General Studies
Current Affair Test (February-2025)

1.Solution: (d)

The PM Surya Ghar Muft Bijli Yojana aims to incentivize rooftop solar installations in households to promote renewable energy adoption and reduce electricity costs. The scheme does not mandate 100% solar adoption nor focus on commercial or industrial projects—its primary target is residential consumers. The scheme provides up to 300 units of free electricity per month through government-subsidized rooftop solar installations.

About PM Surya Ghar Muft Bijli Yojana:

- What is the PM Surya Ghar Scheme?
  - The PM Surya Ghar Muft Bijli Yojanais a centrally sponsored scheme aimed at providing free electricity to households by subsidizing the installation of rooftop solar panels.
- Ministry: Ministry of New and Renewable Energy (MNRE).
- Launch Date: The scheme was officially launched on February 15, 2024, following its announcement in January 2024.
- Aim:
  - To provide up to 300 units of free electricity per month to one crore households.
  - To reduce electricity costs for households and the government.
  - To increase the share of renewable energy in India's energy mix.
  - To reduce carbon emissions and promote sustainable development.
- Key Features:
  - Subsidy: The scheme provides a subsidy of 40% of the cost for solar panel installations. For systems up to 2 kW capacity, the subsidy is 60%, and for systems between 2 kW and 3 kW, it is 40% of the additional cost. The subsidy is capped at 3 kW capacity.
  - Financial Outlay: The total outlay for the scheme is ₹75,021 crore, with ₹4,950 crore allocated as incentives for DISCOMs (Distribution Companies).
  - Target: The scheme aims to cover one crore households by FY 2026-27.
  - Savings: Households can save up to ₹18,000 annually on electricity bills.
  - Government Savings: The scheme is expected to save the government ₹75,000 crore annually in electricity costs.
  - DISCOM Incentives: DISCOMs are designated as State Implementation Agencies (SIAs) and receive incentives based on their performance in installing rooftop solar capacity beyond a baseline level.
- Eligibility Criteria:
  - The applicant must be an Indian citizen.
  - The household must own a house with a roof suitable for solar panel installation.
  - The household must have a valid electricity connection.
  - The household must not have availed any other subsidy for solar panels.

2. Solution: (a)

Statement 1 is correct: The Democratic Republic of Congo (DRC) is the second-largest country in Africa by area, after Algeria.

Statement 2 is incorrect: The Congo River is the second-longest river in Africa, after the Nile River. However, it is the deepest river in the world and has the second-largest discharge after the Amazon River.

Statement 3 is incorrect: The DRC has a small coastline of about 37 km along the Atlantic Ocean.

About the Democratic Republic of Congo (DRC):

- Location:
  - The DRC is located in Central Africa and is the second-largest country in Africa by land area.
  - It shares borders with nine countries: Republic of the Congo, Central African Republic, South Sudan, Uganda, Rwanda, Burundi, Tanzania, Zambia, and Angola.
- Capital:
  - The capital and largest city is Kinshasa, which is also the economic and administrative center of the country.
- Geographical Features:
  - Congo River: The DRC is centered around the Congo Basin, home to the Congo River, the second-longest river in Africa.
  - Mountains: The eastern region features the Albertine Rift Mountains, including the Virunga Mountains and the active Mount Nyiragongo volcano.
  - Lakes: The country is home to several large lakes, including Lake Kivu, Lake Tanganyika, and Lake Edward.

3. Solution: (b)

The primary objective of the MSME TEAM Initiative is to empower MSMEs by integrating them into a unified digital ecosystem, thereby enhancing their market access and reducing operational costs.

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- What is the TEAM Initiative?
  - The Trade Enablement and Marketing (TEAM) initiativeis a government scheme designed to help MSMEsadopt digital commerce by leveraging the Open Network for Digital Commerce (ONDC).
- Ministry:Ministry of Micro, Small, and Medium Enterprises (MSME).
- Scheme Under:It has been launched under the "Raising and Accelerating MSME Productivity (RAMP)" Programme.
- Aim:
  - To empower MSMEs by integrating them into the digital commerce ecosystem.
  - To promote inclusivityby ensuring 50% participation of women-led businesses.
  - To provide MSMEs with access to digital storefronts, payment solutions, and logistics support.
- Targets:
  - Onboard 5 lakh MSMEsonto the ONDC network.
  - Conduct 150+ workshopsin tier 2 and 3 cities, focusing on MSME clusters, women-led, and SC/ST-led businesses.
- Implementation Partner:National Small Industries Corporation (NSIC).
- Budget and Duration:
  - Budget:₹277.35 crore.
  - Duration:Three years (2025-2028).
- Key Features:
  - Digital Storefronts:Enable MSMEs to create and manage online stores.
  - Payment Solutions:Provide seamless payment integration for businesses.
  - Logistics Support:Facilitate efficient delivery and supply chain management.
  - Workshops:Conduct over 150 workshops to educate MSMEs on joining ONDC, creating digital catalogues, and optimizing platform usage.
  - Dedicated Portal:Offer a portal for workshop registration, financing options, grievance support, and tools for catalogue creation and account management.
  - Inclusivity:Ensure 50% participation of women-led businesses.

4. Solution: (b)

Statement 1 is incorrect: Nuclear fusion involves two light atomic nuclei (such as hydrogen isotopes deuterium and tritium) combining to form a heavier nucleus (helium), releasing immense energy. Fusion does not involve heavy nuclei, unlike nuclear fission.

Statement 2 is correct: Fusion requires extremely high temperatures (above 100 million Kelvin) to overcome the Coulomb barrier (electrostatic repulsion between positively charged nuclei).

Statement 3 is incorrect: Unlike nuclear fission, fusion does not produce long-lived radioactive waste. The primary byproduct of fusion, helium, is non-radioactive, and while fusion reactions involving tritium produce some radioactive materials, their half-life is much shorter than fission waste.

- What is Nuclear Fusion?
  - Nuclear fusion is a process where two light atomic nuclei combine to form a heavier nucleus, releasing immense energy—the same process that powers the Sun and other stars.
- How it works?
  - High Temperature & Plasma Formation: Fusion requires temperatures above 100 million degrees Celsius, creating a plasma state where atoms split into charged particles.
  - Magnetic Confinement: Plasma is confined using strong magnetic fields to prevent contact with reactor walls.
  - Fusion Reaction: Hydrogen isotopes (Deuterium & Tritium) fuse, producing helium and energy in the form of heat.
  - Energy Capture & Conversion: Future reactors aim to use this heat to generate steam, driving turbines to produce electricity.

Difference between Nuclear Fusion and Nuclear Fission:

Aspect	Nuclear Fusion	Nuclear Fission
Process	Combines atomic nuclei	Splits heavy atomic nuclei
Fuel Used	Hydrogen isotopes (Deuterium & Tritium)	Uranium-235 or Plutonium-239
Energy Output	Extremely high (1g of fuel = 8 tonnes of coal)	High but lower than fusion
Nuclear Waste	Minimal, no long-term radioactive waste	Produces hazardous radioactive waste
Safety	No risk of meltdown, self-regulating process	Risk of reactor meltdowns (e.g., Chernobyl, Fukushima)

5. Solution: (b)

Statement 1 is correct: The Ministry of Mines is responsible for implementing the NCMM, which is designed to ensure India's self-reliance in critical minerals essential for renewable energy, defense, and high-tech industries.

Statement 2 is incorrect: The mission not only focuses on domestic mineral exploration but also promotes overseas mineral acquisitions through Public Sector Undertakings (PSUs) and private firms.

Statement 3 is correct: One of the key aims of NCMM is to reduce dependency on China for Rare Earth

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Elements (REEs) and lithium, which are crucial for EV batteries, electronics, and defense applications.

What is the National Critical Mineral Mission (NCMM)?

- The National Critical Mineral Mission (NCMM) is a strategic initiative designed to ensure India's self-reliance in critical mineral resources.
- These minerals are vital for renewable energy, electronics, and defense manufacturing, reducing import dependency and fostering industrial growth.

Key Details:

- Ministry:Ministry of Mines
- Announced In:Union Budget 2024-25
- Budget:₹34,300 crore (₹16,300 crore from the government + ₹18,000 crore from PSUs & private sector)
- Objective:Strengthen India's supply chain for critical minerals through domestic exploration, overseas asset acquisition, and technological innovation.

Aims of NCMM:

- Accelerate Domestic Exploration & Mining:-Expand critical mineral exploration within India, including offshore reserves.
- Regulatory Reforms:Fast-track mining approvals for seamless extraction and processing.
- Strategic Global Partnerships:Facilitate acquisition of mineral assets abroad by PSUs and private players.
- Infrastructure Development:Establish mineral processing parks and promote critical mineral recycling.
- Encourage R&D & Innovation:Support research in advanced mineral processing technologies and set up Centers of Excellence.

○ Key features of NCMM:

- Comprehensive Value Chain Development:-Covers exploration, mining, beneficiation, processing, and recycling of critical minerals.
- Financial Incentives:Offers monetary support for exploration and sustainable mineral recovery.
- Stockpile Strategy:Develops a national reserve of critical minerals for long-term security.
- Industry Collaboration:Encourages PSUs and private firms to invest in global mining projects.
- Legislative Backing:Strengthened by 2023 amendments to the Mines and Minerals (Development and Regulation) Act, 1957.

○ Some critical minerals covered under NCMM:

- The mission prioritizes minerals essential for renewable energy, semiconductor manufacturing, and defense applications, including:

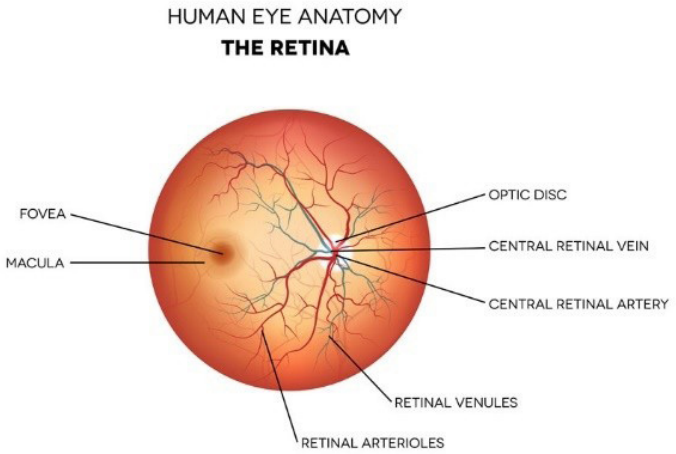
Mineral Name	Industry Used In
Lithium & Cobalt	EV batteries, electronics
Graphite & Nickel	Battery storage, alloys
Rare Earth Elements (REEs)	High-tech manufacturing, defense applications
Titanium & Tungsten	Aerospace, industrial applications
Vanadium & Molybdenum	Steel production, energy storage solutions

6. Solution: (a)

Statement 1 is correct: The retina functions as a light-sensitive layer at the back of the eye, converting light into electrical signals that the optic nerve transmits to the brain for visual interpretation.

Statement 2 is incorrect: Rod cells are responsible for night vision (low-light conditions), while cone cells are responsible for colour vision and function well in bright light.

Statement 3 is incorrect: Retinal diseases primarily affect the retina, not the cornea. The cornea is the outermost transparent layer of the eye, while retinal diseases impact photoreceptors, blood vessels, or neural pathways.



7. Solution: (c)

The Paris AI Summit 2025 is not the first global AI summit, as previous summits include the Bletchley Park AI Summit (UK, 2023) and Seoul AI Summit (South Korea, 2024). The summit is co-chaired by India's Prime Minister and French President Emmanuel Macron, not the European Commission President.

Its primary objective is to develop a global AI governance framework, balancing innovation and regulation to ensure AI systems remain ethical, safe, and accessible. The summit includes global participants, not just European nations.

About the Paris AI Summit 2025:

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- What is the Paris AI Summit?
  - The Paris AI Summit 2025is a high-level global conference focused on AI regulation, innovation, and ethical governance.
  - It builds on previous AI Safety Summits Held in Bletchley Park (UK) in 2023 and Seoul (South Korea) in 2024, aiming to create a global consensus on AI policies.
- Key Details of the Paris AI Summit 2025:
  - Host:France
  - Chair & Co-Chair:Emmanuel Macron (Chair) & PM Narendra Modi (Co-Chair)
  - Participants:Heads of state, AI researchers, policymakers, businesses, and civil society leaders
- Aims of the Paris AI Summit:
  - Global AI Governance:Establish frameworks for AI regulation and ethical use.
  - Balancing Innovation & Regulation:Foster AI growth without stifling development.
  - Addressing AI Market Concentration:Examine the dominance of big tech companies like Microsoft, Google, Amazon, and Meta in foundational AI models.
  - Public Interest & AI Safety:Ensure AI tools align with security, trust, and responsible use.
  - Global Collaboration:Strengthen cooperation between countries to tackle AI-related challenges.

8. Solution: (a)

Statement 1 is incorrect: The scheme is implemented by the Ministry of New and Renewable Energy (MNRE), not the Ministry of Power.

Statement 2 is incorrect: Households cannot avail multiple subsidies for solar energy under different government schemes.

Statement 3 is correct: The scheme allows households to sell surplus electricity back to the grid, reducing their electricity costs.

9. Solution: (c)

Statement 1 is correct: The summit focuses on creating a global regulatory framework to prevent the misuse of AI while ensuring innovation.

Statement 2 is correct: The digital divide in AI development is a key concern, with the summit promoting fair AI access for developing countries.

Statement 3 is correct: One of the summit's key agendas is curbing the monopolization of AI technologies by major corporations like Google, Microsoft, and Amazon, ensuring greater competition and accessibility.

10. Solution: (d)

Retinitis Pigmentosa (RP) is an inherited retinal disease (IRD) caused by genetic mutations affecting photoreceptor cells. It leads to progressive vision loss, starting with night blindness and peripheral vision loss, eventually leading to complete blindness.

What are Retinal Diseases?

- Retinal diseases are disorders that affect the retina, the light-sensitive tissue at the back of the eye.
- These diseases can lead to progressive vision loss and, in severe cases, blindness. They can be caused by genetic mutations, aging, or other underlying health conditions.

- Role of the Retina in Vision:
  - The retina is responsible for converting light into neural signals, which are sent to the brain via the optic nerve.
  - It contains specialized cells called photoreceptors(rods and cones) that detect light and colour, enabling us to see.
  - Damage to the retina disrupts this process, leading to vision impairment or blindness.
- Types of Retinal Diseases:
  - Inherited Retinal Diseases (IRDs):Caused by genetic mutations in over 300 genes.

Examples: Retinitis Pigmentosa, Leber Congenital Amaurosis, Stargardt Disease.

- Age-Related Macular Degeneration (AMD):Affects the central part of the retina (macula), leading to loss of central vision.
- Diabetic Retinopathy:Caused by damage to blood vessels in the retina due to diabetes.
- Retinal Detachment:Occurs when the retina pulls away from its normal position.
- Retinoblastoma:A rare cancer of the retina, primarily affecting children.

RNA-based therapeutics can cure retinal diseases:

- What is RNA Therapy?
  - RNA-based therapies involve using ribonucleic acid (RNA)to correct genetic defects or modulate gene expression. Unlike DNA-based therapies, RNA therapies are temporary and do not alter the patient's genome, reducing the risk of long-term side effects.
- Types of RNA Therapies for Retinal Diseases:
  - Antisense Oligonucleotides (ASOs):
  - Small RNA molecules that bind to specific RNA sequences to correct genetic errors.
  - Used to treat conditions like spinal muscular atrophy and being explored for Stargardt Disease and Retinitis Pigmentosa.
  - RNA Editing with ADAR Enzymes:
  - Corrects specific mutations at the RNA level without altering DNA.
  - Promising for treating IRDs caused by single-point mutations.
  - Suppressor tRNAs:
  - Bypass stop-codon mutations that prematurely halt protein synthesis, restoring full-length protein production in retinal cells.

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- Small Molecule RNA Therapies (e.g., PTC124/ Ataluren):
- Used to treat cystic fibrosisand Duchenne muscular dystrophy, now being tested for rare eye diseases like aniridia.
- Advantages of RNA Therapies:
- Precision:Targets specific genetic mutations.
- Safety:Temporary changes reduce the risk of unintended effects.
- Versatility:Can address a wide range of genetic defects.

11. Solution: (d)

The eCoO 2.0 System is a digital platform that facilitates the issuance of both preferential and non-preferential CoOs, ensures compliance with trade agreements, and enables seamless trade documentation. While the system enhances digital security, it does not yet employ blockchain technology for authentication. However, it does support Aadhaar-based e-signing and digital signature tokens.

About Enhanced eCoO 2.0 System:

- What is eCoO 2.0?
  - The eCoO 2.0 system is an upgraded digital platform for issuing Certificates of Origin (CoO), which authenticate the origin of exported goods. It facilitates exporters with seamless access to both preferential and non-preferential CoOs, ensuring global trade compliance.
- Administering Ministry/Department: Directorate General of Foreign Trade (DGFT), Ministry of Commerce and Industry, Government of India.
- Aims of eCoO 2.0:
  - Streamlining Export Processes: Simplify the CoO certification process for exporters.
  - Enhancing Trade Efficiency: Reduce processing times and improve trade documentation accuracy.
  - Supporting Global Supply Chains: Provide transparency for intermediary and re-export trade.
- Key Features of eCoO 2.0:
  - Multi-User Access: Allows exporters to authorize multiple users under a single Importer Exporter Code (IEC).
  - Aadhaar-Based e-Signing: Adds flexibility alongside digital signature tokens for document authentication.
  - Back-to-Back Certificates of Origin: Enables re-export and transshipment certifications for non-Indian-origin goods based on verified documentation.
  - Mandatory Electronic Filing: Non-preferential CoOs are now mandatorily processed online from 1st January 2025.
  - In-Lieu Certificate of Origin: Provides correction options for previously issued CoOs via an easy online application.

12. Solution: (d)

The introduction of the Nile Perch in the 1950s for commercial fishing led to a drastic decline in native fish species, particularly cichlids, which were key to the lake's ecological balance. This triggered food chain disruptions and contributed to biodiversity loss.

A recent study has revealed alarming insights into Lake Victoria's algal blooms, caused by cyanobacteria, which pose significant threats to ecosystems, human health, and water quality.

Threats from Cyanobacteria:

- Cyanobacteria blue-green algae form harmful algal blooms (cyanoHABs), leading to:
  - Ecosystem Disruption:Toxic blooms degrade water quality and harm aquatic life.
  - Human Health Risks:Drinking or using contaminated water can expose communities to toxins that cannot be eliminated by boiling.
  - Economic Impact:Affects fishing livelihoods and increases the cost of water treatment.

13. Solution: (c)

The Wetland City Accreditation (WCA) scheme is a voluntary initiative by the Ramsar Convention aimed at recognizing cities that value and promote the conservation and wise use of their natural or human-made wetlands. This accreditation provides international recognition and positive publicity for the cities' efforts in sustainable wetland management.

About Wetland Accredited Cities:

- What is Wetland City Accreditation (WCA)?
  - Wetland City Accreditation (WCA) is a voluntary initiative under the Ramsar Convention that recognizes cities for wetland conservation efforts.
  - Established in COP12 (2015): WCA was introduced during the 12th Conference of the Parties (COP12) to the Ramsar Convention held in Uruguay in 2015.
  - Validity and Renewal: Accreditation is valid for 6 years and can be renewed if cities continue to meet the prescribed international criteria.
- Aim:
  - To promote conservation and wise use of wetlands in urban and peri-urban areas.
  - To ensure socio-economic benefits for local populations while safeguarding ecological balance.
  - To encourage cities near Ramsar-designated wetlands to maintain positive relationships with these ecosystems.

Criteria for Accreditation:

Cities must satisfy six international criteria, including:

- Adopting measures for wetland conservation and wise use.
- Promoting ecosystem services provided by wet-

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lands.
- Maintaining sustainable socio-economic practices linked to wetlands.
- Engaging local communities in conservation.
- Addressing concerns related to wetland degradation.
- Protecting both natural and human-made wetlands.

Features:

- Provides international recognition and positive publicity for cities.
- Encourages wetland conservation policies in urban planning.
- Helps implement India's Amrit Dharohar initiative by the Ministry of Environment, Forest and Climate Change (MoEF&CC).
- Promotes sustainable urban development while ensuring ecological preservation.

Recent Addition from India:

- Indore, Madhya Pradesh:
  - Recognized for Sirpur Lake, a Ramsar site developed as a bird sanctuary and water bird congregation zone.
- Udaipur, Rajasthan:
  - Known for its interconnected wetlands, including Pichola, Fateh Sagar, Rang Sagar, Swaroop Sagar, and Doodh Talai, which support biodiversity and eco-tourism.

14. Solution: (b)

Statement 1 (Correct): Lezim was historically used as a form of martial training in the Maratha era, particularly for improving agility and coordination among soldiers.

Statement 2 (Incorrect): Lezim dance is not gender-specific, and in traditional performances, it is often performed by men and women. It is also not primarily linked to Navratri but is performed during various cultural and sports events.

Statement 3 (Correct): The dance is accompanied by traditional percussion instruments like the Dhol, Nagara, or Tasha, providing a powerful rhythmic backdrop.

About Lezim Dance:

- What is Lezim Dance?
  - Lezim is a traditional folk-dance originating from Maharashtra, characterized by vigorous movements and rhythmic beats. It is performed with a Lezim, a handheld instrument made of wood with metallic jingles that produce a distinct sound during the dance.
- Region:
  - Primarily performed in Maharashtra, especially during festivals like Ganesh Chaturthi, marriage processions, and cultural celebrations.
  - Also popular in regions along the Konkan coast.
- Features:
  - Physical Rigor: Involves energetic movements like stepping, squatting, and jumping, often forming patterns in groups of twos or fours.
  - Instruments: Accompanied by drums like dhol or dhalgi, with occasional song accompaniments.
  - Cultural Symbolism: Represents community spirit and is widely practiced as a physical exercise in schools across Maharashtra.
  - Formation: Dancers move in circles or synchronized formations, gradually increasing the pace in tandem with the drum beats.

Historical Significance of Lezim Dance:

- Origin:
  - Believed to have evolved from akhadas (traditional gymnasiums), where physical skills and drills were performed as part of training.
  - Initially performed during martial arts training and later adapted into cultural and celebratory events.
- Role of Shivaji Maharaj in Lezim Dance:
  - During Chhatrapati Shivaji Maharaj's reign, the dance was popularized as a military exercise to maintain physical fitness among soldiers.
  - It became a symbol of Maratha pride and unity, resonating with the community's cultural identity.

15. Solution: (a)

Storm Eowyn, a bomb cyclone, has caused widespread destruction across the British Isles, particularly in Ireland and Scotland.

Storm Éowyn rapidly intensified due to high sea surface temperatures and latent heat flux, which supplied energy to the developing storm. The clash between cold Arctic air and warm oceanic air provided instability, fueling the bombogenesis process. A strong jet stream (200+ mph winds) contributed to the storm's rapid deepening.

16. Solution: (b)

Statement 1 (Correct): Piezoelectric lighters use quartz crystals to generate a spark when mechanical pressure is applied.

Statement 2 (Correct): Electronic stove lighters use batteries or an external power source to generate an ignition spark.

Statement 3 (Incorrect): Piezoelectric lighters do not require recharging, as they generate electricity mechanically.

About Stove Lighter:

- What is a Stove Lighter?
  - A stove lighter is a compact device designed to create electric sparks that ignite gas stoves. It eliminates the need for matches, offering a

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safer and more efficient way to light stoves.

- Types of Stove Lighters:
  - Manual Lighters: Use a piezoelectric mechanism where pressure generates a spark.
  - Electronic Lighters: Operate on batteries to create sparks using an electric circuit.
  - Flame-Based Lighters: Create a small flame using fuel (like butane) to ignite gas.
- How Does a Stove Lighter Work?
  - Piezoelectric Mechanism:
  - Contains piezoelectric materials, where pressure applied by clicking displaces positive and negative ions, creating a charge difference.
  - This charge generates a spark as electrons jump through the air, ionizing it and forming a conductive path.
  - The spark ignites the gas released from the stove burner.
  - Electronic Mechanism:
  - Uses a battery to power a small circuit that produces high-voltage sparks at the press of a button.
  - Sparks ignite the gas for immediate flame generation.
  - Flame-Based Mechanism:
  - A small fuel reservoir releases gas, and a built-in spark ignites the flame, which lights the stove burner.

17. Solution: (b)

Unlike the princely states that joined India through the Instrument of Accession, Goa remained under Portuguese control, as Portugal refused to negotiate or recognize India's sovereignty over the region. Portugal, a NATO member, received diplomatic support from Western nations, delaying India's efforts.

About Goa Liberation Movement:

- Timeline and Background:
  - Period: The liberation struggle gained momentum between 1954 and 1961.
  - Reason: Goa was under Portuguese rule for over 450 years. The oppressive regime and economic exploitation fuelled nationalist sentiments. The turning point came in 1954 when India imposed an economic blockade after Portuguese suppression of satyagrahis.
- Key Events:
  - 1954 Blockade: Following the arrest of satyagrahis, India severed Goa's road, rail, and sea links.
  - August 1955 Satyagraha: Thousands of satyagrahis attempted to enter Goa but faced violent retaliation from Portuguese forces.
  - Operation Vijay (1961): The final military action by India, launched on 17th December 1961, led to the surrender of Portuguese forces and the liberation of Goa on 19th December 1961.

18. Solution: (a)

Lala Lajpat Rai co-founded Punjab National Bank (PNB) in 1894 to promote financial independence from British-controlled banking institutions. His efforts aligned with the Swadeshi movement, which aimed to reduce economic dependence on the British.

About Lala Lajpat Rai:

- Birth:
  - Born on 28th January 1865, in Dhudike village (now in Ferozepur district, Punjab).
  - His father, Munshi Radha Krishna, was a teacher, and his mother, Gulab Devi, imbued him with strong moral values.
- Education and Profession:
  - Completed his law education from Government College, Lahore.
  - Practiced law in Hisar but eventually devoted himself to political and social causes.
- Contribution to Freedom Movement:
  - A prominent member of the Indian National Congress (INC), he participated in several political agitations in Punjab.
  - Opposed the Partition of Bengal (1905) and supported the Non-Cooperation Movement (1920) under Gandhi's leadership.
  - Played a key role in the Lal-Bal-Pal trio (Lala Lajpat Rai, Bal Gangadhar Tilak, and Bipin Chandra Pal), representing the extremist wing of Congress.
  - Founded the Home Rule League of America in 1917 to garner international support for India's independence.
  - Protested against oppressive laws like the Rowlatt Act and condemned the Jallianwala Bagh massacre.
  - Spearheaded the opposition to the Simon Commission (1928), which excluded Indian representation, leading a peaceful protest in Lahore.
- Organizations Associated:
  - Co-founded the Punjab National Bank (1894) to promote financial independence.
  - Founded the Hindu Relief Movement (1897) to aid famine victims and protect them from religious conversion.
  - Established the Servants of People Society (1921) to work on social reform and upliftment.
  - Actively involved with Arya Samaj, contributing to its educational and social initiatives.
- Literature and Newspapers:
  - Authored influential works such as Young India, England's Debt to India, India's Will to Freedom, Evolution of Japan, Political Future of India, and Message of the Bhagavad Gita.
  - Edited the Arya Gazette and used it as a platform for nationalist ideas.

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19. Solution: (c)

Statement-I (Correct): The eCoO 2.0 system improves efficiency and transparency in export certification.

Statement-II (Incorrect): While the eCoO 2.0 system is a major upgrade, it does not replace all other trade documentation platforms under DGFT.

20. Solution: (a)

Statement 1 (Incorrect): The Banaras Hindu University (BHU) was established by Madan Mohan Malaviya, not Lala Lajpat Rai.

Statement 2 (Incorrect): Purna Swaraj (Complete Independence) was first demanded by Bal Gangadhar Tilak and later formalized in 1929 by the INC.

Statement 3 (Correct): Lala Lajpat Rai founded the Servants of the People Society (1921) to promote education, social service, and nationalistic ideals.

21. Solution: (c)

Indian political practice borrows the concept of whips from British parliamentary traditions. While critical to party functioning, the Constitution does not directly reference whips. Their legal enforceability emerges from the anti-defection provisions under the Tenth Schedule.

About Whip in Parliamentary Practice:

- What is a Whip?
  - A whip is a written directive issued by a political party to its legislators, mandating their presence during an important vote or requiring them to vote in a specific way.
  - It derives from the British parliamentary practice of "whipping in" members to ensure adherence to the party line.
- Appointed by: Each political party designates a Chief Whip, usually a senior legislator, to issue whips.
- Constitutional Status: The Constitution of India does not explicitly mention whips.
- Functions and Powers:
  - Ensure Attendance: Whips ensure party members are present during crucial legislative sessions and votes.
  - Party Discipline: Maintains internal discipline by aligning members' actions with party objectives.
  - Strengthens Decision-making: Ensures cohesion in voting on critical matters like budgets, Bills, and motions of no-confidence.
  - Compliance Monitoring: Tracks members' adherence to the party line and reports instances of defiance.
  - Prevents Fragmentation: By enforcing a collective stance, whips mitigate the risk of internal divisions in the party.

22. Solution: (d)

A one-line whip informs members about an upcoming vote but leaves voting discretion to them. A two-line whip does not mandate strict compliance with voting behaviour, only attendance. Whips are not legally enforceable globally but are a norm in many parliamentary systems.

Types of Whips:

- One-line Whip: Informs members about an important vote but allows abstention if they choose not to follow the party line.
- Two-line Whip: Directs members to be present during the vote, without explicitly binding them to vote in a particular way.
- Three-line Whip: The most stringent, mandating members to be present and vote according to the party's directive. Defiance can lead to disqualification under the anti-defection law.

23. Solution: (b)

LiDAR technology in ADAS is not used for weather predictions but for creating high-resolution 3D maps of the surroundings. Radar detects objects and measures their speed and distance, while ADAS cameras identify traffic signs using machine learning algorithms.

- What is ADAS?
  - ADASstands for Advanced Driver Assistance Systems, a combination of technologies designed to improve driver safety, enhance convenience, and minimize the risk of accidents.
  - It integrates sensors, cameras, and processors to analyze real-time data and provide alerts or automated assistance to the driver.
- How Does ADAS Work?
  - Sensors and Cameras:Commonly used sensors include RADAR, LiDAR, and SONAR, paired with 360-degree cameras that monitor the vehicle's surroundings.
  - Data Processing:Real-time data is processed by onboard computers to assess the environment, make decisions, and alert the driver or take automated actions.
  - Response Mechanism:Based on processed data, ADAS can initiate actions such as braking, steering corrections, or collision warnings faster than human reaction times.
- Key Features of ADAS:
  - Collision Intervention Systems:Prevents incoming collisions by detecting obstacles.
  - Automatic Emergency Braking (AEB):Applies brakes if the driver does not react to warnings.
  - Blindspot Alert and Avoidance:Warns of vehicles in blind spots and adjusts accordingly.
  - Lane Departure Alert and Lane Keep Assist:Alerts and steers the vehicle back into its lane if it deviates.
  - Traffic Sign Recognition:Identifies road signs and informs the driver.
  - Driver Drowsiness Detection:Monitors driver

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fatigue and provides alerts.
- Adaptive Cruise Control:Maintains a safe distance from the vehicle ahead by adjusting speed.
- Parking Assist:Automates or assists during parking using cameras and sensors.

24. Solution: (b)

The NEP emphasizes promoting multilingual education and improving governance standards but does not centralize all universities under the UGC or mandate PhD qualifications for academic positions.

25. Solution: (a)

The apparent slower motion of outer planets is due to their larger orbital paths and longer periods (Kepler's Third Law). Retrograde motion is a different concept related to apparent movement from Earth's perspective.

26. Solution: (d)

Statement 1 is incorrect: Satguru Ram Singh was exiled to Rangoon, Burma, rather than executed.

Statement 2 is incorrect: The British used cannons for public executions of Kukas but did not employ advanced artillery in battles.

Statement 3 is incorrect: The rebellion ended with brutal suppression, including the execution of 66 Kukas in January 1872, not a peace treaty.

27. Solution: (c)

All three factors influence the efficacy of antivenom treatment. Higher venom doses and delayed administration reduce efficacy, while the species determines whether the antivenom is suitable for neutralizing the specific toxins.

About Antivenoms:

- What are Antivenoms?
  - Antivenoms are life-saving medicines used to neutralize snake venom toxins. Produced by injecting venom into animals (usually horses), their immune systems generate specific antibodies, which are then extracted, purified, and formulated as antivenoms.
- The Big Four Snakes: India's primary venomous snakes contributing to most snakebite deaths are: Indian Cobra (Naja naja), Common Krait (Bungarus caeruleus), Russell's Viper (Daboia russelii) and Saw-scaled Viper (Echis carinatus)
- How is Antivenom Produced?
  - Venom Extraction: Snakes are milked to collect venom in controlled conditions.
  - Immunization: Horses are injected with small, increasing doses of venom over weeks to stimulate antibody production.
  - Antibody Extraction: Antibodies generated in the horses' blood are extracted, purified, and processed into antivenoms.
  - Formulation: The purified antibodies are prepared for clinical use, ensuring safety and effectiveness.
- Features of Antivenoms:
  - Specific Binding: Antivenoms neutralize toxins by binding to them like a key in a lock.
  - Life-Saving: They counteract venom effects like paralysis, blood clotting, and tissue destruction.
  - Polyvalent Nature: Current antivenoms target multiple snake species but have limited efficacy against less common species.
  - Critical Role in Healthcare: Antivenoms are essential for treating snakebite victims in rural and urban areas.

28. Solution: (a)

Statement 1 is correct: The scheme aims to establish Health and Wellness Centres (HWCs) in both rural and urban areas.

Statement 2 is correct: Integrated Public Health Labs (IPHLs) are planned for all districts to improve diagnostic capabilities.

Statement 3 is correct: Mobile hospitals are part of the disaster response component.

Statement 4 is incorrect: While the scheme strengthens healthcare infrastructure, it does not directly aim to reduce costs for economically weaker sections (addressed by Ayushman Bharat PM-JAY).

29. Solution: (c)

BRICS focuses on reforming global governance, South-South cooperation, and funding development projects through the NDB. However, the establishment of a unified currency is not currently on its agenda, despite discussions about de-dollarization.

30. Solution: (b)

The DIA Scheme supports India's diamond export industry by allowing duty-free imports of specific diamonds, promoting value addition, and boosting competitiveness globally.

About Diamond Imprest Authorization (DIA) Scheme:

- What it is: The DIA Scheme allows duty-free import of natural cut and polished diamonds under ¼ carat (25 cents) with an export obligation of 10% value addition.
- Ministry involved: Ministry of Commerce & Industry.
- Aim: To promote value addition, export growth, and enhance the competitiveness of Indian diamond exporters, particularly MSMEs.
- Key features:
  - Duty-free import of natural cut and polished diamonds.
  - Exporters with Two Star Export House status or higher and a minimum annual export of $15 million are eligible.
  - 10% value addition as export obligation.

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- Aims to generate employment opportunities, particularly for diamond assorters and semi-finished diamond processors.

- Implementation:
  - The scheme will be effective from April 1, 2025, and will be monitored under the Gems and Jewellery Export Promotion Council (GJEPC).

31. Solution: (d)

Community Notes stand out by allowing users to contribute context or corrections, which are only published after consensus on their helpfulness, ensuring community-driven moderation.

About Community Notes:

What is it?

- Community Notes is a crowdsourced fact-checking system where users can add context or facts to specific posts.

Launched by: Originally piloted as 'Birdwatch' by Twitter in 2021, rebranded as X, it is now being adopted by Meta across Facebook, Instagram, and Threads.

How it works:

- Contributors provide additional context below posts.
- Notes appear only if enough users agree on their helpfulness, ensuring diverse perspectives.
- Data is public, allowing anyone to analyse contributions for transparency.

Significance:

- Scalable Content Moderation: Reduces reliance on centralized fact-checkers.
- Community-driven Transparency: Empowers users to counter misinformation collectively.
- Adaptable System: Improves accuracy with increasing user participation and algorithmic refinements.

32. Solution: (b)

Statement 3 is incorrect because the Silver Notice does not replace the Red Notice, which focuses on tracking fugitives.

About the Silver Notice:

What it is: A colour-coded alert by Interpol to track and recover criminally acquired assets such as properties, vehicles, financial accounts, and businesses.

How it works:

- Member countries can issue a Silver Notice to request information about assets linked to criminal activities.
- Facilitates the identification, location, seizure, confiscation, or recovery of assets under national laws.
- Reviewed by Interpol's General Secretariat to ensure compliance with its rules and prevent misuse for political purposes.

Need for Such Notices:

- Addresses the challenge of transnational organized crime and recovers illicit wealth.
- Helps combat fraud, corruption, drug trafficking, and other financial crimes.

33. Solution: (b)

Statement 2 is incorrect as the SSI Mantra was developed by SS Innovations, not ISRO.

About SSI Mantra:

What it is: An indigenous surgical robotic system designed for performing advanced robotic surgeries, including telesurgery.

Developed by: SS Innovations.

Features:

- Ultra-low latency (35-40 milliseconds): Enables seamless real-time remote surgical procedures.
- High precision: Facilitates complex surgeries such as Totally Endoscopic Coronary Artery Bypass (TECAB).
- Telesurgery and Tele-proctoring Approved: The first robotic system globally to receive regulatory approval for telesurgery by Central Drugs Standard Control Organization (CDSCO).

How it works:

- Uses advanced robotic arms controlled remotely by surgeons over a secure network.
- Ensures precision and efficiency through high-speed data transmission with minimal delay.
- Supports collaboration in surgical education and mentoring through tele-proctoring.

Significance:

- Bridges Healthcare Gaps: Provides access to expert surgical care in remote and underserved areas.
- Enhances Patient Outcomes: Enables accurate and minimally invasive procedures.
- Transformative for India: Addresses disparities in healthcare access, especially for rural populations.
- Global Potential: Demonstrates scalability for worldwide adoption in medical care and education.

34. Solution: (a)

Cuba lies at the intersection of the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico, making it a strategic location in the region.

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35. Solution: (b)

Statement 3 is incorrect as NOTTO does not provide funding for transplant surgeries.

Central government employees who donate organs are eligible for 42 days of leave, as per the National Organ and Tissue Transplant Organisation (NOTTO).

About National Organ and Tissue Transplant Organisation (NOTTO):

What it is: NOTTO is a national-level organization established under the Directorate General of Health Services, Ministry of Health and Family Welfare, Government of India.

Ministry: Ministry of Health and Family Welfare.

Headquarters: Located in the Institute of Pathology (ICMR) Building, Safdarjung Hospital, New Delhi.

Aim:

- To coordinate, regulate, and promote organ and tissue donation and transplantation in India.
- Facilitate the safe and efficient allocation and utilization of organs and tissues.

Functions:

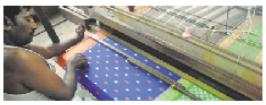
- Policy Formation: Lay down guidelines and protocols for organ donation and transplantation.
- Coordination and Networking: Act as the apex body for coordinating organ procurement, allocation, and distribution across regions.
- Registry Maintenance: Maintain a National Organ and Tissue Donation and Transplant Registry.
- Awareness Campaigns: Promote organ donation through public awareness initiatives.
- Training and Support: Organize training programs for healthcare workers and provide consultancy on legal and non-legal aspects of organ donation.
- Monitoring: Oversee transplantation activities and maintain a data bank for surveillance.

36. Solution: (b)

Ganjifa art, originating in Karnataka, was historically used in designing playing cards.

Art in a box

President Droupadi Murmu's guests are set to receive a gift box containing the best of south India's GI-tagged crafts. Here are some products featured in the hamper:



Pochampally Ikat on a pencil pouch: This Telangana staple is known for its distinct geometric patterns and bold colours

Etikoppaka toys: The soft wood and lacquer toys from the eponymous village in Andhra Pradesh are valued for the use of natural dyes and themes depicting everyday life

Kalamkari on bamboo: These goodies will arrive in a bamboo box decorated with Kalamkari motifs, pen-drawn with natural dyes

Kanchipuram silk as a pouch: The handloom silk, world renown for its richness and elegance, makes its way from Tamil Nadu

37. Solution: (c)

CSPOC operates independently of other Commonwealth institutions, with secretariat support provided by Canada.

About CSPOC:

Established in: 1969 by Speaker Lucien Lamoureux, Canada.

History:

- First initiated to enhance cooperation and share parliamentary practices among Commonwealth nations.
- Operates independently of the Commonwealth Secretariat or Parliamentary Association.
- Canada provides secretariat support for its activities.

Aim:

- Foster impartiality and fairness in parliamentary leadership.
- Promote knowledge and understanding of parliamentary democracy in diverse forms.
- Develop and strengthen parliamentary institutions.

Structure:

- Two-year cycle: Full membership conference every two years, Standing Committee meeting in the intervening year.
- Chairperson: Rotates based on the host country.

38. Solution: (c)

The submarines use stealth technology to avoid detection, but their diesel-electric propulsion limits underwater endurance compared to nuclear-powered submarines.

About Scorpene Class Submarines:

What are Scorpene Submarines?

- Scorpene-class submarines are diesel-electric attack submarines designed for stealth opera-

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tions, targeting adversary vessels, and intelligence gathering.

Launched under: The submarines were built under Project P-75, signed in 2005 as a $3.75 billion agreement between MDL and the French defense firm Naval Group, involving transfer of technology.

Submarines in Project P-75:

INS Kalvari (commissioned in 2017)

INS Khanderi (commissioned in 2019)

INS Karanj (commissioned in 2021)

INS Vela (commissioned in 2021)

INS Vagir (commissioned in January 2023)

INS Vaghsheer (delivered in 2024 after sea trials in 2023)

Features of Scorpene Submarines:

Capabilities:

- Equipped for Anti-Surface and Anti-Submarine Warfare, intelligence gathering, and area surveillance.
- Can launch torpedoes and tube-launched anti-ship missiles.

Propulsion System:

- Diesel-electric propulsion with an endurance of ~50 days.
- Retrofit with Air Independent Propulsion (AIP) systems starting 2024 for extended stealth and underwater endurance.

Advanced Systems:

- High-level automation with Integrated Platform Management and Combat Management Systems.
- Features indigenously developed Air Conditioning Plant and Internal Communication System (from INS Vaghsheer onwards).

Stealth Technology:

- Designed with superior stealth features to avoid detection by adversaries.

39. Solution: (c)

Statement 2 is incorrect as organ donation is voluntary in India, even for accident victims. The other statements reflect key functions of NOTTO.

About National Organ and Tissue Transplant Organisation (NOTTO):

What it is: NOTTO is a national-level organization established under the Directorate General of Health Services, Ministry of Health and Family Welfare, Government of India.

Ministry: Ministry of Health and Family Welfare.

Headquarters: Located in the Institute of Pathology (ICMR) Building, Safdarjung Hospital, New Delhi.

Aim:

- To coordinate, regulate, and promote organ and tissue donation and transplantation in India.
- Facilitate the safe and efficient allocation and utilization of organs and tissues.

Functions:

- Policy Formation: Lay down guidelines and protocols for organ donation and transplantation.
- Coordination and Networking: Act as the apex body for coordinating organ procurement, allocation, and distribution across regions.
- Registry Maintenance: Maintain a National Organ and Tissue Donation and Transplant Registry.
- Awareness Campaigns: Promote organ donation through public awareness initiatives.
- Training and Support: Organize training programs for healthcare workers and provide consultancy on legal and non-legal aspects of organ donation.
- Monitoring: Oversee transplantation activities and maintain a data bank for surveillance.

40. Solution: (a)

The Gulf of Mexico is bordered by the United States (north), Mexico (west and south), and Cuba (southeast).

41. Solution: (c)

Statement-I is correct as the Harappan script remains undeciphered.

However, Statement-II is incorrect because the script is not limited to seals; it is also found on pottery, clay impressions, and copper tablets. The motifs extend beyond animals, including humans and symbolic figures.

About Harappan Script:

What it is:

- The writing system of the Indus Valley Civilization (c. 2600-1900 BCE), featuring undeciphered symbols with no confirmed linguistic association.

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Material used:

- Found on steatite seals, clay impressions, pottery, bronze tools, stoneware bangles, shells, ivory, and small copper tablets.
- Seals were often square, about 2.54 cm, and occasionally made of materials like silver, faience, and calcite.

Features of the script:

- Short inscriptions averaging five symbols, with the longest known being 26 symbols.
- Early forms appeared during the Ravi and Kot Diji phases (c. 3500-2700 BCE).
- The script appears to have been fully developed by the Urban period (c. 2600-1900 BCE).

Motifs found on script:

- Animal motifs such as unicorns, bulls, tigers, elephants, and mythical creatures.
- Depictions of human figures, often in symbolic or narrative contexts, including combat or ritual scenes.

42. Solution: (a)

Statement 1 is incorrect. The National Anthem, composed in Bangla, was first sung in 1911 during the Calcutta Session of the Indian National Congress. The full song has five stanzas, but only the first is officially recognized.

Statement 3 is incorrect because the word "India" is not present in the original Bangla composition.

About National Anthem:

Written by: Composed by Rabindranath Tagore in Bangla.

Adopted in: The Hindi version was adopted as the National Anthem of India by the Constituent Assembly on January 24, 1950.

Procedure for Singing the Anthem:

Full Version:

- Time:Approximately 52 seconds.
- Conditions & Occasions:
- During civil and military investments.
- When the President or Governorarrives at or departs from formal state functions.
- At paradesor when the National Flag is unfurled.
- On arrival or departure of the President for any public function.
- Preceded by a drum rollwhen played by a band.

Short Version:

- Short Version of Anthem:

Jana-gana-mana-adhinayaka jaya he,

Bharata-bhagya-vidhata,

Jaya he, jaya he, jaya he, Jaya jaya jaya jaya he.

Time: Approximately 20 seconds.

Conditions & Occasions:

- Played during toasts in Messes.
- On occasions with special orders by the Government of India.

Mass Singing:

- Conditions & Occasions:
- During the unfurling of the National Flag.
- At cultural or ceremonial functions, with choirs or public participation.
- On arrival or departure of the Presidentat non-state public functions.
- Schools: Encouraged as part of morning assemblies to instill respect for the nation.

43. Solution: (c)

Umred-Pauni-Karhandla Wildlife Sanctuary is ecologically significant as it serves as a tiger corridor connecting the Tadoba-Andhari Tiger Reserve with other forested areas.

About Umred Karhandla Wildlife Sanctuary:

Location: Situated in Pauni Tahsil, Bhandara district, and Umred, Kuhi, and Bhivapur Taluka, Nagpur district, Maharashtra.

National Park: Connected to Tadoba Andhari Tiger Reserve via the forest along the Wainganga River, forming a crucial tiger conservation corridor.

River: Bounded by the Wainganga River and the GoseKhurd Dam to the northeast.

Flora: Dense deciduous forests with teak, bamboo, and other hardwoods dominating the landscape.

Fauna:

- Mammals: Tigers, leopards, sloth bears, wild dogs, Indian gaur, sambar deer, and spotted deer.
- Birds: Rich avian population with various endemic and migratory species.
- Reptiles: Cobras, pythons, and other reptiles add to the biodiversity.

44. Solution: (b)

Statement 2 is incorrect.

Artesian aquifers are defined by the presence of overlying impermeable layers, and they provide insights into subsurface geology. Statement 2 is incorrect because water does not always gush out; the flow depends on the piezometric surface.

About artesian condition:

Definition: An artesian condition occurs when groundwater is confined under pressure between layers of impermeable rocks, called an artesian aquifer.

Factors leading to artesian condition:

- Confined aquifer: Water trapped between impermeable rock layers.
- Pressure gradient: Natural geological pressure caused by the weight of overlying impermeable layers.
- Rupture or Drilling: Release of pressure when the top layer is punctured (e.g., during drilling).

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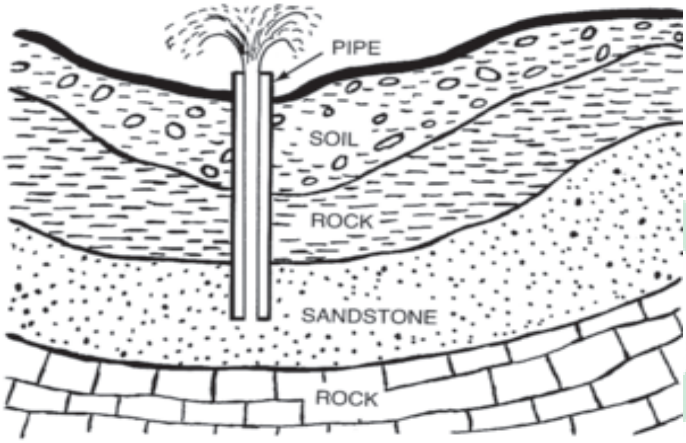
How it works:

- Artesian water flows naturally to the surface when the confining layer is breached, propelled by the internal pressure.
- The water may gush out forcefully, depending on the depth and pressure within the aquifer.

Significance:

- Water Source in Arid Regions: Provides access to groundwater in deserts like Rajasthan.
- Geological insight: Reveals subsurface hydrogeological conditions.
- Agricultural utility: Enables irrigation without pumping in confined aquifers.
- Global examples: Found in Australia, Africa, and historical wells like Artois in France.



45. Solution: (d)

The National Anthem can be played instrumentally without vocals, and the tempo must adhere to the prescribed duration of approximately 52 seconds. Statement 1 is incorrect, as individuals are permitted to sing the Anthem.

46. Solution: (c)

The BHARATPOL Portal centralizes INTERPOL operations, issues notices, and supports field officers in combating transnational crimes. Statement 1 is incorrect as the portal focuses on international cooperation rather than intra-state coordination.

About BHARATPOL Portal:

Ministry Involved:

- Ministry of Home Affairs, in collaboration with the CBI as the National Central Bureau (NCB) for INTERPOL in India.

Aim:

- To enable real-time information sharing and streamline international police assistance through INTERPOL, addressing challenges posed by transnational crimes.

Features:

- Centralized platform to process INTERPOL requests, including Red Notices and other color-coded notices.
- Accessible via the CBI's official website for seamless communication among CBI, INTERPOL Liaison Officers (ILOs), and Unit Officers (UOs).
- Enhances efficiency for field-level officers in combating crimes like cybercrime, drug trafficking, human trafficking, and financial fraud.
- Reduces reliance on traditional communication methods like letters, emails, and faxes.
- Facilitates faster access to international police assistance for criminal investigations.

47. Solution: (a)

The UGC Draft Regulations 2025 allow professionals from academia, industry, public administration, or policymaking to apply for the post of VC, not just academic professionals.

Draft Guidelines for Vice-Chancellor Appointment:

Organisation involved: University Grants Commission (UGC).

Key features of VC appointment guidelines:

Authority for Selection: Chancellors or Visitors are empowered to form a three-member search-cum-selection committee for appointing VCs.

Selection Process:

- Applications are invited via all-India newspaper advertisements or through nomination/talent search processes.
- A committee consisting of nominees from the Visitor/Chancellor (Chairperson), UGC Chairperson, and the university's apex body (e.g., Senate, Syndicate) selects the VC.

Eligibility:

- Distinguished professionals from academia, industry, public administration, or policymaking with proven academic contributions are eligible.

Inclusivity: Encourages representation of economically weaker sections (EWS), SC, ST, OBC, and persons with disabilities.

Transparency: Mandates public notification and objective assessment methods.

48. Solution: (c)

The scheme aims to reduce import dependency by promoting domestic production in categories like Alloy Steel Products and Electrical Steel. Statement 2 is incorrect because there is no mandate for using 100% indigenous raw materials.

About PLI Scheme 1.1:

What it is: Production Linked Incentive (PLI) Scheme 1.1 focuses on enhancing domestic production of specialty steel in five key categories.

Launched by: Union Ministry of Steel and Heavy Industries.

Aim:

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- Reduce dependency on imports of specialty steel.
- Promote high-value steel manufacturing.
- Strengthen India's position as a global steel powerhouse.

Key Features:

- Five Product Categories: Coated/Plated Steel, High Strength/Wear Resistant Steel, Specialty Rails, Alloy Steel Products & Steel Wires, and Electrical Steel.
- Reduced Thresholds:
- Investment threshold for CRGO (Cold-rolled grain-oriented steel) reduced to ₹3,000 crore.
- Production threshold reduced to 50,000 tonnes.
- Carry Forward Excess Production: Companies can carry forward surplus production to the next year for incentive eligibility.
- Focus on Existing Capacities: Investments in augmenting existing facilities are now eligible for participation.
- Incentive Period: FY 2025-26 to FY 2029-30.

49. Solution: (b)

Statements 1 and 2 are correct. The cluster incorporates Biofloc technology and is part of PMMSY. Statement 3 is incorrect because the cluster focuses on sustainable, not intensive, aquaculture practices.

About India's First Organic Fisheries Cluster:

What it is: A fisheries cluster designed for sustainable and eco-friendly fish farming using organic practices.

Features:

- Focuses on minimal environmental pollution and sustainable production.
- Incorporates amur carp and other key species for organic fish farming.
- Supported by NABARD through funding for infrastructure, capacity building, and forming Farmer Producer Organizations (FFPOs).

50. Solution: (b)

The sanctuary supports populations of tigers, leopards, Indian gaur, and wild dogs. However, it is not a Ramsar wetland site, making Statement 2 incorrect.

51. Solution: (b)

Statement 1 is incorrect because the Entity List applies to various sectors, including AI, semiconductors, and more.

Statement 2 is correct as activities counter to U.S. foreign policy can lead to inclusion.

Statement 3 is incorrect because inclusion is determined administratively by the Bureau of Industry and Security, not Congress.

The United States recently removed three Indian nuclear entities Bhabha Atomic Research Centre (BARC), Indira Gandhi Atomic Research Centre (IGCAR), and Indian Rare Earths (IRE) from its restrictive Entity List.

About Entity List:

What is the Entity List?

- The Entity List Is published by the U.S. Bureau of Industry and Security (BIS) and includes foreign entities—businesses, institutions, or organizations—subject to stringent licensing requirements for the export, re-export, or transfer of specified items.
- Entities are listed if they are suspected of engaging in activities against U.S. national security or foreign policy interests.

- Impact of Listing:
  - Stringent Licensing Requirements:Entities must secure individual licenses for any export or transaction involving U.S. goods and technologies.
  - Hindered International Cooperation:Being on the list complicates access to advanced technologies and partnerships.
  - Economic and Strategic Limitations:Limits participation in global supply chains, especially in high-tech sectors.

52. Solution: (d)

The agreement did not allow unrestricted movement, mandate fencing, or address the Tin Bigha Corridor dispute (resolved later in 2011).

About 1975 Indo-Bangladesh Joint Agreement:

- What it is: A bilateral guideline for border management to maintain peace and avoid disputes.
- Key Features:
  - Prohibits constructing defense structures within 150 yards of the international border.
  - Encourages bilateral discussions for border issues, ensuring mutual respect and cooperation.

- Why Disputed:

- Fencing Definition: India does not consider wire fencing a defense structure, while Bangladesh does.
- Security Concerns: High incidents of cattle smuggling, human trafficking, and illegal immigration necessitate fencing, which Bangladesh views as a disruption to local livelihoods.
- Smart Fencing Opposition: Bangladesh opposes smart fences with CCTV and electronic surveillance near the border, citing privacy concerns.

Status of Fencing:

- Total Fenced: 3,141 km of the 4,156 km border (Ministry of Home Affairs, 2023).
- Pending Issues:
  - Non-cooperation from local authorities in West Bengal and land acquisition delays.
  - Difficult terrain, including 900 km of riverine border, complicates fencing efforts.

53. Solution: (b)

Statements 2 and 3 are correct. INS Vaghsheer bolsters India's underwater combat strength and is the final submarine under Project 75. Statement 1 is incorrect, as AIP technology is planned for future upgrades, not included from inception.

About Commissioned Ships:

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Ship Name	Built By	Project Name	Features	Significance
INS Nilgiri	Mazagon Dock Shipbuilders Limited (MDL), Mumbai, and Garden Reach Shipbuilders and Engineers (GRSE), Kolkata	Project 17A (Nilgiri-class stealth frigates)	– Multi-mission stealth frigate for "blue water" operations	First of seven frigates under Project 17A, ensuring versatile capability in anti-air, anti-surface, and anti-submarine warfare
			– Equipped with supersonic surface-to-surface missiles, Medium Range Surface-to-Air Missiles (MRSAMs), and advanced close-in weapon systems	
INS Surat	Mazagon Dock Shipbuilders Limited (MDL), Mumbai	Project 15B (Visakhapatnam-class stealth guided missile destroyers)	– India's first AI-enabled warship	Fourth and final destroyer of Project 15B, enhancing India's offensive and defensive naval capabilities
			– Equipped with surface-to-air missiles, anti-ship missiles, and torpedoes	
			– Powered by a Combined Gas and Gas (COGAG) propulsion system, achieving speeds exceeding 30 knots	
			– Designed for "network-centric" warfare	
INS Vaghsheer	Mazagon Dock Shipbuilders Limited (MDL), Mumbai	Project 75 (Kalvari-class submarines)	– Diesel-electric attack submarine based on the French Scorpene-class design	Sixth and final submarine under Project 75, reinforcing India's underwater combat and intelligence-gathering capabilities
			– Equipped with wire-guided torpedoes, anti-ship missiles, and advanced sonar systems	
			– Features modular construction with future upgrade potential for Air Independent Propulsion (AIP) technology	

54. Solution: (c)

Blood Money (Diya) is a provision under Islamic Sharia law where the offender compensates the victim or their family for unintentional or intentional homicide, as a form of restorative justice. It is not applicable to property crimes or determined by international law.

What is Blood Money?

- Blood money, or diya, is a provision under Islamic Sharia law that allows a perpetrator to compensate the victim or their family in cases of unintentional murder, culpable homicide, or even intentional murder if the victim's family chooses to forgo retribution (qisas).
- The aim is not to place a price on life but to alleviate the family's loss and suffering.

- How does it work?

- Reconciliation: Blood money is often negotiated between the perpetrator and the victim's family, with judicial oversight ensuring fairness.
- Amount Determination: Factors like gender, religion, and nationality of the victim influence the compensation in many Islamic countries.
- Legal Duality: Even when blood money is accepted, the state may impose separate punitive measures, such as imprisonment or fines, to maintain public order.

55. Solution: (a)

The initiative highlights the role of private-sector companies in space exploration by launching two distinct lunar missions aboard a single SpaceX Falcon 9 rocket, focusing on cost-effective and innovative lunar technologies.

About One Rocket, Two Missions:

- What it is: A SpaceX Falcon 9 rocket recently launched two lunar spacecraft, Blue Ghost and Resilience, under NASA's CLPS program and Japan's private-sector initiatives, respectively. These missions aim to deliver scientific payloads and demonstrate advanced technologies for future lunar operations.

- Nations involved:

- United States: Through NASA's CLPS program, promoting cost-effective lunar exploration via commercial partners.
- Japan: Represented by ispace, a Tokyo-based private company, contributing with innovative technology like the Tenacious micro rover.

- Satellites and Payloads Launched:

- Blue Ghost:
  - Developed by Firefly Aerospace (U.S.).
  - Carries 10 NASA scientific instruments for studying Earth's magnetosphere, lunar dust, and the Moon's thermal and structural properties.
  - Focused on navigation and computing technology demonstrations in harsh lunar environments.
- Resilience:
  - Developed by ispace-Europe (Luxembourg subsidiary of Japan's ispace).
  - Features Tenacious, a micro rover equipped with a high-definition camera and regolith-scooping technology.
  - Aims to investigate the Moon's far north, Mare Frigoris.

- Significance:

- Technological Advancements: Both missions are testing advanced navigation, computing, and robotic systems essential for future lunar sustainability.
- Global Collaboration: Highlights international partnerships between private companies and government agencies to achieve lunar exploration goals.
- Sustained Lunar Economy: A stepping stone for establishing long-term human presence on the Moon under NASA's Artemis program.
- Innovation in Exploration: Demonstrates cost-effective approaches to achieving complex space missions.

56. Solution: (c)

The primary objective of the CROPS experiment was to study plant growth in microgravity conditions similar to extraterrestrial environments, aiming to develop sustainable food systems for long-term space missions.

About Lobia Seeds Germination in Space:

- What it is:
  - ISRO's experiment involved germinating lobia seeds aboard the CROPS module to study plant growth under microgravity conditions.
  - The seeds sprouted successfully on the fourth day, with visible leaves by the fifth day, marking a milestone in India's space research.
- Mission name: Compact Research Module for Orbital Plant Studies (CROPS).
- Seed/Plant Used: Lobia (black-eyed pea), a nutrient-dense plant ideal for space farming experiments.
- Aim:

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- To develop sustainable food sources for long-term space missions.
- To test plant growth in conditions mimicking extraterrestrial environments, including microgravity and controlled atmospheric conditions.

- Significance of Success:
  - Support for Space Missions:

● Enables astronauts to grow food, reducing dependency on pre-packaged supplies.

● Contributes to oxygen generation and CO□ recycling aboard spacecraft.

  - Technological Advancements:

● Demonstrates India's capability to manage complex life-support systems in space.

● Provides insights into designing space habitats with integrated agriculture.

  - Psychological Benefits: Tending to plants offers stress relief and improves mental health for astronauts.
- Global Contribution: Paves the way for India's collaboration in global space farming initiatives, such as those on the International Space Station (ISS).

57. Solution: (a)

The US AI Export Rule aims to regulate the export of advanced AI technologies like GPUs, ensuring they do not reach adversarial nations or undermine U.S. national security. It does not ban all exports or promote unrestricted access.

About US AI Export Rule:

What is it?

- A regulatory framework introduced by the US government to control the export of AI hardware, particularly GPUs, based on national security concerns.
- Aims to ensure advanced AI capabilities remain under the purview of the US and its closest allies.

● Categories and India's Placement:

- Tier 1:
  - Includes 18 closest US allies such as Australia, Japan, South Korea, and the UK.
  - Minimal export restrictions; US companies can freely deploy AI technology here.
- Tier 2:
  - Encompasses the majority of countries, including India.
  - Restrictions include a cap on computing power imports unless hosted in trusted environments.
  - Capped at 50,000 advanced AI chips through 2027, extendable upon bilateral agreements.
- Tier 3:
  - Countries like Russia, China, and North Korea face near-total prohibition on importing US AI technology.
- Special Provision for India and China:
  - India: Authorized firms can use exported technology for civilian and military purposes (excluding nuclear use).
  - China: Exported technology is restricted to civilian applications only.

58. Solution: (b)

About Nautor Land:

- Definition: Nautor refers to barren or wasteland owned by the government that can be allotted to individuals for cultivation or other productive use, subject to approval by competent authorities.
- Purpose: Regularizing nautor land grants legal ownership to locals who have utilized such land over the years.
- History:
  - Jammu and Kashmir: Originated under a rule established by Hari Singh, the former king of Jammu and Kashmir, in 1932.
  - Himachal Pradesh: The nautor policy was adopted in 1968 but later halted due to administrative concerns.
- Found in: Predominantly implemented in hilly and remote areas, such as Leh and Kargil in Ladakh and parts of Himachal Pradesh.
- Features:
  - Ownership Transfer: Aimed at granting ownership to locals using government wastelands.
  - Preservation of Local Interests: Prevents the exploitation of resources by outsiders.
  - Cultural and Economic Value: Recognizes traditional practices of land use, contributing to local livelihoods.

59. Solution: (d)

All statements are incorrect. The experiment did not require a fully automated hydroponic system but used controlled atmospheric conditions. Lobia was chosen for its adaptability and nutrient content, not its short life cycle. The seeds were grown with controlled light, not without sunlight.

60. Solution: (a)

The 1975 Indo-Bangladesh Joint Agreement aimed to maintain peace and cooperation along the border by addressing issues like fencing, smuggling, and movement of people.

61. Solution: (c)

The Asan Wetland is an artificial wetland influenced by human activities and supports the endangered Putitor mahseer, a vital component of its aquatic biodiversity.

About Asan Wetland:

- Location: Situated in Dehradun district, Uttarakhand, at the confluence of the Asan River and the Eastern Yamuna Canal.
- Lies near the borders of Uttarakhand and Himachal Pradesh.

Rivers and History:

- Created due to the damming of the Asan River at

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the Asan Barrage (Dhalipur Lake) in 1967 during the construction of the Dhalipur power house.
- Declared Uttarakhand's first Ramsar sitein 2020, highlighting its global ecological significance.

Uniqueness and Features:

- Biodiversity Hub: Home to 330 bird species, including critically endangered white-rumped vulture, red-headed vulture, and Baer's pochard.
- Migratory Birds: Provides shelter to globally endangered species like Brahminy duck, red-crested pochard, gadwall, and mallard, migrating from Central Asia.
- Fish Species: Hosts 49 fish species, including the endangered Putitor mahseer.
- Wetland Ecosystem: Vital for maintaining ecological balance, supporting hydrological regimes, and enabling biodiversity.

62. Solution: (d)

The AWC involves local communities and citizen scientists to enhance participation and awareness. It also tracks the impact of climate change on waterbird populations.

About Asian Waterbird Census (AWC):

- Conducted By: The Asian Waterbird Census (AWC) is coordinated by Wetlands International as part of the global International Waterbird Census (IWC).
- Frequency: The AWC is an annual citizen science event held during the months of January to coincide with the migration season of waterbirds.

63. Solution: (a)

The recommendations of the Pay Commissions primarily impact central government employees, including revisions to Dearness Allowance (DA) and pension structures, making Statement 3 correct. These recommendations serve as a benchmark for states, but they do not directly dictate the salaries of state government employees, as those are determined by state-specific pay panels or commissions. This makes Statement 1 incorrect.

Additionally, while some recommendations may be implemented with retrospective effect, this is not always the case. Typically, the implementation date is predefined, often starting from a financial year or a specific date mentioned in the recommendations, making Statement 2 incorrect.

64. Solution: (a)

DDT contamination is not limited to temperate climates; it is a global issue, affecting ecosystems in tropical, subtropical, and temperate regions. Persistent organic pollutants like DDT accumulate in soils and water bodies worldwide, making Statement 1 incorrect.

Biochar, a carbon-rich material derived from biomass, has a strong ability to adsorb DDT and similar hydrophobic organic compounds. This reduces their bioavailability and subsequent uptake by plants and organisms, making Statement 2 correct.

Biochar is an organic material, not inorganic. It does not chemically react with DDT but instead physically adsorbs it due to its porous structure and high surface area. Thus, Statement 3 is incorrect.

65. Solution: (d)

Statement I: Bharat Ranbhoomi Darshan is not limited to promoting tourism in border areas alone. The initiative encompasses key historical and battlefield sites across India, including those located inland. This makes Statement I incorrect.

Statement II: The initiative leverages digital technology to provide virtual tours of significant military and battlefield sites. This feature aims to enhance public understanding of India's historical military heritage and encourage tourism through immersive experiences. Hence, Statement II is correct.

66. Solution: (a)

Bharathapuzha, also known as the Nila River, is an important cultural and historical river in Kerala, but it is not commonly referred to as the "River of Life." This title is more often associated with other rivers globally or rivers with critical lifeline functions, making Statement 1 incorrect.

Bharathapuzha is a non-perennial river, meaning its flow is highly dependent on the monsoon rains. During dry seasons, the river often experiences reduced water levels, highlighting its seasonal nature. This makes Statement 2 correct.

Bharathapuzha does not support Kerala's largest urban water supply network. Other rivers, such as the Periyar River, are more prominent for urban water needs in Kerala. Hence, Statement 3 is incorrect.

67. Solution: (b)

WHO's primary aim is to ensure universal health coverage, promote health equity, and strengthen global preparedness for health emergencies. It works beyond pandemics, focusing on disease prevention, capacity building, and setting health guidelines globally.

About WHO: Aim and Functions

- Aims
  - Ensure universal health coverage and promote health equity.
  - Strengthen disease prevention and control worldwide.
  - Enhance global preparedness and response to health emergencies.
- Functions
  - Set global health standards and guidelines.
  - Monitor emerging health issues and coordinate responses.
  - Provide technical assistance to countries for

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capacity building.
- Facilitate health research and policy development.

WHO's Role in Global Health:

- Global Coordination:
  - Leads international efforts in combating pandemics, such as COVID-19 and Ebola.
  - Collaborates with governments, NGOs, and private entities to strengthen healthcare systems.
- Disease Eradication: Played a key role in eradicating smallpox and reducing polio cases by 99%.
- Capacity Building: Assists low- and middle-income countries in improving health infrastructure, access to medicines, and training healthcare workers.
- Health Policy Advocacy: Advocates for funding and policies addressing non-communicable diseases, mental health, and nutrition improvement.

68. Solution: (b)

Statements 2 and 3 are correct. The scheme integrates advocacy campaigns and is now part of Mission Shakti. However, it is not limited to financial incentives but includes broader gender equity measures.

About Beti Bachao Beti Padhao:

- What it is: A government scheme aimed at addressing gender bias and promoting the rights, survival, and education of the girl child.
- Launched in: January 22, 2015, in Panipat, Haryana.
- Ministry involved: Ministry of Women and Child Development in collaboration with the Ministries of Health and Family Welfare and Education.
- Objectives:
  - Improve Child Sex Ratio (CSR).
  - Ensure gender equality and empowerment of women.
  - Prevent gender-biased, sex-selective elimination.
  - Promote education and participation of the girl child.
- The scheme is divided into three components:
  - Advocacy campaigns were launched to address the issue of declining Child Sex Ratio (CSR) and Sex Ratio at Birth (SBR).
  - Multi-sectoral interventions were planned and are being implemented in gender-critical districts across the country.
  - A financial incentive-linked scheme—Sukanya Samriddhi scheme—was launched to encourage parents to build a fund for female children.
- Beneficiaries:
  - Primary: Pregnant/lactating mothers, young parents, and girl children.
  - Secondary: Adolescents, medical professionals, private hospitals, and families.
  - Tertiary: Community leaders, media, NGOs, and the public.
- Eligibility:
  - The family must have a girl child below 10 years of age.
  - A Sukanya Samriddhi Account (SSA) should be opened in the girl's name.
  - The girl must be a resident Indian.
- Features:
  - Advocacy campaigns for addressing gender bias.
  - Multi-sectoral interventions in gender-critical districts.
  - Financial incentives through the Sukanya Samriddhi Scheme.
  - Measurable outcomes, such as improving CSR and providing functional toilets for girls in schools.

69. Solution: (c)

The Vaigai River originates from the Western Ghats, not the Eastern Ghats, and flows into the Palk Strait (Bay of Bengal), not the Arabian Sea. It holds historical and cultural significance in Tamil Nadu.

About Vaigai River:

- Origin: The Vaigai River originates from the Varusanadu Hills on the Periyar Plateau in the Western Ghats.
- End Point: It empties into the Palk Strait, near the Pamban Bridge in Ramanathapuram district.
- Tributaries: Major tributaries include Suruliyar, Mullaiyaru, Varaaga Nadhi, Manjalaru, Kottagudi, Kridhumaal, and Upparu.
- Flow through states: It primarily flows through the state of Tamil Nadu.

  Dams and Features:
  - Vaigai Dam: A crucial structure for irrigation and water storage located near Andipatti in Theni district.
  - Vattaparai Falls: A notable waterfall situated on the river.

70. Solution: (c)

The platform promotes transparency through AI-based solutions but is not limited to Parliament alone or exclusively focused on digitization.

About One Nation, One Legislative Platform:

- What it is: A mission to integrate all legislative bodies of India—Parliament, state legislatures, and local bodies—onto a single digital platform.
- Aim:
  - Enable real-time sharing of legislative data and practices.
  - Foster transparency, accountability, and public participation in legislative processes.

  Features of One Nation, One Legislative Platform:

- Integrated Digital Platform: Unifies Parliament, state legislatures, and local bodies on a single platform for seamless data sharing and coordination.
- Real-Time Information: Provides live updates on legislative proceedings, bills, and debates to enhance transparency and accessibility.
- AI and Technology Integration: Utilizes Artificial Intelligence to streamline legislative functioning, analyze data, and improve decision-making.
- Paperless Legislatures: Promotes eco-friendly practices by digitizing legislative records, reducing dependency on physical documentation.
- Public Accessibility: Ensures citizens can access legislative information, encouraging participation and fostering accountability.

71. Solution: (b)

Statement 1 is incorrect because MPs from both ruling and opposition parties can introduce such Bills.

Statement 2 is correct because Private Member's Bills are non-binding and do not impact the government's stability.

Statement 3 is also correct since these Bills are scheduled for discussion on Fridays.

What is a Private Member's Bill?

- A legislative proposal introduced by Members of Parliament (MPs) who are not part of the government.
- Represents individual MPs' legislative priorities or public issues outside the official government agenda.
- Can be introduced by both ruling and opposition party MPs.

Features:

- Non-Binding: Rejection does not affect the government's confidence or stability.
- Legislative Independence: Reflects the independent voice of parliamentarians.
- Historical Significance: Only 14 Private Members' Billshave become law; the last was passed in 1970.
- Scheduling: Reserved for discussion on Fridays, limiting its time and priority.

Procedure in the House:

- Drafting and Notice: The member drafts the Bill and gives a one-month notice before introduction.
- Introduction: Introduced in the House, followed by initial discussion and possible referral to a committee.
- Debate: If selected, the Bill is debated during the allotted Friday session.
- Decision: The member may withdraw it on the minister's request or proceed for voting.

72. Solution: (b)

Statement 1 is correct, as Exercise Surya Kiran is an annual bilateral military exercise between India and Nepal.

Statement 3 is also correct because it includes training in jungle warfare and disaster management. Statement 2 is incorrect since it does not focus on maritime security but on counter-terrorism and jungle warfare.

About Exercise Surya Kiran:

- Nations involved:India and Nepal.
- Location:Conducted at the Nepal Army Battle School, Saljhandi, in the Shivalik ranges of Western Nepal.
- Current Edition:18th edition.
- Aim:To enhance interoperability in counter-terrorism operations and jungle warfare in mountainous regions.
- Features:Includes jungle warfare training, simulation of counter-terrorism operations, and capacity-building exercises for joint disaster responses.
- Humanitarian Assistance:Focuses on disaster management and humanitarian relief during emergencies.
- Humanitarian Assistance: Focuses on disaster management and humanitarian relief during emergencies.

73. Solution: (c)

A belly landing is a controlled emergency maneuver typically conducted when landing gear fails to deploy or if using the landing gear could worsen the aircraft's condition. It is not a routine procedure or caused by structural flaws in the fuselage.

About Belly Landing:

- What it is:
- Definition:A belly landing occurs when an aircraft lands without deploying its landing gear, skidding on its underside (fuselage).
- Risk Level:It is inherently dangerous, with risks of fire, structural damage, and injuries.

Why it is done:

- Landing Gear Failure:When the landing gear fails to deploy or extend correctly.
- Aircraft Damage:If landing on wheels risks worsening existing damage.
- Controlled Emergency:Considered safer than landing with gear down under specific emergency conditions.
- Extreme Scenarios:May be preferred during water landings (ditching) or severe runway conditions.

74.Solution: (c)

Google's Willow quantum processor, featuring 105 physical qubits, is designed primarily to improve quantum error correction and scalability. Quantum computers are highly sensitive to environmental disturbances, which can lead to errors in qubit states. To address this, Willow employs advanced error-correction techniques such as surface codes, which use a combination of data and measurement qubits to

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detect and mitigate errors without collapsing quantum states.

75. Solution: (d)

About Trinidad and Tobago:

- Capital:Port of Spain
- Location:Southernmost island nation in the Caribbean, situated 11 km northeast of Venezuela and 130 km south of Grenada.
- Trinidad and Tobago are located in the Atlantic Ocean.

  Geographic Features:
- Rivers:Ortoire River, Caroni River, and Nariva River (major rivers on the island of Trinidad).
- Mountains:Northern Range (Trinidad), including the highest peak, El Cerro del Aripo (940 meters).

76. Solution: (c)

NASA's Kessler Syndrome Mitigation focuses on preventing cascading collisions (where debris collisions create more debris) by promoting strategies to limit debris generation and improve space traffic management.

Major Initiatives to Counter Space Debris:

- Kessler Syndrome Mitigation (NASA):Studies and strategies to avoid cascading collisions in orbit by limiting debris generation.
- Japan's ELSA-d Mission:A demonstration by Astroscale for capturing and de-orbiting defunct satellites using magnetic capture technology.
- United Nations' Guidelines for Long-Term Sustainability of Outer Space Activities:Non-binding recommendations for safe satellite operations, debris mitigation, and international cooperation.
- Active DebrisRemoval (ADR) Projects: Development of technologies like nets, harpoons, and lasers to capture or de-orbit debris (e.g., ESA and JAXA).

77. Solution: (b)

Statement 1 is Incorrect. AIP technology is used in conventional diesel-electric submarines, not nuclear ones.

Statement 2 is Correct. AIP systems carry liquid oxygen to generate electricity underwater.

Statement 3 is Correct. AIP enhances stealth by reducing the need for surfacing, lowering detection vulnerability.

Statement 4 is Incorrect. AIP systems are compact and efficient compared to conventional diesel-electric setups.

About Air Independent Propulsion System (AIP):

- Definition: AIP is a technology that allows conventional diesel-electric submarinesto operate without surfacing or using a snorkel for oxygen.

  How it works:
- Uses fuel cells or other systems to generate electricity underwater.
- Carries liquid oxygen and either diesel, methanol, or hydrogen as fuel.
- Generates power through either electro-chemical cell (e.g., fuel cells) or heat engines.

  Features:
- Enhances underwater endurance significantly.
- Reduces vulnerability to detection during operation.
- Uses compact systems like fuel cells for efficiency and safety.

78. Solution: (a)

Statement 1 is correct as MPs must provide a one-month notice before introducing the Bill in either House of Parliament. This notice period allows for the necessary procedural and administrative preparations.

Statement 2 is also correct since Private Member's Bills, like other legislative proposals, can be referred to a parliamentary committee for detailed examination. This ensures comprehensive scrutiny of the Bill's provisions and implications before further consideration.

Statement 3 is incorrect because a Private Member's Bill does not require the President's approval before its introduction. Presidential assent is relevant only after a Bill has been passed by both Houses of Parliament.

79. Solution: (a)

Statement 1 is correct as superconducting qubits require temperatures near absolute zero for stability. Statement 2 is also correct since these qubits achieve a coherence time of 100 microseconds.

Statement 3 is incorrect because Willow does not use photonic states; it uses superconducting qubits.

About Willow Quantum AI:

- Willow is Google's latest quantum processor with 105 physical qubits designed to enhance quantum error correction and scalability.

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- Error Correction Protocols:Employs surface code with data and measurement qubits to detect and mitigate errors without collapsing qubit states.
- Superconducting Qubits:Operates at near absolute zero temperatures (-273.15° C) for maximum stability.
- Improved Coherence Time:Achieves 100 microseconds of coherence time, allowing qubits to hold information longer during computations.
- Leakage Error Management:Includes additional measurement qubits to manage leakage errors effectively.

80. Solution: (c)

During a belly landing, level alignment ensures that the wings remain parallel to the ground, preventing the aircraft from flipping or breaking apart. Other factors, such as deploying landing gear, are not applicable in belly landings.

Technique behind it:

- Level Alignment: The aircraft must touch down with wings absolutely parallel to the ground to avoid flipping or breaking apart.
- Controlled Descent: Speed and angle of descent are carefully managed to minimize impact forces.
- Flap Management: Adjustments to flaps, slats, and other aerodynamic surfaces ensure the plane doesn't stall while approaching at slower speeds.
- Braking Systems: Utilizes aerodynamic drag, thrust reversers, and wheel brakes (if functional) to bring the aircraft to a stop.

81. Solution: (a)

Mission Mausam focuses on modernizing India's weather and climate monitoring infrastructure by deploying advanced radars, satellites, and high-performance computing systems. While it indirectly supports disaster management, the creation of a task force or global treaty is not part of its objectives.

About Mission Mausam:

- What it is: Mission Mausam is a comprehensive program to modernize India's weather and climate monitoring infrastructure, focusing on advanced technologies for atmospheric observations and data analysis.
- Ministry/Department: Ministry of Earth Sciences (MoES) and India Meteorological Department (IMD).
- Aim:
  - To make India a weather-ready and climate-smart nation.
  - To enhance weather forecasting accuracy and support climate change mitigation efforts.
- Key Features
  - Advanced Infrastructure: Deployment of next-generation radars, satellites, and high-performance computing systems for real-time atmospheric monitoring
  - Improved Forecasting: Strengthening weather and climate prediction models with high-resolution data for accurate short and long-term forecasts.
  - Air Quality Monitoring: Enhanced air quality data collection for environmental interventions and weather management strategies.
  - Sectoral Benefits: Direct benefits to agriculture, disaster management, aviation, defence, energy, and health sectors.
  - Vision-2047 Alignment: Complementing the IMD Vision-2047 roadmap for climate adaptation and resilience.

82. Solution: (c)

Diego Garcia is located south of the equator and serves as a U.S. military base and logistics hub. It is uninhabited except for military personnel, and it features a significant coral reef ecosystem.

About Diego Garcia Island:

- Located in: Central Indian Ocean, part of the Chagos Archipelago.
- Controlled by: British Indian Ocean Territory (BIOT), leased to the United States for a military base.
- Features:
  - A coral atoll with a V-shaped cay and an open lagoon at its northern end.
  - Discovered by the Portuguese in the 16th century.
  - Strategic air and naval base for the U.S.
  - Located in the south of the equator.

83. Solution: (b)

The Purulia Observatory's main significance lies in its contribution to global networks for transient

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astronomical observations, such as supernovae and gamma-ray bursts. It does not focus on radio astronomy, satellite tracking, or Earth's magnetosphere.

About Purulia Observatory:

- Established by: S N Bose Centre for Basic Sciences (SNBCBS) under the Department of Science and Technology (DST), India.
- What it is: An advanced astronomical observatory equipped with a 14-inch telescope for scientific observations and training.
- Located in: Panchet Hill, Garpanchkot area, Purulia district, West Bengal, at an elevation of 600 meters.
- Other observatories in India:
  - Aryabhatta Research Institute of Observational Sciences (ARIES) in Nainital, Vainu Bappu Observatory in Tamil Nadu, and IUCAA Observatory in Pune.
- Significance:
  - Fills a critical longitudinal gap (86° E) in global astronomical observation networks.
  - Enables observation of transient astronomical events for international collaboration.
  - Promotes astrophysics research, local ecosystem growth, and student engagement in a backward region.

84. Solution: (b)

Sada landscapes are flat-top plateaus formed due to the erosion and weathering of lateritic soils over centuries. They are not formed by volcanic activity, alluvial deposition, or glacial action.

About Sada:

- What it is: Flat-top plateaus formed by centuries of erosion, locally called sada, meaning a large flat area.
- Located in: Found in the Konkan region of Maharashtra, particularly in Ratnagiri district, between the Arabian Sea and the Western Ghats.
- How they are established: Created due to geological weathering of lateritic soil and erosion processes over centuries.
- Other names: Similar to pathar plateaus, such as the Kaas Plateau in Satara district.
- Geographical features:
  - Rocky terrain with lateritic soil, transforming into lush biodiversity hubs during monsoons.
  - Serve as freshwater catchments due to their unique geology.

85. Solution: (d)

The PKC River Link Project serves multiple purposes, including irrigation, drinking water, and industrial use. It impacts wildlife habitats, particularly in the Ranthambore Tiger Reserve. It is a domestic project involving Rajasthan and Madhya Pradesh, not a transboundary initiative.

About Parbati-Kalisindh-Chambal (PKC) Link Project:

- What it is: An inter-state river-linking project combining the PKC link and Eastern Rajasthan Canal Project (ERCP).
- Launched in: Conceived in 2017 and modified in 2023.
- Aim: To optimize water resources for irrigation, drinking, and industrial use, benefiting people in Rajasthan and Madhya Pradesh.
- Features:
  - Total cost: ₹72,000 crore (90% by the Central Government).
  - Provides 4,100 MCM water to Rajasthan and 3,000 MCM to Madhya Pradesh.
- Rivers involved: Chambal, Parbati, Kalisindh, Banas, and their tributaries.
  - Chambal River:
- Origin: Singar Chouri Peak, Vindhya Mountains, Madhya Pradesh.
- Tributaries: Banas, Kali Sindh, Parbati, Sipra, and Mej Rivers.
  - Parbati River:
- Origin: Vindhya Range, Sehore District, Madhya Pradesh.
- Tributaries: Kuno, Parwan, and Seep Rivers.
  - Kali Sindh River:
- Origin: Bagli, Dewas District, Madhya Pradesh.
- Tributaries: Newaj, Ahu, and Parwan Rivers.

86. Solution: (a)

Ranthambore Tiger Reserve is unique due to the Great Boundary Fault, where the Aravallis and Vindhyas meet. It is not the only reserve located near river systems, it does not have saline lakes, and while it has a significant tiger population, it does not host the largest in India (that distinction belongs to reserves like Corbett).

About Ranthambore Tiger Reserve:

- Location: Situated at the junction of the Aravallis and Vindhyas in Eastern Rajasthan.
- Features:
  - Bounded by the Chambal River in the south and the Banas River in the north.
  - Includes the iconic Ranthambore Fort (UNESCO World Heritage Site).
  - Dominated by tropical dry deciduous and thorn

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forests.
- Flora: Abundance of Dhok trees interspersed with grasslands and lush foliage near water sources.
- Fauna: Hosts tigers, leopards, wild boars, sloth bears, striped hyenas, and rhesus macaques.
- Uniqueness: Known for its 'Great Boundary Fault,' a meeting point of the Vindhyas and Aravalli's.

87. Solution: (c)

The Gaza Truce Deal underscores the growing influence of Middle Eastern nations, particularly Qatar and Egypt, in mediating high-stakes regional conflicts. It does not resolve the Israel-Palestine dispute, nor does it involve foreign force withdrawal or governance restructuring.

About Gaza Truce Deal:

- What it is: A proposed ceasefire agreement to end the prolonged conflict in Gaza, including provisions for a phased truce, hostage release, and further negotiations for lasting peace.
- Nations involved:
  - Primary Parties: Israel and Hamas.
  - Supporting Nations: U.S., Qatar, and Egypt.
- Mediator Nation: Qatar led the mediation efforts, hosting negotiations in Doha with representatives from Israel and Hamas.
- Significance:
  - Humanitarian Impact: Aims to halt the fighting, which has resulted in over 46,000 Palestinian casualties.
  - Political Implications: Could stabilize regional tensions and influence coalition politics in Israel.
  - Global Diplomacy: Marks a critical moment in U.S. diplomacy under outgoing President Biden and incoming President Trump.

88. Solution: (d)

Rat-hole mining is prevalent in Northeast India, not the Western Ghats. It is a manual, unmechanized process and is highly unsustainable due to its environmental and safety issues.

About Rat-hole Mining:

- What it is: Rat-hole mining involves digging narrow tunnels, barely large enough for workers to crawl in, to extract coal seams. It is of two types:
  - Side-cutting mining on hill slopes to follow visible coal seams.
  - Box-cutting mining where deep pits are dug, and horizontal tunnels are made.
- Why it persists in India:
  - Economic Incentives: Workers earn significantly more compared to farm or construction work.
  - Local Control: In Sixth Schedule areas like Meghalaya, landowners also own the minerals, making regulation challenging.
  - Lack of Modern Techniques: High costs and terrain complexities discourage mechanized mining.
  - Poor Governance: Weak enforcement and alleged official complicity allow illegal mining to flourish.
- NGT Ban: Imposed in 2014 to prevent environmental degradation and protect lives.
- Why Northeast India has more rat-hole coal mines:
- Sixth Schedule Land Rights: In states like Meghalaya, tribal communities own land and minerals, making it difficult for government regulations to enforce mining standards effectively.
- Thin Coal Seams: The coal deposits in Northeast India are narrow and shallow, making large-scale mechanized mining economically unviable and favoring primitive rat-hole techniques.
- Challenging Terrain: The hilly and rugged topography of the region restricts the use of modern mining machinery, leading to reliance on manual methods like rat-hole mining.
- High Demand and Local Economy: Rat-hole mining provides quick profits and employment for local communities, driven by demand from nearby industries like cement and thermal power plants.

89. Solution: (b)

The Nag Mk-2 is a third-generation fire-and-forget anti-tank guided missile designed to neutralize armored threats. It is equipped with advanced imaging infrared (IIR) seekers for accuracy. It is not a laser-guided, cruise, or ballistic missile.

About Nag Mk-2 Anti-Tank Guided Missile:

- What it is: Nag Mk-2 is a third-generation, indigenously developed fire-and-forget anti-tank guided missile designed to neutralize modern armoured threats.
- Developed by: The missile was developed by the Defence Research and Development Organisation (DRDO) under India's Integrated Guided Missile Development Programme (IGMDP).

- Key Features:

- Fire-and-Forget Technology: Operators can lock onto targets before launch, ensuring precision strikes in complex battlefield conditions.
- Versatility: Capable of defeating modern armoured threats, including those equipped with Explosive Reactive Armour (ERA).
- Effective Range: Validated performance for both maximum and minimum range during trials.
- Platform Integration: Designed for multiple platforms, including the Nag Missile Carrier (NAMICA) for greater operational flexibility.
- Advanced Guidance Systems: Equipped with advanced imaging infrared (IIR) seekers for improved accuracy in day and night conditions.

90. Solution: (d)

Mission Mausam is a weather and climate monitoring initiative led by the Ministry of Earth Sciences and the

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IMD, not focused on maritime networks, tourism, or a dedicated disaster response unit.

91. Solution: (d)

HMPV belongs to the Pneumoviridae family and does not currently have a specific antiviral treatment, distinguishing it from influenza or RSV.

About Human Metapneumovirus (HMPV):

What is HMPV?

- Human Metapneumovirus (HMPV) is a respiratory virus first identified in 2001, belonging to the Pneumoviridae family. It causes upper and lower respiratory tract infections, typically manifesting symptoms akin to the common cold or flu.

Origin and Discovery:

- HMPV was discovered in the Netherlands in 2001 through genomic sequencing of samples from patients with respiratory infections.

Who is at Risk?

- Children under 5, particularly infants.
- Older adults(65+).
- Immunocompromised individuals and those with chronic respiratory conditions, like asthma.

Symptoms:

- Common:Cough, runny nose, fever, sore throat.
- Severe:Wheezing, shortness of breath, leading to bronchitis or pneumonia.

Mode of Spread:

- Dropletsfrom coughing/sneezing.
- Close contact, including handshakes.
- Contaminated surfaces, followed by touching the face.

Treatment:

- No specific antiviral or vaccine.
- Symptom management: Hydration, rest, Over the Counter (OTC) medicationsfor fever and congestion.
- Severe cases: Hospitalization for oxygen therapy or Intravenous (IV) fluids.

Diagnosis:

- NAATs (Nucleic Acid Amplification Tests)to detect viral genetic material.
- Antigen-based immunoassays for severe cases or outbreaks.

92. Solution: (b)

BAANKNET provides a centralized platform and uses an automated payment gateway. Statement 2 is incorrect because international bidder participation is not explicitly mentioned in its framework.

About 'BAANKNET' Portal:

What is BAANKNET?

- A centralized platform for the e-auction of properties held by PSBs, designed to boost transparency, efficiency, and accessibility.
- Department/Ministry: Managed by the Department of Financial Services (DFS)under the Ministry of Finance.

Objectives:

- Streamline Recovery:Aid PSBs in recovering bad loans and improving balance sheets.
- Unlock Value:Maximize the value of distressed assets and boost investor confidence.
- Ease of Access:Provide a one-stop destination for buyers and investors to explore and bid on properties.

Features:

- Consolidated Listings:Over 122,500 properties, including residential, commercial, industrial, agricultural land, vehicles, and machinery.
- Technology-Driven:Built on microservices architecture with an automated payment gateway and integrated KYC tools.
- End-to-End Processes:Streamlined pre-auction, auction, and post-auction activities.
- Support System:Dedicated helpdesk and call center with callback options.
- Training:DFS-trained PSB executives and debt recovery tribunal (DRT) officers for effective usage.

93. Solution: (d)

The District Magistrate is responsible for issuing identity certificates to transgender persons under the Act.

Procedure for Changing Name and Gender Identity

Court Judgment Highlights:

- Case Reference: X vs State of Karnataka (2024).
- The court upheld the 2019 Actas a special law, directing that the 1969 Registration of Births and Deaths Act must comply with it.
- The Registrar of Births and Deaths Must issue corrected birth certificates based on identity certificates.

Officials Responsible for Changes:

- District Magistrate (DM):Processes applications for identity certificates.
- Registrar of Births and Deaths:Issues revised birth certificates based on identity certificates.

Eligibility Criteria:

- Must identify as transgender and file an affidavit with the DM.
- For revisions post-sex-reassignment surgery, a medical certificate is required from the Chief Medical Officer or Medical Superintendent.

Procedure for Changes:

- Application for Identity Certificate:
  - Submit an affidavit declaring gender identity to the DM.
  - DM issue's identity certificate and transgender identity card within 30 days.
- Revised Identity Certificate (Post-Surgery):

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- Obtain a medical certificate from a recognized authority.
- Apply for revision with the DM, processed within 15 days.

- Updates in Official Documents:
  - Submit a valid identity certificate to authorities for Aadhaar, passport, or birth certificate changes.
  - Changes must be implemented within 15 days of application.

94. Solution: (b)

The LEADS Report evaluates logistics infrastructure, services, and regulatory environments across states/UTs to identify areas for improvement.

About LEADS:

- Full Form:Logistics Ease Across Different States.

Launched In:

- Ministry:Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce and Industry.

Aim:

- Assess logistics infrastructure and services across states/UTs.
- Provide actionable insights for logistics reforms.
- Foster competitive federalism to enhance logistics efficiency.

Parameters:

- Logistics Infrastructure.
- Logistics Services.
- Operating and Regulatory Environment.

Methodology:

- Based on over 7,300 responsesfrom a pan-India survey conducted.
- Includes inputs from 750+ stakeholder consultations and associations.

95. Solution: (c)

Statements 1, 2, and 3 are correct. Statement 4 is incorrect because the Vice Chief and seven Commanders-in-Chief are excluded from the new policy.

About Revamp of Army Promotion Policy:

Old Promotion Policy:

- Procedure:Promotions were primarily based on seniority, date of birth, and vacancy availability.
- Applicability:Applied to Lieutenant Generals for appointments as Commanders-in-Chief (C-in-C).
- Criteria:Officers required at least 18 months of service remaining before retirement.

New Promotion Policy:

Procedure:

- Introduction of a quantified Annual Confidential Report (ACR)system with attributes graded on a 1-9 scale.
- Merit becomes the primary criterion for promotions to apex-level roles.
- Aligns Army practices with the Navy and Air Force, where quantified appraisals for equivalent ranks already exist.

Applicability:

- Applies to Lieutenant Generals(except Vice Chief and seven Commanders-in-Chief of operational and training commands).

Significance:

- Merit-Based Selection:Promotes excellence and accountability among top-ranking officers.
- Uniformity Across Services:Aligns Army practices with Air Force and Navy for tri-Service synergy.
- Preparedness for Theatre Commands:Ensures qualified leadership for integrated commands managing threats from China, Pakistan, and the Indian Ocean Region.
- Transparency and Objectivity:Reduces subjectivity and potential bias in promotions.

96. Solution: (b)

Statements 2 and 4 are correct. The mission focuses on inspiring STEM careers and features student-developed payloads. Statement 1 is incorrect as advanced imaging technologies are not specified. Statement 3 is incorrect as private organizations like Space Kidz India (SKI) and IN-SPACe are key contributors.

About Mission ShakthiSAT:

- What it is:An all-girls lunar mission involving the design, build, and launch of a satellite to lunar orbit, showcasing global talent in space exploration.
- Expected Launch:Scheduled for September 2026, to be launched by ISRO's Polar Satellite Launch Vehicle (PSLV).

Organizations Involved:

- ISRO: Leading the mission.
- Space Kidz India (SKI): Coordinating student participation and payload development.
- IN-SPACe: Facilitating private sector involvement in the project.

Objective:

- Promote gender inclusivity in STEM by empowering young women.
- Inspire global collaboration in space science and technology.
- Conduct scientific experiments in lunar orbit using student-developed payloads.

Features:

- Global Representation:Participation from 12,000 girls across 108 countries.
- Age Criteria:
- African/Latin American countries: Girls aged 14–18 years.
- Other regions: Girls aged 14–16 years.
- Skill Development:Top 108 girls will be trained in

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Chennai to build payloads for the satellite.

97. Solution: (a)

Tranquilizers are typically delivered subcutaneously or intramuscularly using darts powered by CO2 or compressed air. Statement 3 is incorrect because dosage is carefully calibrated based on the animal's weight and species.

About Tranquilizers:

What is a Tranquilizer?

- A chemical agent used to immobilize animals by inducing sedation or unconsciousness through remote injection mechanisms like dart guns.

Tranquilizers in the Past:

Rudimentary Methods:

- Manual Capture:Early methods involved traps, pitfalls, and chasing animals with nets.

Early Chemical Tranquilizers:

- Curare:Derived from tree bark, used by South American tribes for hunting. It paralyzed animals but didn't sedate them.
- Narcotic Bullets (1912):Carried morphine for painless kills but lacked precision in immobilization.
- Mercy Bullets (1928):
- Hypodermic needles with basic sedative chemicals, first introduced by Captain Barnett Harris.
- Often unreliable and lethal in incorrect doses.

How Tranquilizers Work:

- Delivered via dart guns powered by compressed CO2 gas.
- The dart injects the chemical subcutaneously or intramuscularly.
- The tranquilizer acts on the central nervous system, inducing sedationor anesthesia

98. Solution: (a)

HMPV spreads through direct contact and causes severe respiratory infections in children. Statement 3 is incorrect as the virus can survive on surfaces for extended periods, facilitating indirect transmission.

99. Solution: (c)

Statements 1, 3, and 4 are correct. Statement 2 is incorrect because while BAANKNET aids in reducing bad debts, it cannot completely eliminate them.

100. Solution: (c)

Hotan Prefecture includes Aksai Chin, a territory disputed between India and China, making it geopolitically significant.

About Hotan Prefecture:

- What it is: Hotan Prefecture is an administrative division in southwestern Xinjiang, China, and encompasses disputed territories like Aksai Chin.
- Location: Located in the Tarim Basin, it borders Tibet to the south, and Ladakh and Gilgit-Baltistan to the west. The region spans vast deserts and mountainous terrains.

History:

- Aksai Chin became a contentious area during the Sino-Indian War of 1962.
- Administered by China since 1962, Hotan was designated as a prefecture in 1971.

Geographical Features:

- Taklamakan Desert: A vast desert covering the northern part of the prefecture.
- Kunlun Mountains: From the southern border, offering a natural divide from Tibet.
- Oases: Hotan city and other settlements thrive on oases, enabling agriculture and trade.

Demographics: Predominantly Muslim Uyghurs inhabit the prefecture, living in oases between the Taklamakan Desert and Kunlun Mountains.