Swapnil's IAS

UPSC Prelims Test Series – 2025

Answers & Explanation: Test 12 GS Full Syllabus

Q 1.C

• In India, GDP is estimated by Central Statistical Office (CSO). Under the Fiscal Responsibility and Budget Management Act 2003 and Rules thereunder, Ministry of Finance uses the GDP numbers (at current prices) to peg the fiscal targets. For this purpose, Ministry of Finance makes their own projections about GDP for the coming two years while specifying future fiscal targets.

• In the revision of National Accounts statistics done by Central Statistical Organization (CSO) in January 2015, it was decided that sector-wise wise estimates of Gross Value Added (GVA) will now be given at basic prices instead of factor cost. In simple terms, for any commodity the basic price is the amount receivable by the producer from the purchaser for a unit of a product minus any tax on the product plus any subsidy on the product. GVA at basic prices will include production taxes and exclude production subsidies available on the commodity. Hence, statement 1 is not correct.

• On the other hand, GVA at factor cost includes no taxes and excludes no subsidies and GDP at market prices include both production and product taxes and excludes both production and product subsidies. Hence, statement 2 and 3 are correct.

• The relationship between GVA at Factor Cost and GVA at Basic Prices and GDP at market prices and GVA at basic prices is shown below:

• GVA at factor cost + (Production taxes less Production subsidies) = GVA at basic prices

• GDP at market prices = GVA at basic prices + Product taxes- Product subsidies

Q 2.C

• Sweat equity refers to the ownership stake given to employees in exchange for their hard work and contributions, rather than cash. Companies issue sweat equity primarily to retain top talent, incentivizing them to stay and perform well. This practice aligns employee interests with company success, fostering loyalty and motivation.

• Notably, companies like Google and Facebook have utilized sweat equity to attract and retain skilled employees, enhancing innovation and productivity.

• Hence, option (c) is the correct answer.

Q 3.B

• With the World Restoration Flagships, the UN is honouring the best examples of large-scale and long-term ecosystem restoration mainly focusing on a specific geographical area with significant biodiversity and restoration potential in any country or region, by embodying the 10 Restoration Principles of the UN Decade.

• The World Restoration Flagship awards are part of the UN Decade on Ecosystem Restoration – led by UNEP and FAO – which aims to prevent, halt, and reverse the degradation of ecosystems on every continent and in every ocean. The awards track notable initiatives that support global commitments to restore one billion hectares – an area larger than China. Hence statement 1 is not correct.

• The Namami Gange Programme to rejuvenate River Ganga and its tributaries has been recognised as World Restoration flagship project by UN which reflects the commitments of Government towards conservation, rejuvenation and development of natural ecosystems and its services. Hence statement 2 is correct.

Q 4.C

• **Water Eroded Arid Landforms:**

o Bolsons: The intermontane basins in dry regions are generally known as bolsons. Hence statement 1 is correct.

> Three unique landforms, viz. pediments, bajadas, and playas, are typically found in bolsons. Small streams flow into bolsons, where water is accumulated. These temporary lakes are called playas. After the evaporation of water, salt-covered playas are called salinas.

> Pediments: In form and function there is no difference between a pediment and an alluvial fan; however, a pediment is an erosional landform while an alluvial fan is a constructional one. A true pediment is a rock-cut surface at the foot of mountains.

> Bajada: Bajadas are moderately sloping depositional plains located between pediments and playa. Several alluvial fans coalesce to form a bajada.

• **Wind Eroded Arid Landforms:**

o The wind or Aeolian erosion takes place in the following ways, viz. deflation, abrasion, and attrition.

> **Deflation:** Removing, lifting and carrying away dry, unsorted dust particles by winds. It causes depression known as blowouts.

> **Abrasion:** When wind loaded with sand grains erodes the rock by grinding against its walls, it is called abrasion or sandblasting.

> **Attrition:** refers to the wear and tear of the sand particles while they are being transported.

• **Deflation Basins:** Deflation basins, called blowouts, are hollows formed by the removal of particles by wind. Blowouts are generally small but may be up to several kilometres in diameter. Hence statement 2 is correct.

• **Mushroom Rocks:** A mushroom rock also called a rock pedestal or a pedestal rock, is a naturally occurring rock whose shape, as its name implies, resembles a mushroom. The rocks are deformed in many different ways: by erosion and weathering, glacial action, or from a sudden disturbance. Mushroom rocks are related to, but different from, yardangs.

• **Inselbergs:** A monadnock or inselberg is an isolated hill, knob, ridge, outcrop, or small mountain that rises abruptly from a gently sloping or virtually level surrounding plain.

• **Demoiselles:** Demoiselles are rock pillars which stand as resistant rocks above soft rocks as a result of differential erosion of hard and soft rocks. Hence statement 3 is correct.

Q 5.C

• The Zabarwan Range is a small mountain range between the Sind River Valley and Lidder River Valley in the north-central part of the Kashmir Valley. The range overlooks the famous Dal Lake and holds the Mughal gardens of Srinagar. The recently built Indira Gandhi Memorial Tulip Garden is considered the largest tulip garden in Asia.

o The Dachigam National Park, which hosts the last viable population of Critically Endangered Kashmir stag (Hangul), is the main feature of the range. Hence statement 1 is correct.

• The Kangra Valley is a strike valley situated between the Dhauladhar Range (north) and the Shivalik Hills (south). It extends from the foot of the Dhauladhar Range to the Beas River. Hence statement 2 is correct.

o Kangra tea is a registered Geographical Indication (GI). Tea gardens are spread across Dharamshala, Palampur, and Baijnath regions.

• The Kullu Valley is a transverse valley in the upper course of the Beas River. It is formed by the Beas River between Manali and Larji. This valley is famous for its tourism industry and apple orchards. Hence statement 3 is not correct.

o A strike valley is a valley that runs perpendicular to the slope or parallel to the ridge, often referred to as a longitudinal valley. On the other hand, transverse valleys are formed by streams cutting across the slope, creating valleys parallel to the slope and along the dip.

• The Siachen in Ladakh near the Karakoram Pass is a piedmont glacier of the "Third Pole" between the Saltoro Ridge, a subrange of the Karakoram, and the main Karakoram Range.

o It originates at the base of the Indira Col West, a col (low point) on the Indira Ridge.

o It is the highest battleground in the world, and the temperature here drops to -50°C.

o It is the source for the Nubra River that waters the Nubra Valley near Leh in the Trans Himalayas. The waters of the Nubra drain into the Shyok River, which drains into the Indus River. Hence statement 4 is correct.

> A piedmont glacier forms when valley glaciers spread into a flat area at the base of a mountain range.

> The Third Pole is Asia's extensive high mountain region, including the Himalayas, Karakoram range. Hindu Kush and Tibetan Plateau, hosting the largest non-polar ice mass.

Q 6.A

• Chenab is the largest tributary of the Indus River. It is formed after the two streams, Chandra and Bhaga, originating near Baralacha La Pass in Lahaul and Spiti (Himachal Pradesh), merge at Tandi.

o The drainage area of the Chenab River basin within India is located in the two states – Himachal Pradesh and Jammu & Kashmir. Hence option (a) is the correct answer.

o Chenab River joins the Indus River near Shorkot in Pakistan.

o Thirot, Sohal, Bhut Nallah, Liddrari, and Marusudar are the main tributaries of the Chenab River.

o Major hydroelectric projects: Baglihar dam (Ramban, J&K), Dulhasti dam (Kishtwar, J&K) and Salal dam (Reasi, J&K)

• Beas originates from the Beas Kund near Rohtang Pass.

o The river flows through the Kullu valley and forms gorges in the Dhauladhar range.

o It enters the Punjab plains, where it meets the Sutlej near Harike. It passes through Himachal Pradesh and Punjab.

o Important cities: Manali, Kullu, and Mandi.

• Ravi, a transboundary river, rises near Rohtang Pass in the Kullu hills of HP and flows through the Chamba Valley. It joins the Chenab near Sarai Sidhu in Pakistan.

o It drains the area lying between the Pir Panjal and Dhauladhar ranges.

o It passes through Himachal Pradesh, Jammu & Kashmir, and Punjab.

o Major hydroelectric projects: Bassi Dam (Mandi, HP), Chamera Dam - I, II, III (Chamba, HP), Ranjit Sagar Dam (Kathua, Punjab), etc.,

o Important cities: Amritsar and Pathankot.

• Jhelum originates from a spring at Verinag in J&K, located at the foot of the Pir Panjal Range.

o It is called Vyeth in Kashmiri, Vetesta in Sanskrit, and Hydaspes in Greek.

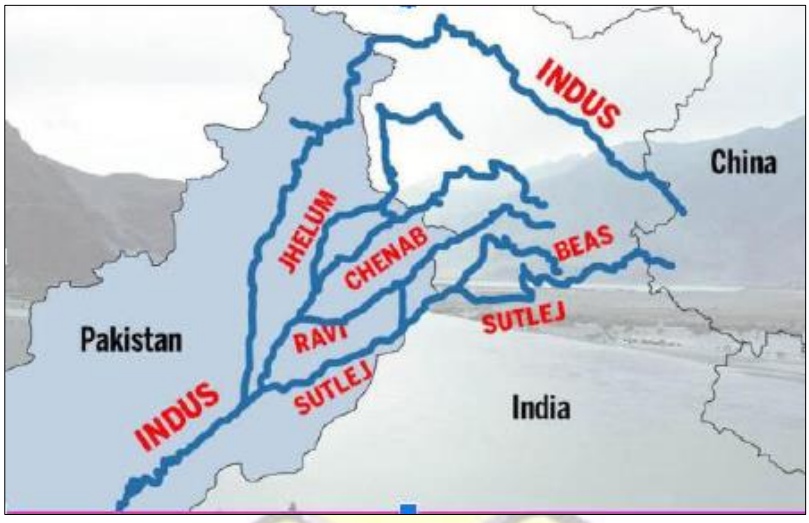
o It is the main waterway of the Kashmir Valley, which flows through Srinagar and Wular Lake.

o This transboundary river joins the Chenab near Jhang in Pakistan.

o Major tributaries: Liddar, Dudhganga and Sindh.

o Important cities: Srinagar, Baramulla, and Uri.

o Uri Dam in Baramulla, Jammu & Kashmir, is an important hydroelectric project of the Jhelum River.



Q 7.C

• The India State of Forest Report (ISFR) 2023, published by the Forest Survey of India (FSI), is a biennial assessment of the country's forest resources using satellite data and field information. The first report was published in 1987, and the ISFR 2023 marks the 18th edition.

• The India State of Forest Report (ISFR) 2023 shows that the country's Forest and Tree cover now spans 827,357 square kilometers, covering 25.17% of the nation's total land area. This includes 715,343 square kilometers (21.76%) of forest cover and 112,014 square kilometers (3.41%) of tree cover. This progress reflects India's successful efforts to balance development with environmental conservation.

• Major findings:

o Area wise top three states having largest forest and tree cover are Madhya Pradesh (85,724 sq km) followed by Arunachal Pradesh (67,083 sq km) and Maharashtra (65,383 sq km).

o Top four states showing maximum increase in forest and tree cover are Chhattisgarh (684 sq km)followed by Uttar Pradesh (559 sq km), Odisha (559 sq km) and Rajasthan (394 sq km).

o Top three states showing maximum increase in forest cover are Mizoram (242 sq km) followed by Gujarat (180 sq km) and Odisha (152 sq km).

o Area wise top three states having largest forest cover are Madhya Pradesh (77,073 sq km) followed by Arunachal Pradesh (65,882 sq km) and Chhattisgarh (55,812 sq km). Hence, optipn (c) is the correct answer.

Q 8.D

• About Raja Ravi Varma (1848 - 1906):

o Belonged to the family of Maharajas of Travancore in Kerala and was addressed as Raja.

o He is called the father of modern Indian art.

o Mastered the Western art of oil painting and realistic life study.

o Painted themes from Indian mythology, depicting scenes from popular epics like the Ramayana and Mahabharata.

o Most famous works: Damayanti Talking to a Swan, Shakuntala Looking for Dushyanta, Nair Lady Adorning Her Hair, and Shantanu and Matsyagandha.

o In 1904, the then Viceroy Lord Curzon, on behalf of the British Emperor, bestowed upon him, the Kaisar-i-Hind Gold Medal. Hence, option (d) is the correct answer.

Q 9.B

• The Finance Ministry has announced the operationalization of the Unified Pension Scheme (UPS) for Central Government employees under the National Pension System (NPS), effective from April 1, 2025.

• Salient features of the Unified Pension Scheme (UPS)

o Eligibility: Applicable to Central Government employees with at least 10 years of service. Hence, statement 1 is not correct.

o Assured Pension: 50% of average basic pay over the last 12 months before retirement for employees with 25+ years of service.

o Proportionate benefits for employees with 10–25 years of service.

o Assured Minimum Pension: ₹10,000 per month for eligible employees.

o Assured Family Pension: 60% of the pension drawn by the employee prior to their death. Hence, statement 3 is correct.

o Inflation Protection: Pensions indexed to inflation. Hence, statement 2 is correct.

> Dearness Relief (DR) linked to the All India Consumer Price Index for Industrial Workers (AICPI-IW).

> Government Contribution: Increased to 18.5% of basic pay and DA (up from 14% under NPS).

> Employee Contribution: 10% of basic pay and DA (same as NPS).

o Lump Sum Payment: One-tenth of last drawn pay (including DA) for every six months of completed service, in addition to gratuity.

o Choice of Scheme: Employees can choose between UPS and NPS starting from the upcoming financial year, with the choice being final once made.

o Beneficiaries: Initially benefits 23 lakh Central Government employees, with potential extension to 90 lakh employees if adopted by state governments.

Q 10.C

• Short-lived climate pollutants — methane, black carbon tropospheric ozone, and hydrofluorocarbons (HFCs), which are also sometimes known as "super pollutants" — remain in the atmosphere for less time than carbon dioxide but have a potent impact on near-term global warming. For example, methane has more than 80 times the warming power of CO_2 in its first 20 years in the atmosphere.

• Short-lived climate pollutants, unlike CO_2, can be swiftly removed from the atmosphere, aiding in rapid mitigation of global warming. Their reduction not only addresses climate change but also offers immediate benefits for human health, crop yields, and economies.

• Hence, option (c) is the correct answer.

Q 11.B

• A wage spiral occurs when workers demand higher wages in response to rising prices, and employers raise prices in response to higher wage costs. This can create a cycle of wage increases and price increases, leading to overall inflation **(Cost Pull inflation)** in the economy. Inflation can be caused by a variety of factors, such as an increase in the money supply, high levels of government spending, or a decrease in the availability of goods and services. Inflation can also be influenced by factors such as the state of the economy, the level of competition in the market, and the level of workers' productivity.

• **Hence, option (b) is the correct answer.**

Q 12.C

• The weights assigned to each currency in the XDR basket are adjusted to take into account their current prominence in terms of international trade and national foreign exchange reserves.

CURRENCY	**WEIGHT**
1. US Dollar	43.38%
2. European Euro	29.31%
3. Chinese Renminbi	12.28%
4. Japanese Yen	7.59%
5. British Pound	7.44%

• **Hence, option (c) is the correct answer.**

Q 13.C

• **The concept of the stupa originated in the Vedic tradition, where mounds over the dead bodies of significant people were built. Hence statement 1 is correct.**

• The mounds represented the cosmic mountain (Meru) and the cycle of birth and rebirth.

• **The Shunga dynasty (c. 185–73 BCE) was instrumental in the architectural evolution of stupas, particularly in their decoration and ornamentation of structures.**

• **They added one of the major innovations by bringing toranas (decorative gateways) to surround stupas. Hence statement 3 is correct.**

• The toranas were highly ornamented with narrative panels in the shape of Jataka stories, stories from the Buddha's life, and mythological designs.

• **The Hellenistic influence is evident in the floral motifs, scroll patterns, and figural representations, which reflect the Greco-Bactrian artistic interactions following Alexander's campaigns and the subsequent Indo-Greek kingdoms. Hence statement 2 is correct.**

o **The best example is the Great Stupa at Sanchi, where toranas exhibit a combination of local Indian subject matter and Hellenistic technical proficiency in art, indicating syncretic cultural interaction during this time.**

Q 14.C

• The BRICS **Contingent Reserve Arrangement (CRA)** is a framework for the provision of support through liquidity and precautionary instruments in response to the actual or potential short-term balance of payments pressures. It was established in 2015 by the BRICS. The New Development Bank (NDB) and the Contingent Reserve Arrangement (CRA) are the **financial mechanisms under BRICS**. **Hence, Statement (2) is correct.**

• The BRICS CRA proposes to **provide short-term liquidity support** to the members through currency swaps to **help to mitigate the BOP crisis,** in case such a situation arises. The BRICS CRA will help India and other signatory countries to forestall short-term liquidity pressures, provide mutual support and further strengthen financial stability. It would also contribute to strengthening the global financial safety net and complement existing international arrangements (from IMF) as an additional line of defence.

Hence, Statement (1) is correct.

• Hence, option (c) is the correct answer.

Q 15.A

• The State Election Commission (SEC) is a Constitutional body responsible for conducting and overseeing elections to the Panchayati Raj Institutions and Municipalities in each state.

• The 73rd and 74th Constitutional Amendments introduced Part IX and Part IX-A in the Constitution and established the SECs under Article 243K (for Panchayats) and Article 243ZA (for Municipalities).

• As per Article 243K (2) of the Constitution, the Governor decides the tenure and conditions of service of the State Election Commissioner (SEC). however, once appointed, the SEC enjoys protection similar to a High Court judge and cannot be removed arbitrarily by the Governor. **Hence, statement 1 is correct.**

• The 73rd Amendment does not grant the SEC the power to decide election disputes. The disputes related to local body elections are settled by such authorities as provided by the State Legislative Assembly through law. **Hence, statement 2 is not correct.** Article 243K states that the SEC is responsible for the 'superintendence, direction, and control of the entire electoral process' for Panchayat elections, including the preparation of electoral rolls. **Hence, statement 3 is correct.**

Q 16.A

• The trachea (windpipe) contains C-shaped rings of cartilage, which provide structural support and keep the airway open. These rings ensure that air flows freely to and from the lungs without collapsing, even during

forceful breathing. **Hence, the major function of the rings of cartilage in the human respiratory system is to prevent the air passage from collapsing. Hence, option (a) is correct.**

• Oxygen absorption occurs in the alveoli (tiny air sacs in the lungs), not in the cartilage rings. **Hence, option (b) is not correct.**

• Nutrients are transported via blood vessels, not cartilage. Cartilage is avascular (lacks blood supply) and does not play a role in nutrient transport. **Hence, option (c) is not correct.**

• Mucus production occurs in goblet cells lining the trachea and bronchi, not in cartilage rings. Mucus helps trap dust, microbes, and pollutants to prevent lung infections. **Hence, option (d) is not correct.**

• Hence, cartilage rings in the trachea provide structural support and prevent airway collapse. They do not participate in gas exchange, nutrient transport, or mucus production.

Q 17.D

• National Clean Air Programme has been launched by the Ministry of Environment, Forest and Climate Change with an **aim to improve air quality in 131 cities (non-attainment cities and Million Plus Cities) in 24 States/UTs by engaging all stakeholders. Hence, statement 1 is not correct.**

• NCAP is the first performance linked funding programme for improving air quality. Cities have to demonstrate improvement in air quality to access funds under NCAP.

o NCAP funding is channelised through state pollution control boards to the departments concerned, the 15th Finance Commission funding is routed through state finance ministries to urban local bodies. Though the criteria for performance assessment have been evolving, currently they require cities to demonstrate improvement in PM10 levels.

• The programme envisages to achieve reductions up to 40% of Particulate Matter10 (PM 10) concentrations by 2025-26 in these cities compared to the base year 2019-20. **Hence, statement 2 is not correct.**

Q 18.D

• The Government of India announced the Carbon Credit Trading Scheme (CCTS) on June 28, 2023, under the Energy Conservation Act, 2001 (Amendment, 2022), with the aim of establishing India's carbon market. **The regulatory framework for the Indian Carbon Market is established under the Energy Conservation Amendment Act, 2022.** EC Act empowers the Central Government, in consultation with the Bureau of Energy Efficiency (Bureau) to specify the carbon credit trading scheme. **Hence, statement 1 is not correct.**

• National Steering Committee for Indian Carbon Market (NSC-ICM) has been formed under CCTS to oversee the Indian Carbon Market (ICM). **The Secretary, Ministry of Environment, Forest and Climate Change and Secretary, Ministry of Power will chair the NSC-ICM. Hence, statement 2 is not correct.**

• The Carbon Credit Trading Scheme is expected to contribute to achieving India's climate goals in line with the commitments under UNFCCC and its Paris Agreement.

Q 19.A

• From its earliest centuries of existence, the Buddhist Community fragmented into many sects and schools on the pretext of sometimes scandalous schisms, and each of these splits had views that were charged with being heresies by the others.

• **Major Buddhist sects are**:

o **Theravada**:

> Emphasizes personal salvation through Arahantship.

> Maintains the Pali Canon.

> Preponderant in Sri Lanka and Southeast Asia.

o **Mahayana**:

> Stresses universal salvation through the Bodhisattva path.

> Involves the deification of Buddha and idol worship.

> Pre-eminent in East Asia (China, Japan, Korea).

o **Vajrayana**:

> Includes Tantric rituals and meditation.

> Found mainly in Tibet, Nepal, and Bhutan.

o **Sthaviravada**:

> Strict observance of original doctrine; forerunner of Theravada.

o **Mahasanghika**:

> Introduced Buddha divinity; shaped the development of Mahayana.

• **Several lesser-known early sects are mentioned in Dipavamsa:**

o Rajagiriya sect is mentioned in the Dipavamsa, a Sri Lankan chronicle, as one of the six additional schools along with Hemavatika, Siddhatthaka, Pubbaseliya, Aparaseliya, and Apararajagirika. Hence, option (a) is the correct answer.

Q 20.C

• In 1867, M.G. Ranade, G.V. Joshi, S.H. Chiplankar, and their associates established the Poona Sarvajanik Sabha. It was a sociopolitical organization in British India that operated as an intermediary between the Indian government and the people in order to advance the legal rights of the peasantry.

• It originated out of public discontent with local government concerns, especially issues concerning the administration of a temple in Pune.

• **During famine, it also organized relief work. Essentially, it was to serve as a link between the government and the people,** allowing the former to be more responsive to the latter's wishes and aspirations. Membership was open to individuals of all castes and classes, although most of the members belonged to the upper-middle class.

• The Sabha was concerned with social reforms like the encouragement of education, uprooting social ills such as untouchability and child marriage, and empowerment of vulnerable groups.

• **Other Early Political Bodie**s:

o **The British Indian Association (1851, Bengal)**: Organized on 29 October 1851 at Calcutta, it was the first-ever political body focused on lobbying Indian rights and interests, with its president being Raja Radhakanta Deb

o **The Bombay Association (1852)**: This association was founded in 1852 and was headed by Dadabhai Naoroji, with the mission of redressing the grievances of Indians under British rule and espousing social and economic reforms.

o **East India Association (1856, London)**: This association was founded by Dadabhai Naoroji in London in 1856. Its mission was to represent Indian interests in Britain and to exert influence on British policy towards India.

o **Madras Native Association (1852)**: Founded in 1852, this association sought to advance the interests of native Indians in Madras and played a crucial role in the advocacy of social reforms and political representation.

o **Madras Mahajana Sabha (1884)**: Founded in 1884, this association concentrated on fighting for civil rights and political representation for Indians and played an important role in the early nationalist movement.

• **Hence option (c) is the correct answer.**

Q 21.D

• **Summer Season in India (March to June)**

o In India, during summers, high temperatures and low humidity dominate the pre-monsoon period.

o The sun's apparent movement from the Equator to the Tropic of Cancer leads to intense heating.

o The southern parts experience higher temperatures in March and April, while North India becomes hotter by May and June.

o Heat waves are common in northern and central India, especially in Rajasthan, Punjab, Haryana, Uttar Pradesh, and Bihar.

• **Reason for the west Coast Cooler Than the East Coast:**

o Role of Prevailing Westerly Winds

o The Arabian Sea influences the west coast, bringing cooler onshore westerly winds.

o These moist winds moderate the temperature, preventing extreme heat along the west coast.

o In contrast, the east coast (Bay of Bengal side) gets hot, dry continental winds from land, making it hotter. Hence, option (d) is the correct answer.

• **Analysis of other options:**

o The Western Ghats block hot, dry winds from penetrating the west coast.

o The Western Ghats act as a barrier but primarily influence rainfall patterns rather than directly controlling temperature differences.

o While they trap moisture on the windward (west) side, they do not significantly block heat from the interior.

o The presence of the Thar Desert intensifies low pressure, drawing moist winds toward the west coast.

o The Thar Desert creates low pressure, but this mainly affects monsoon winds in June-September, not pre-monsoon summer temperatures.

o The presence of the tropical easterly jet stream in summer deflects warm air away from the west coast.

o The tropical easterly jet stream primarily impacts monsoon onset and upper atmospheric circulation, not coastal temperatures.

Q 22.B

• **Chromite** is an important commercial chromium-bearing mineral. It is an oxide of chromium and iron. In its purest form, chromite ore contains 68% chromium oxide and the Cr: Fe ratio is 1.8:1, but in nature such chromite is rare. It occurs as a primary mineral of ultrabasic igneous rocks and is normally associated with peridotite, pyroxenite, dunite and serpentinite.

o Chromite is of critical importance because it imparts unique qualities to the products to which it is added. It is **used in the production of stainless steel and high-temperature alloys** having numerous industrial and defence applications. It is also used in the manufacture of ferrochrome, charge-chrome, refractories and chemicals.

o **India is one of the leading producers and exporters of chromite in the world.**

o Chromite deposits of the Sukinda and Nausahi ultramafic belt of **Odisha constitute 94% of the country's chromite resources.** Here chromite occurs as concentration and dissemination in the ultramafic rocks, in the form of lenses, pockets, thin seams and stringers. **Hence pair 1 is correctly matched.**

o Other states contributing to the country's resources of chromite are Manipur, Nagaland, Karnataka, Jharkhand, Maharashtra, Tamil Nadu, Telangana and Andhra Pradesh.

• **Nickel** is a silver-white metal used as an alloy both in ferrous and non-ferrous applications, mainly in steel alloy. Besides, nickel is also used in nickel plating, coin making, ceramics, colouring glass, batteries, electronic circuits and nickel compounds.

o Nickel is a strategic metal and is found associated with the lateritic deposits of Sukinda Valley in Odisha. Nickel is not produced from primary sources in the country and the entire demand is met through imports. However, it is recovered as a by-product in the form of nickel sulphate during the refining of copper at the Ghatsila copper smelter of Hindustan Copper Ltd. (HCL) in Jharkhand.

o **The state of Odisha is endowed with the largest share of resources of nickel ore in the country at 174.63 million tonnes (92%). Hence pair 2 is not correctly matched.**

• **Silver** is a soft and lustrous metal that is grouped in the category of noble metals. Its brilliant white colour, malleability and resistance to atmospheric oxidation have enhanced its value as a highly desired precious metal which is used in many industrial applications.

o Apart from its monetary and decorative uses, silver is known to have the **highest electrical conductivity** amongst all metals which enhances its potential in modern-age applications, viz, for printed electric circuits, coating for electronic conductors and in alloys of gold & copper for electrical contacts.

> Its chloride and iodide are light-sensitive and hence used in photographic material. **Silver is typically used (in paste form) on solar cells.** It means the photovoltaic (PV) market has become one of the most important areas of silver demand. These two major uses have contributed to the increase in the supply of scrap of silver-containing products.

o Silver, which is the least expensive of the precious metals, is the whitest element and has the highest electrical and thermal conductivity among all the metals.

o In India, there are no native silver deposits except the small and unique Bharak deposits in Rajasthan. It occurs generally with lead, zinc, copper (especially their sulphide ore) and gold ores and is extracted as a by-product from electrolysis or chemical methods. It was usually extracted by melting silver-bearing lead ore (ore containing argentiferous galena).

o Silver is recovered as a co-product as well as a by-product in the country. **By States, Rajasthan accounted for about 86% of reserves/resources in terms of ore**, Karnataka & Jharkhand 4% each, Andhra Pradesh 3% and Madhya Pradesh, Uttarakhand, Odisha, Meghalaya, Sikkim, Tamil Nadu and Maharashtra together shared 3% ore reserves/remaining resources. **Hence pair 3 is correctly matched.**

Q 23.C

• **Directorate of Weed Research (DWR) introduced an exotic beetle, Cyrtobagus Salviniae, into the Sarani reservoi**r in Betul district, Madhya Pradesh. This beetle, native to Brazil, specifically targets Salvinia molesta and has been used successfully in other parts of the world for biological control.

• **Salvinia molesta, a highly detrimental aquatic fern, that poses a significant threat to water ecosystems.**

• It had e**ngulfed the entire Sarani reservoir (Satpura dam) built on the Tawa river** in the Betul district of Madhya Pradesh. **Known locally as "Chinese Jhalaar"**. Under high-nitrogen levels and a temperature of

30°C, the plant area can double every eight days and biomass every 2.2 days, forming mats up to 1 m deep spread across waterways.

• **Hence, option (c) is the correct answer.**

Q 24.D

• **The posts of Deputy Prime Minister and Deputy Chief Minister did not find a place anywhere in the Constitution.** The existence of the position of Deputy Prime minister as well as the responsibilities to be bestowed on him/her depends totally on the discretion of the Prime Minister. It is not a codified position and also not mentioned in the rules of business. **Hence statement 1 correct.**

• Supreme Court in **K.M. Sharma vs Devi Lal & Ors (1990)** opined that the terminology "deputy" is only descriptive and does not confer on deputy PM any power of Prime Minister. He is like other cabinet minister. **Therefore, Deputy Prime Minister is also appointed Under Article 75 of the Indian Constitution. Hence statement 2 is correct.**

• **In the official table of precedence, the Deputy PM is ranked above the union cabinet ministers** and Deputy CM is the ranked above the state cabinet ministers. **Hence statement 3 is correct.**

Q 25.A

• **The Fourth Schedule of the Indian Constitution outlines the allocation of seats in the Rajya Sabha (Council of States) for each State and Union Territory.** This schedule, referenced in Articles 4(1) and 80(2) of the Constitution, ensures proportional representation of states and Union Territories in the Rajya Sabha based on their population.

• **As per the Fourth Schedule of the Indian Constitution, the number of Rajya Sabha seats allocated to the given states is:**

o **Maharashtra → 19 seats**

o **Karnataka → 12 seats**

o **Tamil Nadu → 18 seats**

o **West Bengal → 16 seats**

o **Thus, the correct descending order (highest to lowest seats) is:**

Maharashtra (19) → Tamil Nadu (18) → West Bengal (16) → Karnataka (12)

• **Hence, option (a) is the correct answer.**

Q 26.A

• **UMANG (Unified Mobile Application for New-age Governance)** is developed by Ministry of Electronics and Information Technology (MeitY) and National e-Governance Division (NeGD) to drive Mobile Governance in India.

• Hence statement 1 is correct.

• UMANG provides a single platform for all Indian Citizens to access pan India e-Governance services ranging from Central to Local Government bodies. Hence statement 2 is not correct.

• In November, 2020 UMANG's international version launched during Online Conference organized to mark 3 years of UMANG.

• The international version was launched for select countries that include USA, UK, Canada, Australia, UAE, Netherlands, Singapore, Australia and New Zealand. It will help Indian international students, NRIs and Indian tourists abroad, to avail Government of India services, anytime. Hence statement 3 is correct.

• UMANG provides seamless integration with popular customer centric services like Aadhaar and Digilocker.

o It provides a unified approach where you can install one application to avail multiple government services.

o It can be accessed on multiple channels like mobile application, web, IVR and SMS which can be accessed through smartphones, feature phones, tablets and desktops.

o It has a rich multimedia interface with a focus on maximizing usability and enriching user experience.

o It supports 12 major Indian languages in addition to English.

Q 27.D

• Rajmata Ahilyabai Holkar(1725-1795)

• The 'Philosopher Queen', Rajmata Ahilyabai Holkar was the Holkar Queen of the Malwa kingdom from 1767 to 1795. She is widely known for her wisdom, courage, and administrative skills. Hence statement 1 is correct.

• She is regarded as one of the most visionary female rulers of India. In the 18th century, as the Maharani of Malwa, she was instrumental in spreading the message of dharma and propagating industrialization. Hence statement 3 is correct.

• She did not observe purdah system and sat in open durbar, held daily public audiences to help redress the problems of the common men. Hence statement 2 is correct.

• She established a textile industry in Maheshwar, which today is very famous for its Maheshwari sarees.

• She also turned her attention towards various philanthropic activities, which ranged from the construction of temples, ghats, wells, tanks, and rest-houses in the north to pilgrimage centres in the south.

• Her most notable contribution was the renovation and repair of the famous Kashi Vishwanath Temple in 1780. Hence statement 4 is correct.

• *"The reign of Ahilyabai, of Indore in central India, lasted for thirty years. This has become almost legendary as a period during which perfect order and good government prevailed and the people prospered. She was a very able ruler and organizer, highly respected during her lifetime, and considered as a saint by a grateful people after her death."* - Jawaharlal Nehru (The Discovery of India/1946)

Q 28.C

• **Extra budget borrowing or Off-Budget borrowings** is excluded from the fiscal deficit calculations, but at the same time, are **added to the total debt of the government. Hence, statement 1 is correct.**

• Though such borrowings are not a part of the consolidated fund of India, the interest payment for such borrowings is made from the consolidated fund.

• According to the budget document, Off the Budget Borrowings or Extra budgetary resources (EBRs) are those **financial liabilities that are raised by Public Sector Undertakings (i.e., government owned entities) for which repayment of entire principal and interest is done from Government budget.** It is not taken in the name of the Government of India. **Hence, statement 2 is correct.**

Q 29.D

• **Mount Tambora**

o Actual Location: Indonesia (Lesser Sunda Islands)

o Famous for: The 1815 eruption, one of the most powerful volcanic eruptions in recorded history.

Hence, pair 1 is not correctly matched.

• **Anak Krakatau**

o Actual Location: Indonesia (Sunda Strait, between Java and Sumatra)

o Famous for: Anak Krakatau ("Child of Krakatoa") emerged after the 1883 Krakatoa eruption, one of the deadliest in history. **Hence, pair 2 is not correctly matched.**

• **Mount St. Helens**

o Actual Location: United States (Washington state, Cascade Volcanic Arc)

o Famous for: The 1980 Plinian-type eruption, one of the most destructive volcanic events in U.S. history. **Hence, pair 3 is not correctly matched.**

• **Mount Pelée**

o Actual Location: Martinique (French overseas territory in the Caribbean)

o Famous for: The 1902 eruption, which destroyed the city of Saint-Pierre, killing ~30,000 people. **Hence, pair 4 is not correctly matched**.

Q 30.C

• **Synthetic media is a term used to describe content (video, audio, image or text) that has been created or modified through the use of AI.** This type of content can include deepfakes—realistic AIgenerated videos or audio recordings that appear as if someone really said or did things they did not, often making it indistinguishable from real content. **Hence option (c) is the correct answer**

• Synthetic media encompasses various types of artificially generated content created using advanced technologies like artificial intelligence (AI) and machine learning. Here are some key types of synthetic media:

o **Deepfake Videos:** Deepfakes are AI-generated videos that manipulate or replace a person's likeness in existing videos. Using deep learning techniques, algorithms can analyze and synthesize facial expressions, movements, and speech patterns to create highly convincing fake videos.

o **AI-Generated Images:** AI algorithms can generate photorealistic images from scratch or manipulate existing images to create new compositions. AI-generated images find applications in various fields, including digital art, graphic design, and content creation.

o **Synthetic text:** AI-generated text, such as poetry, created by neural networks trained on large datasets. Applications include content creation and information storage in synthetic macromolecules.

o **Synthetic speech:** Text-to-speech systems that generate human-like synthetic voices for applications like dubbing, announcing, and narration. Deep learning has made these systems more accurate and accessible.

o **Chatbots and Virtual Assistants:** Chatbots and virtual assistants use natural language processing (NLP) and machine learning algorithms to understand and respond to user queries in text or speech format.

o **AI-Generated Music:** AI algorithms can compose, generate, and remix music autonomously based on existing compositions or musical styles. These algorithms analyze patterns in music data and learn to create new melodies, harmonies, and rhythms.

o **Synthetic Video Games:** AI algorithms can generate virtual environments, characters, and narratives for video games, enhancing gameplay experiences and enabling procedural content generation.

Q 31.B

• PPP is a popular macroeconomic analysis metric to compare economic productivity and standards of living between countries. PPP is an economic theory that compares different countries' currencies through a "basket of goods" approach. It measures prices at different locations using a common good or goods to contrast the real purchasing power between different currencies

• On a PPP basis, China is the world's largest economy in 2024. The total wealth of China is estimated at 37.1 trillion international dollars. The United States follows China with figure 29.2 trillion and India follows the USA. **Hence, statement 1 is not correct.**

• India's GDP (PPP) in 2024 is estimated to be $16.1 trillion. This makes India the third largest economy in the world by purchasing power parity (PPP). **The Purchasing Power Parities (PPPs) of Indian Rupee per US$ at Gross Domestic Product (GDP) level is now 20.65 in 2024 from 15.55 in 2011. Hence, statement 3 is correct.**

• As per IMF, India's share in global GDP measured by PPP is 8.2 %. Hence, statement 2 is correct.

• Hence, option (b) is the correct answer.

Q 32.A

• **Qutbuddin Aibak**: Born in Turkestan around 1150 CE, he was sold into slavery as a child and eventually became a trusted general of Muhammad Ghori. He declared himself Sultan of Delhi in 1206 after Ghori's assassination, marking the beginning of the Slave Dynasty.

o **Achievements**:

> Commissioned notable architectural projects like **Qutb Minar and Adhai Din Ka Jhonpra.**

> Introduced coins such as the **silver tanka and copper jital.**

> Established an efficient administrative system based on military strength.

• **Iltutmish**: Originally a slave purchased by Aibak; he married Aibak's daughter and succeeded Aram Shah to become Sultan in 1211 CE. He ruled from 1211 to 1236 CE.

o **Achievements**:

> Consolidated power by defeating rival claimants like Yeldoz.

> Completed construction of Qutub Minar started by Aibak.

> Introduced administrative reforms such as assigning iqtas (land grants) to nobles.

• **Ghiyasuddin Balban**, who was also known as Ulugh Khan, ruled the Delhi Sultanate from 1266 to 1287, and was an influential figure in medieval Indian history. Originally named Baha-ud-Din and part of Iltutmish's group of forty slaves, Balban implemented significant reforms during his reign.

o He introduced the Iranian Theory of Divine Rights, asserting that the Sultan is God's representative on Earth. In terms of administration, he adopted Persian court practices such as Sijda (prostration), Zaminbosi (kissing the ground), and Paibos (kissing the monarch's feet) to emphasize reverence for the Sultan.

o Additionally, he established a strong spy system (Barid) for efficient governance and surveillance. Militarily, Balban successfully repelled Mongol invasions by reorganizing his forces and conquering Bengal after it had declared independence under Arsalan Khan.

o He also suppressed rebellions with an "iron fist" policy against local tribes in Mewat and Awadh. Culturally, Balban introduced Nowruz celebrations in India and supported education; notable poets like Amir Khusrau flourished during his reign.

• **Firoz Shah Tughlaq**: He succeeded his cousin Muhammad bin Tughlaq after his death in Thatta, Sindh, in 1351. Initially reluctant to take power but was persuaded by camp followers.

o **Reforms and Achievements**:

> Administrative Reforms: Introduced significant changes to improve administration and military organization.

> Irrigation Projects: **Known as the father of India's irrigation system; he built numerous canals for agriculture, including those connecting rivers like Sarasvati with Markanda.**

> **Architectural Contributions:** Constructed cities like Firozpur, Hisar, and Fatehabad; also built mosques and madrasas.

> Sharia Law Implementation: Strictly enforced Islamic law throughout his domain after the death of his heir in 1376.

• **Hence option (a) is the correct answer**

Q 33.A

• **Rushikonda beach is located in Vizag city in Andhra Pradesh.** Known as one of the **virgin beaches** of South India, Rushikonda received the "**Blue Flag" certification** in 2020. Rushikonda Beach is widely known for its **golden sands** and tidy waves of the Bay of Bengal. **Hence pair 1 is not correctly matched.**

• **Vagator Beach is a famous beach in North Goa**, part of a long stretch that includes Anjuna Beach, Chapora Beach, and Calangute Beach. It is a scenic beach known for its red cliffs, white sands, and sunsets. It's a popular tourist destination with restaurants, bars, and water sports. **Hence, pair 2 is not correctly matched.**

• **Gahirmatha Beach is a beach in the Kendrapara district of the Indian state of Odisha**. The beach separates the **Bhitarkanika Mangroves** from the **Bay of Bengal** and is the **world's most important nesting beach for olive ridley sea turtles**. The beach is part of the **Gahirmatha Marine Wildlife Sanctuary**, including the adjacent portion of the Bay of Bengal. **Hence pair 3 is correctly matched.**

Q 34.D

• **Recent Context: Recently, the Ministry of External Affairs (MEA) has criticized the Kerala government for appointing an 'External Cooperation' Official.**

• **Para-diplomacy:**

o **Para-diplomacy deals with the foreign policy capacity of subnational governments. It is also known as 'state diplomacy', 'continent diplomacy', 'regional diplomacy', and 'subnational diplomacy'.**

o Para-diplomacy makes space for external relations of subnational or federal units that might indulge themselves in international activism to promote their own interests.

o It is opposite to conventional diplomatic relations that fall under the exclusive domain of sovereign nation-states exercised by central governments. **Hence, option (d) is the correct answer.**

Q 35.C

• **White hydrogen** is also referred to as "**natural," "gold," or "geologic" hydrogen**. It is **naturally produced** in the Earth's **crust** and is considered a potential source of **clean energy**. It generally exists combined with other molecules. **Hence, statement 1 is correct.**

• It causes **no CO2 emissions** when used as a fuel. Hence, it is a cleaner fuel as compared to **Brown Hydrogen** (it is produced by gasification, where carbonous materials are heated into a gas). **Hence, statement 3 is correct.**

• **White hydrogen** will be crucial to tackle climate issues as it is naturally produced or present in the Earth's crust.

• **Hydrogen energy only produces water when burned,** which makes it an environment-friendly energy source. "**H2 + O2 = energy + H_2O**". **Hence, statement 2 is correct.**

Q 36.B

• **The World Bank Group (WBG) is a family of five international organizations that make leveraged loans to developing countries.** It is the largest and best-known development bank in the world and an observer at the United Nations Development Group.

o The bank is headquartered in Washington, D.C., in the United States.

• Its five organizations are:

o the International Bank for Reconstruction and Development (IBRD),

o the International Development Association (IDA),

o the International Finance Corporation (IFC),

o the Multilateral Investment Guarantee Agency (MIGA) and

o the International Centre for Settlement of Investment Disputes (ICSID).

• The World Bank's money comes from several different sources. IBRD, which provides loans to middle income countries and to poorer countries able to repay loans at terms based on market rates, raises most of its funds on the world's financial markets by selling World Bank bonds to investors. The International Development Association (IDA) is an international financial institution which offers concessional loans and grants to the world's poorest developing countries.

• While the International Bank for Reconstruction and Development (IBRD) raises most of its funds on the world's financial markets, IDA is primarily funded by contributions from the governments of its richer member countries. Additional funds come from IBRD's and International Finance Corporation's (IFC) income and borrowers' repayments of earlier IDA credits. **Hence, statement 1 and statement 2 are correct.**

• IMF helps the member countries in eliminating or reducing the disequilibrium or maladjustments in the balance of payments, not the World Bank. **Hence, statement 3 is not correct.**

Q 37.A

• In alignment with the 'LiFE' (Lifestyle for Environment) Mission announced by the Prime Minister, the Ministry of Environment, Forest and Climate Change has notified the Ecomark Rules on 26th September 2024. It replaces the Ecomark scheme of 1991.

• The scheme will encourage the demand for environment-friendly products aligning with the principles of 'LIFE', promote lower energy consumption, resource efficiency and circular economy.

• The scheme seeks to ensure accurate labelling and prevent misleading information about products.

Products accredited under the Ecomark Scheme will adhere to specific environmental criteria, ensuring minimal environmental impact. It will build consumer awareness of environmental issues and encourage sustainable consumption.

• **The scheme is implemented by the Central Pollution Control Board (CPCB) in partnership with the Bureau of Indian Standards (BIS). Hence statement 1 is correct.**

• The CPCB oversees the environmental aspects, while BIS provides technical standards.

• **Conditions for grant of Ecomark.**

o Ecomark is NOT limited to products with mandatory BIS certification.

o An Ecomark can be granted to a product if it has:

o BIS Certification (if applicable) or

o A mandate under Quality Control Orders (QCOs) issued by the Central Government.

o Hence, BIS certification is not a mandatory requirement for Ecomark approval.

• **Hence statement 2 is not correct.**

• **Criteria for grant of an Ecomark specified under the First Schedule (2024 Rules) may include the following**:-

• reduces the pollution by minimising or eliminating the generation of waste and environmental emissions

• is recyclable or is made from recycled material or both

• reduces the use of non-renewable resources, including non-renewable energy sources and natural resources

• reduces the use of any material, which has adverse impacts on the environment

Q 38.B

• The Post-Mauryan era, between around 200 BCE and 300 CE, was characterized by political disintegration and the emergence of local dynasties such as the Shungas, Kanvas, Satavahanas, Indo-Greeks, and Kushans, with notable cultural exchanges with Central Asia and developments in trade and art.

• **Key dynasties in the Post-Mauryan era**:

o **Shunga Dynasty (185 BCE – 73 BCE): It was established by Pushyamitra Shunga** and replaced the Mauryans in Magadha. Pushyamitra was a devoted supporter of Brahmanism. Pushyamitra, his son Agnimitra was the ruler. The last of the Sunga rulers was Devabhuti, who was killed by his minister Vasudeva Kanva.

o **Kanva Dynasty (73 BCE – 28 CE):** Came into being after the deposal of the Shungas, ruling over Magadha with Vasudeva Kanva as its founder.

o **Satavahana Dynasty (230 BCE – 220 CE)**: Controlled most of Deccan India, famous for their patronage of Buddhism and trade networks. **Simuka was the founder of the Satavahana dynasty.** The best king of the Satavahana dynasty was Gautamiputra Satakarni. He reigned for 24 years from 106 to 130 A.D. His

achievements were documented in the Nasik inscription by his mother Gautami Balasri. Gautamiputra Satakarni conquered all of Deccan and increased his empire.

o **Indo-Greek Kingdoms (180 BCE – 10 AD)**: Emerging from Bactria, they dominated regions in northwest India and infused Greek culture into Indian architecture and art.

o **The Sakas:** They invaded Bactria and Parthia and conquered them from the Greek kings. After the Greeks, the Sakas extended their authority over northwestern India gradually. The founder of Saka rule in India during the first century B.C. was Maues.

o **Kushan Empire (60–375 CE):** Originating from Central Asia, they expanded across northern India and Central Asia, fostering cultural exchange through trade routes like the Silk Road. The founder of the Kushana dynasty was Kujula Kadphises or Kadphises I.

o **Gupta Dynasty:** Chandragupta I (320 – 335 CE) · Chandragupta Ⅰ is considered to be the founder of the Gupta Era which started with his accession in 319 – 320 CE, but many also believe his predecessor Sri Gupta founded the dynasty. Samudrgupta was the successor of the Chandra Gupta I.

• Hence option (b) is the correct answer.

Q 39.A

• World Trade Statistical Review 2023:

o It is the WTO's flagship statistical publication. WTSR 2023 looks into the latest developments in world trade, featuring key data on global trade in merchandise and commercial services. Hence, option (a) is the correct answer.

o **Key highlights:**

 India retains 8th position in global agriculture exports in 2023

 India ranked 18th in merchandise exports and 7th in services exports.

 China, USA and Germany remained the top three merchandise exporters in 2022.

Q 40.C

• The Booker Prize is one of the most prestigious literary awards, given annually for the best original novel written in English and published in the UK or Ireland. Established in 1969, it has recognized many outstanding authors. It was established by Booker McConnell, a multinational company. The first Booker Prize was awarded to P.H. Newby for his novel **Something to Answer For.**

• Many Indian authors and Indian-origin authors have won the prestigious Booker Prize.

• Salman Rushdie won for Midnight's Children (1981). **Hence option 1 is correct.**

• Amitav Ghosh has been shortlisted but has never won. **Hence option 2 is not correct.**

Arundhati Roy won for The God of Small Things (1997). Hence option 3 is correct.

• Aravind Adiga won for The White Tiger (2008). Hence option 4 is correct.

Q 41.C

• Hemis high altitude national park or the **Hemis national park is a wildlife park located in Ladakh.** The park is quite famous among tourists for its population of snow leopards. **This is the only park in the country, which is located in the northern region of Himalayas and it is the largest national park in the country. Rivers Indus and Zaskar flowing at its boundaries. Hence, option (c) is the correct answer.**

o **Flora of Hemis National Park:** The park lies in the Tibetan plateau region, which covers pine forests, alpine tundra region, meadows and shrublands. The park lies in the rain shadow region. Dry forests are commonly found here. The upper moist slopes of the mountain contain Veronica, Kobresia, Carex, Gentiana and others. The regions of steppe vegetation contain Ephedra, Artemisia, Stachys and others. More than 15 different endangered medicinal plants are found here like Hyoscyamus niger, Artimisia maritima, Bergenia stracheyi and others.

o **Fauna of Hemis national park:** The park is home to snow leopards. These leopards are concentrated in the Rumbak catchment area. The main prey of leopards are the Great Tibetan sheep, blue sheep, Ladakhi Urial, and others. **This is the only national park in the country that holds Ladakhi Urial.**

> Other notable animals are Tibetan wolf, red fox, Eurasian brown bear, mountain weasel, Himalayan mouse hare, Himalayan marmot and others.

o **Climate of Hemis national park:** The park receives ample amounts of sunlight and warmth during summer. The summers are mildly warm and nights are cold. Winters are extremely cold and vegetation will be very less. Snowfall is very common after November. Rainfall is minimal during monsoon season. There is no distinct monsoon season in this region.

• **The Nanda Devi Biosphere Reserve also known as the Nanda Devi National Park** and the Valley of Flowers, both a part of the prestigious UNESCO World Heritage List, encompass a **unique transition zone between the Zanskar mountain range and the Great Himalaya. Rivers Alaknanda and its tributaries, including Rishi Ganga, Dhauli Ganga, Pushwapati and Khiro Ganga, which criss-cross the area.**

• **Dachigam National Park is in Jammu and Kashmir** and best known as the home of the hangul, or Kashmir stag.

• **Kishtwar National Park is a national park located, just 40 km from Kishtwar town in the Kishtwar district of Jammu and Kashmir, India. It is bounded to the north by Rinnay** river, south by Kibar Nala catchment, east by main divide of Great Himalaya and **west by Marwah river. Kishtwar High Altitude National Park** lies in altitude range of 1700 to 4800 Metres.

Q 42.D

• **The Gulf of Mannar, the first Marine Biosphere Reserve in the South and South East Asia.** The Gulf of Mannar endowed with three distinct Coastal ecosystems namely coral reef, seagrass bed and mangroves is

considered one of the world's richest region from a marine biodiversity perspective. **Hence, statement 1 is correct.**

• The **surrounding seascape of the Marine National Park and a 10 km strip** of the coastal landscape covering a total area 10,500 sq. km., in the **Ramanathapuram, Tuticorin,Tirunelveli and Kanyakumari Districts forms the Gulf of Mannar Biosphere Reserve**.

• **Gulf of Mannar Biosphere Reserve is included in the UNESCO Man and the Biosphere (MAB) program. Hence, statement 2 is correct.** Gulf of Mannar National Park has been identified as the Important Bird Areas by BNHS-Birdlife International because of rich avian fauna consist of 187 species.

• **The Tamil Nadu government has launched the country's 'first' marine force to protect marine resources and biodiversity in the Gulf of Mannar and the Palk Bay. Hence, statement 3 is correct.**

• Besides key coastal habitats like coral reefs, seagrass beds and mangroves, the Gulf of Mannar Biosphere Reserve supports several globally important species such as the critically endangered Dugong dugong (sea cow), all protected sharks (IWPA, 1972) including whale shark, sea horses, green and hawksbill sea turtles, dolphins and sea cucumbers and several endemic species of Balanoglossus, sea grass, crabs and mangroves.

• The swamp near the Kodandaraman Temple near Rameswaram gives shelter to a flock of about 10,000 flamingos every year, during the months of December to March along with various other species of waders and wetland birds.

Q 43.D

• Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) has been operationalised from 1st July, 2015 with the objective of enhancing irrigation coverage and improving the delivery system at farm level. The scheme has four components which are as under.

• **Accelerated Irrigation Benefit Programme**- To focus on faster completion of ongoing Major and Medium Irrigation including National Projects. **Hence option 1 is correct**

• **Har Khet Ko Pani**- Creation of new water sources through minor irrigation (both surface and ground water); repair, restoration & renovation of traditional water bodies; command area development; strengthening and creation of distribution network from sources to the farm etc. **Hence, option 2 is correct.**

• **Per Drop More Crop**- Precision irrigation systems, efficient water conveyance & application, micro level storage structures, topping up of input cost beyond Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) permissible limits, secondary storage, water lifting devices, extension activities, coordination & management etc. **Hence, option 3 is correct.**

• **Watershed Development**- Ridge area treatment, drainage line treatment, soil and moisture conservation, rainwater harvesting and other watershed interventions. **Hence, option 4 is correct.**

Q 44.C

• In computer networks, cables are the medium through which data transfer from one computer to another. There are several types of computer cables available. The type of cable chosen for a network is related to the network topology, protocol, and size. Fiber optic cables and copper wires are the two primary types of cables used in networks.

• **Fiber Optic Cable is also known as the Optical Fiber Cable.** It is made up of **plastic or glass.** It transmits **signals in the form of light.** There are 3 basic components of the optical transmission system which are as follows:

o Light source

o Transmission media (fiber optics)

o Detector

• **Advantages of Fiber optic cables:**

o **High bandwidth:** Fiber optic cables have a much **higher bandwidth than copper wires**, which means they can carry more data at faster speeds.

o **Long distance:** Fiber optic cables can **transmit data over long distances without signal loss.** This makes them ideal for long distance communication. **Hence Statement-I is correct.**

o **Immunity to electromagnetic interference:** Fiber optic cables are immune to electromagnetic interference, which can be a significant problem for copper wires.

o **Security:** Fiber optic cables are much more difficult to tap into or intercept than copper wires, making them more secure for sensitive data transmission.

• **Disadvantages of Fiber Optic Cables:**

o **Cost:** Fiber optic cables are generally **more expensive than copper wires**, which can be a significant factor in some applications.

o **Fragility:** Fiber optic cables are more fragile than copper wires and can be damaged easily if not handled carefully.

o **Limited compatibility:** Fiber optic cables are **not always compatible with older network equipment** and may require costly upgrades. **Hence Statement-II is not correct.**

• Copper wire is a type of electrical conductor made from copper, widely used in various forms of electrical wiring due to its excellent conductivity. In computer networking, copper wires are typically used to transmit data through electrical signals. It transmits data in the form of electronic signals. It is the single solid conductor.

Q 45.C

• **Recent context:** Carbon dioxide (CO_2) levels in the atmosphere surged in 2024, driven by wildfires and anthropogenic emissions, breaking all previous records, according to the Keeling Curve — an iconic 67-year record of atmospheric CO_2 maintained at the Mauna Loa Observatory since 1958.

• The Keeling Curve is a continuous record of atmospheric CO_2 levels, measured since 1958 at the Mauna Loa Observatory (Hawaii) by scientist Charles David Keeling. It **highlights the steady increase in CO_2 due to human activities like fossil fuel burning and deforestation. Hence, option (c) is the correct answer.**

• Other options

o Earth's magnetic field fluctuations are studied in geomagnetism.

o Solar radiation variations are linked to the solar cycle but not the Keeling Curve.

o Global sea level rise is monitored through satellite altimetry, not the Keeling Curve.

Q 46.D

• This 1905 period was referred to as the period of extremism within the Indian National Movement. The extremists or the militant nationalists held the belief that success was attainable through audacious means.

• The significant extremist leaders were Lala Lajpat Rai, Bal Gangadhar Tilak, Bipin Chandra Pal, and Aurobindo Ghosh.

• The growth of extremism in the Indian National Movement was due to disillusionment with moderate leaders, economic difficulties, the partition of Bengal in 1905, the impact of international revolutionary movements, and a rising sense of cultural pride and national identity.

• Their primary aim was to achieve Swaraj or full independence and not mere self-government.

• The Extremists had no faith in the British sense of justice and fair play. They pointed out the forceful means by which the British had taken control of India. They believed that political rights would have to be fought for. They had the spirit of self-reliance and self-determination.

• The methods used by the extremists were:

o Not cooperating with the British Government by boycotting government courts, schools, and colleges.

o Encouragement of Swadeshi and boycott of imported goods.

o Propagation and establishment of national education.

o Public Protests and Strikes: Extremists coordinated mass demonstrations, strikes, and public gatherings to rally opposition to British rule, establishing a feeling of national unity and urgency.

o Extremists focused on pride in Indian heritage and culture, utilizing the festivals and mass gatherings to cultivate nationalism among people.

o In contrast to negotiation-minded moderates, extremists opposed confrontation with the British authorities straight away, thus resulting in outright violence.

• Hence option (d) is the correct answer.

Q 47.C

• The Election Commission of India (ECI) was established on 25 January 1950, with Sukumar Sen, an Indian Civil Service (ICS) officer, being appointed as the Chief Election Commissioner in March.

• Voter-verified paper audit trail (VVPAT):

o It allows the voters to verify that their votes are cast as intended.

o This slip is visible through a transparent window for 7 seconds before it automatically cuts and drops into a sealed box.

o It was introduced to have the fullest transparency in the voting system and to restore the confidence of the voters by ensuring the accuracy of the voting system using EVMs.

o Goa was the first state to use VVPATs with all EVMs during its 2017 legislative assembly.

o VVPATs were fully deployed in the 2019 Lok Sabha General elections. **Hence, statement 1 is not correct.**

• **The 2019 general elections (17th Lok Sabha) saw a voter turnout of 67.40%, the highest in India's electoral history**. **Hence statement 2 is correct.**

o The 2024 general elections saw a voter turnout of 65.79%.

• **In the 1984 Lok Sabha elections, following the assassination of Prime Minister Indira Gandhi, the Indian National Congress (INC) led by Rajiv Gandhi secured a landslide victory, winning 414 out of 533 seats.**

o **This remains the largest majority ever achieved by a single party in the Lok Sabha.**

o **Hence statement 3 is correct.**

Q 48.D

• The Kakori Train Action was a train robbery, committed by the revolutionaries of the Indian independence movement against the British Raj on **August 9, 1925, in a village called Kakori near Lucknow.**

• The robbery plan was executed by Ram Prasad Bismil, Ashfaqulla Khan, Rajendra Lahiri, Chandrashekhar Azad, Swaran Singh, Sachindra Bakshi, Keshab Chakravarty, Manmathnath Gupta, Mukundi Lal, Banwari Lal , Kundan Lal, and Pranawesh Mukherjee.

• According to official records, 40 people were arrested during the trial.

• **While Ashfaqullah Khan joined Ram Prasad Bismil, Rajendra Nath Lahiri, and Thakur Roshan Singh, who were earlier awarded death sentence, Sachindra Bakshi joined Shachindra Nath Sanyal in the infamous cellular jail at Port Blair (Kālā Pānī).**

• **Reaction to the Verdict & Clemency Appeal Political personalities like Motilal Nehru, Muhammad Ali Jinnah, Acharya Narendra Dev, Jawaharlal Nehru, and Lala Lajpat Rai came out in support of the arrested men. Hence option(d) is correct.**

• A team of eight lawyers, headed by Gobind Ballabh Pant, was assigned to provide legal defense to the revolutionaries. **Members of the central legislature came up with a petition to the Viceroy of India to reduce the death sentences to life sentences, but to no avail.**

Q 49.C

• The Palayakkarar Rebellion or Polygar Wars refers to a succession of rebellions against British rule in Tamil Nadu, which occurred mostly between 1755 and 1801.

• Palayakkarars were native Tamil Nadu chieftains enjoying semi-autonomous authority under the Mughals and subsequently the British East India Company. Their roles included enforcement of order and taxation in their respective areas. **Hence statement 1 is correct.**

• The uprising was driven by resentment against heavy taxation, loss of self-governance, and the repressive policies of the British.

• Key Events:

o **First Phase (1755-1799):** The early conflicts started with the likes of **Puli Thevar**, who fought against British expansion. The uprising picked up steam with different local leaders coming together to fight against British forces.

o **Second Phase (1800-1801)**: The second phase is especially marked by the **leadership of Kattabomman and the Marudu brothers** (Marudu Pandian and Chinna Marudu). They attracted extensive support, with Kattabomman being a major leader following a violent clash with British troops in 1799. **Hence statement 2 is correct.**

o The Panchalamkurichi Fort served as a focal fortress for the rebels. The British, following some initial success, initiated a sequence of military expeditions to extinguish the rebellion.

• By 1801, the rebellion was put down effectively, and the areas such as Sivagangai were annexed by the British. The brutal actions against the rebels caused fear in the entire region.

Q 50.A

• A floor test is a procedure used to determine whether the government in power enjoys the confidence of the legislature. It is conducted in Lok Sabha (for the Union Government) or in the State Legislative Assembly (for the State Government).

• The Indian Constitution does not explicitly mention the term ‘floor test’. As per Article 75(3) of the Indian Constitution, the Council of Ministers is collectively responsible to the House of People. Further, the Supreme Court in S R Bommai Case established that the majority of a government should be tested on the floor of the House. **Hence statement 1 is correct.**

• When the House is in session, it is the speaker who can call for a floor test. But when the Parliament is not in session, only the President can summon a special session under Article 85. **Hence, statement 2 is not correct.**

• Floor tests are conducted in Lok Sabha (for the Union Government) and State Assemblies (for the State Government). Rajya Sabha does not conduct floor tests since the Union government's majority is determined in Lok Sabha. So, the nominated members of the Rajya Sabha are not allowed to take part in the floor test. **Hence, statement 3 is not correct.**

Q 51.B

• National Security Council (NSC) was constituted 25 years ago based on the recommendations of a task force headed by K.C. Pant (in 1999).

o **It is an apex advisory body headed by the Prime Minister (PM).Hence statement 1 is not correct.**

o **It comprises of the Ministers of Finance, Defense, Home and External Affairs. Hence statement 3 is correct.**

• Its purpose is to promote integrated thinking and coordinated application of the resources of the State to protect and promote national security goals and objectives.

• In 2019, the allocation of Business Rules was amended to cover NSA and NSCS within its purview.

Thus, **NSA, the Secretary of the NSC, holds the rank of Cabinet Minister**. NSA can generate Cabinet notes, access relevant Cabinet papers, and participate in any Inter-Ministerial consultation**. Hence statement 2 is correct**

Q 52.D

• **Recent Context:** The Jammu & Kashmir (J&K) government has initiated the "Tree Aadhaar" mission to conserve the region's iconic chinar trees (Platanus orientalis var. cashmeriana) by geo-tagging and mapping trees, giving each tree a unique ID through a detailed census. This initiative aims to address threats from urbanization, infrastructure development, and diseases affecting the Chinar population.

• The Chinar tree (Platanus orientalis), also known as the Oriental plane, is a deciduous tree native to regions from the Balkans to the Himalayas, including parts of Turkey, the Caucasus, and Iran. **In India, it is predominantly found in the Kashmir Valley, where it holds significant cultural and historical importance. The tree thrives in the valley's temperate climate and is a prominent feature of its landscape.**

• The tree is locally known as "Bouin" in Kashmiri and has been a symbol of the region for centuries.

• **It is not native to the Western Ghats, Eastern Himalayas, or the Thar Desert, which have different climatic conditions unsuitable for Chinar trees.**

• **Hence, option (d) is the correct answer.**

Q 53.D

• India relies heavily on gypsum imports—in 2021-22, it used around 9.2 million tonnes, of which it only produced 3.5 million tonnes (38 per cent). Gypsum produced during flue gas desulphurisation is a potential alternative to the rare natural mineral.

• Flue gas desulphurisation is a method used to remove sulfur dioxide (SO2) from exhaust flue gases of fossil-fuel power plants. Hence, statement 1 is correct.

• Globally, the following practices have been majorly adopted for **utilization of FGD gypsum:**

o Production of Gypsum Board

o Cement Manufacturing

o Composite Binder

o Soil Amendment

o Mine Backfilling

• In Denmark, nearly all the **FGD gypsum produced is being utilized in the building material, gypsum boards or use in cement production**. **Hence, statement 2 is correct.**

• FGD gypsum can also be utilized as one of the **filler medium for backfilling of the mines**. **Hence, statement 3 is correct.**

Q 54.C

• Commercial banks accept deposits from the public and lend out part of these funds to those who want to borrow. The interest rate paid by the bank to the depositors is lower than the rate charged from the borrower. This difference between these two types of interest rates is called "The Spread".

• Hence, option (c) is the correct answer.

Q 55.C

• National e-Vidhan Application (NeVA) is one of the Mission Mode Projects (MMPs) under the "Digital India Programme" of Government of India. Hence statement 1 is correct.

• Its core aim is for end-to-end digitalisation of all the functions of State Legislatures by transforming them into "Digital Houses". Hence statement 2 is correct.

• It also empowers more effective engagement of Members in legislative debates by leveraging the latest Information and Communication Technology (ICT) tools.

Q 56.A

• Twelve years after the Fukushima nuclear meltdown, Japan is releasing the power plant's cooling water into the ocean. Japan had to cool the reactors at the nuclear power plant since they were destroyed during a catastrophic tsunami in 2011. It takes 170 tons of cooling water per day to keep them cool.

• Before it's released into the ocean, the contaminated cooling water and groundwater will be sent through a filter system called the Advanced Liquid Processing System (ALPS). ALPS can filter 62 different radionuclides — radioactive elements — but can't filter out the radioactive isotope tritium. Hence, statement 1 is correct but statement 2 is not correct.

• Tritium is a form of hydrogen that occurs naturally in Earth's atmosphere. It is radioactive but far less dangerous than cesium-137 or strontium-90 — both of which are life-threatening. It emits a weak beta particle that can be stopped by a sheet of plastic or human skin.

Q 57.D

• Recent Context: Global Family Farming Forum (GFFF) was launched at the Food and Agriculture Organization's World Food Forum (WFF).

• GFFF celebrates the essential role of family farmers in building sustainable agrifood systems and tackling the impacts of the climate crisis. GFFF also marked the halfway completion of the United Nations Decade of Family Farming 2019-28 (UNDFF).

• UNDFF was declared by United Nations General Assembly and it serves as a framework for countries to develop public policies and investments to support family farming.

• On the sideline of WFF, the Food and Agriculture Organization (FAO) & Global Framework on Water Scarcity in Agriculture (WASAG), adopted the Rome Declaration on Water Scarcity in Agriculture. Hence, option (d) is the correct answer.

Q 58.B

• Originally, the Constitution of India did not make any provision with respect to the Special Officer for Linguistic Minorities , Later, the States Reorganisation Commission (1953-55) made a recommendation in this regard. Hence statement 1 is correct.

o Accordingly, the Seventh Constitutional Amendment Act of 1956 inserted a new Article 350-B in Part XVII of the Constitution.

• This article contains the following provisions:

o There should be a Special Officer for Linguistic Minorities. He is to be appointed by the President of India.

o It would be the duty of the Special Officer to investigate all matters relating to the safeguards provided for linguistic minorities under the Constitution.

o **He would report to the President upon those matters at such intervals as the President may direct**. **Hence statement 3 is not correct.**

> The President should place all such reports before each House of Parliament and send to the governments of the states concerned.

• **Constitution does not specify the qualifications, tenure, salaries and allowances, service conditions and procedure for removal of the Special Officer for Linguistic Minorities. Hence statement 2 is correct.**

• In pursuance of the provision of Article 350-B of the Constitution, the office of the Special Officer for Linguistic Minorities was created in 1957.

• He/she is designated as the Commissioner for Linguistic Minorities (CLM).

o The CLM has his/her headquarters in New Delhi.

o He/she has three regional offices at Belgaum (Karnataka), Chennai (Tamil Nadu) and Kolkata (West Bengal).

• At the Central level, the CLM falls under the Ministry of Minority Affairs. Hence, he/she submits the annual reports or other reports to the President through the Union Minority Affairs Minister.

Q 59.A

• **Climate Refugees:** There is no international definition of 'climate refugees', however, the concept was first introduced by **Lester Brown** of **the World Watch Institute** in the 1970s**Forced migration** of people due to **environmental degradation** and **natural disasters**.

• **Current Status:** There are **currently no legal protections** for '**climate refugees**.' **Hence statement 1 is correct.**

• **India and UN Refugee convention:**

o The UN Convention on Refugees is an international convention that pertains to refugee protection worldwide.

It was adopted in **1951** and entered into force in **1954**. There has been **one amendment** to the convention in the form of the **1967 Protocol**.

o The foundation of the 1951 Convention is the principle of **non-refoulement**. As per this principle, a refugee **should not be returned to a country where they face serious threats to life or freedom**.

o India **doesn't have a refugee policy** and neither India is party to the **1951 UN Refugee Convention** and its **1967 Protocol. Hence statement 2 is not correct.**

Q 60.B

• Commercial paper is a money-market security issued (sold) by specified large corporations to obtain funds to meet short-term debt obligations (for example, payroll), and is backed only by an issuing bank or company which promise to pay the face amount on the maturity date specified on the note. **Hence options (a) and d are correct.**

• Since it is not backed by collateral, only firms with excellent credit ratings from a recognized credit rating agency will be able to sell their commercial paper at a reasonable price. **Hence, option (b) is not correct.**

• Commercial paper is usually sold at a discount from face value, and generally carries lower interest repayment rates than bonds due to the shorter maturities of commercial paper. Typically, the longer the maturity on a note, the higher the interest rate the issuing institution pays. Interest rates fluctuate with market conditions but are typically lower than banks' rates. **Hence, option (c) is correct.**

• Hence, option (b) is the correct answer.

Q 61.C

• The **Qualified Foreign Investor (QFI)** is sub-category of Foreign Portfolio Investor and refers to any foreign individuals, groups or associations, or resident, however, **restricted to resident from a country that is a member of Financial Action Task Force (FATF)** or a country that is a member of a group (the Gulf Cooperation Council /the European Commission) which is a member of FATF and a country that is a signatory to International Organization of Securities Commission's (IOSCO) Multilateral Memorandum of Understanding (MMOU). **Hence, Statement (1) is correct.**

• As per the guidelines issued by the Securities & Exchange Board of India, other eligibilities for QFIs (which shall include individuals, groups or associations) are:

• A QFI should neither be a person resident in India nor should be registered with the SEBI as a Foreign Institutional Investor ('FII'), sub-account or Foreign Venture Capital Investor. **Hence, Statement (2) is correct.**

• A QFI should be set up with a SEBI - registered Qualified Depository Participant (QDP) to commence activities. The QDP shall provide inter alia custody services.

• Hence, option (c) is the correct answer.

Q 62.B

• Tropical cyclones are **intense low-pressure areas** confined to the area lying between 30° N and 30°S latitudes, in the atmosphere around which high-velocity winds blow. Horizontally, it extends up to 500-1,000 km and vertically from the surface to 12-14 km. A tropical cyclone or hurricane is like a heat engine that is energized by the release of latent heat on account of the condensation of moisture that the wind gathers after moving over the oceans and seas.

• There are differences of opinion among scientists about the exact mechanism of a tropical cyclone. However, some initial conditions for the emergence of a tropical cyclone are:

o The Coriolis effect is essential for cyclonic rotation. Also a strong Coriolis force prevents the filling of low pressure at the center and ensures cyclonic motion.

o Absence of Coriolis force near the equator limits the formation of tropical cyclones between 0°-5° latitude). **Hence, statement 1 is correct.**

o Tropical cyclones require weak vertical wind shear.

o Strong vertical winds disrupt the system by tilting the storm structure, preventing the storm from organizing. **Hence, statement 2 is not correct.**

o Warm ocean waters (above 26°C) provide moisture, which fuels the storm by releasing latent heat during condensation.

o This is the primary energy source for a tropical cyclone. **Hence, statement 3 is correct.**

Q 63.A

• The Programme The National Programme for Civil Services Capacity Building (NPCSCB)- Mission Karmayogi aims to create a competent civil service rooted in Indian ethos, with a shared understanding of India's priorities, working in harmonization for effective and efficient public service delivery.

• The Mission seeks to keep the civil service at the center of all change, empowering them to deliver in challenging environments. The focus of NPCSCB is also on enhancing the government-citizen interaction, with officials becoming enablers for citizens and business, with development of Behavioural functional domain competencies leading to ease of living and ease of doing business.

• **Thus, by design, Mission Karmayogi adopts a citizen-centric approach for civil service reforms. Hence statement 1 is correct.**

• On 2nd September 2020, Government approved the **National Programme for Civil Services Capacity Building (NPCSCB)** with six key pillars including Policy Framework, Institutional Framework, Competency Framework, Digital Learning Framework (iGOT-Karmayogi), the electronic Human Resource Management System (e-HRMS) and the Monitoring and Evaluation Framework.

• The Programme will cover all civil servants (including contractual employees) across different ministries, departments, organizations and agencies of the Union Government.

o Hence statement 2 is not correct.

• **A Programme Management Unit (PMU) under the Department of Personnel, Public Grievances, and Pensions** to interface with support agencies. It will provide program management and support services to the department for rolling out and managing different aspects of NPCSCB. **Hence statement 3 is not correct.**

Q 64.A

• Venus is the **brightest planet in the solar system and is the third brightest object visible from the Earth after the sun and the moon.** In ancient literature, Venus was often referred to as the morning & evening star.

• It is the brightest among planets because **it has the highest albedo due to the highly reflective sulfuric acid that covers its atmosphere.** It is sometimes visible to the naked eye in broad daylight. **Hence option (a) is the correct answer.**

• Venus is sometimes called Earth's sister planet or Earth's twin because of their similar size, mass, proximity to the Sun, bulk composition, and presence of similar physical features such as high plateaus, folded mountain belts, numerous volcanoes, etc. It is radically different from Earth in other respects.

• The surface of Venus is totally obscured by a **thick atmosphere composed of about 96% carbon dioxide,** covered with clouds of highly reflective sulfuric acid.

• It has the **densest atmosphere of the four terrestrial planets**. The atmospheric pressure at the planet's surface is 92 times that of Earth, or roughly the pressure found 900 m underwater on Earth.

• Venus is by far the hottest planet in the Solar System, even though Mercury is closer to the Sun. This is because of the greenhouse effect arising from high concentrations of CO2 and a thick atmosphere.

• A day on Venus is equivalent to 243 Earth days and lasts longer than its year (224 days). It rotates in the opposite direction (clockwise) to most other planets.

Q 65.A

• **Boson** is a subatomic particle with **integral spin** (i.e., angular momentum in quantum-mechanical units of 0, 1, etc.) that is governed by the Bose-Einstein statistics (q.v.). Bosons include **mesons (e.g., pions and kaons)**, **nuclei of even mass number** (e.g., helium-4), and the **particles required to embody the fields of quantum field theory (e.g., photons and gluons).**

• The work that was done by **Bose and Albert Einstein** laid the foundation for the discovery of the God particle. **Hence statement 1 is correct.**

• The **Big Bang** occurred approximately 13.75 billion years ago, and it is responsible for the creation of the Universe. But after the Big Bang, the universe was a **gigantic soup of particles racing around at the speed of light without any mass**. That's where Higgs field comes into the picture.

• Higgs field is the invisible energy field that exists throughout the universe. It consists of **Higgs boson particles (God particles).**

• When the particles scattered from the Big Bang cross the Higgs field, the former attains mass and slow down as their weight increases. If Higgs didn't provide mass to particles, then all particles float in the universe with the speed of light and there will be no gravity and no life. More **interaction of particles** with Higgs fields gives heavier mass to the particles, they **settle down at one place**, **creation of stars**, planets, etc. The process of giving mass to a particle is known as the **Higgs effect.**

• Higgs-boson particles are named as God Particles as they are the **fundamental particles that provide mass to other particles.**

• The Higgs-boson was named after two scientists – **Peter Higgs,** along with **Satyendra Nath Bose**, a Bengali physicist whose pioneering work in the field in the early 1920s changed the way particle physics has been studied.

• He was awarded India's second highest civilian award, the Padma Vibhushan by the Government of India.

• He never received a Ph.D, **nor was he awarded a Nobel Prize**, though the Nobel committee recognized other scientists for research related to concepts he developed. **Hence statement 2 is not correct.**

Q 66.C

• The names of some states and union territories have been changed since independence.

• **The United Provinces was the first state to have a new name. It was renamed 'Uttar Pradesh' in 1950.**

• **In 1969, Madras was renamed 'Tamil Nadu'.**

• **Similarly, in 1973, Mysore was renamed as 'Karnataka**'.

o In the same year, Laccadive, Minicoy and Amindivi Islands were renamed 'Lakshadweep'.

• In 1992, the Union Territory of Delhi was redesignated as the National Capital Territory of Delhi (without being conferred the status of a full-fledged state) by the 69th Constitutional Amendment Act, 1991.

• **In 2006, Uttaranchal was renamed as 'Uttarakhand'.**

• **Hence option (c) is the correct answer.**

Q 67.B

• **Gross National Product (GNP**) is the Gross Domestic Product (GDP) of a country added with its **'income from abroad'**. Here, the **trans-boundary economic activities of an economy** are also taken into account. The items which are counted in the segment 'Income from Abroad' are: Private Remittances, Interest on External Loans, External Grants. **Hence, statement 1 is correct.**

• The International Monetary Fund and the Organization for Economic Cooperation and Development use weights based on PPP (Purchasing Power Parity) rates, while the **World Bank uses market exchange rates** to determine the weights in its regional and global aggregations of real GDP. **Hence, statement 2 is not correct.**

• Every asset goes for depreciation in the process of their uses, which means they 'wear and tear'. The governments of the economies decide and announce the rates by which assets depreciate. It is done in India by the Ministry of Commerce and Industry and a list is published, which is used by different sections of the economy to determine the real levels of depreciation in different assets. **Hence, statement 3 is not correct.**

• **Gross value added (GVA)** adds up the value of all goods and services produced in an economy after **deducting the input costs,** while Gross Domestic Product (GDP) is a measure of the country's national income by adding up the expenditures in the economy. **Hence, statement 4 is correct.**

• **Hence, option (b) is the correct answer.**

Q 68.D

• **The Rare Earth elements are very special and are used in most modern technologies. The Rare Earth elements include as many as 17 chemical elements**, which in recent years have become very precious and refined. In many productions (magnets, catalysts, displays) the Rare Earth elements are indispensable. The Rare Earth elements are these: dysprosium (Dy), cerium (Ce), erbium (Er), gadolinium (Gd), europium (Eu), holmium (Ho), Lutetium (Lu), lanthanum (La), neodymium (Nd) , promethium (Pm), praseodymium (Pr), samarium (Sm), terbium (Tb), scandium (Sc), thulium (Tm), yttrium (Y) and ytterbium (Yb). Among the rare earth elements, there are 15 lanthanides plus scandium and yttrium. **Cerium, lanthanum, and neodymium are the rare earth elements that are mostly produced**. The rare earth elements have many medical applications.

• **Use of Rare Earth Elements in Cancer Diagnosis & Treatment:**

o **Yttrium for Liver Cancer Treatment:** In recent years, we have witnessed a very important role of Yttrium in Cancer Treatment. Yttrium-90 microsphere therapy at the Clinica Universidad de Navarra achieved local control of liver cancer in more than 80% of cases.

o **Neodymium for the Treatment of Skin Cancer:** Neodymium laser therapy is of great importance for skin cancer. Neodymium emits at a wavelength of 1.32 microns in the near-infrared. It produces protein coagulation in a sphere around its emission point. It seals blood vessels through thermal action.

o **Cerium Oxide as an Antioxidant:** The creation of innovative cerium oxide nanoparticles also serves in the treatment of cancer patients.

o **Gadolinium Nanoparticles as an MRI contrast:** Due to their electromagnetic properties, help technology so much in detecting tumors in the brain. Gadolinium, in particular, favors doctors who fight against brain cancer, who use it in MRI as a contrast material. Gadolinium helps to locate small tumors, to which gadolinium stains its own color: silver-white.

o **Samarium for the treatment of Bone Metastases:** Samarium-153-Lexidronam (EDTMP) is used in the treatment of bone metastases. Bone metastases are a frequent complication in neoplastic patients, in this sense, the bone tissue is in the third place of systems with metastases after the lung and liver. **Hence option (d) is the correct answer.**

Q 69.D

• The Supreme Court is the highest judicial authority in India established under Article 124 of the Indian Constitution, whereas High Courts function as the highest courts at the state level under Article 214.

• As per Article 124(7), a retired SC judge cannot appear before any court or authority in India. However, as per Article 220, a retired HC judge cannot practice in the same High Court where they served.

However, they can practice in the Supreme Court or the other High Courts. **Hence, statement 1 is not correct.**

• Article 124(3) mentions that a distinguished jurist can be appointed as a judge of the Supreme Court. However, the criteria of 'distinguished jurist' does not exist for the High Court judges. **Hence, statement 2 is not correct.**

Q 70.B

• **Saint Ramalinga**: Saint Ramalinga or Ramalinga Swamingal was one of the leading saints of Tamil Nadu during the nineteenth century. It is said that his spiritual powers were realized at the tender age of eleven.

o **In 1865 he established the Samarasa Suddha Sanmargha Sangha with the aim of propagating his ideals of creating a casteless society.**

o **He imparted teachings of love and compassion to the people. He wrote Tiru Arutpa. His other literary writings are Manu Murai Kanda Vasagam and Jeeva Karunyam.**

o His words were so plain that the illiterate masses could comprehend his teachings. He shifted to Mettukuppam, which was three miles from Vadalur, in 1870. There he began building the Satya Gnana Sabai in 1872. He proposed the doctrine that God could be worshipped as Light.

• **Periyar E.V. Ramaswamy**: A leading social reformer and activist, Periyar E.V. Ramaswamy (1879-1973) was famous for his work against caste discrimination and for propagating rationalism, women's rights, and self-respect among the Tamils.

• **Atmaram Pandurang: Atmaram Pandurang Turkhadekar (1823-1898) was an Indian social reformer and physician who co-founded the Prarthana Samaj in 1867**, advocating social equality, widow remarriage, and women's education and against the caste system.

• **Sri Vaikunda Swamigal: Sri Vaikunda Swamigal (1807-1851) was a highly respected spiritual leader and reformer in Tamil Nadu, famous for establishing the Ayyavazhi movement,** which sought to elevate the downtrodden and encourage monotheistic worship of God through his teachings.

• **Hence option (b) is the correct answer.**

Q 71.D

• The total liability of the monetary authority of the country, RBI, is called the monetary base or high powered money.

• It consists of:

o Currency (notes and coins) in circulation with the public.

o Vault cash of commercial banks

o Deposits held by the Government of India with RBI.

o Deposits held by the commercial banks with RBI.

• **Hence, option (d) is the correct answer.**

Q 72.C

• External Commercial Borrowings is a loan availed by an Indian entity from a nonresident lender with a minimum average maturity. Most of these loans are provided by foreign commercial banks buyers' credit, suppliers' credit, securitized instruments such as Floating Rate Notes and Fixed Rate Bonds etc.

• The negative list, for which the ECB proceeds cannot be utilised, would include:

o real estate activities,

o investment in capital market,

o equity investment,

o working capital purposes (except from foreign equity holder),

o repayment of Rupee loans (except from foreign equity holder)

• **Hence, option (c) is the correct answer.**

Q 73.D

• Recently, the Government of India appointed the 23rd Law Commission for a three-year time period i.e. from 1st September 2024 to 31st August 2027.

• It conducts research and provides recommendations based on the defined Terms of Reference.

• The Law Commission is not established by any statute, instead it is formed through a government resolution. So, it is neither a constitutional nor a statutory body. **Hence, statement 1 is not correct.**

• It consists of the chairperson, four full-time members, and additional ex-officio and part-time members. The chairperson is usually a retired judge of the Supreme Court or High Court. The chairperson of the Law Commission is not appointed by the President but by the Government of India or Union Cabinet. **Hence, statement 2 is not correct.**

• The Law Commission functions in an advisory capacity. It suggests legal reforms but does not have the power to enforce them. The government may or may not accept the recommendations. **Hence, statement 3 is not correct.**

• The Terms of Reference of the 23rd Law Commissions are:

o Create a Standard Operating Procedure for periodic review of existing laws for simplification.

o Based on the relevance, and current economic needs, suggest repealing and amendments to the laws.

o Examine laws affecting the poor and conduct post-enactment audits of socio-economic legislation.

o Review of judicial administration to simplify the process and ensure economic disposal of cases by eliminating of delays and speedy clearance of arrears.

o Examine existing laws and suggest reforms to ensure the effective implementation of DPSPs and to attain the objectives set out in the Preamble.

o Ensure gender equality by suggesting amendment to strengthen laws

o Revision of Central Acts to remove anomalies and inequities.

o Examine the impact of globalization on food security, unemployment and recommend measures for the protection of the marginalized

Q 74.C

• **Jet streams are fast-moving narrow bands of strong winds found in the upper troposphere, just below the tropopause. These winds move from west to east due to the Coriolis effect.**

• Polar Jet Streams (PJS) are located between polar and temperate air masses and generally occur at 6 – 9 km altitude.

• Subtropical Jet Streams (SJS) are found between tropical and temperate air masses at a higher altitude of 10 - 16 km.

• This variation occurs because the troposphere is thicker near the equator (~17-18 km) and thinner near the poles (~8-9 km).

• Since jet streams form in the upper troposphere, their altitude varies according to tropospheric thickness. **Hence, statement I is correct.**

• A greater temperature difference between air masses does increase the speed of the jet stream because jet streams exist due to temperature gradients (higher contrast leads to stronger winds). However, it **does NOT raise the altitude of the jet stream.**

• **The altitude is determined by the location within the troposphere rather than the temperature contrast.**

• For example, polar jet streams remain at a lower altitude even though they have a high temperature gradient, while subtropical jet streams are higher due to the natural thickness of the troposphere at lower latitudes. **Hence, statement II is not correct.**

Q 75.C

• Recently, **Supreme Court has recommended** that the Union government **create a comprehensive policy for the governance and management of sacred groves across the country.** These are patches of land dedicated by local communities to deities, nature or ancestral spirits. The communities preserve these areas with near natural-state of vegetation.

• Sacred groves bear different names based on their location, these include: the **Dev vans of Himachal** and the **Bugyals of Uttarakhand** in the north, the **Orans of the Thar** in the northwest, **Mawphalang of Meghalaya** in the Northeast, the **Sarpa kavu of Kerala** and the **Kovil kavu of Tamil Nadu** in the deep south in addition to the **Saranas of the great Central Indian belt. Hence, option (c) is the correct answer.**

• The total area occupied by sacred groves is an estimated 33,000 hectares. This is 0.01 per cent of India's total area. Maharashtra has the highest number of groves, with nearly 3,000 documented.

Q 76.C

• The economic capital of a central bank includes its capital, reserves, risk provisions and revaluation balances.

• Realized equity is the component of RBI's economic capital comprising its capital, reserve fund and risk provisions. Realized equity is a form of a contingency fund for meeting all risks primarily built up from retained earnings. It is also called the Contingent Risk Buffer (CBR). **Hence, statement 1 is correct.**

• The risk provisions comprise of:

• Contingency Fund which includes provisions for unforeseen contingencies arising from depreciation of securities or monetary/exchange rate policy risks, and

• Asset Development Fund, which is the amount set aside for investment in subsidiaries and internal capital expenditure.

• Revaluation balances are unrealized gains, net losses resulting from movement of exchange rate, gold price or interest rate. The revaluation balances are the major component of RBI's economic capital (73%). **Hence, statement 2 is correct.**

• The Bimal Jalan Committee suggested that a distinction needs to be made between realized equity and revaluation balances in RBI's balance sheet, as the latter are highly volatile. It recommended that the RBI should also include its revaluation balances as part of overall risk buffers.

• **Hence, option (c) is the correct answer.**

Q 77.A

• **Recent Context:** The Union Budget 2025 has proposed the establishment of a **Makhana Board in Bihar** to boost makhana cultivation, processing, and export. This initiative aims to support farmers, enhance productivity, and position makhana as a globally recognized superfood. With Bihar being the largest producer of makhana, the board will play a crucial role in research, subsidies, and market linkages.

• **Makhana (fox nuts) is an aquatic crop that thrives in stagnant freshwater bodies such as ponds, wetlands, and lakes.** It is traditionally cultivated using pond-based farming, but field-based cultivation methods are also gaining popularity. **Hence, statement 1 is correct.**

• Bihar is the largest producer of makhana in India, contributing to over 80% of the country's production. The state also plays a significant role in global makhana production, making it a key economic crop. **Hence, statement 2 is correct.**

• **Makhana is naturally low in fat and cholesterol-free.** It is a highly nutritious snack, rich in protein, fiber, antioxidants, calcium, and magnesium. Unlike processed snacks, makhana is free from trans fats, making it a healthy alternative for weight management, diabetes control, and heart health. **Hence, statement 3 is not correct.**

• **Nutritional Benefits of Makhana:**

o High in protein and fiber, making it an excellent choice for weight loss.

o Low in calories and fat, making it heart-friendly.

o Rich in antioxidants, aiding in anti-aging and diabetes management.

o Gluten-free, making it suitable for people with gluten intolerance.

• With government initiatives like the Makhana Board and better agricultural practices, makhana has the potential to emerge as an export-driven superfood in the coming years.

Q 78.B

• India has a rich heritage of folk theatre in different regions of India. The traditional folk theatre depicts the different facets of the local way of life such as social mores, beliefs, and practices.

• **Various folk theatre of India:**

o **Ankia Nat: A one-act traditional play of Assam, developed by Srimanta Sankardeva, which integrates music, dance, and drama revolving around themes of devotion to Lord Krishna.**

o **Ramlila**: A dramatic reenactment of the life of Lord Rama, especially his journey to save Sita, enacted during the festival of Dussehra in different regions of India.

o **Raslila**: A colorful dance-drama of Uttar Pradesh that portrays the mischievous and romantic adventures of Lord Krishna and his followers, particularly the gopis.

o **Ramman**: A folk ritualistic performance of Uttarakhand that commemorates the Ramayana through folk songs, dances, and theatrical performances.

o **Bhuta**: **A type of folk theatre in Karnataka that entails ritualistic performances of local deities and spirits, sometimes with elaborate costumes and music.**

o **Bhavai**: A traditional folk theatre of Gujarat that integrates storytelling with music and dance, sometimes tackling social issues through satire and humor.

o **Daskathia**: A folk theatre tradition of Odisha, distinguished by its storytelling style in which artists sing and act out Hindu epic stories, especially Lord Krishna's life.

o **Garodas**: A folk performance tradition of Gujarat based on humor and satire, presenting stories of local culture and societal issues through song and dance.

o **Kariyila**: An old folk theatre type of Karnataka incorporating dance and dramatic elements for disseminating moral codes and folklore-based stories.

o **Maach**: One of Madhya Pradesh's conventional folk theatres that, for the communication of historical epics and legendaries, joins forces with music, dance, and drama.

o **Oja-Pali**: Traditional dance-drama based in Assam by the priestly order of Ojas related to descriptions through song as well as drama, of God-head stories.

o **Tamasha**: A folk theatre genre from Maharashtra that is popular for its vibrant performances involving music, dance, and comedy elements that are often based on social issues.

o **Bhaona**: A classic form of theatre from Assam that involves the integration of music and dance with storytelling to portray religious themes with an emphasis on Vaishnavism.

o **Yakshagana**: A classical dance-drama from Karnataka that is defined by its ornate costumes, colorful makeup, and narration based on Hindu epics such as the Mahabharata.

o **Pagati Veshaalu**: A traditional Andhra Pradesh folk performance where actors dress up in elaborate costumes to enact mythological figures and tell stories through song and dance.

o **Bayalata**: A Karnataka folk performance that combines music and dance with narration of stories, typically interestingly portraying historical or mythological incidents.

o **Theyyam: A Kerala ritual dance form with elaborate costumes and makeup used to enact deities and ancestral spirits, enacted as part of temple festivals..**

• Hence option (b) is the correct answer.

Q 79.B

• **The Nilgiri Tahr is an endangered mountain ungulate endemic to the southern part of the Western Ghats**. The species is found in a roughly 400 km stretch in the Western Ghats which **falls in the states of Kerala and Tamil Nadu**. The Eravikulam National Park has the highest density and largest surviving population of Nilgiri tahr.

• **The Namdapha Flying Squirrel** is indigenous to the Changlang district and **endemic to Arunachal Pradesh,** specifically the Namdapha National Park. It is protected under Schedule II of the Wildlife Protection Act 1972 and is classified as critically endangered on the IUCN Red List.

• **Kashmir Stag or Hangul** is one of the most **critically endangered species** found in the temperate grasslands of western Himalayas. Dachigam National Park in Kashmir represents one such grassland habitat that supports Hangul, a highly threatened and the only subspecies of the Red deer (Cervus elaphus) to be found in India, which is **now confined only to the Kashmir Valley.**

• **The Kharai camel, indigenous to Gujarat,** derives its name from the local term "Khara," meaning saline, reflecting its adaptability to both desert and coastal ecosystems. **Known as the "Swimming Camel," it can traverse long distances across water** and has been preserved by the Rabari and Fakirani Jat tribes for over 400 years. Currently, about 6,200 Kharai camels exist, primarily in Kutch, where they play a crucial role in local ecosystems, particularly in maintaining mangrove forests.

• Hence, option (b) is the correct answer.

Q 80.A

• Recently, the International Whaling Commission has rejected proposals to overturn a four-decadeold moratorium on commercial whaling. A commercial whaling moratorium was adopted in 1982 and came into full force in 1986

• **The International Whaling Commission (IWC) was established in 1946 as the global body** responsible for management of whaling and conservation of whales. It is an **inter-governmental organisation** with a current membership of 88 governments from all over the world. The legal framework of the IWC is the International Convention for the Regulation of Whaling**. Hence, statement 1 is correct.**

o The **Convention recognises three different types of whaling: commercial, aboriginal subsistence and special permit (also known as scientific) whaling.** Aboriginal Subsistence Whaling which is conducted by indigenous communities, often in remote parts of the world.

o **The Convention contains a separate category of special permit whaling for scientific research purposes. Special permit whaling is not regulated by the Commission but by national governments. Hence, statement 2 is not correct.**

o **Conservation initiatives and efforts are** not limited to regulating whaling but also encompass addressing threats such as bycatch, entanglement, ship strikes, ocean noise, pollution, and debris.

Q 81.D

• **The medieval India witnessed many important battles which were fought between the regional powers and between the regional powers and foreign invaders. A list of some of the important battles fought by the Mughals in the 16 century has been shared below.**

o **First Battle of Panipat (1526)**: Babur defeated Ibrahim Lodi, and the Mughals came to govern India.

o **Battle of Khanwa (1527)**: Babur defeated Rana Sanga along with his coalition.

o **Battle of Ghaghra (1529): Also known as the Battle of Gogra; Babur defeated an Afghan-Bengal alliance under the leadership of Sultan Mahmud Lodi and Sultan Nusrat Shah.**

o **Battle of Chausa (1539**): Took place between Sher Shah Suri and Mughal Emperor Humayun in Bihar. Sher Shah Suri won.

o **Battle of Bilgram (1540): Also the Battle of Kannauj; between Humayun and Sher Shah Suri.**

o **Second Battle of Panipat (1556)**: Between the army of Bairam Khan for Akbar and Hemu's Delhi army.

o **Battle of Haldighati (1576): Between Maharana Pratap and the Mughal army under Man Singh I.**

• **Hence option (d) is the correct answer.**

Q 82.C

• **Unsustainable riverbed sand mining** is a major problem in India.

• Sand aquifer helps in recharging the water table. Removal of the sand from riverbeds causes the **lowering of water table** in the nearby areas. Hence, **option 1 is correct.**

• The removal of sand from riverbeds causes an **increase in the depth** of the river and also **changes the flow**. It also disrupts the **base of the river.** Due to all these factors, there is a high chance of the **collapse of bridges** and other structures. E.g., bridge collapse on the Savitri River in Pune. **Hence, option 2 is correct.**

• Removal of sand from rivers also reduces the barrier between surface water and groundwater, thus increasing the chances of **intermixing, percolation, and leaching.** This leads to **groundwater pollution**.

Hence option 3 is correct.

• The **removal of sand from rivers causes an "increase" (**not decrease) **in the salinity** of the rivers.

Hence, option 4 is not correct.

Q 83.B

• Lord Cornwallis (1786-1793) replaced Warren Hastings as Governor-General in 1786. **The Parliament amended Pitt's India Act in 1786 so as to enable him to overrule the decision of the majority of his council, if necessary.**

• **Important Events during his reign**:

o **Third Mysore War:** Cornwallis was instrumental as Governor-General in this war (1790-1792) against Tipu Sultan, and he led British troops to victory and gained large amounts of territory for the British East India Company. **Hence option 1 is correct.**

o **Permanent Revenue Settlement**: Cornwallis implemented this reform in 1793, which created a permanent land revenue system in Bengal, which had a profound effect on agricultural cultivation and land ownership in British India. **Hence option 2 is correct.**

o **Cornwallis Code (1793**), including many judicial reforms and separation of revenue administration and civil jurisdiction.

o **Europeanisation of administrative machinery and introduction of civil services.**

• **The Treaty of Mangalore was entered into in 1784, during the regime of Warren Hastings,** then Governor-General of India. He had a central role in the negotiations that resulted in the treaty, which brought to an end the Second Anglo-Mysore War. **Hence option 3 is not correct.**

• **Hence option (c) is the correct answer.**

Q 84.A

• **NationaL GreenTribunal (NGT)**- The National Green Tribunal has been established under the National Green **Tribunal** Act,2010 for effective and expeditious disposal of cases relating to environmental protection and conservation of forests and other natural resources including enforcement of any legal right relating to environment and giving relief and compensation for damages to persons and property and for matters connected therewith or incidental thereto. **Hence, statement 2 is not correct.**

• **Powers**

o The NGT has the power to hear all civil cases relating to environmental issues and questions that are linked to the implementation of laws listed in Schedule I of the NGT Act.

o This means that any violations pertaining only to these laws, or any order/decision taken by the

Government under these laws can be challenged before the NGT. Importantly, the

o **NGT has not been vested with powers to hear any matter relating to the Wildlife (Protection) Act, 1972,** the Indian Forest Act, 1927 and various laws enacted by States relating to forests, tree preservation etc. **Hence, statement 1 is correct.**

• Review and Appeal

o Under the **NGT** Rules, there is a provision for seeking a Review of a decision or Order of the NGT. **If this fails, an NGT Order can be challenged before the Supreme Court within ninety days.**

Q 85.C

• As per Article 80 of the Indian Constitution, the Rajya Sabha consists of representatives of States and Union Territories, elected by the elected members of State Legislative Assemblies. Hence, statement 1 is correct.

• Section 154 of the Representation of the People Act, 1951 states that a member elected in a by-poll holds office only for the remainder of the term of the member whose seat became vacant. Hence, statement 2 is correct.

• The Supreme Court, in its 2018 judgment ruled that NOTA (None of the Above) is not applicable in Rajya Sabha elections.

• The Court held that NOTA is not applicable in indirect elections like those for the Rajya Sabha, as these elections are based on proportional representation and involve voting by elected representatives (MLAs).

• Hence, statement 3 is correct.

Q 86.A

• The PM SHRI Scheme was launched by the Government of India to upgrade existing schools into model schools that reflect the vision of the National Education Policy (NEP) 2020. Under the scheme there is provision of setting up of More than 14500 PM SHRI Schools (PM ScHools for Rising India) by strengthening the existing schools from amongst schools managed by Central government/State/UT Government/local bodies. **Hence, statement 1 is correct.**

• The PM SHRI is a centrally sponsored scheme with the Central Government providing 60% of the funding and the state governments contributing 40%. The scheme was approved by Cabinet on 7 September, 2022 and the Ministry of Education is the nodal ministry for the implementation of the scheme. **Hence, statement 3 is not correct.**

• The scheme covers both rural and urban areas, ensuring equitable access to quality education across the country. Hence, statement 2 is not correct.

Q 87.A

• The primary factor that determines the color of a star in the night sky is its temperature. This relationship is described by Wien's Law, which states that the temperature of a star is directly related to the peak wavelength of the light it emits.

o Stars emit light across the electromagnetic spectrum, and their color is a result of the balance of different colors within that spectrum. Here's a breakdown of how star temperature correlates with color:

• **Hot Stars (High Temperature)**: Stars with high temperatures appear blue or blue-white. **These stars emit a significant amount of their light in the blue** and ultraviolet part of the spectrum.

• **Intermediate-Temperature Stars: Stars with intermediate temperatures appear white or yellowwhite**.

These stars emit a more balanced spectrum of colors, with visible light spanning across the rainbow.

• **Cool Stars (Low Temperature)**: **Stars with lower temperatures appear red or orange**. These stars emit a larger portion of their light in the red and infrared part of the spectrum

• **The size of a star does influence its luminosity (brightness), but it doesn't play a direct role in determining the color.** Two stars of the same temperature but different sizes may have different luminosities, but their colors will be similar.

• **Distance affects the apparent brightness of a star as observed from Earth**, but it doesn't impact the intrinsic color of the star. Even though a star might appear dimmer or brighter due to its distance, the color remains determined by its temperature.

• **Luminosity is a measure of the total energy radiated by a star per unit of time**. While it is related to the star's size and temperature, it doesn't independently determine the color. Luminosity affects how bright a star appears, **but it doesn't alter the color associated with the star's temperature.**

• The color of a star provides valuable information about its temperature and, to some extent, its age and composition.

o While temperature is the primary factor influencing a star's color, other factors such as its size, distance, and luminosity can affect its overall appearance and brightness in the night sky.

o However, when it comes to the specific color of the star, temperature is the dominant factor.

• **Hence option (a) is the correct answer.**

Q 88.A

• **The Vellore Mutiny of 1806** is an important moment in Indian history, for it is one of the first systematic rebellions against British colonial rule.

• **Key points**:

o **First Large-Scale Mutiny:** The Vellore Mutiny is the first large-scale act of violent rebellion by Indian sepoys against the British East India Company, 51 years prior to the Indian Rebellion of 1857.

o **Immediate Causes:** The mutiny was triggered by the imposition of new dress regulations that offended both Hindu and Muslim soldiers. **Hence statement 1 is correct.**

> These included prohibitions on caste markings and mandatory changes to their traditional attire, which were perceived as direct assaults on their religious and cultural identities.

o **Symbolic Gesture: The sepoys, during the mutiny, substituted the British Union Jack with Tipu Sultan's Royal Tiger flag and proclaimed** his son Fateh Hyder their king. It was a symbolic gesture expressing rejection of British authority and restoration of native sovereignty. **Hence statement 2 is correct.**

o **Brutal Suppression**: The British reaction was quick and brutal. Once they had recaptured the fort, around 100 captured sepoys were put to death without trial, a move that appalled public opinion in Britain and brought about profound changes in military policy.

o **Impact on Military Policy: The mutiny led to the dissolution of all three Madras regiments that were involved.** Moreover, the new dress code rules were repealed, and the flogging of Indian soldiers was abolished, reflecting a clear reaction to the complaints made by the sepoys. **Hence statement 3 is correct.**

o **Legacy of Dissent**: Although the revolt was crushed, it created a sense of rebellion among Indian soldiers and is regarded as a foretaste of subsequent rebellions against British dominion. The violent repression also helped create hesitation among southern sepoys in joining the 1857 uprising.

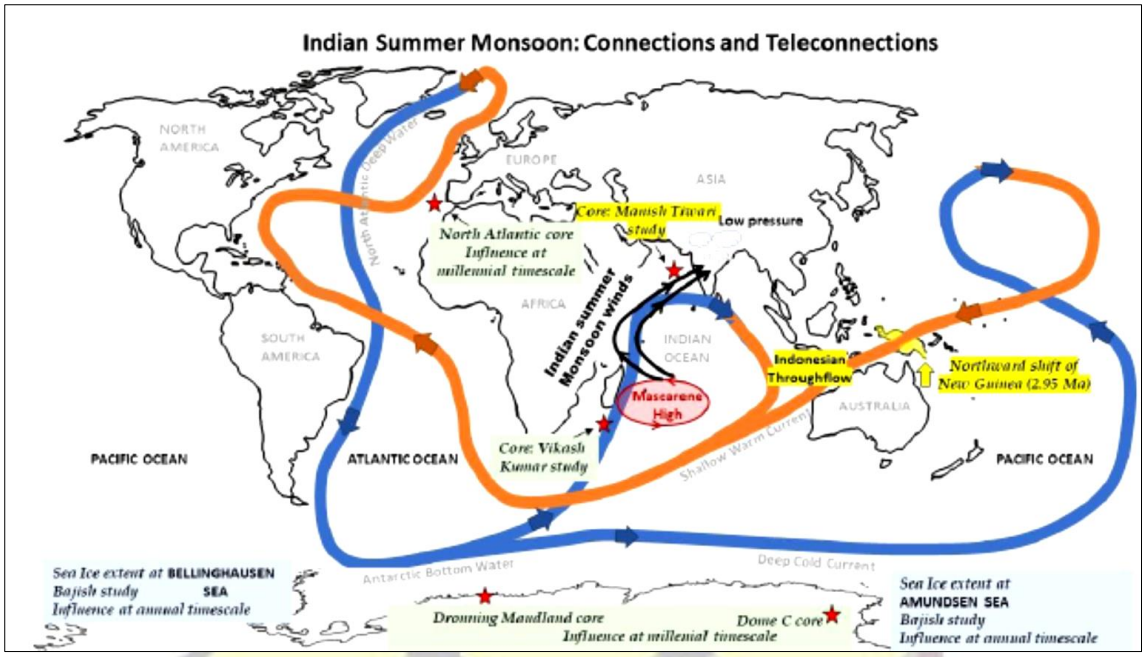
• Hence option (a) is the correct answer.

Q 89.D

• The Mascarene High (MH), is a key component of the Asian-Africa-Australia monsoon system in austral winter (JJA), spanning over the South Indian Ocean. It is a low-level subtropical high dominating the southern Africa and South Indian Ocean, characterized by a north-westward tilt with height, which is attributed to its spatially inhomogeneous thermal structure. Large-scale subsidence characterizes the main body of the MH, with the stronger subsidence to the east than to the west.

• During summers, the Indian subcontinent experiences high temperatures establishing low pressure conditions over the land. On the other hand, **the Mascarene High located between 25 and 35 degrees south and 40 and 90 degrees east in the Indian Ocean has high pressure conditions.** This difference in the pressure over the land and ocean gives rise to winds from the south-west that carry moisture from the underlying ocean. When the cloud-laden winds reach the land, it rains. With the Mascarene High being well connected with the other parts of the globe, the Indian Summer Monsoon also gets influenced by the changes happening elsewhere. So, along with nearby connections, the Indian Summer Monsoon also has distant relationships known as 'teleconnections'. **If there is a delay in the formation of Mascarene High, there is also the possibility of a delay in the onset of monsoon in India.**

• Hence option (d) is the correct answer.



Q 90.A

• **Affective computing refers to the study and development of technologies that can recognize, interpret, process, and simulate human emotions.** In simpler terms, it's about creating machines that understand and respond to human emotions.

o **For example**, Affectiva, an emotion measurement technology company, provides software that can analyze facial expressions during video calls to gauge customer reactions and satisfaction.

o **For example**, the company Cogito has developed an app that uses voice analysis during phone conversations to monitor the mental health of individuals. It can detect signs of depression and anxiety, providing valuable insights to healthcare providers.

• **Emotion AI using large language models (LLMs) and affective computing" refers to the field of artificial intelligence that leverages the capabilities of LLMs to analyze and understand human emotions within text, essentially allowing computers to "read" and respond to emotional cues in language, often utilizing techniques from the broader field of affective computing which focuses on the study and simulation of human emotions in technology.**

• **LLMs as emotion detectors:** By training LLMs on large datasets of text with associated emotional labels, researchers can enable them to identify emotional states expressed in written communication, like happiness, sadness, anger, or fear, based on word choice, sentence structure, and context.

• **Affective computing applications:** This technology can be used in various applications like chatbots that respond empathetically, sentiment analysis of customer feedback, virtual assistants that adjust their tone based on user emotions, and even mental health support systems.

• **How it works:**

o **Text analysis:** LLMs analyze text input by looking for emotional keywords, phrases, and patterns associated with specific emotions.

o **Contextual understanding:** LLMs can consider the broader context of a conversation to interpret the intended emotion behind the words.

o **Emotional response generation:** Based on the detected emotion, the LLM can generate responses that are appropriately aligned with the user's emotional state. **Hence option (a) is the correct answer.**

Q 91.B

• The loan-to-value (LTV) ratio is an assessment of lending risk that financial institutions and other lenders examine before approving a mortgage.

• The loan to value (LTV) ratio is a metric used to assess the level of risk involved in extending a loan to a borrower by comparing the value of the loan against the value of the underlying collateral. **Hence, statement 1 is not correct.**

• The loan to value (LTV) ratio is calculated by dividing the loan amount by the estimated market value of the collateral. It shows the amount of money that can be salvaged from a borrower in case of a default. Since the actual market value of the collateral is likely to fluctuate over time, loans with lower LTV ratio are considered safer as the lender is protected from larger fluctuations in collateral value. **Hence, statement 2 is correct.**

Q 92.D

• In the wake of the Covid pandemic, a pre-packaged insolvency resolution was introduced in April 2021 to deal with stress of these small and mid-sized companies. The pre-packaged insolvency process (PPRIP) is an alternate and speedier resolution mechanism for micro, medium and small enterprises in financial distress. **Unlike in the corporate insolvency process, the pre-packaged insolvency process allows for an informal understanding between creditors and debtors**. **Hence, statement 1 is correct.**

• It is available for resolving stress where default is at least ₹ 1 crore for which CIRP is available. **Unlike CIRP, it is also available in respect of defaults where default is at least ₹ 10 lakh,** and defaults that arose between 25th March, 2020 to 24th March, 2021. **Hence, statement 2 is correct.**

• In India, pre-packaged insolvency, also known as Pre-Packaged Insolvency Resolution Process (PPIRP), is **currently only available to Micro, Small, and Medium Enterprises (MSMEs)** under the Insolvency and Bankruptcy Code (IBC). **Hence, statement 3 is correct.**

• **Hence, option (d) is the correct answer.**

Q 93.A

• **Article 315 of the Indian Constitution provides for the establishment of a Joint Public Service Commission (JPSC).** Unlike state public service commissions, which are created by state legislatures, **a**

JPSC is formed through a Parliamentary Act at the request of the states concerned. Hence, statement 1 is correct.

• Article 323(2) states that a Joint Public Service Commission (JPSC) submits its annual report to the Governors of the respective states, not the President of India. Hence, statement 2 is not correct.

• As per Article 320, the role of Public Service Commissions (UPSC, SPSC, and JPSC) is to advise the government on matters related to recruitment, appointments, promotions, and disciplinary actions. However, the government is not obligated to follow the recommendations. Hence, statement 3 is not correct.

Q 94.B

• There are two kinds of radiation: non-ionizing radiation and ionizing radiation.

o **Non-ionizing radiation** has enough energy to move atoms in a molecule around or cause them to vibrate, but not enough to remove electrons from atoms. Examples of this kind of radiation are radiowaves, visible light and microwaves.

o **Ionizing radiation** has so much energy it can knock electrons out of atoms, a process known as ionization. Ionizing radiation can affect the atoms in living things, so it poses a health risk by damaging tissue and DNA in genes.

• Types of Ionizing Radiation:

o **Alpha particles (α)** are helium nuclei which are positively charged and made up of two protons and two neutrons from the atom's nucleus. **Alpha particles come from the decay of the heaviest radioactive elements, such as uranium, radium and polonium. Tritium is a light radioactive isotope of hydrogen, which undergoes beta decay (β), not alpha decay. Hence, statement 1 is not correct.**

> Even though alpha particles are very energetic, they are so heavy that they use up their energy over short distances and are unable to travel very far from the atom.

> The health effect from exposure to alpha particles depends greatly on how a person is exposed. Alpha particles lack the energy to penetrate even the outer layer of skin, so exposure to the outside of the body is not a major concern.

o **Beta particles (β)** are small, fast-moving particles with a negative electrical charge that are emitted from an atom's nucleus during radioactive decay. These particles are emitted by certain unstable atoms such as hydrogen-3 (tritium), carbon-14 and strontium-90.

> **Beta particles are more penetrating than alpha particles, but are less damaging to living tissue** and DNA because the ionizations they produce are more widely spaced. They travel farther in air than alpha particles, but can be stopped by a layer of clothing or by a thin layer of a substance such as aluminum.

o **Gamma rays (γ)** are weightless packets of energy called photons. Unlike alpha and beta particles, which have both energy and mass, gamma rays are pure energy. Gamma rays are similar to visible light, but have

much higher energy. Gamma rays are often emitted along with alpha or beta particles during radioactive decay. **Gamma rays are not deflected in a magnetic field because they are composed of photons, which are neutral particles and do not carry any charge. Hence statement 2 is correct.**

> Gamma rays are a radiation hazard for the entire body. They can easily penetrate barriers that can stop alpha and beta particles, such as skin and clothing. Gamma rays have so much penetrating power that several inches of a dense material like lead, or even a few feet of concrete may be required to stop them. Gamma rays can pass completely through the human body; as they pass through, they can cause ionizations that damage tissue and DNA.

o **X-rays** are similar to gamma rays in that they are photons of pure energy. X-rays and gamma rays have the same basic properties but come from different parts of the atom. **X-rays are emitted from processes outside the nucleus, but gamma rays originate inside the nucleus.** They also are generally lower in energy and, therefore less penetrating than gamma rays. X-rays can be produced naturally or by machines using electricity. **Hence statement 3 is not correct.**

Q 95.C

• Global Climate Risk Index, prepared by Germanwatch, identifies India as among the sixth worst affected countries between 1993-2022 period.

o The Climate Risk Index (CRI), published since 2006, is one of the longest running annual climate impact-related indices. The report shows that India reported loss of 80,000 lives and nearly $180 billion in 400 extreme weather events in 30 years (1993-2022).

o It is a backward-looking index ranking the human and economic toll of extreme weather with the most affected country ranked highest.

o The CRI analyses climate-related extreme weather events' degree of effect on countries. In doing so, it measures the consequences of realised risks on countries.

o This index ranks countries by their economic and human impacts (fatalities as well as affected, injured, and homeless) with the most affected country ranked highest.

• Hence, option (c) is the correct answer.

Q 96.B

• Committee on Government Assurances

o This committee examines the assurances, promises and undertakings given by ministers from time to time on the floor of the House and reports on the extent to which they have been carried through.

o **In the Lok Sabha, it consists of 15 members and in the Rajya Sabha, it consists of 10 members.**

o It was constituted in 1953.

• Committee on Private Members' Bills and Resolutions

o This committee classifies bills and a llocates time for the discussion on bills and resolutions introduced by private members (other than ministers).

o This is a special committee of the Lok Sabha and consists of 15 members including the Deputy Speaker as its chairman.

o **The Rajya Sabha does not have any such committee. The same function in the Rajya Sabha is performed by the Business Advisory Committee of that House.**

• Committee on Absence of Members from the Sittings of the House:

o **The "Committee on Absence of Members from the Sittings of the House" is a parliamentary committee responsible for examining leave applications from Members of Parliament (MPs) and investigating cases where an MP has been absent from the House for an extended period without permission, typically for more than 60 days; this committee is constituted by the Speaker and consists of 15 members.**

o **There is no such committee in Rajya sabha and all matters are dealt by the House itself.**

• Hence option (b) is the correct answer.

Q 97.C

• Tobin tax is a duty proposed on spot currency trades to penalize short-term currency trading in order to stabilize markets and disincentive speculation. It is a proposal to impose small tax on all foreign exchange transactions with the objective to discourage destabilising speculation and volatility in the foreign exchange markets.

• In the short-term market, the rapid inflows and outflows make it challenging to manage financial transactions. As a result, levying a Tobin tax could reduce volatility and regulate speculative capital flows or hot money. Tobin Tax burden is inversely related to transaction period or length.

• Hence, option (c) is the correct answer.

Q 98.C

• Recent Context: The International Energy Agency (IEA) has recently published a report titled "The Path to a New Era for Nuclear Energy," highlighting the pivotal role of nuclear power in addressing energy security and climate change.

• IEA (HQ: Paris, France) is an autonomous body, established in 1974 to help co-ordinate a collective response to major disruptions in oil supply.

• The Path to a New Era for Nuclear Energy is a new report by the International Energy Agency that looks at the opportunities for nuclear energy to address energy security and climate concerns – and at critical elements needed to pursue these opportunities, including policies, innovation and financing.

• Key highlights of report

o Increasing acceptance: Over 40 countries have plans to expand role of nuclear power in energy systems.

o Small modular reactors (SMRs) installations: It could reach 80 GW by 2040, accounting for 10% of overall nuclear capacity globally.

o Expansion in annual investment: Double to $120 billion by 2030.

o Emerging economies as market leaders: As of the end of 2024, there were 63 nuclear reactors under construction, of which three-quarters are in emerging economies and half in China alone.

• Significance **of Nuclear Energy**

o Energy security: 9% contribution to global electricity generation in 2023.

o Low-emissions source: Second-largest source of low emissions electricity in 2023 after hydropower.

o Source of heat: Dual benefits of harnessing thermal energy and electricity generation from nuclear reactors.

o Opportunities in developing economies: Nuclear energy accounted for just 5% of total electricity generation in 2023 as compared to 17% in advanced economies

• **Hence option (c) is the correct answer.**

Q 99.D

• **Recent context:** With a digital twin, people will also be able to attend meetings and work from remote locations, said Mr. Thrun, who led the development of Google's self-driving car.

• **A digital twin is a virtual representation of an object or system designed to reflect a physical object accurately. It spans the object's lifecycle, is updated from real-time data and uses simulation, machine learning and reasoning to help make decisions. Hence option (d) is the correct answer.**

• **How does a digital twin work?**

o The studied object—for example, a wind turbine—is outfitted with various sensors related to vital areas of functionality. These sensors produce data about different aspects of the physical object's performance, such as energy output, temperature, weather conditions and more. The processing system receives this information and actively applies it to the digital copy.

o After being provided with the relevant data, the digital model can be utilized to conduct various simulations, analyze performance problems and create potential enhancements. The ultimate objective is to obtain valuable knowledge that can be used to improve the original physical entity.

• Applications of Digital Twins:

o **Manufacturing** – Used to optimize production lines and prevent equipment failures.

o **Healthcare** – Used in personalized medicine and patient monitoring.

o **Smart Cities** – Helps manage urban infrastructure and traffic control.

o **Aerospace & Defense –** NASA uses digital twins to simulate spacecraft behavior before launching missions.

Q 100.A

• The Ministry of Panchayati Raj launched the People's Plan Campaign (Jan Yojana Abhiyan) for the preparation of Panchayat Development Plans (PDPs) for 2025–26. It is aimed to accelerate people's participation in the process of preparation of the Panchayat Development Plan. Hence, statement 1 is correct.

• The scheme was rolled out as 'Sabki Yojana Sabka Vikas' by the Ministry of Panchayati Raj on 2nd October 2018.

• **The scheme is implemented at all three tiers of Panchayats** with the active involvement of Elected Representatives, Government Frontline workers, Community-Based Organizations (CBOs) like Self Help Groups (SHGs), and other stakeholders. **Hence, statement 2 is not correct.**

• **One of the major components** of the scheme is the Preparation of a Gram Sabha-wise calendar and identification of Thematic developmental gaps based on the **Panchayat Development Index (PDI), to be presented in the Gram Sabha.** PDI is a multi-domain and multi-sectoral index that is intended to be used to assess the overall holistic development, performance & progress of panchayats. **The approved GPDP is to be published on the e-Gram Swaraj portal.**