achieved through the tax code by providing relief to specific groups or activities. **Hence, option (d) is the correct answer.**
- Through its tax and expenditure policy, the government attempts to bring about a distribution of income that is considered 'fair' by society. The government affects the personal disposable income of households by making transfer payments and collecting taxes and, therefore, can alter the income distribution.

Q 82.B

- The **Ministry of Power and the Ministry of New and Renewable Energy** have jointly launched a National Mission to quickly identify emerging technologies in the power sector and develop them indigenously, at scale, for deployment within and outside India. The National Mission, titled "Mission on Advanced and High-Impact Research (MAHIR)" aims to facilitate indigenous research, development, and demonstration of the latest and emerging technologies in the power sector. By identifying emerging technologies and taking them to the implementation stage, the Mission seeks to leverage them as the main fuel for future economic growth and thus make India a manufacturing hub of the world. **Hence statement 1 is not correct.**

Mission Objectives

The key objectives of the Mission are as follows:

- To identify emerging technologies and areas of future relevance for the Global Power Sector and take up indigenous end-to-end development of relevant technologies
- To provide a common platform for Power Sector Stakeholders for collective brainstorming, synergetic technology development and devise pathways for smooth transfer of technology
- To support pilot projects of indigenous technologies (developed especially by Indian Start-ups) and facilitate their commercialization
- To leverage foreign alliances and partnerships to accelerate research & development of advanced technologies and to build competencies, capabilities and access to advanced technologies through bilateral or multilateral collaborations, thereby facilitating exchange of knowhow and Technology Transfer.
- To seed, nurture and scale up scientific and industrial R&D and to create vibrant & innovative ecosystem in the Power Sector of the country
- To make our Nation among the leading Countries in Power System related Technologies & Applications development

- **Hence statement 2 is correct.**

Areas Identified for Research

To begin with, the following eight areas are identified for research:

i. Alternatives to Lithium-Ion storage batteries
ii. Modifying electric cookers / pans to suit Indian cooking methods
iii. Green hydrogen for mobility (High Efficiency Fuel Cell)
iv. Carbon capture
v. Geo-thermal energy
vi. Solid state refrigeration.
vii. Nano technology for EV battery
viii. Indigenous CRGO technology

- **Hence statement 3 is correct.**

Q 83.A

- **Multilateral Export Control Regimes (MECR) are voluntary and non-binding agreements created by the major supplier countries that have agreed to co-operate in their effort to prevent and regulate the transfer of certain military and dual use technology.** It aims at preventing the proliferation of Weapons of Mass Destruction.
  - They are independent of the United Nations.
  - Their regulations apply only to members and it is not obligatory for a country to join.
  - **India is now a member of three of the four MECRs, except the Nuclear supplier Group. Hence option (a) is the correct answer.**
- **Wassenaar Arrangement:**
  - The Wassenaar Arrangement is a voluntary export control regime. The Arrangement, formally established in July 1996, has 42 members who exchange information on transfers of conventional weapons and dual-use goods and technologies.

- ✓ **Dual-use refers** to the ability of a good or technology to be used for multiple purposes - usually peaceful and military.
  - Wassenaar Arrangement's Secretariat is in Vienna, Austria.
  - India was inducted to the Wassenaar Arrangement on 7 December, 2017 as the 42nd member.
- **Nuclear Suppliers Group:**
  - The Nuclear Suppliers Group (NSG) is a group of nuclear supplier countries that seeks to contribute to the non-proliferation of nuclear weapons through the implementation of two sets of Guidelines for nuclear exports and nuclear-related exports.
  - The NSG came into being as a response to the 1974 nuclear tests by India.
  - It has 48 participating governments.
  - India is not a member of the NSG because all its efforts were consistently blocked by China and some other members.
  - India's bid for membership being blocked on the ground of India being a non-signatory to the nuclear non-proliferation treaty.
- **Australia Group:**
  - It is an informal association of member states that aims to minimize risk of proliferation of chemical and biological weapons.
  - The formation of the Australia Group (AG) in 1985 was prompted by Iraq's use of chemical weapons during the Iran-Iraq War (1980-1988).
  - India joined the Australia Group (AG) on 19 January 2018.
- **Missile Technology Control Regime (MTCR):**
  - It is an informal political understanding among states that seek to limit proliferation of missiles and missile technology.
  - Formed in 1987 by G-7 countries.
  - It is not legally binding.
  - India was inducted into the Missile Technology Control Regime in 2016 as the 35th member.

Q 84.A

- The producer price index (PPI) is a collection of indexes that calculates and represents the average change in selling prices from domestic production over time. In other words, PPI is an index that **measures the average price change of goods and services as they leave the place of manufacture or enter the manufacturing process. Hence statement 1 is not correct.**
- The main goal of the Producer Price Index (PPI) is to address price increases at the producer level before they are passed on to consumers, and **it excludes indirect taxes, transportation, trade margins, and so on.**
- **The Producer Price Index has not yet been used in India,** but Niti Aayog has developed a plan to implement it soon. **Hence statement 2 is not correct.**
- **PPI measures price change from the perspective of the seller.** It is an index that tracks price changes in the manufacturing process. It tracks the average change in selling prices received by producers for their goods and services. It tracks price changes for goods and services sold to final and intermediate demand. **Hence statement 3 is correct.**

Q 85.B

- One of the contemporary Rajput political powers, the Paramaras, emerged in the **region of Gujarat, Malwa and Southern Rajputana out of the bitter struggle between the Gurjara-Pratiharas and the Rashtrakutas**. The territory ruled over by the Paramaras of Malwa included Malwa proper and the adjoining districts. **Hence statement 1 is not correct.**
- The **Harsola copper plates**, found in present-day Gujarat state, consist of two Indian inscriptions from 949 CE. These inscriptions document the grants of two villages to a father-son duo of Nagar Brahmins. The inscription was issued **by the Paramara king Siyaka II. Hence statement 3 is correct.**
- The **Parmara were feudatories of Rashtrakutas of Manyakheta.** Due to their conflicts with neighbouring kingdoms such as the Chalukyas of Gujarat, the Chalukyas of Kalyani, the Kalachuris of Tripuri, the Paramara dynasty experienced multiple periods of both growth and decline. **Hence statement 2 is correct.**
- The majority of the Paramara **kings were followers of Shaivism** and constructed various Shiva temples although they were patrons of Jain scholars. **Hence statement 4 is not correct.**
- **Hence option (b) is the correct answer.**

Q 86.D

- **A Zero FIR is a First Information Report (FIR) that can be registered by any police station in India, regardless of the area where the offense occurred. Hence option (d) is the correct answer.**
- **Recommendations of the Justice Verma Committee led to the introduction of Zero FIR.**
  - The Justice Verma Committee was formed in the aftermath of the brutal gang rape and murder of Nirbhaya in Delhi in 2012.
- It is typically used in cases where the victim is unsure of the exact location of the offense, or when immediate action is required to prevent further harm.
  - Once a Zero FIR is registered, the concerned police station is responsible for investigating the offense and transferring the case to the appropriate jurisdiction.
  - Zero FIRs are not a substitute for regular FIRs registered at the appropriate police station.
- The practice of Zero FIRs has been recognized by the Supreme Court of India in several landmark judgments.

Q 87.D

- The World Trade Organization is the only international organizationthat deals with the rules of trade between countries. The WTO officially commenced in 1995 under the Marrakesh Agreement signed by 124 nations, replacing the General Agreement on Tariffs and Trade (GATT).
- According to its rules, all decisions are taken through consensus and any member can exercise a veto.
- **Recently, the 13th Ministerial Conference (MC13) of the World Trade Organization (WTO) ended in a status quo**. No consensus was reached on most of the key issues. WTO reforms still remains an Achilles heel. However, Indian Commerce and Industry Minister Piyush Goyal emphasised that India has retained full policy space for the benefit of its farmers.
- **Outcomes of 13th Ministerial Conference:**
- **No agreement was reached on the public stock holding issue**. Developed nations, such as the European Union, have opposed public stock holding programs on the ground that could impact the food security of other countries. India faces no immediate threat to its public stock holding program due to the 'peace clause'. It offers a shield to developing countries from legal challenges over subsidies or free distribution of grains to the poor. **Hence statement 1 is not correct.**
- **India opposed the continued exemption of Customs duties on e-commerce or electronic transmission.** India has argued that the moratorium adversely affected revenue collections. India also wanted an assessment of the moratorium's scope and its impact on other countries. **WTO nations agreed to maintain the current practice of not imposing Customs duties on electronic transmissions until the next ministerial conference or March 31, 2026, whichever is earlier. Hence statement 2 is not correct.**
- India has demanded the establishment of a fully functional dispute settlement system for amicable resolution of disputes. **Countries have resolved to establish a fully functioning dispute settlement system accessible to all members by the end of 2024. • Member nations failed to produce an outcome document regarding subsidization of fisheries.** The ministerial declaration did not mention fisheries subsidies. India acknowledged the negative impact of subsidies on the fisheries sector. India emphasised on the need to curb harmful subsidies for countries engaged in distant water fishing.

Q 88.C

- On 7 July 2023, after two weeks of intense negotiations, the member states of the International Maritime Organization (IMO) unanimously adopted the 2023 IMO Greenhouse Gas Strategy. This updated strategy builds upon the initial strategy adopted back in 2018. In 2018, IMO adopted an Initial Strategy for the reduction of GHG emissions from ships, setting out a vision that confirms IMO's commitment to reducing GHG emissions from international shipping and phasing them out as soon as possible. **Hence statement 1 is correct**.
- Targets to be achieved by the measures developed by the IMO
- To **reach net-zero GHG emissions from international shipping by around 2050**, with interim checkpoints of 20-30 percent by 2030 and 70-80 percent by 2040;
- To make zero- or near-zero GHG energy, fuels, and technologies 5-10 percent of shipping's energy mix by 2030; and
- To develop a marine GHG fuel standard and a maritime GHG emissions pricing mechanism, which are expected to be adopted in 2025 and could enter into force in 2027.
- **Hence statement 2 is not correct.**

- While 2030 strategy targets are not entirely 1.5°C aligned—a key point of critique, the political agreement still represents an important step forward for global climate action. Eventually, it was achieved based on consensus among all 175 IMO member states. **Hence statement 3 is correct.**

Q 89.B

- Recently, SEBI allowed alternative investment funds (AIFs) to participate in the Credit Default Swaps (CDS) market.
- **A Credit Default Swap (CDS) is a financial derivative contract between two parties** (typically referred to as the buyer and the seller) **to transfer the credit risk from one party to another.** In this contract, the buyer pays the seller a periodic fee or premium in exchange for protection against the risk of default on a specific debt obligation, such as a bond or loan, issued by a third party (often referred to as the reference entity).
- **CDS allows business entities to hedge risks associated with the bonds market and facilitate the deepening of the domestic corporate bond segment.**
- **Hence, option (b) is the correct answer.**

Q 90.B

- **Recent Context: Iran launched missile and drone attacks in Iraq, Syria, and Pakistan.**
- Syria's (Daesh terrorist group) suicide bombers struck crowds gathered near the tomb of the revered IRGC (Islamic Revolutionary Guard Corps) general Qasem Soleimani in **Kerman (city in Iran)** in January 2024. In response, Iran launched ballistic missiles into **Syria's Idlib region. Hence pairs 1 and 2 are not correctly matched.**
- In **Iraq**, the IRGC claimed responsibility for targeting an alleged Israeli facility. Iran launched a missile strike, into **Irbil,** destroying Mossad's (Israel's external security agency) spy headquarters in the Kurdistan region. The attack is purportedly a response to recent Israeli actions, including the assassination of Iranian and pro-Iranian commanders. **Hence pair 3 is correctly matched.**
- Iranian security personnel were killed in Rask, a town closer to the Pakistan border, by Jaish al-Adl (the Army of Justice) militant group in December 2023. In response, Iran carried out a surprise attack in **Panjgur**, **a border town in Pakistan's Baluchistan. Hence pair 4 is correctly matched.**

Q 91.B

- As the clamor for constitutional reforms in India surged under the leadership of Indian figures amidst the advancing British Rule, the developing administrative structures established by the British **facilitated the transition towards a more responsible government in India**. This transition was predicated on the principle of increased representation of Indians.
- The Government of India Act of 1935 was a significant piece of legislation passed by the British Parliament that laid the groundwork for the political structure of independent India. Here are some of its key provisions:
    - **Establishment of an All-India Federation:** The Act proposed the creation of a "Federation of India" that would include both British Indian territories and princely states. However, the federation never materialized due to a lack of support from the required number of princely states.
    - **Division of Powers: The Act divided powers between the center and the provinces into three lists - Federal, Provincial, and Concurrent. Hence statement 1 is not correct.**
    - **Provincial Autonomy: The Act abolished the diarchy system introduced by the Government of India Act of 1919 and granted a large measure of autonomy to the provinces.**
    - **Introduction of Dyarchy at the Center:** The Act introduced the concept of dyarchy at the center. Defence, External Affairs, Ecclesiastical Affairs, and the administration of Tribal Areas were reserved in the hands of the Governor-General.
    - **Bicameral Legislature**: The Act established a bicameral federal legislature consisting of the Council of State and the Federal Assembly. **Hence statement 2 is correct.**
    - **Extension of Franchise:** The Act extended the franchise, increasing the size of the legislatures.
    - **Establishment of a Federal Court:** The Act provided for the establishment of a Federal Court.
    - **Safeguards for Minorities:** The Act included provisions safeguarding the rights of minorities.
    - **Restructuring of Provinces:** The Act partially restructured provinces, for instance, separating Sindh from Bombay, splitting Bihar and Orissa Province into separate provinces of Bihar and Orissa, and completely separating Burma from India.

Q 92.D

- **The Rashtrakutas widely patronized the Sanskrit literature.** There were many scholars in the Rashtrakuta court.
- Trivikrama wrote Nalachampu and the Kavirahasya was composed by Halayudha during the reign of Krishna III.
- The Jain literature flourished under the patronage of the Rashtrakutas. Amogavarsha I, who was a Jain patronized many Jain scholars.
- **His teacher Jinasena composed Parsvabhudaya, a biography of Parsva in verses. Hence statement 1 is correct.**
- **Another scholar Gunabhadra wrote the Adipurana, the life stories of various Jain saints. Hence statement 2 is correct.**
- Sakatayana wrote the grammer work called Amogavritti.
- The great mathematician of this period, Viracharya was the author of Ganitasaram.
- The Kannada literature saw its beginning during the period of the Rashtrakutas.
- **Amogavarsha's Kavirajamarga was the first poetic work in Kannada language. Hence statement 3 is correct.**
- **Pampa was the greatest of the Kannada poets.** His famous work was Vikramasenavijaya.
- Ponna was another famous Kannada poet and he wrote Santipurana.

Q 93.A

- **Located within the close vicinity of the Bhitarkanika National Park is Odisha's only Turtle Sanctuary. A part of Gahirmatha Beach, the Turtle Sanctuary is the place where one can spot Olive Ridley Turtles.** These turtles travel all the way from the South Pacific Ocean to breed on the coast of Gahirmatha. About half a million of these species visit the beach every year for mating. I**t extends from Dhamara River mouth in the north to the Brahmani river moth in the south.**
- **The rookery at Gahirmatha, from Dhamra mouth to Hukitola island, covering 1,435 square kilometers, was declared a marine sanctuary in 1997 by the government to protect the endangered turtles that are protected under the Wild Life (Protection) Act, 1972 as a Schedule I animal. It is known as the known as the world's largest rookery(a colony breeding) of sea turtles. Hence, option (a) is the correct answer.**
- Lakhs of endangered Olive Ridley turtles flocked the Rushikulya river mouth for their annual mass nesting in Odisha's Ganjam district. These endangered species flock to the place every year from the third week of February to the first week of March for nesting. Thus, Odisha is the largest mass nesting site for Oliver Ridleys in the world.

Q 94.C

- **Monoclonal antibodies:**
  - To fight a viral infection, our bodies create proteins known as antibodies. **Monoclonal antibodies are artificial antibodies that mimic the activity of our immune systems. Hence statement 1 is correct.**
  - They are produced through a process that involves extracting specific antibodies from human blood and then cloning them.
  - These monoclonal antibodies are designed to target a virus or a specific part of one — for instance, REGEN-COV2 is a cocktail of two monoclonal antibodies developed to target the SARS-CoV-2 spike protein.
  - The monoclonal antibodies bind to specific parts of the spike protein, blocking its ability to infect healthy cells.
  - **Monoclonal antibodies have been utilized in the treatment of a wide range of diseases, including cancer, autoimmune disorders, infectious diseases, and inflammatory conditions. Hence statement 2 is correct.**
  - For example, monoclonal antibodies like trastuzumab and rituximab have been approved for the treatment of certain types of cancer, while others like infliximab and adalimumab are used to treat autoimmune diseases like rheumatoid arthritis and Crohn's disease.
  - Additionally, monoclonal antibodies have played a significant role in the development of therapies for infectious diseases such as COVID-19, where monoclonal antibody cocktails have been authorized for emergency use to help reduce the severity of illness and prevent hospitalization.

Q 95.C

- **The disinvestment process involves the sale of government stake in public sector enterprises to strategic or financial buyers, either through the sale of shares on stock exchanges or through the sale of shares directly to buyers.** The proceeds from the disinvestment are used to finance various social and infrastructure projects and to reduce the government's fiscal deficit.
- In India, **the disinvestment process is conducted by the Department of Investment and Public Asset Management (DIPAM),** which comes under the Ministry of Finance. **Government had constituted the National Investment Fund (NIF) in 2005 into which the proceeds from disinvestment of Central Public Sector Enterprises were to be channelized. Hence statement 2 is correct.**
- During the current fiscal (2023-24), the revised estimates of disinvestment mop-up has been pegged at Rs 30,000 crore, lower than Rs 51,000 crore budgeted at the time of presentation of Budget last year. As per the Interim Budget 2024-25 document tabled in the Lok Sabha, the government is not expected to receive any money from monetisation of public assets in the current fiscal. It had planned to receive Rs 10,000 crore in the budget estimates for 2023-24.
- **Modes of disinvestment in India are:** 1. Initial Public Offering i.e. listing of CPSE on stock market. 2. Further Public Offering ,3. Buy back of shares, etc. **Hence statement 1 is correct.**
- **The government historically has been missing the disinvestment targets set in budgets with the exception of 2018-19 and 2017-18 financial years.** The highest ever mop-up from disinvestment at Rs 1,00,056 crore was recorded in 2017-18, marginally exceeding the budget target of Rs 1 lakh crore. In 2018-19, the government collected RS 84,972 crore from CPSE disinvestment, higher than Rs 80,000 crore pegged in the Budget for that year.
- **The government pegged disinvestment target for 2024-25 fiscal at Rs 50,000 crore in the interim budget for 2024-25, up from Rs 30,000 crore in the revised estimate for the current financial year.**

Q 96.B

- **The Office of Deputy Speaker is a constitutional position in the Indian Parliament.** The Deputy Speaker assists the Speaker in managing the proceedings of the House and discharging its responsibilities.
- **History of the Office of Deputy Speaker in India**
  - The position of Deputy Speaker in India **has its roots in the Government of India Act of 1919, which established the Central Legislative Assembly**.
    - ✓ **1919-1947: Deputy President (Hence, statement 1 is correct.)**
      - The presiding officer of the Central Legislative Assembly was designated as the "President," and the Deputy President served as his second-in-command.
    - ✓ **1947-1950: Deputy Chairman of the Constituent Assembly**
    - ✓ **1950-Present: Deputy Speaker**
      - With the adoption of the Indian Constitution in 1950, the office of Deputy President was renamed as Deputy Speaker.
- **Article 95(1) of the Indian Constitution states that the Deputy Speaker shall perform all the functions of the Office of the Speaker when the office is vacant** or when the Speaker is absent from a sitting of the House.
  - **Under Article 95(1) of the Constitution, when the office of the Speaker is vacant, the Deputy Speaker can determine petitions relating to disqualification under the 10th Schedule. Hence, statement 2 is correct.**
- **The Constitution of India, in Articles 93 and 178, outlines the process for choosing the Speaker and Deputy Speaker of the Lok Sabha and state Assemblies, respectively.** These articles state that these Houses **"shall, as soon as may be"**, appoint two of its members to these positions.
  - **The phrase "as soon as may be" does not specify a specific timeline for the appointment of the Deputy Speaker. Hence, statement 3 is not correct.**

Q 97.C

- **Stem cells** are special human cells (fundamental building blocks) that are able to develop into many different cell types such as muscle cells, blood cells, and brain cells. Three main types of stem cells play key roles in this process: **embryonic stem cells,** which supply new cells for the growth and development of an embryo into a baby; **adult stem cells**, which provide new cells for an organism's growth and replace damaged cells; and induced pluripotent stem cells (iPS cells), crafted by scientists in laboratories.
- **Stem cell therapy (SCT**) is a novel therapeutic approach that **utilizes the unique properties of stem cells, including self-renewal and differentiation, to regenerate damaged cells and tissues in the human body** or replace these cells with new, healthy and fully functional cells by delivering exogenous cells into a patient. **Hence statement 1 is correct.**

- **Delhi High Court permitted Stem Cell Therapy for treatment of Autism Spectrum Disorder (ASD).** ASD is a neurological and developmental disorder that affects how people interact with others, communicate, learn, and behave. **Hence statement 2 is correct.**
- The SCT process involves several stages, starting with the harvesting of stem cells from a donor, followed by conditioning to prepare the body for transplant. The actual transplantation of stem cells takes place, targeting the damaged areas, and the subsequent recovery phase ensues. Regenerative medicine, the overarching focus of SCT, seeks to pioneer and implement novel treatments that can heal tissues and organs, restoring lost function resulting from aging, diseases, damage, or defects.
- The regulation of SCT is governed by the "New Drugs and Clinical Trial Rules 2019," wherein stem-cell derived products are classified as "new drugs." This designation mandates that **any doctor utilizing SCT must seek permission from the government,** emphasizing the need for stringent oversight and adherence to established protocols. **Hence statement 3 is correct.**

Q 98.C

- **The Convention on the Conservation of Migratory Species of Wild Animals (also known as CMS or Bonn Convention) was adopted in 1983 under the aegis of the United Nations Environment Programme**, aims to conserve terrestrial, aquatic, and avian migratory species throughout their range.
- **The important legally binding agreements (Rio Convention) were opened for signature during the Earth Summit, 1992:**
  - UN Convention on Biological Diversity (CBD)
  - UN Framework Convention on Climate Change (UNFCCC)
  - United Nations Convention to Combat Desertification (UNCCD)
  - Rio Declaration on Environment and Development
  - Agenda 21
  - Forest Principles
- **Hence option (c) is the correct answer.**

Q 99.C

- The annual State of the Cryosphere Report titled Two Degrees is Too High is published by the **International Cryosphere Climate Initiative** (ICCI). ICCI is a registered non-profit organization. ICCI seeks to find such new and integrated solutions to benefit local mountain and Arctic communities. **Hence option (c) is the correct answer.**
- The State of the Cryosphere 2023 – Two Degrees is Too High report shows that all of the Earth's frozen parts will experience irreversible damage at 2°C of global warming, with disastrous consequences for millions of people, societies, and nature. Confirming that just 2°C of global warming will trigger irreversible loss to Earth's ice sheets, mountain glaciers and snow, sea ice, permafrost, and polar oceans, it updates the latest science and highlights the global impacts from cryosphere loss.
- **Key findings in the report on the impact of 2°C of warming include**:
  - Ice sheets: nearly all of Greenland, much of West Antarctica, and even vulnerable portions of East Antarctica will be triggered to very long-term, inexorable sea-level rise.
  - Glaciers: extensive, irreversible ice loss from the world's glaciers in many major river basins, with some disappearing entirely. As glaciers melt, risks of catastrophic events such as landslides, sudden ice shears, and glacial lake outburst floods increase.
  - Sea ice: extensive sea ice loss at both poles, with severe feedback to global weather and climate. By 2°C, the Arctic Ocean will be sea ice-free in summer every year, potentially for several months.
  - Permafrost: extensive permafrost thaw and resulting greenhouse gas emissions will cause temperatures to continue to rise, even once human emissions reach zero. At 2°C, annual total permafrost emissions (both CO2 and methane) would total the size of the entire European Union's emissions from 2019.
- Polar ocean acidification: year-round, permanent corrosive ocean acidification conditions in many regions of Earth's polar and near-polar seas. Shell-building animals and commercial fisheries that rely on them in the food chain may not survive.

Q 100.B

- Raja Rammohan Roy founded the Brahmo Sabha in 1828 which later came to be known as Brahmo Samaj. The Samaj was committed to "the worship and adoration of the Eternal, Inscrutable, Immutable Being who is the Author and Preserver of the Universe". To purify Hinduism and to preach monotheism, Brahmo samaj was based on the twin pillars of reason and the Vedas and Upanishads. Brahmo Samaj promotes rational thinking to eliminate the evil practices of the religion. **Hence statement 1 is correct.**

- Ram Mohan Roy was greatly influenced by western modern thought and stressed on rationalism and modern scientific approach. He explored the English writings of philosophers such as Euclid and Aristotle, which significantly influenced his ethical and religious perspectives. **Hence statement 2 is icorrect.**
- "The Precepts of Jesus" was a significant work authored by Rammohun Roy, which was published in 1828. The book is renowned for its compilation of teachings and moral values, emphasizing the moral and philosophical aspects of the New Testament, distinct from its miraculous elements. Roy's intention with this work was to integrate ethical values from Christianity into Hinduism, contributing to his broader efforts of religious and social reform. **Hence statement 3 is correct.**