

Solutions

DATE : 13th Jan- 18th Jan

1) Correct Answer: a) 1, 2, and 4 only

Explanation:

1. **Roles of the Pay Commission:**

- **Review Salaries:** Evaluates and revises salary structures for **central government employees**.
- **Pension Recommendations:** Suggests revisions to pensions, ensuring equitable support for **retired employees**.
- **Financial Sustainability:** Proposes reforms to ensure **fiscal prudence** in salary expenditures.

2. **Why Statement 3 is Incorrect:**

- Addressing **wage disparities between central and state employees** is not under the Pay Commission's jurisdiction. States have their own mechanisms for salary reviews.

3. **Significance:**

- Ensures **fair compensation** and enhances the efficiency of governance while maintaining **economic sustainability**.

2) Correct Answer: c) To enhance awareness of India's military history and valor

Explanation:

1. **Aim of Bharat Ranbhoomi Darshan:**

- Promotes **battlefield tourism** to commemorate India's **military history and valor**.
- Focuses on significant historical locations like **Galwan Valley, Nathu La Pass, and Longewala**.

2. **Features:**

- **Virtual Tours:** Offers **interactive experiences** of battlefields.
- **Travel Guidance:** Provides information on **permits and travel arrangements** for tourists.
- **Tourism Integration:** Part of the **Incredible India campaign**, attracting domestic and international tourists.

3. **Impact:**

- Enhances **public understanding of military history**.
- Drives **socio-economic development** in border regions.

3) Correct Answer: d) Statement-I is incorrect, but Statement-II is correct

Explanation:

1. **Why Statement-I is Incorrect:**

- India is the **fourth nation** to achieve satellite docking, following **USA, Russia, and China**. It is not the first nation.
- Previous docking feats include the **Gemini program (USA)** and **Soyuz missions (Russia)**.

2. **Why Statement-II is Correct:**

- SpaDeX supports future missions like **human spaceflight, satellite servicing, and space station assembly**.
- Demonstrates the **transfer of power and control** between docked satellites, essential for **long-term space missions**.

3. **Significance of SpaDeX:**

- Marks a milestone in **India's space technology** development.
- Boosts capabilities for **interplanetary missions** and future **Gaganyaan** missions.

4) Correct Answer: c) Persistent organic pollutant that bioaccumulates in the food chain

Explanation:

1. **Environmental Impact of DDT:**

- **Persistent Pollutant:** DDT remains in the environment for decades, leading to **long-term contamination**.
- **Bioaccumulation:** It is **fat-soluble**, accumulating in higher organisms and entering the **food chain**.

2. **Incorrect Options:**

- **Rapid Degradation (a):** DDT does not degrade quickly; it persists in the environment.
- **High Water Solubility (b):** DDT is not highly water-soluble, limiting its direct contamination of water bodies.
- **Short-lived Effects (d):** DDT's impacts are long-lasting and cause significant ecological harm.

3. **Reason for the Ban:**

- Banned globally due to its **ecological toxicity**, effect on **soil fertility**, and adverse impacts on **human health**.

5) Correct Answer: b) To enhance immigration clearance through automated e-gates for faster processing

Explanation:

1. **Aim of FTI-TTP:**

- Facilitates **faster and secure immigration clearance** by deploying **automated e-gates**.

- Uses **biometric authentication** to streamline international travel processes.
- 2. **Key Features:**
 - **Automated e-Gates:** Allows passengers to complete immigration without manual intervention.
 - **Biometric Authentication:** Ensures **secure and accurate identification**.
 - **Online Registration:** Passengers register through an online portal, uploading required documents.
- 3. **Significance:**
 - Reduces **wait times** and enhances passenger experience.
 - Strengthens **national security** by improving immigration monitoring.

6) **Correct Answer:** b) Only two

Explanation:

1. **Correct Statements:**
 - **Backup for Second Launch Pad:** TLP acts as a standby for the **Second Launch Pad (SLP)** to ensure operational continuity.
 - **Supports NGLVs and Human Missions:** Designed to launch **Next-Generation Launch Vehicles (NGLVs)** and **human spaceflight missions** like Gaganyaan.
2. **Incorrect Statement:**
 - TLP is not used for **satellite docking experiments**, as these are conducted using **dedicated satellite modules**.
3. **Significance of TLP:**
 - Enhances India's **space launch capacity** for the next 25–30 years.
 - Provides infrastructure for **advanced and larger payloads**.

7) **Correct Answer:** c) Anaimalai Hills

Explanation:

1. **Origin of Bharathapuzha River:**
 - The river originates from the **Anaimalai Hills**, Tamil Nadu, and flows westward through the **Palakkad Gap** in the Western Ghats.
2. **Features:**
 - Flows through **Kerala and Tamil Nadu**, supporting agriculture and biodiversity.
 - Major tributaries include **Kannadipuzha, Kalpathipuzha, and Gayathripuzha**.
3. **Significance:**
 - The **Malampuzha Dam**, built on the river, is Kerala's **largest reservoir**, serving irrigation and hydroelectric needs.

8) **Correct Answer:** a) a-2, b-3, c-1, d-4

Explanation:

1. **Correct Matches:**
 - **Longewala (a):** Site of the **Indo-Pak War (1971)**.
 - **Nathu La Pass (b):** Strategic pass connecting **Sikkim and Tibet**.
 - **Galwan Valley (c):** Site of the **2020 India-China clash**.
 - **Doklam (d):** Tri-junction between **India, Bhutan, and China**.
2. **Significance:**
 - Highlights India's **strategic locations** and historical battlefields, promoting awareness of **geopolitical history**.

9) **Correct Answer:** d) None

Explanation:

1. **India's Ranking:**
 - India ranked **25th overall**, not in the top 10.
 - India's **strongest category** was **Future of Work**, where it ranked **2nd globally**.
2. **Focus of Index:**
 - Evaluates both **technical skills** (AI, robotics) and **non-technical skills** (problem-solving, sustainability).
 - Measures how countries prepare their workforce for evolving job markets.
3. **Significance:**
 - Recognizes India's **progress** in tech readiness and highlights areas needing improvement, like **sustainability-oriented innovation**.

10) **Correct Answer:** b) Only two

Explanation:

1. **Correct Statements:**
 - **Fat-Soluble (1):** DDT bioaccumulates in higher organisms, causing **ecological harm**.
 - **Degradation (3):** DDT takes **decades to degrade**, leading to long-term contamination.
2. **Incorrect Statement:**
 - **Soil Fertility (2):** DDT was primarily banned due to its **ecological and health impacts**, not specifically for harming soil fertility.
3. **Environmental Impact:**
 - A **persistent organic pollutant** that affects ecosystems and public health, necessitating its global ban.

11) Correct Answer: b) Only two

Explanation:

- **Statement 1 (Incorrect):** The U.S. Entity List is not restricted to nuclear or defense technologies; it applies to a wide range of sectors such as AI, semiconductors, and advanced computing.
- **Statement 2 (Correct):** Entities are added for activities counter to U.S. foreign policy or national security interests.
- **Statement 3 (Incorrect):** Inclusion in the list is determined by the **Bureau of Industry and Security (BIS)** administratively, without requiring congressional approval.

Entity List Key Points:

- Published under the **Export Administration Regulations (EAR)**.
- Imposes licensing requirements for export or transfer of U.S. goods and technologies.
- Removal of Indian nuclear entities like BARC, IGCAR, and IRE has strengthened Indo-U.S. cooperation.

12) Correct Answer: d) None

Explanation:

- **Statement 1 (Incorrect):** The agreement did not allow unrestricted movement of goods and people across the border.
- **Statement 2 (Incorrect):** It did not mandate fencing along the border.
- **Statement 3 (Incorrect):** The **Tin Bigha Corridor** issue was resolved in 2011, not under the 1975 agreement.

1975 Indo-Bangladesh Joint Agreement Highlights:

- Focused on peaceful border management and bilateral dispute resolution.
- Prohibited constructing defense structures within **150 yards** of the border.
- Aimed to tackle issues like smuggling and illegal immigration through bilateral discussions.

13) Correct Answer: b) Only two

Explanation:

- **Statement 1 (Incorrect):** INS Vaghsheer is not equipped with **Air Independent Propulsion (AIP)** from inception; this is planned for future upgrades.
- **Statements 2 & 3 (Correct):** INS Vaghsheer enhances India's underwater combat capabilities and is the **final submarine under Project 75**.

INS Vaghsheer Key Features:

- A **diesel-electric submarine** (Kalvari-class) built under **Project 75**.
- Equipped with **wire-guided torpedoes**, anti-ship missiles, and sonar systems.
- Strengthens India's **maritime defense and intelligence capabilities**.

14) Correct Answer: c) Compensation paid by the offender to the victim or their family in cases of unintentional or intentional homicide.

Explanation:

- **Blood Money (Diya)** is a Sharia law provision where perpetrators compensate victims or their families for loss in cases of unintentional or intentional homicide.

Key Features of Blood Money:

- Promotes reconciliation between the offender and the victim's family.
- The amount is influenced by factors like **gender, religion**, and local customs.
- Even if diya is accepted, states can impose additional penalties for maintaining public order.

15) Correct Answer: a) To showcase the capabilities of private-sector companies in lunar exploration.

Explanation:

The **One Rocket, Two Missions** initiative highlights private-sector involvement in space exploration by launching two lunar missions on a single rocket.

Key Details:

- **Blue Ghost (NASA):** Carries scientific instruments to study the Moon's thermal and structural properties.
- **Resilience (ispace, Japan):** Aims to investigate the Moon's far north using innovative rover technology.
- Demonstrates **cost-effective collaboration** between private companies and governments.

16) Correct Answer: c) To test plant growth under extraterrestrial atmospheric conditions.

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Explanation:

The experiment aboard ISRO's **Compact Research Module for Orbital Plant Studies (CROPS)** studied plant growth in microgravity.

Key Points:

- **Lobia Seeds** were chosen for their adaptability and nutritional value.
- Aims to develop **sustainable food systems** for long-term space missions.
- Supports astronauts by enabling **food growth** and **oxygen generation** in space.

17) Correct Answer: a) To control the diffusion of advanced AI capabilities to adversarial nations.

Explanation:

The U.S. AI Export Rule regulates advanced AI technologies like **GPUs** to safeguard national security.

Key Details:

- **Tier 1 Countries:** Close U.S. allies with minimal restrictions (e.g., Japan, South Korea).
- **Tier 2 Countries (e.g., India):** Limited exports with caps on technology usage.
- **Tier 3 Countries (e.g., China):** Nearly total prohibition of U.S. AI exports.

18) Correct Answer: b) Government-owned wasteland allotted for cultivation or productive use.

Explanation:

Nautor Land refers to government wasteland allotted to individuals for agricultural or productive use.

Key Features:

- Originated in **Jammu and Kashmir** under Hari Singh's rule in 1932.
- Prominent in **hilly and remote areas** like Himachal Pradesh and Ladakh.
- Legalizes land use for locals, preserving their livelihoods.

19) Correct Answer: d) None

Explanation:

- **Statement 1 (Incorrect):** The experiment used controlled atmospheric conditions, not a fully automated hydroponic system.
- **Statement 2 (Incorrect):** Lobia was chosen for its adaptability, not its short lifecycle.
- **Statement 3 (Incorrect):** Controlled light was used, not complete absence of sunlight.

20) Correct Answer: a) To establish guidelines for maintaining peace and cooperation along the border.

Explanation:

The 1975 Indo-Bangladesh Joint Agreement aimed to maintain **peaceful border relations** and manage disputes.

Key Features:

- Prohibited **defense structures** near the border.
- Encouraged **bilateral discussions** for resolving issues like smuggling and illegal movement.

21) Correct Answer: b) Only two

Explanation:

- **India dominates** the global turmeric market with over 60% export share.
- The **USA is the largest importer** of Indian turmeric.
- However, **India imports turmeric**, particularly in dry form from Vietnam and Indonesia, for value addition.

22) Correct Answer: a) 1 and 2 only

Explanation:

- Pixxel's private satellite constellation is designed for **hyperspectral imaging** to support **resource management** and **precision agriculture**.
- It does not use **synthetic aperture radar (SAR)** or focus on military surveillance.

23) Correct Answer: b) Only two

Explanation:

- The **Secretary of the Department of Atomic Energy** is the Chairperson of the AEC.
- It includes **eminent scientists** and key ex-officio members.
- The **Prime Minister is not the ex-officio President** of the AEC.

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24) **Correct Answer:** a) 1 and 2 only

Explanation:

- Armed Forces Veterans Day strengthens the bond between veterans and serving personnel.
- It promotes the **integration of veterans into civilian roles**.
- It does not commemorate a war memorial inauguration.

25) **Correct Answer:** c) Only three

Explanation:

- The **IMD issues disaster warnings**, conducts **climate research**, and operates **Doppler Weather Radars**.
- **Earthquake monitoring is managed by the National Center for Seismology**, not the IMD.

26) **Correct Answer:** a) Treaty on the Non-Proliferation of Nuclear Weapons (NPT)

Explanation:

- India has not signed the **NPT** due to its discriminatory nature.
- India is a part of the **Convention on Nuclear Safety (CNS)**, the **Joint Convention on Spent Fuel Management**, and the **Vienna Convention on Civil Liability for Nuclear Damage**.

27) **Correct Answer:** d) Caspian Sea

Explanation:

- The **Kumani Bank mud volcano** erupted off the eastern coast of Azerbaijan in the **Caspian Sea**, forming a temporary landmass known as a "Ghost Island."

28) **Correct Answer:** c) Promoting research on turmeric-based nutraceuticals

Explanation:

- The **National Turmeric Board** emphasizes research into turmeric's **medicinal and nutraceutical properties**, differentiating it from other commodity boards.

29) **Correct Answer:** d) 1 and 3 only

Explanation:

- IMD operates under the **Ministry of Earth Sciences** and provides **real-time weather data** to aviation and shipping.
- **Satellite-based data collection** is also managed by ISRO, in collaboration with IMD.

30) **Correct Answer:** b) Only two

Explanation:

- The AEC promotes **research in nuclear science for peaceful purposes** and oversees **nuclear power plant development**.
- However, the regulation of **nuclear waste disposal** is handled by the **Atomic Energy Regulatory Board (AERB)**.

31) **Correct Answer:** b) Preservation of ancient maritime trade routes

Explanation:

- **Mission Mausam** aims to reconnect and reestablish India's historic cultural and trade links with countries in the **Indian Ocean Region**.
- It focuses on **reviving ancient maritime networks** to promote regional cooperation and understanding.
- **Led by:** Ministry of Culture, in collaboration with Archaeological Survey of India (ASI).
- **Objective:** Enhancing cultural exchange, archaeological research, and heritage preservation linked to maritime trade routes.

32) **Correct Answer:** c) 1, 2, 3, and 4

Explanation:

- **Location:** South of the equator in the **Indian Ocean**, part of the **Chagos Archipelago**.
- **Controlled By:** British Indian Ocean Territory, leased to the United States.
- **Key Features:**
 - **Military Significance:** Refueling and logistics hub for **U.S. naval operations**.
 - **Coral Reef:** Home to one of the largest coral reefs globally, contributing to rich biodiversity.
 - **Uninhabited:** Inhabited only by **military personnel** and contractors.

33) **Correct Answer:** b) It helps integrate India into global networks for transient astronomical observations.

Explanation:

- **Location:** Purulia district, West Bengal.
- **Purpose:** Focuses on **transient astronomical phenomena**, such as supernovae and gamma-ray bursts.
- **Significance:**
 - Fills a **longitudinal gap** in global observation networks.

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- Strengthens international collaborations in astrophysical research.
- Promotes **scientific outreach** in a backward region.

34) **Correct Answer:** b) Erosion and weathering of lateritic soils over centuries

Explanation:

- **Sada Landscapes:** Flat-top plateaus formed due to **erosion** and **weathering** of **lateritic soils**.
- **Location:** Found in the **Konkan region**, particularly in **Ratnagiri**, Maharashtra.
- **Features:**
 - Rocky terrain with unique **biodiversity during monsoons**.
 - Important as **freshwater catchments**.

35) **Correct Answer:** d) None

Explanation:

- The **Parbati-Kalisindh-Chambal (PKC) River Link Project** involves multiple objectives:
 - **Irrigation**, drinking water, and industrial use.
 - Impacts **wildlife habitats** (e.g., Ranthambore Tiger Reserve).
 - It is a **domestic project** involving **Rajasthan** and **Madhya Pradesh**, not a transboundary initiative.
- **Rivers Involved:** Chambal, Parbati, and Kalisindh.

36) **Correct Answer:** a) It contains the Great Boundary Fault, where the Aravalis meet the Vindhyas.

Explanation:

- **Location:** Eastern Rajasthan.
- **Key Feature:**
 - **Great Boundary Fault:** Geological meeting point of the **Aravalis** and **Vindhyas**.
 - Includes the **Ranthambore Fort**, a **UNESCO World Heritage Site**.
- **Biodiversity:** Hosts tigers, leopards, sloth bears, and wild boars.

37) **Correct Answer:** c) It highlights the shifting role of Middle Eastern nations in global diplomacy.

Explanation:

- **Significance:**
 - Demonstrates the **diplomatic influence** of nations like **Qatar** and **Egypt** in mediating conflicts.
 - Aims to stabilize the region and support humanitarian relief.
- **Parties Involved:** Israel, Hamas, U.S., and Middle Eastern mediators.

38) **Correct Answer:** d) None

Explanation:

- **Rat-hole mining** is primarily conducted in **Northeast India** (e.g., Meghalaya), not in the **Western Ghats**.
- **Manual Process:** Involves narrow tunnels, unmechanized methods, and poor safety standards.
- **Environmental and Safety Issues:** Highly unsustainable due to **land degradation** and health risks.

39) **Correct Answer:** b) A fire-and-forget anti-tank guided missile with advanced imaging systems

Explanation:

- **Developed By:** DRDO.
- **Features:**
 - **Fire-and-Forget Technology:** Precision strikes without operator intervention.
 - Equipped with **Imaging Infrared (IIR) seekers** for high accuracy.
 - Effective against **Explosive Reactive Armor (ERA)**.

40) **Correct Answer:** a) Only one

Explanation:

- **Mission Mausam** focuses on reviving ancient maritime networks in the **Indian Ocean Region**.
- **Led By:** Ministry of Culture.
- **Objective:** Promote cultural and historical connections, not disaster management or tourism.

41) **Correct Answer:** d) Oxygen-blocking chemical coating

Explanation:

- **Composition:** Contains **ammonium polyphosphate**, which forms a coating on vegetation to **block oxygen**, reducing combustion.
- **Functionality:** Stays longer than water, making it highly effective.
- **Application:** Sprayed via **planes or helicopters** to create fire lines.

Key Features:

1. **Visibility:** Pink dye enhances application accuracy.
2. **Durability:** Long-lasting and reduces reliance on water-based solutions.

Concerns:

- **Environmental Impact:** Contains **toxic metals** (e.g., cadmium), harmful to ecosystems.
- **Health Risks:** Prolonged exposure can cause **kidney and liver diseases**.

42) Correct Answer: a) Only one

Explanation:

- **Correct Statements:**
 1. **Denotification** occurred after the **Criminal Tribes Act, 1871**, was repealed in 1952.
 2. The **Idate Commission** recommended a sub-quota for DNTs within SC/ST/OBC.
- **Incorrect Statement:**
 - Not all DNTs fall under **ST**; they are also classified as **SC, OBC**, or unclassified.

Key Features of DNTs:

- **Historical Background:** Labeled as “criminal tribes” during British rule.
- **Communities Affected:** 1,526 communities, with **269 uncategorized**.
- **Commission Recommendations:**
 - Permanent DNT Commission.
 - Sub-quota under SC/ST/OBC.

43) Correct Answer: c) Only three

Explanation:

- **Correct Statements:**
 1. Facilitates **global collaboration** to address data gaps.
 2. Operates under **ECOSOC** via the UN Statistical Commission.
 3. Develops methodologies to integrate **big data** into national statistics.
- **Incorrect Statement:**
 - Does not directly **fund projects**.

Functions:

- **Standardization:** Develops global standards for big data use.
- **Collaboration:** Encourages partnerships for data sharing.
- **Sustainable Development Goals (SDGs):** Aims to monitor SDG progress.

44) Correct Answer: d) Lower computational requirements and better scalability

Explanation:

- **Features of SLMs:**
 - **Compact Size:** Trained on fewer parameters than **LLMs**.
 - **Efficiency:** Cost-effective and deployable on **edge devices** (e.g., smartphones).
- **Comparison with LLMs:**
 - SLMs excel in **localized tasks** but lack the multi-tasking capabilities of LLMs.

Significance:

- **Accessibility:** Enhances AI access in regions with limited resources.
- **Energy Efficiency:** Reduces resource consumption.

45) Correct Answer: b) Only two

Explanation:

- **Correct Statements:**
 1. Home to **India's only ape**, the Hoolock Gibbon.
 2. Hosts **nocturnal primates** like the Bengal Slow Loris.
- **Incorrect Statement:**
 - It is located along the **Bhogdoi River**, not the Brahmaputra.

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Features:

- **Location:** Jorhat District, Assam.
- **Habitat:** Evergreen forests with semi-hydrophytic plants.
- **Fauna:** Tigers, leopards, jungle cats, and multiple macaque species.

46) Correct Answer: a) Only one

Explanation:

- **Correct Statement:**
 - Equipped with **advanced avionics** like glass cockpit systems.
- **Incorrect Statements:**
 - Primarily used for **utility roles**, not attack operations.
 - Automated targeting system is exclusive to the **Mk-IV variant**.

Features:

- **Variants:** Mk-I, Mk-II (utility), Mk-III (advanced avionics), and Mk-IV (armed).
- **Capabilities:** High-altitude operations, rescue missions, and anti-submarine warfare.

47) Correct Answer: c) Only three

Explanation:

- **Correct Statements:**
 1. Reduces **carcinogenic contamination** in water.
 2. Prevents **microplastic release**.
 3. Supports **biotechnological innovations**.
- **Incorrect Statement:**
 - Does not eliminate all harmful by-products; some intermediates remain.

Significance:

- **Sustainability:** A breakthrough in reducing plastic pollution.
- **Applications:** Large-scale enzyme production for waste management.

48) Correct Answer: b) Alignment of the Sun, Moon, and Jupiter in specific zodiac signs

Explanation:

- **Astrological Basis:**
 - Occurs when celestial bodies align in **Kumbha Rashi (Aquarius)**.

Key Points:

- **Spiritual Importance:** Believed to cleanse sins and grant **moksha**.
- **Cultural Impact:** Attracts millions, making it the **largest gathering of humanity**.

49) Correct Answer: c) Only three

Explanation:

- **Correct Statements:**
 1. Fluoride causes **skeletal fluorosis**.
 2. Nitrate contamination leads to **algal blooms**.
 3. Arsenic causes **kidney damage and skin lesions**.
- **Incorrect Statement:**
 - Uranium contamination arises from **natural leaching**, not urban wastewater.

Impacts:

- **Health:** Chronic illnesses and increased healthcare costs.
- **Environment:** Eutrophication harms aquatic ecosystems.

50) Correct Answer: b) Only two

Explanation:

- **Correct Statements:**
 1. Aims to reduce reliance on **imported renewable technologies**.
 2. Aligns with **Nationally Determined Contributions (NDCs)** under the Paris Agreement.
- **Incorrect Statement:**

- Does not provide direct **financial incentives** but focuses on innovation and scalability.

Significance:

- **Sustainability:** Supports India's **500 GW renewable energy target** by 2030.
- **Global Competitiveness:** Positions India as a leader in **cleantech manufacturing**.



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