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1) With reference to Poliomyelitis (Polio), consider the following statements:

1. The disease mainly spreads through respiratory droplets in densely populated urban areas.
2. The Inactivated Polio Vaccine (IPV) provides stronger intestinal immunity than the Oral Polio Vaccine (OPV).
3. The World Health Organization (WHO) generally certifies a country as polio-free after three consecutive years without any new reported case.

How many of the above statements are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

Answer: (a)

Explanation:

Polio is a highly infectious viral disease that primarily affects the nervous system and can lead to irreversible paralysis in severe cases.

Statement 1 is incorrect. The principal mode of transmission is the faecal-oral route through contaminated food or water. The virus multiplies in the intestine before spreading within the body.

Statement 2 is incorrect. The Oral Polio Vaccine (OPV) provides strong intestinal immunity, making it highly effective in interrupting person-to-person transmission. In contrast, the Inactivated Polio Vaccine (IPV) mainly provides systemic immunity in the bloodstream and offers comparatively weaker intestinal protection.

Statement 3 is correct. According to WHO norms, a country is declared polio-free after recording zero indigenous cases for a continuous period of three years under effective surveillance. India reported its last wild polio case in 2011 and received polio-free certification in 2014.

Although global eradication efforts under the Global Polio Eradication Initiative (GPEI) have reduced cases drastically, the disease remains endemic in Pakistan and Afghanistan, requiring continuous vigilance and vaccination coverage worldwide.

2) Consider the following statements regarding the Indo-Tibetan Border Police (ITBP):

1. The ITBP is a Central Armed Police Force specializing in high-altitude warfare and survival under sub-zero climatic conditions.
2. The force operates administratively under the Ministry of Defence while remaining operationally under the Ministry of Home Affairs.
3. The ITBPF Act, 1992 granted the force an independent statutory framework.

How many of the above statements are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

Answer: (b)

Explanation:

The Indo-Tibetan Border Police (ITBP) is one of India's specialized Central Armed Police Forces tasked with guarding the Himalayan frontier.

Statement 1 is correct. ITBP personnel, known as "Himveers," are specially trained for high-altitude combat, mountain rescue operations, and survival in extreme climatic conditions reaching elevations above 18,000 feet.

Statement 2 is incorrect. The ITBP functions entirely under the Ministry of Home Affairs (MHA) for both administrative and operational purposes. It is not controlled by the Ministry of Defence.

Statement 3 is correct. Although the force was initially raised under the CRPF framework after the 1962 Sino-Indian conflict, it later received an independent legal identity through the ITBPF Act of 1992.

The ITBP's responsibilities extend beyond border guarding to disaster response, internal security assistance, and mountaineering rescue operations along the Indo-China frontier.

3) Consider the following statements regarding the UNESCO International Convention against Doping in Sport:

Statement-I: The Convention is a legally binding international treaty that requires member states to align domestic policies with the World Anti-Doping Code.

Statement-II: The Convention provides governments with a legal framework to implement anti-doping measures because the WADA Code itself directly applies only to sports bodies and athletes, not sovereign governments.

Which one of the following is correct in respect of the above statements?

- (a) Both Statement-I and Statement-II are correct and Statement-II is the correct explanation for Statement-I
- (b) Both Statement-I and Statement-II are correct but Statement-II is not the correct explanation for Statement-I
- (c) Statement-I is correct but Statement-II is incorrect
- (d) Statement-I is incorrect but Statement-II is correct

Answer: (a)

Explanation:

The UNESCO International Convention against Doping in Sport, adopted in 2005, is a legally binding treaty aimed at harmonizing anti-doping efforts globally.

Statement-I is correct. By ratifying the Convention, governments commit themselves to implementing measures consistent with the World Anti-Doping Agency (WADA) Code, including legislation, testing frameworks, and educational initiatives.

Statement-II is also correct and directly explains Statement-I. The WADA Code primarily governs sports organizations, federations, and athletes under private sporting regulations. Since it does not automatically bind sovereign governments, the UNESCO Convention serves as the legal bridge enabling states to enforce anti-doping standards through national law.

The Convention has emerged as one of UNESCO's most widely accepted legal instruments and continues to evolve in response to emerging challenges such as gene doping and technological manipulation in sports.

- 4) Which one of the following best describes the "23for23" initiative launched by the Government of India?
- (a) A mission to achieve carbon neutrality in 23 Himalayan districts by 2030
 - (b) A strategy to increase India's forest cover to 23% through local participation
 - (c) A nationwide public awareness campaign focused on snow leopard conservation
 - (d) A multilateral agreement among 23 countries for the protection of migratory birds

Answer: (c)

Explanation:

The "#23for23" initiative was launched by the Ministry of Environment, Forest and Climate Change (MoEFCC) in connection with International Snow Leopard Day observed on October 23.

The campaign aims to increase public awareness and citizen participation in snow leopard conservation and Himalayan ecosystem protection. Unlike traditional conservation approaches focused solely on state agencies, the initiative seeks to involve communities, students, and the general public in understanding the ecological significance of snow leopards.

The initiative also complements the broader objectives of the Global Snow Leopard and Ecosystem Protection Programme (GSLEP), emphasizing the relationship between mountain biodiversity, water security, and local livelihoods.

The campaign additionally highlighted findings from India's first National Snow Leopard Census, which estimated a population of 718 snow leopards across the Indian Himalayan region.

- 5) Consider the following statements regarding Pilot Whales (Globicephala):
- 1. They are classified as "Endangered" under the IUCN Red List because of frequent mass strandings.
 - 2. They display a matrilineal social structure in which males often remain within their mother's pod throughout life.
 - 3. They are distributed across multiple oceanic regions, including parts of the Indian Ocean near India.

How many of the above statements are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

Answer: (b)

Explanation:

Pilot whales are highly social marine mammals belonging to the dolphin family (Delphinidae).

Statement 1 is incorrect. Despite recurring mass stranding events, pilot whales are presently categorized as “Least Concern” on the IUCN Red List due to their relatively stable global population.

Statement 2 is correct. Pilot whales exhibit a rare matrilineal social system where strong family bonds persist throughout life, including adult males remaining within maternal pods.

Statement 3 is correct. Pilot whales occur in several oceanic regions worldwide. Short-finned pilot whales inhabit warm and tropical waters, including the Indian Ocean.

These whales are deep divers specializing in squid hunting and are protected under international agreements such as CITES and the Convention on Migratory Species (CMS).

6) Which of the following migratory species are covered under the Central Asian Mammals Initiative (CAMI)?

- 1. Saiga Antelope
- 2. Persian Leopard
- 3. Bukhara Deer
- 4. Asiatic Lion

Select the correct answer using the code given below:

- (a) 1 and 3 only
- (b) 2, 3 and 4 only
- (c) 1, 2 and 3 only
- (d) 1, 2, 3 and 4

Answer: (c)

Explanation:

The Central Asian Mammals Initiative (CAMI), functioning under the Convention on Migratory Species (CMS), focuses on the conservation of migratory mammals inhabiting Central Asia.

Statements 1, 2, and 3 are correct. Species covered under CAMI include the Saiga Antelope, Persian Leopard, and Bukhara Deer, among others such as the Snow Leopard and Wild Camel.

Statement 4 is incorrect. The Asiatic Lion is confined primarily to Gujarat's Gir landscape in India and is not considered part of the migratory Central Asian ecosystems addressed by CAMI.

The initiative aims to protect ecological corridors and transboundary habitats necessary for long-distance migration and survival of these species.

7) In the context of quantum computing and the "Willow" processor, the term "Quantum Advantage" refers to:

- (a) The capability of quantum computers to function efficiently without cryogenic cooling systems
- (b) The integration of quantum hardware with conventional cloud infrastructure for data management
- (c) The creation of algorithms capable of solving all mathematical problems irrespective of complexity
- (d) A stage where a quantum computer performs a particular computational task significantly faster than the best known classical supercomputer

Answer: (d)

Explanation:

Quantum Advantage refers to a milestone in quantum computing where a quantum processor can solve a specific problem much faster than the most advanced classical supercomputers.

It does not imply that quantum computers outperform classical systems in every domain. Instead, it demonstrates superiority for particular categories of computational problems that are extremely difficult for conventional computing architectures.

The "Willow" processor achieved this by executing complex quantum interference calculations through specialized quantum algorithms far more efficiently than classical systems.

This milestone is considered a major step toward fault-tolerant quantum computing, which could eventually transform fields such as cryptography, material science, and pharmaceutical research.

8) Which one of the following best explains the functioning of the Intrusion Detection System (IDS) implemented by the Northeast Frontier Railway?

- (a) It employs satellite-based thermal imaging to detect the body heat of wild animals near railway tracks
- (b) It uses acoustic deterrent systems that emit sound waves to prevent elephants from approaching railway lines
- (c) It deploys drones equipped with LIDAR sensors to generate real-time three-dimensional maps of elephant corridors
- (d) It uses vibration-sensitive optical fiber cables to detect animal movement through seismic disturbances in the ground

Answer: (d)

Explanation:

The Intrusion Detection System (IDS) implemented by the Northeast Frontier Railway is an innovative wildlife protection mechanism designed to prevent train-elephant collisions.

The system utilizes optical fiber cables laid along railway tracks. When large animals such as elephants move nearby, their footsteps generate vibrations in the ground. These disturbances create micro-bends in the optical fiber cables, altering the transmission of light signals.

Artificial intelligence-based software analyzes these signal changes in real time and distinguishes elephant movement from other disturbances such as weather or vehicular activity.

Upon detecting possible animal intrusion, the system immediately alerts station authorities and train drivers, enabling trains to slow down or halt before entering the affected zone.

This proactive technology is particularly significant in the ecologically sensitive elephant corridors of Northeast India, where railway accidents pose a major threat to wildlife conservation.

9) With reference to the United Nations Conference on Trade and Development (UNCTAD), consider the following statements:

1. It is a permanent intergovernmental body of the United Nations established to facilitate the integration of developing countries into the global economy.
2. It serves as the principal international institution responsible for resolving trade disputes among nations under international trade law.

3. It offers technical assistance to developing countries in areas such as sovereign debt management and investment policy formulation.

How many of the above statements are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

Answer: (b)

Explanation:

The United Nations Conference on Trade and Development (UNCTAD), established in 1964, is an important institution within the UN system that focuses on the relationship between trade, finance, investment, and sustainable development.

Statement 1 is correct. UNCTAD was created to support developing countries in integrating more effectively into the global economy and addressing challenges arising from globalization and unequal economic structures.

Statement 2 is incorrect. UNCTAD does not possess any adjudicatory authority over international trade disputes. The responsibility for resolving trade disputes lies with the Dispute Settlement Mechanism of the World Trade Organization.

Statement 3 is correct. UNCTAD provides technical cooperation and policy assistance to developing nations in areas such as debt management, financial analysis, digital economy, and investment policy. One of its major initiatives is the Debt Management and Financial Analysis System (DMFAS), which assists countries in managing sovereign debt more effectively.

Unlike the WTO, UNCTAD primarily functions as a policy research body, consensus-building forum, and technical assistance agency. Its work strongly supports the Financing for Development agenda and the Sustainable Development Goals (SDGs), particularly for countries of the Global South.

10) Consider the following statements regarding the Holocene Period:

1. It is the geological epoch that existed before the emergence of agriculture and settled human societies.
2. The period is marked by the large-scale expansion of continental ice sheets across the Northern Hemisphere.

Which of the above statements are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Answer: (d)

Explanation:

The Holocene is the current geological epoch that began approximately 11,700 years ago after the end of the last Ice Age.

Statement 1 is incorrect. The Holocene coincides with the rise of agriculture, domestication of animals, and the establishment of permanent human settlements. Rather than preceding agriculture, it provided the stable climatic conditions necessary for farming civilizations to flourish.

Statement 2 is incorrect. The Holocene is characterized by post-glacial warming and the retreat of major ice sheets. The large-scale expansion of glaciers and continental ice sheets occurred during the preceding Pleistocene Epoch.

The relatively stable climate of the Holocene enabled the development of complex societies, urbanization, and advanced human civilizations. Fossil discoveries from this epoch are crucial for reconstructing ancient ecosystems and understanding environmental changes during the Quaternary period.

11) Regarding Printed Circuit Boards (PCBs), consider the following statements:

1. PCBs use conductive pathways etched from copper layers to establish electrical connections among components.
2. Copper foil generally constitutes a major share of the raw material cost in PCB manufacturing.
3. Polyphenylene ether (PPE) resin is an important substrate material used for maintaining signal integrity in high-speed electronic systems.

Which of the above statements are correct?

- (a) 1 and 2 only
- (b) 1 and 3 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

Answer: (d)

Explanation:

Printed Circuit Boards (PCBs) form the structural and electrical foundation of modern electronic devices.

Statement 1 is correct. PCBs consist of conductive copper tracks etched onto non-conductive substrates, enabling electrical connectivity among various electronic components.

Statement 2 is correct. Copper foil is one of the most significant raw materials in PCB production and often accounts for nearly 60% of total material costs. As a result, fluctuations in copper prices directly affect PCB manufacturing expenses.

Statement 3 is correct. Polyphenylene ether (PPE) resin is widely used in advanced PCB substrates because of its excellent thermal stability and signal integrity properties, especially in high-frequency and high-speed applications such as AI servers and telecommunications equipment.

PCBs range from basic single-layer boards to highly sophisticated multi-layer architectures used in advanced electronics, computing systems, and industrial automation technologies.

12) Consider the following statements:

Statement-I: The Petersberg Climate Dialogue is an annual informal forum intended to facilitate political discussions ahead of the United Nations Climate Change Conference (COP).

Statement-II: Transitioning toward renewable energy sources such as solar and wind is increasingly viewed as a means to reduce geopolitical vulnerabilities associated with fossil-fuel-based energy systems.

Which one of the following is correct in respect of the above statements?

- (a) Both Statement-I and Statement-II are correct and Statement-II is the correct explanation for Statement-I
- (b) Both Statement-I and Statement-II are correct but Statement-II is not the correct explanation for Statement-I
- (c) Statement-I is correct but Statement-II is incorrect
- (d) Statement-I is incorrect but Statement-II is correct

Answer: (b)

Explanation:

The Petersberg Climate Dialogue was initiated by Germany in 2010 as an informal ministerial platform to build trust and political consensus before the annual UN Climate Change Conference (COP).

Statement-I is correct. The Dialogue serves as a preparatory diplomatic forum where countries discuss climate priorities, negotiate differences, and build momentum for formal COP negotiations.

Statement-II is also correct. One of the recurring themes in recent climate dialogues has been the strategic importance of renewable energy in reducing dependence on volatile fossil-fuel markets and enhancing long-term energy security.

However, Statement-II does not explain Statement-I. The purpose of the Petersberg Climate Dialogue is diplomatic consensus-building and negotiation facilitation, whereas Statement-II merely highlights one of the substantive policy themes discussed during such meetings.

The Dialogue also serves as a bridge between developed and developing nations on climate governance and energy transition issues.

13) Which of the following best describes the “Guban” in the context of Somali geography?

- (a) A perennial river system originating from the Ethiopian Highlands
- (b) The highest mountain peak located near Somalia’s border with Kenya
- (c) A narrow and arid coastal plain situated in northern Somalia
- (d) A large stretch of ancient sand dunes along the southern Indian Ocean coast

Answer: (c)

Explanation:

The Guban is a narrow coastal plain located along the Gulf of Aden in the northern part of Somalia.

It is characterized by extremely arid climatic conditions, sparse vegetation, and high temperatures. The region forms part of the varied topography of Somalia, which includes mountains, plateaus, coastal plains, and dune systems.

The southern regions of Somalia contain extensive ancient dune belts along the Indian Ocean coast, while the country’s major perennial rivers—the Jubba and Shabeelle—originate in the Ethiopian Highlands and flow through the southern plains.

The Guban region reflects the ecological diversity of the Horn of Africa and its harsh desert-like environmental conditions.

14) In the context of marine biology, the “bubble-net feeding” technique is most commonly associated with which of the following species?

- (a) Great White Shark
- (b) Humpback Whale
- (c) Dugong
- (d) Leatherback Sea Turtle

Answer: (b)

Explanation:

Bubble-net feeding is a sophisticated and cooperative hunting strategy displayed by the Humpback Whale.

In this technique, groups of humpback whales swim beneath schools of fish or krill while releasing bubbles from their blowholes in circular patterns. The rising bubbles create a visual and physical barrier that traps the prey within a concentrated area.

The whales then simultaneously swim upward through the center of the bubble net with open mouths, engulfing large quantities of prey in a single coordinated movement.

This behavior demonstrates advanced communication, social coordination, and intelligence among humpback whales. Beyond their ecological importance as marine mammals, whales also contribute to nutrient cycling in oceans through the “whale pump,” which supports phytoplankton growth and marine productivity.

15) The Bab el-Mandab Strait connects which of the following water bodies?

- (a) Persian Gulf and Gulf of Oman
- (b) Red Sea and Gulf of Aden
- (c) Mediterranean Sea and Black Sea
- (d) Andaman Sea and South China Sea

Answer: (b)

Explanation:

The Bab el-Mandab Strait is a strategically important maritime passage connecting the Red Sea with the Gulf of Aden.

The strait forms the southern gateway to the Suez Canal route and serves as a critical corridor for global trade, particularly for oil, liquefied natural gas (LNG), and container shipping between Europe and Asia.

Geographically, it lies between Yemen on the Arabian Peninsula and Djibouti and Eritrea in the Horn of Africa. The strait is divided into channels by Perim Island, with the western channel being the principal route for large commercial vessels.

Due to its importance in global energy transportation and maritime commerce, the Bab el-Mandab remains highly sensitive to geopolitical instability and regional conflicts.

16) With reference to the Global Action Plan for the Steppe Eagle, consider the following statements:

1. The plan seeks to combat illegal trade in Steppe Eagles, including surveillance of online wildlife markets.
2. The Steppe Eagle is an important migratory species associated with the Central Asian Flyway (CAF), which includes parts of the Indian subcontinent.

Which of the above statements are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Answer: (c)

Explanation:

The Global Action Plan (GAP) for the Steppe Eagle was adopted under the Convention on the Conservation of Migratory Species of Wild Animals to address the rapid decline of the species.

Statement 1 is correct. The Action Plan includes measures to curb illegal killing, trapping, poisoning, and online trade of Steppe Eagles through coordinated international monitoring and enforcement.

Statement 2 is also correct. The Steppe Eagle is a migratory raptor that follows the Central Asian Flyway (CAF), travelling from breeding grounds in Central Asia and Russia to wintering regions in the Indian subcontinent, particularly western India.

The conservation plan emphasizes habitat protection, reduction of poisoning risks, safeguarding migratory corridors, and strengthening international cooperation among range countries.

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