

General Studies

Current Affair Test (May-2025)

1. Solution: c)

Domestic Systemically Important Banks (D-SIBs) are identified in India based on their significance to the stability of the financial system. The Reserve Bank of India (RBI) uses criteria such as size relative to GDP, which measures the bank's scale in the economy, and cross-jurisdictional activity, reflecting its international operations. Additionally, interconnectedness within the financial system evaluates how closely the bank is linked to other institutions, and other factors like complexity and substitutability are also considered. However, profitability ratios are not a criterion for identifying D-SIBs. Profitability measures such as return on assets or equity are more relevant to assessing a bank's financial performance but do not directly indicate its systemic importance. The focus for D-SIB classification is on a bank's potential to impact financial stability rather than its earnings.

2. Solution: d)

Statement 1 is correct as CENVAT simplifies the taxation process by allowing credit for input taxes. Statement 2 is incorrect because CENVAT reduces costs by eliminating cascading taxes. Statement 3 is correct as businesses save costs, which can be reinvested into production and innovation. Significance of CENVAT:

- Avoids double taxation: Prevents repeated taxation on the same value addition.
- Simplifies taxation: Reduces the tax burden on manufacturers and service providers.
- Promotes competitiveness: Encourages businesses to reinvest savings in production and innovation.
- Consumer benefit: Reduces the overall cost of goods and services by eliminating cascading taxes.

3. Solution: c)

Statement-I is correct. The Crew Escape System (CES) integrated into ISRO's HLVM-3 (Human-rated LVM3) is designed to maximize astronaut safety during launch. In the event of a launch anomaly—such as rocket malfunction or explosion during ascent—the CES can rapidly separate the crew module from the launch vehicle, propelling it away to a safe distance using quick-reacting motors. This significantly enhances the survivability of astronauts during the most critical phases of launch.

Statement-II is incorrect. The CES does not wait until the spacecraft reaches Low Earth Orbit (LEO) to activate. In fact, it is specifically designed to function during the initial atmospheric phase of the launch, when the risks of mechanical failure or explosion are highest. Once the rocket clears this danger zone and is on a stable trajectory toward orbit, the escape system is jettisoned, as its utility diminishes post-atmosphere.

4. Solution: a)

- Tungsten is used in armor-piercing projectiles due to its density and strength, and in aerospace for high-strength, heat-resistant alloys.
- Tungsten's density (~19.3 g/cm³) and hardness make it effective in military-grade applications, while its thermal properties are indispensable in aerospace engineering for withstanding high temperatures.

5. Solution: d)

Statement 1 is incorrect. In India, the reporting of notifiable diseases is legally mandatory for healthcare providers. This requirement helps public health authorities detect outbreaks early, allocate resources efficiently, and implement containment measures. The Ministry of Health and Family Welfare, as well as state health departments, regularly update the list of notifiable diseases under relevant public health laws.

Statement 2 is incorrect. While communicable diseases like AIDS, tuberculosis, or cholera are commonly classified as notifiable due to their potential for outbreaks, non-communicable diseases (NCDs) such as cancer and diabetes have also been designated as notifiable in some states and contexts. This allows for improved disease surveillance and health planning across all disease spectrums.

Statement 3 is incorrect. Although public health concerns may justify some exceptions to patient confidentiality, especially during epidemics, the right to privacy is not automatically suspended. Public health authorities are required to balance data sharing with ethical and legal obligations to protect individual confidentiality.

6. Solution: a)

Statement 1 is incorrect: Super volcanoes erupt extremely rarely, often with intervals spanning millennia, whereas regular volcanoes erupt more frequently.

Statement 2 is correct: Regular volcanoes are often visible as steep, conical structures.

Statement 3 is correct: Super volcanoes have global impacts, such as climate change, while regular volcanoes primarily affect local or regional areas.

Difference Between Volcano and Supervolcano:

Aspect	Volcano	Super volcano
Size	Smaller, conical structure	Massive calderas spanning dozens of kilometres
Eruption Volume	Less than 1,000 km ³ of material	More than 1,000 km ³ of material
Frequency	More frequent eruptions	Extremely rare, occurring over millennia
Impact	Local or regional effects	Global climate and ecosystem impact
Visibility	Typically, visible as steep mountains	Often subtle depressions difficult to identify

7. Solution: d)

The Greater Caucasus Range acts as a natural boundary between Europe and Asia, running through Georgia and neighboring countries.



8. Solution: b)

Origin: Originated during the colonial era under the Bengal Eastern Frontier Regulation Act, 1873, to protect Crown interests.

Law governing: Currently regulated under the Foreigners (Protected Areas) Order, 1958 for foreign tourists and state-specific ILP guidelines for Indian citizens.

9. Solution: b)

Statement 1 is correct: Credit cooperative societies are formed to provide financial assistance to their members, typically at lower interest rates compared to market rates. These societies help in reducing dependency on moneylenders and facilitate savings and credit services among members.

Statement 2 is correct: Producers' cooperative societies aim to support small producers by providing them with essential resources such as raw materials, tools, and technical assistance. These societies help in collective production,

marketing, and achieving economies of scale.

Statement 3 is incorrect: Housing cooperative societies are not limited to rural areas. They cater to both rural and urban populations, providing affordable housing solutions by pooling resources and sharing costs.

10. Solution: c)

Statement-I is correct. In India, when a disease is designated as notifiable, it legally mandates healthcare providers to report cases to the government. This enables the government to initiate timely surveillance, diagnostics, containment, and treatment measures, especially during outbreaks. It provides the legal authority for the administration to take actions like quarantine, contact tracing, and public health advisories. This mechanism is vital for epidemiological intelligence and effective disease control.

Statement-II is incorrect. The declaration of a notifiable disease in India does not trigger automatic involvement by the World Health Organization (WHO). WHO only steps in under specific circumstances, particularly when diseases are covered under the International Health Regulations (IHR) — for example, novel influenza strains or other Public Health Emergencies of International Concern (PHEIC). Domestic public health declarations and response mechanisms remain under national jurisdiction, unless the disease has cross-border implications warranting international cooperation.

11. Solution: c)

The key difference lies in the constitutional powers of Indian Governors and U.S. State Governors regarding death sentences. In India, under Article 161 of the Constitution, Governors have the authority to grant pardons, reprieves, respites, or remissions of punishment, or to suspend, remit, or commute sentences for offenses related to state laws. However, they cannot pardon death sentences; this power is exclusively vested in the President of India under Article 72.

In contrast, U.S. State Governors have the authority to pardon death sentences for crimes committed under state jurisdiction, as per the laws of their respective states.

12. Solution: b)

India is not a signatory to the 1951 Refugee Convention or its 1967 Protocol and lacks a dedicated domestic refugee law. However, it manages refugees through a case-by-case administrative framework, granting asylum based on humanitarian and political considerations. The government handles different groups (e.g.,

Sri Lankan Tamils, Tibetans, Rohingya) through executive decisions rather than codified law.

13. Solution: a)

Pagers are simple, low-power communication devices that primarily receive messages broadcast over radio frequencies.

Statement 2 is correct because pagers are designed for one-way communication — they pick up signals from central transmitters but do not actively communicate back. This design makes them highly reliable even in remote areas and hard for third parties to track in real-time.

Statement 1 is incorrect because pagers do not send encrypted or any other signals back to towers; they are passive receivers, unlike mobile phones, which constantly send and receive signals.

Statement 3 is also incorrect as pagers are not equipped to transmit replies or messages; users must use a separate phone line or another device to respond after receiving a notification.

14. Solution: b)

Supercomputers in India are developed and utilized for various specialized purposes.

Statement 1 is incorrect because PARAM Siddhi AI was developed by the Centre for Development of Advanced Computing (C-DAC), not ISRO. It focuses on artificial intelligence applications and is a major achievement under the National Supercomputing Mission (NSM).

Statement 2 is correct — AIRAWAT is an AI-specific supercomputer built under India's National AI Mission, intended to boost research in machine learning, deep learning, and other AI-related fields. It positions India competitively in the global AI research ecosystem.

Statement 3 is also correct — Pratyush and Mihir are high-performance computing systems used mainly for weather and climate forecasting, helping in areas like monsoon prediction, cyclone warning, and climate change studies. These systems significantly contribute to disaster management and agricultural planning.

15. Solution: b)

Statement 2 is incorrect.

The battery has an anti-freezing electrolyte and targets cold climate durability, and it contributes to low-carbon energy solutions like metal-air batteries. However, it is not intended to replace nuclear batteries used in space missions (such as RTGs).

The Council of Scientific and Industrial Research (CSIR) has developed a new battery designed to function effectively in sub-zero temperatures, which is particularly beneficial for defence forces and civilians in high-altitude regions.

The innovative battery features a durable cathode catalyst and an anti-freezing electrolyte, making it suitable for extreme cold conditions where conventional batteries fail.

Researchers at CSIR-Central Mechanical Engineering Research Institute created a hybrid cathode material combining cobalt and iron alloys with nanoparticles.

This enhancement improves the battery's durability and performance in both liquid and solid-state zinc-air batteries, even in very low temperatures.

The new battery's portability, flexibility, and lightweight nature make it a versatile energy solution for various users, including military personnel and remote communities.

The technology is part of a broader effort to develop efficient energy storage systems, addressing limitations of traditional lithium-ion batteries and exploring alternatives like metal-air batteries and electro-catalytic techniques for low carbon footprint solutions.

16. Solution: a)

Solar paraboloid systems are an advanced type of concentrated solar power (CSP)

Statement 1 is incorrect because solar paraboloids typically require a heat engine, such as a Stirling engine or a Rankine cycle system, to convert the collected thermal energy into electricity. They do not directly produce electricity like photovoltaic cells.

Statement 2 is correct — while the technology offers high efficiency, high upfront capital costs, including the cost of precision mirrors, tracking systems, and specialized heat engines, are significant barriers to its wider deployment, especially in developing countries.

Statement 3 is incorrect because solar paraboloid systems operate at very high temperatures, often exceeding 300°C, allowing for more efficient thermodynamic conversion; operating at below 100°C would be too low for efficient electricity generation.

17. Solution: a)

Electroencephalography (EEG) is a critical tool for evaluating brain electrical activity but has specific, limited applications.

Statement 1 is incorrect because EEG is not an imaging modality; brain tumors are primarily detected using imaging techniques like MRI or CT scans, not EEG. EEG assesses the brain's electrical patterns but cannot visualize structural abnormalities.

Statement 2 is correct — EEG is instrumental in confirming brain death by demonstrating a complete absence of cerebral electrical activity,

an essential criterion in clinical protocols. Statement 3 is incorrect — in standard EEG, electrodes are non-invasively attached to the scalp using adhesives or conductive gels. Surgical implantation of electrodes is only performed in specialized cases (like intracranial EEG for epilepsy surgery), and even then, it is not the norm.

18. Solution: d)

Proba-3 is distinct because it uses two separate spacecraft — the Coronagraph and the Occulter — flying in perfect formation with millimeter-level precision to artificially replicate solar eclipses. This is a major technological innovation, allowing continuous, prolonged observations of the Sun's corona — something traditional instruments struggle with due to the overwhelming brightness of the solar disk.

Proba-3 physically separates the occulter and the observing telescope, minimizing diffraction and light scattering.

Neither lunar occultations (natural eclipses) nor single-satellite designs are employed here, making Proba-3 a pioneer in precision formation flying for space science.

19. Solution: b)

The Human Rated Launch Vehicle Mark-3 (HLVM-3) is an advanced, human-rated adaptation of ISRO's LVM3 designed to safely carry astronauts under the Gaganyaan mission.

Option (b) is correct — the key distinguishing feature of HLVM-3 is its incorporation of a Crew Escape System (CES). This system ensures that in case of any malfunction during launch or atmospheric ascent, the crew module can quickly detach and move away safely to protect the astronauts, up until the point of atmospheric separation.

20. Solution: d)

India's participation in the Axiom-4 mission represents its first step into private astronaut missions, partnering with NASA and Axiom Space, a U.S.-based private company. It does not involve an independent lunar mission, nor is ISRO launching them using HLVM-3 for this mission; they will travel aboard a spacecraft like SpaceX's Crew Dragon.

This mission strengthens the ISRO-NASA partnership and provides valuable exposure to Indian astronauts before Gaganyaan. It also symbolizes a shift towards public-private international collaboration in space exploration.

21. Solution: c)

The BioE3 Policy is a comprehensive framework aimed at promoting a sustainable bioeconomy by replacing conventional fossil-fuel-based products

with bio-based alternatives.

Statement 1 is correct because the policy supports the development of biopolymers, bioenzymes, and other biomaterials to reduce dependency on petrochemicals. This aligns with the broader goals of reducing environmental impact and fostering innovation in green chemistry and biotechnology.

Statement 2 is also correct — the policy recognizes the need to lower the carbon footprint and actively encourages the development and deployment of carbon capture, utilization, and storage (CCUS) technologies. These measures are essential to combat climate change by removing or utilizing carbon emissions effectively.

Together, these initiatives form a part of India's broader strategy to transition toward a circular bioeconomy and meet its international climate commitments.

22. Solution: c)

Uranium enrichment primarily focuses on increasing the concentration of Uranium-235 (U-235), which is the isotope responsible for sustaining nuclear fission reactions.

Natural uranium contains only 0.7% U-235, insufficient for most reactor operations. Standard light water reactors require 3-5% U-235, while some specialized reactors need up to 20%.

Enrichment ensures a sustainable chain reaction for energy production or, at higher levels (>90%), for weapons-grade material.

23. Solution: c)

Pattadakal Group of Monuments, located in Karnataka, is a confluence of Northern and Southern styles of temple architecture and primarily dedicated to Hindu deities, especially Lord Shiva.

The site exemplifies early Chalukyan temple architecture and includes several Dravidian and Nagara style temples but does not have direct links to Buddhist traditions.

On the contrary, Ajanta Caves are renowned for Buddhist paintings and sculptures; Mahabodhi Temple is the place of Buddha's enlightenment; and Nalanda Mahavihara was a prominent Buddhist monastic and educational institution.

24. Solution: b)

Statement 1 is correct – DPS Wetland supports migratory birds on the Central Asian Flyway, which includes many species like flamingos that rest and feed here.

Statement 2 is also correct – It is a feeding and resting ground for flamingos, making it ecologically vital.

Statement 3 is incorrect – There's no evidence suggesting it's an artificial water body from excavation; it is a natural tidal wetland system.

About DPS Wetland:

Location:

Situated in Seawoods, Navi Mumbai, Maharashtra.

Spread over 30 acres, adjacent to the Thane Creek Ramsar site.

River Drainage:

DPS Lake forms part of the Thane Creek ecosystem, a tidal waterbody fed by numerous freshwater sources and marine influences.

Supports migratory birds on the Central Asian Flyway.

Key Features:

Acts as a critical feeding and resting ground for thousands of migratory flamingos.

Restoration of tidal flow and algae clearance initiatives were pivotal in reviving the wetland ecosystem.

A sensitive ecological buffer that strengthens climate resilience against floods and sea-water intrusion.

25. Solution: a)

Statement 1 is incorrect – Flamingos are not forest birds; they are commonly seen in coastal wetlands, saline lakes, and mudflats, such as Sambhar Lake, Rann of Kutch, and Thane Creek, not in the evergreen forests of the Western Ghats.

Statement 2 is correct – The Greater Flamingo (*Phoenicopterus roseus*) is the largest flamingo species and the one most commonly found in India.

Statement 3 is incorrect – Flamingos construct mud mound nests, not floating ones, to protect their eggs from flooding and predators.

What are Flamingos?

Flamingos are large, pink-hued wading birds known for their graceful necks, long legs, and downward-bent bills.

Scientific Name: The Greater Flamingo (found in India) is scientifically named *Phoenicopterus roseus*.

Key Features:

Physical:

Height ranges between 90 to 150 cm; striking pink or rosy plumage due to carotenoid pigments from their diet.

Biological:

Specialized filter-feeding with comblike structures inside their bills to sieve algae, crustaceans, and diatoms.

Nests are conical mud mounds where one or two eggs are laid, with both parents incubating.

Social:

Highly gregarious birds forming large colonies; engage in synchronized group movements and

nesting.

26. Solution: c)

The Lanjia Saora are officially recognized as a PVTG in Odisha, marked by low literacy, pre-agricultural practices, and distinct languages and rituals. The mango harvest dance is performed as a seasonal thanksgiving ritual to ancestral spirits, celebrating nature's bounty.

They also practice Podu, a form of shifting cultivation involving rotation of fields and forest clearings.



27. Solution: b)

Statement 1 is correct. The *Natyashastra*, attributed to sage Bharata, is a seminal treatise on dramaturgy and the performing arts. It laid down the foundation for classical Indian theatre and the theory of *Rasa*, a concept essential to Indian aesthetics.

Statement 2 is incorrect. The *Natyashastra* is not a text of medieval ritualism; it predates temple traditions and instead belongs to a classical Sanskrit knowledge tradition.

Statement 3 is correct, as the treatise extensively covers stage design, dramaturgical elements, musical instruments, gestures (*mudras*), and acoustic principles.

It's encyclopedic in nature and has influenced both textual and performance traditions across Asia. Its inclusion in UNESCO's Register highlights its pan-cultural artistic value.

The manuscripts of the *Bhagavad Gita* and Bharat Muni's *Natyashastra* were added to UNESCO's Memory of the World Register.

About *Gita* and *Natyashastra* added to UNESCO's Memory of the World Register:

What It Is?

An international initiative by UNESCO to preserve humanity's valuable documentary heritage and safeguard it against neglect, decay, and destruction.

Established In: 1992.

Objective: To protect archival holdings, manuscripts, rare collections, and promote broader accessibility and awareness.

Criteria for Inclusion:

- Outstanding universal value.
- Historical, cultural, or social significance.
- Authenticity, integrity, and rarity of the document.

India and Memory of the World:

- With the inclusion of Gita and Natyashastra, India now has 14 entries in the Memory of the World Register.
- Other recent entries include Ramcharitmanas, Panchatantra, and Sahrdaya loka-Locana in the 2024 MOWCAP Regional Register.

Natyashastra:

Name: Natyashastra (Treatise on Performing Arts).

Author: Bharat Muni.

Features: A foundational text detailing Indian classical dance, drama, music, and stagecraft; establishes concepts like Rasa (aesthetic flavor) that continue to influence Indian arts.

28. Solution: c)

Statement-I is correct: Majuli's nomination reflects India's efforts to highlight culturally and ecologically integrated landscapes, strengthening its profile in heritage diplomacy.

Statement-II is incorrect: Majuli is not an example of post-industrial land use or restoration ecology; it is a naturally evolving riverine island, not rehabilitated from prior industrial use.

Following Charaideo Maidams' UNESCO World Heritage status in 2024, Assam is now pushing for Majuli Island and Sivasagar to achieve UNESCO recognition.

About Majuli Island:

Location: Majuli is located in the Brahmaputra River in Assam, about 40 km from Jorhat city.

Formation: Formed by the dynamic shifting of Brahmaputra's river channels over centuries, Majuli emerged as the world's largest river island.

Key Features:

Area: Once spread across 880 sq km, currently reduced due to severe erosion.

Biodiversity: Known for lush landscapes, paddy fields, wetlands, and monsoon submergence enriching the soil.

Culture: Home to vibrant Assamese traditions, Satras (Vaishnavite monasteries), and tribes like the Mising, Deori, and Assamese.

Status: Declared a district in 2016, it is being proposed under the mixed category (cultural and natural) for UNESCO recognition.

29. Solution: a)

Statement 1 is correct – The Western Ghats were inscribed for their exceptional biodiversity, endemism, and ecological significance.

Statement 2 is incorrect – Rani-ki-Vav in Gujarat was inscribed purely under cultural criteria for

its stepwell architecture and symbolic water management system in the semi-arid region.

What are Heritage Sites?

Heritage Sites are locations officially recognized by UNESCO for possessing outstanding cultural, natural, or mixed universal value.

They represent humanity's shared legacy, preserving achievements in history, architecture, biodiversity, and culture for future generations.

India's Status:

As of 2024, India proudly holds 43 UNESCO World Heritage Sites, showcasing its rich and diverse civilizational history.

India's journey began in 1983 with the listing of Agra Fort, Taj Mahal, Ajanta Caves, and Ellora Caves as the first recognized sites.

Categories of Sites in India:

Cultural Sites (e.g., Taj Mahal, Hampi): Reflecting India's monumental architecture, spirituality, and artistic excellence.

Natural Sites (e.g., Western Ghats, Sundarbans): Celebrating India's ecological richness and biodiversity.

Mixed Sites (e.g., Khangchendzonga National Park): Having both cultural and natural significance.

30. Solution: d)

The most significant astrobiological clue regarding potential life on K2-18 b is the detection of Dimethyl Sulfide (DMS) and Dimethyl Disulfide (DMDS). These compounds, on Earth, are predominantly produced by marine microorganisms, such as phytoplankton, and are therefore considered strong biosignature gases. Their presence in an exoplanetary atmosphere marks a breakthrough in observational astrobiology and points to the possibility of microbial oceanic life in exoplanetary systems.

Scientists using the James Webb Space Telescope have detected possible biosignature gases Dimethyl Sulfide (DMS) and Dimethyl Disulfide (DMDS) in the atmosphere of exoplanet K2-18 b, suggesting a strong potential for microbial life. About Recent Discovery and Signs of Life on K2-18 b:

Discovery: Researchers detected Dimethyl Sulfide (DMS) and Dimethyl Disulfide (DMDS) — gases on Earth typically produced by marine microorganisms — in the atmosphere of K2-18 b.

Significance:

These are the strongest indicators yet of potential life outside the solar system, representing a new era of observational astrobiology.

The planet, categorized as a hycean world (water-rich, hydrogen-dominated atmosphere), might harbor microbial oceanic life.

Scientists caution that more observations are needed before confirming extraterrestrial life.

31. Solution: d)

The Magai River flows through Azamgarh, Mau, and Ghazipur districts of eastern Uttar Pradesh and is particularly known for supporting the traditional and economically significant betel (pan) leaf cultivation in this region. The microclimate and fertile soil along its banks make it ideal for pan farming, a vital livelihood source.

About Magai River:

Location: Flows through Azamgarh, Mau, and Ghazipur districts in Eastern Uttar Pradesh.

Origin: Village Dubawan, Azamgarh district, Uttar Pradesh.

Tributary of: Tamsa River, which later joins the Ganges near Ballia district.

Key Features:

The Magai region is famous for its pan (betel) leaf cultivation.

Plays a crucial role in rural connectivity and agriculture in eastern UP.

32. Solution: a)

Both statements are correct, and Statement-II is the correct explanation for Statement-I.

JWST's placement at the L2 point ensures it remains on the dark, cold side of Earth, facing away from the Sun, Earth, and Moon.

This position minimizes thermal and optical interference, allowing its infrared sensors to detect extremely faint signals from the early universe and exoplanet atmospheres. The stability and distance from Earth's radiation make L2 ideal for deep space observations.

About the James Webb Space Telescope (JWST)

What it is?

The James Webb Space Telescope is the largest and most advanced infrared space observatory ever built, designed to study the early universe, stars, galaxies, and exoplanet atmospheres.

Launched: December 25, 2021.

Developed by: NASA, in collaboration with ESA (European Space Agency) and CSA (Canadian Space Agency).

Key Features:

Size: Comparable to a tennis court with a 3-story height; built to fold origami-style to fit inside a rocket.

Sunshield: A giant silver sunshade protects instruments from solar heat, maintaining a 600°F temperature difference between its sides.

Infrared Vision: Captures heat signals invisible to the human eye, allowing observation through cosmic dust and the early universe.

Gold-Coated Mirrors: 18 hexagonal mirrors

coated with gold enhance infrared reflection for clearer, deeper space imaging.

33. Solution: d)

All three statements about the Shyok River are incorrect.

Firstly, the Shyok River does not flow entirely within India; it originates in Ladakh and flows into Pakistan-administered Gilgit-Baltistan, thereby crossing the Line of Control and forming part of the transboundary Indus River system.

Secondly, its source is the Rimo Glacier, a part of the Siachen Glacier system in the Karakoram range. This is geographically distinct from Pangong Tso, which lies in a nearby but separate endorheic basin and does not contribute to the Shyok.

Lastly, the river does not merge with the Ganga, nor does it flow through the plains of Punjab. Instead, the Shyok joins the Indus River near Skardu in Pakistan.

34. Solution: a)

Only Statement 3 is correct.

The Finance Commission (FC), constituted under Article 280 of the Indian Constitution, does not recommend borrowing limits for the Union or State governments. Borrowing by states is regulated under Article 293, and decisions on limits are taken by the Union government, often in consultation with the Ministry of Finance, not the FC.

Secondly, the Finance Commission has no mandate to evaluate the Reserve Bank of India or its performance in monetary policy, which falls exclusively under the RBI's autonomous jurisdiction.

However, Statement 3 is correct. Since the 73rd and 74th Constitutional Amendments, the FC is tasked with making recommendations to augment the Consolidated Fund of the States to support Panchayati Raj Institutions (PRIs) and Urban Local Bodies (ULBs). This is a critical step in fiscal decentralization and strengthening third-tier governance.

35. Solution: b)

Only Statements 1 and 3 are correct.

The Colombo Process, established in 2003, is a regional consultative process (RCP) that focuses on the management of overseas employment and contractual labour for countries of origin in Asia. Statement 1 is correct—the International Organisation for Migration (IOM) serves as the technical and administrative secretariat through its Colombo Process Technical Support Unit (CPTSU). It supports member states in implementing initiatives and thematic discussions.

Statement 2 is incorrect. The Colombo Process comprises only labour-sending (origin) countries, such as India, Bangladesh, Nepal, Pakistan, and others. While labour-receiving countries (e.g., GCC states, Malaysia) may engage in dialogue forums like the Abu Dhabi Dialogue, they are not formal members of the Colombo Process.

Statement 3 is correct. The Process encourages bilateral agreements and policy harmonisation through thematic working groups on ethical recruitment, skills development, remittances, and more.

36. Solution: b)

Only Statements 2 and 3 are correct.

Eco-Sensitive Zones (ESZs) are notified around Protected Areas like national parks and wildlife sanctuaries to act as buffer or transition zones, minimizing external pressures on core ecosystems.

Statement 1 is incorrect because the Forest (Conservation) Act, 1980 deals specifically with the regulation of forest land diversion for non-forest purposes and does not cover ESZs.

Statement 2 is correct. ESZs function as “shock absorbers”, providing a graded buffer between ecologically critical areas and zones of lesser protection. They are essential for maintaining ecological balance and ensuring sustainable development in adjoining landscapes.

Statement 3 is also correct. Under Section 3(2)(v) of the Environment (Protection) Act, 1986, the central government is empowered to declare ESZs, laying down measures to protect the environment. These include restrictions on industrial operations, waste disposal, mining, and construction.

37. Solution: c)

LiDAR is an active remote sensing technology — it emits its own laser pulses rather than relying on sunlight like passive systems (e.g., optical satellites). This self-generated light penetrates vegetation gaps and reflects off surfaces such as the ground, tree canopy, or man-made structures. The return time of pulses is measured to generate a 3D point cloud, later refined into Digital Elevation Models (DEMs).

This makes LiDAR uniquely suitable for mapping forest-covered archaeological sites, unlike passive sensors limited by cloud cover or vegetation density.

38. Solution: c)

Neutrinos are neutral elementary particles with extremely low mass and no electric charge. They interact only via the weak nuclear force, making their interaction cross-section with matter extraordinarily small.

Trillions of them pass through the human body every second without any interaction. This elusive behavior is why massive, sensitive detectors like the Super-Kamiokande in Japan or the planned India-based Neutrino Observatory (INO) are required to spot rare neutrino events.

Options a), b), and d) are factually incorrect—neutrinos do not violate relativity, are neutral, and are stable over long distances.

39. Solution: a)

Nanobubbles, typically less than 200 nm in diameter, are neutrally buoyant, which means they do not rise rapidly to the surface like conventional bubbles.

This unique property enables them to remain suspended for weeks or even months, allowing for extended interaction with organic matter, microbes, and dissolved gases. Their high surface area-to-volume ratio, along with their negative surface charge, improves gas dissolution efficiency and allows for effective degradation of contaminants.

Their role is enhanced in algae control, oil separation, and biofilm removal, making them critical in sustainable and chemical-free water treatment systems.

40. Solution: d)

India's participation in the MSFN is aimed at securing reliable access to critical minerals such as lithium, cobalt, nickel, and rare earth elements, essential for electric vehicles, semiconductors, batteries, and clean energy technologies.

These minerals are foundational to India's goals of becoming a global hub for electronics manufacturing and green mobility.

41. Solution: b)

Only Statements 1 and 3 are correct.

The International Criminal Court (ICC), established by the Rome Statute (1998), has jurisdiction over four core international crimes: genocide, crimes against humanity, war crimes, and, since 2018, the crime of aggression.

Importantly, the ICC prosecutes individuals, not states, which makes Statement 2 incorrect. Violations of general human rights treaties, unless they amount to these grave crimes, do not fall under ICC's jurisdiction.

Statement 3 is correct because the ICC can prosecute crimes committed outside the territory of a member state if the accused is a national of a member state, or if the crime occurred on the territory of a state party. It can also act when referred by the UN Security Council, even if the state involved is not a party to the Rome Statute (e.g., Sudan, Libya).

42. Solution: a)

Both statements are correct, and Statement-II explains Statement-I.

ASEAN's non-interference principle, though essential for cohesion, has paralyzed its response to Myanmar's coup, where efforts like the Five-Point Consensus have failed to make an impact. ASEAN's model of quiet diplomacy and consensus limits its ability to exert pressure, especially when member consent is lacking, highlighting the tension between sovereignty and collective responsibility.

43. Solution: c)

Statement I is correct. The Philippines and Vietnam rank among the top nations globally in terms of frequency, damage, and fatalities from typhoons.

Statement II is incorrect. These countries are influenced by systems from the Western Pacific, not the Atlantic, which affects the Americas, not East Asia.

Why Vietnam and the Philippines are affected by so many typhoons?

Vietnam and the Philippines are frequently affected by typhoons due to their geographic location in the Western Pacific, one of the most active typhoon basins in the world.

Both countries lie along the Pacific typhoon belt, where warm ocean waters and atmospheric conditions favour the formation of strong tropical storms.

Their long coastlines and low-lying areas also make them highly vulnerable to storm surges, flooding, and landslides triggered by typhoons.

Additionally, the seasonal monsoons intensify these weather systems, especially during the peak typhoon season from June to November.



44. Solution: a)

A-2: Central Arctic ice loss strengthens Rossby

waves, increasing central and northern India rainfall.

B-3: Barents-Kara Sea melt creates pressure anomalies, reducing northwest and central Indian rainfall.

C-1: Greenland melt has minimal direct teleconnection with Indian monsoon.



45. Solution: c)

Statement 1 is correct. NREGA is demand-driven, meaning employment must be provided upon demand, not based on budgetary allocations alone.

Statement 2 is incorrect—the Act mandates that employment be provided within 15 days of making a job demand, not from registration.

Statement 3 is correct—NREGA is now operational in all rural districts of India, including those in urban-rural transition zones.

Statement 4 is correct—Gram Panchayats are the key implementing agencies at the village level, responsible for identifying projects, issuing job cards, and work allocation.

About NREGA and Its Importance:

Legal Entitlement to Employment: The Mahatma Gandhi National Rural Employment Guarantee Act (2005) ensures 100 days of guaranteed wage employment to rural households annually.

Largest Employment Guarantee Programme Globally: With over 25 crore registered workers, MGNREGA is the world's most expansive public employment scheme.

Poverty Alleviation Tool: NREGA acts as a safety net for the rural poor, especially during crises like the COVID-19 pandemic, when rural joblessness spiked.

Strengthening Rural Infrastructure: It promotes natural resource management (e.g., water conservation, afforestation) while providing employment.

Wage Growth Multiplier: Studies (Jean Drèze, Raghav Gaiha) show that NREGA has raised overall rural wages and improved bargaining power for casual workers.

How NREGA wage rates are decided?

Section 6(1): Central government can notify independent wage rates. The Centre can set NREGA wages regardless of the state's minimum wage under the Minimum Wages Act.

Section 6(2): State minimum agricultural wages apply in absence of central notification

This was the default mechanism between 2005–2009.

Historical Cap Introduced in 2009: To reduce fiscal burden, NREGA wages were capped at 100 despite rising state wages.

Indexation to CPI-AL since 2011 (base year 2009): The wage is revised annually based on the CPI for Agricultural Labourers (CPI-AL).

States may top up wages over the Centre's notified rate: A few states voluntarily pay the gap between the Centre's rate and their minimum wage.

46.Solution: d)

NaBFID is supervised by the Department of Financial Services, Ministry of Finance, and is exempt from regulatory liquidity norms like Cash Reserve Ratio (CRR) and Statutory Liquidity Ratio (SLR) to enable long-term lending.

Statement 2 is correct: NaBFID can issue taxable and tax-free bonds, especially infrastructure bonds, under Section 54EC of the Income Tax Act.

Statement 3 is also correct—it plays a catalytic role in financing projects under the National Infrastructure Pipeline (NIP), which aims to invest over 100 lakh crore by 2025.

However, Statement 4 is incorrect—NaBFID does not engage in construction activity; it is a financier, not an executing agency.

About NaBFID (National Bank for Financing Infrastructure and Development):

What it is: A Development Finance Institution (DFI) dedicated to funding long-term infrastructure projects across India.

Established under: NaBFID Act, 2021.

Regulated by: Reserve Bank of India (RBI) as an All-India Financial Institution (AIFI).

Objectives:

Fill gaps in long-term non-recourse infrastructure finance.

Support growth of India's bond and derivatives markets.

Accelerate sustainable economic development.

Strengthen the ecosystem for project financing in clean energy, transport, and water.

Key Features:

Capital base to be scaled to 1 trillion with institutional support.

Focus on medium to long-term funds (1–5+ years).

Plans joint research, workshops, and capacity

building with global partners like NDB.

NaBFID promotes public-private partnerships (PPPs) and ensures financial viability of infrastructure projects.

47.Solution: c)

“Har Khet Ko Pani” is implemented by the Ministry of Jal Shakti and focuses on expanding irrigation coverage, particularly to underserved and rain-fed areas, ensuring that every field receives adequate water.

“Per Drop More Crop” falls under the Department of Agriculture and Farmers Welfare, and promotes micro-irrigation technologies such as drip and sprinkler systems to enhance water-use efficiency and improve crop yields with minimal water.

The Watershed Development Component, overseen by the Ministry of Rural Development, is crucial for soil moisture conservation, reducing runoff, and enabling sustainable agriculture in dryland and hilly regions.

48. Solution: b)

Both statements are correct. Statement I reflects the core objective of WMA—to help states manage short-term mismatches in cash inflows and continue essential public services.

Statement II is also correct—Article 293(3) mandates that states must seek Centre's consent for borrowing if they are indebted to the Centre. However, Article 293 is related to long-term borrowings, whereas WMA is a short-term facility under RBI's purview, and doesn't require constitutional consent under Article 293. So, Statement II is not the direct explanation for Statement I.

The Reserve Bank of India (RBI) has increased the Ways and Means Advances (WMA) limits for State governments and Union territories by 28%.

49. Solution: a)

The 13th Finance Commission proposed creating a Disaster Relief Fund and contributed towards GST transition planning.

The 14th Finance Commission made a bold move by raising the states' share in Union taxes from 32% to 42%, enhancing fiscal federalism.

The 15th Finance Commission focused on performance-based grants, especially for local bodies, revenue deficit grants, and reforms in defence and health funding. Hence, a) is correct.

What is a Finance Commission?

The Finance Commission in India is a constitutional body established under Article 280 of the Indian Constitution. Its primary function is to recommend the distribution of financial resources between the central government and the state governments.

The Fifteenth Finance Commission, constituted on 27th November 2017, made recommendations covering six years from 1st April 2020 through its Interim and Final Reports. These recommendations are valid up to the financial year 2025-26.

Composition of the Finance Commission of India (FCI):

Structure: Consists of a Chairman and four members appointed by the President.

Term: Duration specified by the President; members can be reappointed.

Qualifications:

Chairman: Experience in Public Affairs.

Members: Must include a High Court judge or qualified individual, a finance/accounting expert, an experienced financial administrator, and an economist.

Functions:

Tax Distribution: Recommends distribution of tax proceeds between the Centre and States.

Grants-in-Aid: Advises on principles for grants from Centre to States.

State Funds: Suggest measures to augment State funds for Panchayats and Municipalities.

Other Matters: Addresses any additional issues referred by the President.

Report:

Submitted to the President, who presents it to Parliament with an explanatory memorandum on actions taken.

50. Solution: d)

Statement 1 is incorrect: LiDAR is an optical remote sensing technology that uses laser pulses to measure distances to Earth's surface. It cannot penetrate below the surface to detect groundwater flow, which requires methods like Ground Penetrating Radar (GPR) or seismic imaging. Laser light is scattered or absorbed in opaque mediums like soil or rock, making subsurface detection impossible for LiDAR.

Statement 2 is incorrect: LiDAR is an active sensor, meaning it generates its own laser light source. This allows it to operate regardless of sunlight, enabling day or night use, unlike passive sensors that depend on reflected sunlight.

Statement 3 is incorrect: LiDAR does not use radar frequencies. It operates in the near-infrared to green spectrum, whereas radar systems like SAR (Synthetic Aperture Radar) work in microwave bands.

51. Solution: b)

Statement 1 is incorrect: GES operates by converting gravitational potential energy to kinetic energy, which is independent of ambient temperature. Unlike thermal storage systems

(e.g., molten salts) that require specific thermal conditions, GES functions efficiently regardless of external temperature.

Statement 2 is correct: Gravity Energy Storage (GES) systems use mechanical methods—such as lifting and lowering massive weights—to store and release energy. Since they contain no chemical reactions or fluids, they experience minimal degradation over time. This contributes to low maintenance needs, making them cost-effective and reliable over decades-long operational lifespans, unlike batteries which degrade after thousands of charge-discharge cycles.

Statement 3 is correct: GES systems are designed for long-duration discharge, typically ranging from hours to a full day, making them ideal for grid stabilization. They can store excess energy generated during periods of high renewable production (e.g., solar or wind) and release it during peak demand or low production periods, ensuring grid reliability.

52. Solution: b)

Statement 1 is incorrect: Although neutrinos have spin, they are electrically neutral and therefore not influenced by electromagnetic fields. Unlike charged particles (such as electrons or protons), neutrinos do not interact via the electromagnetic force, which is why they can pass through entire planets with minimal interaction.

Statement 2 is correct: Supernovae are among the most prolific sources of neutrinos in the universe. In a stellar explosion, nearly 99% of the energy is released in the form of neutrinos, making them key indicators of such cataclysmic events.

Statement 3 is correct: Geoneutrinos, a specific type of neutrino emitted from radioactive decay in the Earth's interior, offer scientists a non-invasive way to study the mantle's heat flow, radioactive composition, and thermal history — critical for understanding Earth's internal structure.

53. Solution: d)

Statement 1 is incorrect: Golden tigers exhibit a pale golden or strawberry coat due to a reduction in eumelanin, a type of melanin pigment responsible for darker coloration. Their appearance is not caused by excess melanin, but rather a genetic mutation leading to hypomelanism.

Statement 2 is incorrect: Golden tigers are not classified separately under Schedule I of the Wildlife Protection Act, 1972. They are a rare color morph of the Bengal tiger (*Panthera tigris tigris*), which as a whole is listed under Schedule I. The golden variant does not enjoy a distinct legal status.

Statement 3 is incorrect: The golden coat trait is

a recessive genetic trait. For it to be expressed in offspring, both parents must carry the recessive gene. If only one parent carries it, the trait will not appear but may be passed on silently.

54. Solution: d)

The BIOCOM Programme—Biodiversity Conservation and Sustainable Natural Resource Management for Integrated Community Development—was launched by UNESCO and KOICA in 2020.

It specifically aims to integrate biodiversity conservation with sustainable livelihood generation in vulnerable communities across Madagascar's ecological hotspots.

The programme does not advocate urban resettlement (eliminating option d) or military approaches (option b).

Nor is it focused on promoting trade per se (option a). Instead, it pursues eco-tourism, vocational training (e.g., in basketry and masonry), and local governance (via dina contracts), creating alternatives to harmful practices like slash-and-burn farming.

About UNESCO's BIOCOM Programme:

What it is: The Biodiversity Conservation and Sustainable Natural Resource Management for Integrated Community Development (BIOCOM) is a flagship UNESCO initiative promoting conservation-linked livelihood generation in Madagascar.

Launched by: UNESCO, in collaboration with the Korea International Cooperation Agency (KOICA).

Launched in: 2020, implemented across Madagascar's Montagne des Français, Marojejy, and Andohahela protected areas.

Aim: To conserve biodiversity while enhancing socio-economic resilience among local communities vulnerable to climate change and unsustainable forest exploitation.

55. Solution: c)

GPS spoofing is a major concern due to its ability to mislead navigation systems, risking security, logistics, and public safety.

However, Statement-II is wrong – spoofers do not hijack satellite systems; they deceive the receiver on the ground. Satellite control remains secure and protected under separate layers of encryption and access.

What is GPS Spoofing?

GPS spoofing is a type of cyberattack where false GPS signals are sent to mislead a receiver about its actual location.

GPS spoofing working:

GPS receivers calculate location based on signals from satellites.

Spoofers broadcast fake GPS signals that are stronger than the real ones.

The receiver locks onto these fake signals, producing incorrect location data.

Attackers may mislead planes, ships, vehicles, or even apps relying on GPS.

56. Solution: d)

The STELLAR model is a state-of-the-art, indigenously developed software tool designed by the Central Electricity Authority (CEA) with support from The Lantau Group (TLG) and ADB.

Its main aim is to enable states and distribution companies to dynamically plan for power adequacy—by accounting for generation, storage, transmission, and demand response till FY 2034–35.

Unlike static models, STELLAR uses chronological simulation, allowing detailed consideration of ramp rates, load flow, unit commitment, and ancillary services. It promotes transparency, is freely accessible to states, and provides a user-friendly interface for dynamic updates.

About STELLAR Model:

What it is?

STELLAR (State of the art Totally indigenously developed Resource adequacy model) is a next-gen software tool for integrated planning of power generation, transmission, storage, and demand response.

Developed by: Central Electricity Authority (CEA) in collaboration with The Lantau Group (TLG) and supported by the Asian Development Bank (ADB).

Aim: To help states and power distribution companies (Discoms) prepare annual dynamic resource adequacy plans, ensuring uninterrupted power supply and system-wide efficiency.

Key Features of STELLAR:

Chronological Power System Modelling: Simulates real-time power system operations with load flow, ramp rates, and unit constraints.

Integrated Planning: Simultaneously models generation, transmission, storage expansion, and demand-side response till FY 2034–35.

Endogenous Demand Response: Considers consumer flexibility in electricity use, optimizing overall load and cost.

Ancillary Services Optimization: Ensures grid stability by factoring in services like frequency control and reserves.

Transparent, Customizable, and Open Access: Shared with all states free of cost; designed for regular updates and user feedback.

57. Solution: b)

Q-Shield is a quantum-resilient cryptographic management platform developed by QNu Labs, incubated at IIT Madras Research Park and supported by the Department of Science and Technology (DST).

It directly addresses the looming challenge of quantum computers breaking traditional encryption. Q-Shield integrates tools like Armos (Quantum Key Distribution), Tropos (Quantum Random Number Generator), and QHSM (Quantum Hardware Security Module), making systems future-proof against even the most advanced computational threats.

It doesn't serve underwater military communication or interstellar satellites, and instead of reverting to classical cryptography, it moves beyond current systems through Post-Quantum Cryptography (PQC).

About Q-Shield Platform:

What is Q-Shield?

Q-Shield is a comprehensive cryptography management platform designed to secure critical infrastructure against future quantum threats.

Developed By:

QNu Labs, incubated at IIT Madras Research Park (2016)

Supported by the Department of Science and Technology (DST) under the National Quantum Mission

Objective:

To empower enterprises with tools that ensure data privacy and cybersecurity across cloud, on-premises, and hybrid environments in a quantum-resilient manner.

Key Features of Q-Shield:

Quantum-Safe Security Tools:

These are advanced tools that protect your data from being hacked, even by super-powerful quantum computers in the future.

Armos: A system that sends super-secure secret keys, so no one can eavesdrop.

Tropos: Creates truly random numbers, which are used to make passwords and encryption much stronger.

QHSM: Like a digital safe box that stores your keys and keeps them secure.

PQC Standards: Uses special encryption methods that even future computers won't be able to break.

58. Solution: b)

Statement 1 is incorrect – Lake Tanganyika is the second-deepest and longest freshwater lake, not the largest by surface area (which is Lake Superior in North America).

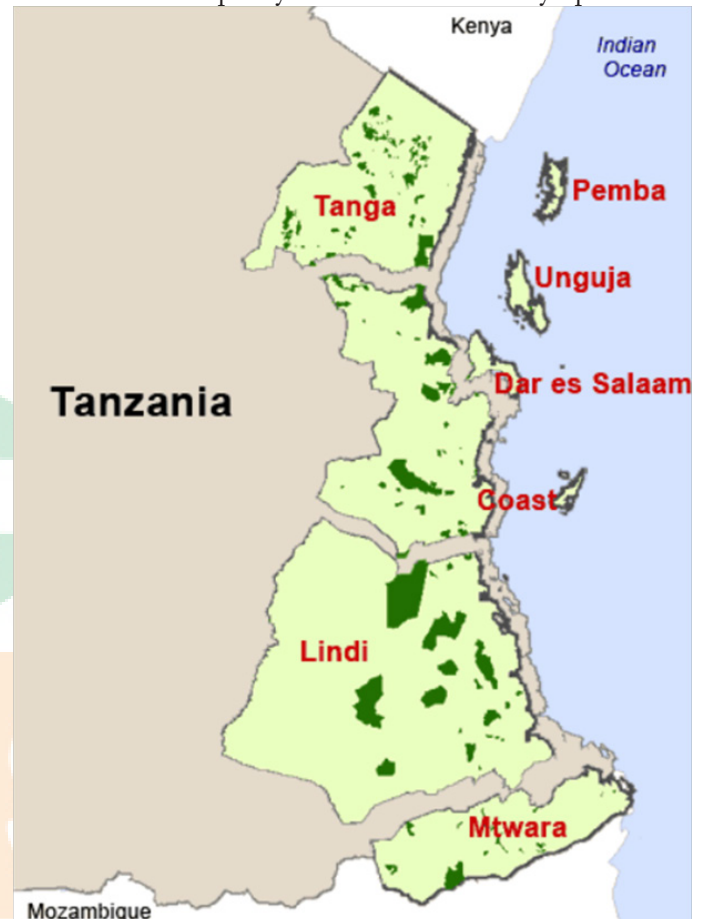
Statement 2 is correct – Mount Kilimanjaro

(5,895 m) is Africa's highest peak and a dormant volcano.

Statement 3 is correct – Serengeti NP is globally renowned for wildebeest migration and is a UNESCO World Heritage Site.

India launched its first Africa-India maritime exercise (AIKEYME-2025) in Tanzania to strengthen naval cooperation.

The exercise involves 9 African nations focusing on anti-piracy and maritime security operations.



59. Solution: a)

Type 5 Diabetes, also referred to as Malnutrition-Related Diabetes Mellitus (MRDM), is primarily observed in young, underweight individuals from low- and middle-income countries, especially in Asia and Africa.

Unlike Type 1 (autoimmune) or Type 2 (obesity-driven) diabetes, Type 5 results from severe protein-energy malnutrition, often during early developmental years.

The pancreas produces insulin, but due to poor metabolic adaptation and nutrient reserves, standard insulin therapy can induce hypoglycemia.

Treatment requires small insulin doses, oral drugs, and nutritional rehabilitation, especially protein and micronutrient supplementation.

60. Solution: c)

Statement 1 is incorrect – Article 341 concerns identification, not classification or reservation.

Statement 2 is incorrect – Article 14 actually permits reasonable classification for substantive equality, not a blanket prohibition.

Statement 3 is correct – Article 16(4) allows reservation in employment for underrepresented backward classes, including sub-groups within SCs if backed by data.

About the Supreme Court Judgment on SC Sub-Classification:

V. Chinniah v State of Andhra Pradesh (2004) – Overruled by 7-judge Constitution Bench in 2024 (6:1 majority).

What the Judgment Clarified?

Sub-classification Permitted:

The SC held that sub-classification within Scheduled Castes (SCs) and Scheduled Tribes (STs) for equitable reservation is constitutionally valid.

Articles Involved:

Article 14: Allows reasonable classification among unequal groups to ensure substantive equality.

Articles 15(4) & 16(4): Permit affirmative action based on social and educational backwardness and inadequate representation.

Article 341: Lists castes as SCs via Presidential Notification, which cannot be altered by states.

States' Power:

States can sub-classify SCs for reservation without modifying the Presidential List.

Sub-classification must be based on empirical data showing inter-se backwardness and under-representation.

Rejection of Homogeneity Argument:

The Court held that SCs are not homogeneous; hence, sub-classification does not violate Article 341.

The Presidential List merely identifies SCs—it does not prevent internal categorisation.

61. Solution: c)

Golden Tiger Wideband gene mutation

Kaziranga National Park

Golden tigers have a pale golden coat with light brown stripes due to a recessive mutation in the wideband gene, which reduces eumelanin pigmentation. These rare tigers have been spotted in the wild, particularly in Kaziranga National Park, Assam.

White Tiger SLC45A2 mutation Rewa, Madhya Pradesh

White tigers exhibit a leucistic condition caused by a mutation in the SLC45A2 gene, which affects melanin transport. They are not albino, as they retain blue eyes. The first recorded white tiger was captured in Rewa, Madhya Pradesh, in 1951, and most captive white tigers today are

descended from that lineage.

Black Tiger → Pseudomelanism → Simlipal Tiger Reserve

Black tigers have dense, merged stripes, making them appear melanistic, though they are genetically Bengal tigers. This condition is termed pseudomelanism. These unique individuals have been photographed in Simlipal Tiger Reserve, Odisha, and appear to be genetically isolated due to inbreeding.

62. Solution: a)

BIOCOM aims to prevent deforestation, not promote it, making statement 3 incorrect. It focuses on skill training (like masonry and eco-cooking), nature-based solutions (e.g., erosion control, forest regeneration), and educational outreach, particularly for women and dropouts.

63. Solution: b)

Only Statement 2 is correct.

About RNA Editing:

Definition: RNA editing involves making precise changes to RNA molecules, which carry instructions from DNA to produce proteins. This process allows scientists to correct errors in RNA before they are translated into proteins.

Mechanism: One method uses enzymes like adenosine deaminase acting on RNA (ADAR) to convert adenosine to inosine, which mimics guanosine, restoring normal protein function.

Guide RNA (gRNA): gRNA directs ADAR enzymes to specific mRNA regions to correct mutations linked to genetic disorders.

Difference Between RNA and DNA Editing:

Permanency: DNA editing makes permanent changes to the genome; RNA editing makes temporary changes, reducing long-term risk.

Safety: DNA editing uses proteins from bacteria, which may cause immune reactions; RNA editing utilizes ADAR enzymes already present in the human body, lowering immune risks.

Flexibility: RNA editing allows effects to fade over time, enabling doctors to stop treatment if side effects arise.

64. Solution: a)

Peatlands are one of the most efficient natural carbon sinks, storing more carbon than all the world's forests combined, even though they occupy a smaller area, making statement 1 incorrect.

Peatlands are also crucial for water regulation and purification, as they help maintain groundwater levels and filter pollutants, ensuring cleaner water for ecosystems and human use, making statement 2 correct.

Additionally, the waterlogged conditions in peatlands create anaerobic environments, which

significantly slow decomposition processes. This unique feature allows peatlands to preserve archaeological and cultural artifacts exceptionally well, contrary to statement 3, which is incorrect.

65. Solution: b)

Microplastics have various applications and unintended consequences, making them a significant environmental concern.

Statement 1 is correct: Microplastics are used in air-blasting technology, where tiny plastic particles are employed to clean surfaces, particularly in industrial and maintenance settings. However, this process can release microplastics into the environment if not carefully managed.

Statement 2 is incorrect: Microplastics are not biodegradable; they are made of persistent synthetic polymers that resist natural degradation. While some cosmetic products claim to be biodegradable, microplastics in these products remain pollutants that accumulate in ecosystems. Statement 3 is correct: Synthetic textiles, such as polyester and nylon, shed microplastic fibers during washing. These fibers often end up in wastewater, ultimately polluting rivers, lakes, and oceans.

66. Solution: d)

Agriculture, particularly livestock farming, is the largest contributor to methane emissions. Ruminant animals produce methane through enteric fermentation, and rice paddies release significant amounts due to anaerobic decomposition in flooded fields. Waste management and fossil fuel extraction also contribute but are not as significant as agriculture.

67. Solution: b)

Volcanic activity significantly influences the climate through the release of aerosols and gases. Statement 1 is correct: Volcanic eruptions emit aerosols, primarily sulfur dioxide, which forms sulfate particles in the atmosphere. These particles reflect solar radiation, leading to temporary cooling of the Earth's surface. For example, the eruption of Mount Pinatubo in 1991 caused global temperatures to drop for a couple of years.

Statement 2 is also correct: While aerosols cool the surface, volcanic eruptions can release gases like water vapor and carbon dioxide into the troposphere, which can trap heat, causing a short-term localized warming effect.

Statement 3 is incorrect: The cooling effects of volcanic aerosols are temporary, typically lasting a few years, as the aerosols eventually settle out of the atmosphere.

68. Solution: d)

Option a is correct: An independent judiciary,

particularly the Supreme Court, plays a critical role in resolving disputes between the Union and states (e.g., Article 131).

Option b is correct: The Constitution includes provisions for amendments (Article 368) to adapt to changing dynamics in federal relationships, reflecting its flexibility.

Option c is correct: The Indian Constitution establishes a strong Union with significant authority over subjects listed in the Union List (e.g., defense, foreign affairs). This is a hallmark of India's quasi-federal system.

Option d is incorrect: Unlike systems with an equal division of powers (e.g., the United States), India's federal structure is tilted in favor of the Union, particularly during emergencies or under specific circumstances, such as using Article 356.

69. Solution: c)

Statement 1 is correct: Type 1 Diabetes is an autoimmune condition where the immune system attacks and destroys the insulin-producing beta cells in the pancreas, leading to little or no insulin production.

Statement 2 is correct: Type 2 Diabetes is far more common than Type 1 Diabetes. It accounts for approximately 90-95% of all diabetes cases worldwide, whereas Type 1 is less common.

Statement 3 is correct: Both Type 1 and Type 2 Diabetes can cause long-term complications, such as neuropathy (nerve damage), retinopathy (eye damage), nephropathy (kidney damage), and cardiovascular diseases, if not managed properly.

Statement 4 is incorrect: Insulin therapy is not mandatory for Type 2 Diabetes. It is often managed with oral medications, lifestyle changes, and dietary modifications. Insulin may be prescribed in advanced cases or when oral therapies fail.

70. Solution: a)

Gestational diabetes arises during pregnancy when hormonal changes cause insulin resistance, impairing the body's ability to regulate blood glucose levels. It typically resolves after childbirth as hormone levels normalize. Statement-I correctly identifies the condition, and Statement-II provides an accurate explanation, linking the hormonal changes during pregnancy to the onset of insulin resistance.

71. Solution: b)

Statement 2 is incorrect.

About International Maritime Organization (IMO): The International Maritime Organisation (IMO) is a specialized UN agency focused on regulating shipping and preventing marine pollution from ships.

Established in 1948 and operational since

1958, the IMO has 175 member states and three associate members, with headquarters in London.

India joined in 1959.

The IMO creates a fair, effective regulatory framework for the shipping industry and addresses legal issues like liability and international maritime traffic facilitation.

72. Solution: a)

Statement 1 is incorrect: Sea groynes are built perpendicular, not parallel, to the shoreline to effectively trap sand and sediment carried by littoral currents.

Statement 2 is correct: The construction of sea groynes typically results in sediment accumulation on the updrift side, which can stabilize the beach, but it may also cause increased erosion on the downdrift side due to a reduced supply of sediment.

Statement 3 is incorrect: The primary purpose of sea groynes is not related to increasing salinity but to reduce coastal erosion by managing sediment transport.

73. Solution: a)

Only Statement 3 is correct.

India and Australia signed a Critical Minerals Partnership in 2023, covering REEs like neodymium and dysprosium, vital for EVs and renewables.

Statement 1 is incorrect – India has domestic reserves and sources some REEs through bilateral cooperation and public sector mining (IREL).

Statement 2 is incorrect – the QUAD nations (US, India, Japan, Australia) have initiated REE collaboration under their broader supply chain resilience framework.

74. Solution: b)

Statement 1 is incorrect.

The Global Tiger Forum is an independent intergovernmental body, not created under any international treaty like the CBD. It facilitates collaboration among tiger-range countries.

Statement 2 is correct. M-STrIPES (Monitoring System for Tigers – Intensive Protection and Ecological Status) is a smart patrolling and ecological monitoring software developed by NTCA for improved management.

Statement 3 is also correct. The National Tiger Conservation Authority (NTCA) was constituted by amending the Wildlife (Protection) Act, 1972 in 2006, giving statutory backing to Project Tiger.

75. Solution: b)

Statements 1 and 3 are correct.

The Treaty of Sugauli (1816), signed after the Anglo-Gorkha War, allowed the British

to recruit Gorkhas into their army, leading to extensive migration for military and plantation work.

Many Gorkhas settled in Darjeeling, Assam, and Dehradun during colonial times.

Statement 2 is incorrect—many Gorkhas living in India, especially those settled before 1950, are Indian citizens by birth or descent.

The 1950 Treaty created confusion but did not confer Nepalese citizenship to Indian Gorkhas. Their continued service in Indian security forces highlights their contribution to the country.

Who are the Gorkhas?

Gorkhas are ethnic Nepali-speaking Indians, distinct from citizens of Nepal.

The term “Gorkha” refers to a martial race with a legacy rooted in bravery, especially due to their service in the British and Indian armies.

Historical Origins:

Descended from Rajputs and Brahmins who migrated from India to Nepal in ancient times.

The name “Gorkha” originates from Guru Gorakhnath, with the town of Gorkha in Nepal central to their historical identity.

The community spread widely post the Anglo-Gorkha War (1814–16) and after the Treaty of Sugauli.

Settlement Regions:

Major settlements include Darjeeling, Kalimpong, Assam, Sikkim, Dehradun, and Northeast India.

Many Gorkhas settled in India during British rule as soldiers, miners, and plantation workers.

76. Solution: a)

The Kannadippaya mat is made using the inner soft layers of reed bamboo, which provide natural thermal insulation. This structural quality allows the mat to remain cool in summer and warm in winter, a rare feature among traditional handicrafts. The mirror-like finish results from the tight and uniform weaving by tribal artisans, not from wax coating or silk threads.

It reflects sunlight mildly and prevents heat absorption, while also offering cushioning. This thermal functionality, combined with biodegradability, makes it both culturally relevant and ecologically sustainable.



77. Solution: d)

All three statements are incorrect.

While the Brahmaputra-Meghna system drains into the Bay of Bengal, the Dhansiri merges with the Brahmaputra but does not directly flow into the sea.

It originates from Laisang Peak in Nagaland, which is part of the Naga Hills, not the Eastern Himalayas.

Most crucially, the Dhansiri is a perennial river, flowing year-round and supporting sustained biodiversity and agriculture. Therefore, option d) is the correct answer.

78. Solution: b)

Statements 1 and 2 are correct.

The First Buddhist Council (483 BCE) was held at Rajgir under Mahakassapa, where Ananda and Upali recited the Buddha's teachings, forming the Sutta and Vinaya Pitakas.

The Fourth Council, convened by Kanishka in Kashmir (1st–2nd century CE), saw the schism between Theravada and Mahayana, with Mahayana emphasizing Bodhisattvas and universal salvation.

Statement 3 is incorrect—the Second Council at Vaishali (~383 BCE) dealt with monastic discipline, not doctrinal developments like Bodhisattvas.

79. Solution: c)

The IUCN defines "Extinct in the Wild" (EW) as a category for species that are known to survive only in captivity, cultivation, or well outside their historical natural range.

These species have disappeared from their natural ecosystems, often due to habitat loss, overexploitation, or invasive species.

Unlike extinction (EX), EW species still exist but only in controlled conditions, such as zoos or botanical gardens.

For instance, the Scimitar-horned oryx is EW but lives in breeding programs.

80. Solution: d)

All statements are incorrect.

Statement 1 is false—the Indian Rhino (*Rhinoceros unicornis*) is protected under Schedule I of the Wildlife Protection Act, 1972, offering the highest legal protection.

Statement 2 is incorrect—rhino horns are made of keratin, the same protein found in human hair and nails, not ivory, which is dentine found in elephant tusks.

Statement 3 is also false—the New Delhi Declaration on Asian Rhinos (2019) is a multi-lateral initiative signed by India, Bhutan, Nepal, Indonesia, and Malaysia to strengthen regional cooperation in Asian rhino conservation.

81. Solution: c)

Statement I is correct – GI registration helps protect the reputation and uniqueness of traditional products rooted in geography and community heritage. It helps preserve artisanal identity, local knowledge, and traditional practices.

Statement II is incorrect – A GI-tagged product must be produced within the registered geographic territory; otherwise, the label cannot legally be used. For example, Darjeeling Tea must come from designated estates in Darjeeling. Therefore, option c) is the right answer.

82. Solution: c)

Ashoka's missionary effort was pivotal: his son Mahendra and daughter Sanghamitra spread Buddhism to Sri Lanka, while emissaries went to Greece, Egypt, and Southeast Asia.

Vajrayana Buddhism, which emerged in 8th-century Bengal and Bihar, blended esoteric rituals (mantras, mandalas) with Mahayana concepts like compassion and the Bodhisattva path.

Statement 1 is incorrect—Nalanda was founded during the Gupta period, not Ashoka's reign.

Statement 2 is incorrect—it describes Theravada, while Mahayana focuses on universal salvation.

Origins of Buddhism in India:

Founded by Siddhartha Gautama (563–483 BCE): Born in Lumbini (Nepal), attained enlightenment in Bodh Gaya, and preached the Four Noble Truths & Eightfold Path.

Reaction to Vedic Ritualism: Rejected caste hierarchy and Brahminical rituals, emphasizing individual enlightenment.

Early Patronage: Magadha rulers (Bimbisara, Ajatashatru) supported Buddhism as an alternative to Brahmanism.

First Buddhist Council (483 BCE): Held at Rajgir to preserve Buddha's teachings after his death.

Ashoka's Role (3rd Century BCE): Spread Buddhism across India and beyond through edicts and missionaries.

Evolution & Development of Buddhism

Theravada vs. Mahayana: Theravada (original teachings) vs. Mahayana (universal salvation, Bodhisattva ideal).

Monastic Universities: Nalanda, Vikramshila, Taxila became global centers of Buddhist learning.

Vajrayana (Tantric Buddhism): Emerged in Bengal & Bihar, blending esoteric rituals with Mahayana philosophy.

Spread Beyond India: Sri Lanka (Ashoka's son Mahendra), China (via Silk Road), Southeast Asia.

Art & Architecture: Sanchi Stupa, Ajanta Caves, Gandhara Art reflect Buddhist influence.

83. Solution: a)

Statements 1 and 2 are correct. The TIG on 6G was set up to create a roadmap for 6G technology in India, covering a comprehensive plan from R&D to deployment. It includes specific task forces on spectrum management, devices and networks, multidisciplinary solutions, international standards, and funding for R&D, highlighting a structured approach toward 6G advancement.

Statement 3 is incorrect, as TIG's focus extends beyond domestic needs; it is also concerned with establishing international standards, showcasing India's commitment to the global 6G landscape.

84. Solution: b)

Lightning rods are critical safety devices designed to protect structures from lightning strikes by providing a safe path for the discharge to the ground.

Statement 1 is correct as the earth acts as a grounding mechanism due to its low electric potential, effectively neutralizing the high charges from lightning.

Statement 2 is also correct because lightning rods ionize the surrounding air, lowering its electrical resistance and creating a conductive path for the lightning to safely travel to the ground.

However, Statement 3 is incorrect as Franklin rods and Early Streamer Emission (ESE) rods differ fundamentally in their operational mechanisms. Franklin rods depend solely on the passive ionization of air around them, while ESE rods actively emit an upward streamer to enhance their ability to capture lightning strikes.

85. Solution: b)

Statement 3 is incorrect.

The Bharat 6G Alliance is a collaborative initiative bringing together stakeholders from industry, academia, and research sectors within India, focusing on advancing 5G and pioneering 6G product development and patent generation. This collaboration ensures that India's technological development is rooted in domestic innovation while enhancing India's capabilities in 5G and future 6G technologies.

Statement 3 is incorrect because Bharat 6G Alliance actively aligns with international bodies such as the Next G Alliance in the United States, 6G Flagship in Finland, and South Korea's 6G Forum, enabling India to participate in and influence global 6G standards and advancements.

86. Solution: d)

The National Action Plan (NAP) for Antimicrobial Resistance (AMR) was launched

in 2017. This plan, developed by the Ministry of Health and Family Welfare, aims to tackle AMR comprehensively.

Statement 2 is correct, as NAP-AMR prioritizes strengthening AMR surveillance and research to monitor resistance trends and improve understanding.

Statement 3 is also accurate, as the plan adopts a One Health approach, emphasizing the interconnectedness of human, animal, and environmental health in combating AMR.

Statement 4 is correct because the plan specifically addresses reducing the misuse of antibiotics in livestock farming, a key driver of AMR in both humans and animals. These initiatives collectively aim to limit the emergence and spread of resistant microbes.

87. Solution: c)

Domestic Systemically Important Banks (D-SIBs) are identified in India based on their significance to the stability of the financial system. The Reserve Bank of India (RBI) uses criteria such as size relative to GDP, which measures the bank's scale in the economy, and cross-jurisdictional activity, reflecting its international operations. Additionally, interconnectedness within the financial system evaluates how closely the bank is linked to other institutions, and other factors like complexity and substitutability are also considered.

However, profitability ratios are not a criterion for identifying D-SIBs. Profitability measures such as return on assets or equity are more relevant to assessing a bank's financial performance but do not directly indicate its systemic importance. The focus for D-SIB classification is on a bank's potential to impact financial stability rather than its earnings.

88. Solution: c)

Under the Armed Forces (Special Powers) Act (AFSPA), the power to declare an area "disturbed" lies with the Governor of the State, the Central Government, or the Union Territory (UT) Administrator.

This designation is invoked when the situation in an area becomes severely volatile, characterized by significant law and order issues, ethnic or communal disturbances, or insurgent activities that cannot be controlled by normal administrative means.

Declaring an area "disturbed" enables the armed forces to operate with special powers, such as the authority to search without a warrant, arrest without prior approval, and even use force, including lethal measures, if necessary to maintain public order.

89. Solution: d)

Hard corals and soft corals differ fundamentally in their structures and ecological roles. Hard corals, also known as stony corals, produce rigid calcium carbonate skeletons, which form the backbone of coral reefs. These skeletons provide structural support, enabling them to create expansive reef systems that serve as habitats for numerous marine species.

Hard corals rely on a symbiotic relationship with zooxanthellae, microscopic algae that live within their tissues, providing them with nutrients through photosynthesis.

In contrast, soft corals lack these limestone skeletons, making them more flexible and often tree-like or fan-shaped in appearance. They are non-reef-building organisms and typically inhabit various marine environments, including reef areas. While soft corals also house zooxanthellae, they are less dependent on them for survival.

90. Solution: c)

India has undertaken significant initiatives to address Antimicrobial Resistance (AMR).

The AMR Surveillance and Research Network (AMRSN), established under the Indian Council of Medical Research (ICMR), monitors AMR trends primarily in human health but does not yet fully integrate veterinary sectors, making statement 1 incorrect.

The National One Health Mission, approved in 2022, focuses on a holistic approach to health by addressing zoonotic diseases, AMR, and other public health challenges through a coordinated strategy involving human, animal, and environmental health sectors, making statement 2 correct.

Additionally, the National Centre for Disease Control (NCDC) has developed national guidelines on infection prevention, control, and antibiotic usage to improve stewardship practices and combat AMR in healthcare settings, making statement 3 correct.

91. Solution: b)

The Armed Forces (Special Powers) Act (AFSPA) provides immunity to armed forces personnel for actions taken in “good faith” under its provisions.

Statement 1 is correct because any prosecution, suit, or legal proceeding against armed forces personnel for actions under AFSPA requires prior approval from the Union Government, ensuring that they are not subjected to unwarranted legal action.

Statement 2 is incorrect as immunity under AFSPA is confined to acts directly connected to

the duties and powers granted under the Act. It does not extend to unrelated acts that fall outside its ambit.

Statement 3 is incorrect because judicial review of actions taken under AFSPA is not entirely barred. Courts can examine the legality of actions in specific cases, especially when fundamental rights are in question.

Statement 4 is correct since civilian complaints against actions under AFSPA necessitate sanction from the Union Government before any legal proceedings can commence.

92. Solution: b)

Coral reefs are complex marine ecosystems primarily found in tropical regions but can also exist in colder waters, such as in the form of deep-sea corals, making Statement 1 incorrect. While tropical corals thrive in warm, shallow waters, the presence of deep-water corals in colder environments demonstrates the diversity of coral habitats.

Statement 2 is incorrect because corals rely on a symbiotic relationship with zooxanthellae, a type of algae, for their energy and nutrients. Zooxanthellae perform photosynthesis, providing essential nutrients to corals, which cannot survive long-term without this association under normal conditions.

Statement 3 is correct as coral bleaching occurs when stressors like rising sea temperatures, pollution, or changes in water chemistry lead corals to expel zooxanthellae. Without these algae, corals lose their color and primary energy source, often leading to their death if stress persists.

93. Solution: d)

Statements 1 and 3 are correct.

Bear markets trigger wealth erosion, which reduces consumer confidence and spending, thereby depressing aggregate demand. In parallel, businesses face uncertain revenue streams and thus implement cost-cutting via hiring freezes or job cuts (statement 3).

However, statement 2 is incorrect — during bear markets, central banks usually reduce interest rates or introduce quantitative easing to improve liquidity and boost growth. Raising rates would further depress investment and worsen financial conditions.

94. Solution: b)

Statements 1, 3, and 4 are correct:

Statement 1: True. RRBs were legally constituted under the RRB Act, 1976.

Statement 3: True. RRBs are scheduled banks, hence subject to priority sector lending (PSL) obligations, similar to commercial banks.

Statement 4: True. RRBs are geographically restricted, often operating in a few designated districts, to maintain local focus.

Statement 2: False. RRBs perform core banking services, including deposits, remittances, and loans, akin to commercial banks, though with a rural focus.

95. Solution: c)

Only Statement 3 is correct. A virtual image in a plane mirror always appears to be behind the mirror, at the same distance as the object in front. Statement 1 is incorrect—mirrors reflect light, not sound. Acoustic reflection occurs with walls and hard surfaces, not typical mirrors.

Statement 2 is incorrect—rear-view mirrors use convex mirrors, not plain glass, to provide a wider field of view. Plain glass would distort or block clear visibility due to internal refraction and lack of curvature.

96. Solution: a)

Sangha provided a framework for egalitarian community living, open to all castes.

Jataka tales, recounting the Buddha's past lives, became central to storytelling and ethical education.

Chaityas (prayer halls) and Viharas (monastic residences) laid the architectural foundation for Indian Buddhist and later Hindu temple design

97. Solution: b)

Statement 1 is incorrect. The Chipko movement was a grassroots forest conservation movement in rural Uttarakhand, not aimed at urban pollution. It was rooted in community-led ecological defense against commercial logging.

Statement 2 is correct. Environmentalism emphasizes that economic justice—particularly for the poor and indigenous—is integral to ecological protection. Resource access, equitable distribution, and livelihood are central to the environmental narrative.

Statement 3 is correct. The Forest Rights Act, 2006 recognizes the historical rights of tribal and forest-dependent communities to manage and conserve forests sustainably.

Statement 4 is incorrect. The Bhopal Gas

Disaster (1984) was a critical turning point in India's environmental jurisprudence, leading to the EPA 1986, judicial activism, and increased awareness around industrial safety and pollution.

98. Solution: b)

Only Statement 2 is correct.

The India Skills Accelerator prioritizes emerging technology sectors, aligning its curriculum and policy with AI, robotics, energy, and global capability centers (GCCs).

Statement 1 is incorrect. There is no mandate to centralize CSR under the Accelerator.

Statement 3 is incorrect. The Accelerator does not replace the Skill India Mission, but complements it by filling policy and collaboration gaps.

99. Solution: c)

The One State, One RRB Policy, driven by the Department of Financial Services, aims to consolidate multiple RRBs within a state into a single entity, as recommended by the Vyas Committee (2005). This policy seeks to enhance operational efficiency, reduce duplication of efforts, and eliminate intra-state competition between RRBs sponsored by different banks.

By consolidating RRBs, the policy promotes better resource utilization, unified governance under one sponsor bank, standardized technology platforms, and improved financial inclusion in rural areas. It does not advocate privatization or merging RRBs with PSBs for urban markets.

100. Solution: c)

The Great Indian Bustard has limited frontal vision—its eyes are positioned laterally to scan for predators while foraging on the ground. This adaptation, while suited for open grassland habitats, leaves the bird incapable of detecting power lines directly in its flight path. As the species is large, heavy-bodied, and low-flying, this results in a high collision mortality rate, especially with transmission lines. This is why both the Supreme Court and conservation bodies have emphasized undergrounding power lines in priority GIB habitats like the Thar Desert. Therefore, (c) is correct.