

Solutions

DATE : 12th- 18th AUGUST

1) Answer: (a) Promoting skill development

Demographic dividend refers to the economic growth potential that arises when the working-age population (15-64 years) is larger than the non-working-age population. To fully harness this demographic dividend, India needs to **promote skill development** to ensure that its working-age population is equipped with the necessary skills to be productive and contribute to economic growth.

2) Answer: (b) Its high population in the age group of 15-64 years

India's demographic dividend comes from having a large percentage of its population in the working-age group (15-64 years). This large, economically active population can drive economic growth, provided they are skilled, healthy, and employed.

5) Answer: b) 1 and 3 only

- **Statement 1:** Correct. These clouds form during **extremely hot wildfires or volcanic eruptions**.
- **Statement 2:** Incorrect. These clouds **do not produce heavy rainfall**; instead, they generate thunderstorms with **little rain**.
- **Statement 3:** Correct. **Rising global temperatures** have contributed to the increased formation of these clouds.

6) Answer is (d)

The variations in the length of daytime and nighttime from season to season are due to the **revolution of the earth on a tilted axis**.

- The Earth's axis is tilted at an angle of **23.5 degrees** relative to its orbit around the Sun. This tilt, combined with the Earth's revolution around the Sun, results in varying lengths of daytime and nighttime across different seasons.
- During different times of the year, different parts of the Earth receive more direct sunlight, leading to longer days in summer and shorter days in winter, especially in areas away from the equator.

7) Answer: (d) 1, 2, 3 and 4

- The burning of crop/biomass residue releases a variety of gases into the atmosphere:
 - **Carbon monoxide (CO):** Produced by incomplete combustion.
 - **Methane (CH₄):** Released during the burning of biomass, especially when oxygen is limited.

3) Answer: (d) high capital-output ratio

A **high capital-output ratio** means that a higher amount of capital is required to produce a single unit of output, which reduces the efficiency of capital investment. Even if an economy saves and invests a lot, if the capital-output ratio is high, the overall output increase may not be significant.

4) Answer: c) The world's oldest lunisolar calendar

Researchers believe that carvings and structures at Göbekli Tepe, dating back to around 10,000 B.C., indicate that the site may have been used as a **lunisolar calendar**, potentially tracking the movements of the moon and sun. This discovery highlights the early development of sophisticated astronomical practices in human history.

- **Ozone (O₃):** Although not directly emitted, ozone can form as a secondary pollutant through photochemical reactions involving methane and other precursors.
- **Sulphur dioxide (SO₂):** Released during the burning of biomass that contains sulfur compounds.

8) Answer: (d) 1, 2 and 3

- **Statement 1:** Correct. **Agricultural soils release nitrogen oxides** into the environment due to the microbial processes in the soil, especially from the application of nitrogen-based fertilizers.
- **Statement 2:** Correct. **Cattle release ammonia** into the environment through their waste, which is rich in nitrogen compounds.
- **Statement 3:** Correct. The **poultry industry releases reactive nitrogen compounds** such as ammonia, especially from poultry manure.

9) Answer is (a) 1 only.

- **Statement 1: Correct.** Coffee plants require a **hot and humid climate** typically found in tropical areas with moderate to high rainfall. On the other hand, tea can be cultivated in **both tropical and subtropical regions**, where the climate is also hot and humid but covers a wider range of geographical areas compared to coffee.
- **Statement 2: Incorrect.** **Coffee is propagated by seeds**, but tea can be propagated by **both seeds and stem cuttings**. Stem cuttings, known as vegetative propagation,

are a common method for growing tea plants, but seeds are also used depending on the cultivation practice.

10) Answer is (c) 3 only

- **Statement 1: Incorrect.** Under the Ramsar Convention, it is not **mandatory** for the Government of India to protect **all** wetlands in the territory of India. The Ramsar Convention specifically obliges the protection and conservation of **Ramsar sites** (wetlands of international importance), not all wetlands in the country.
- **Statement 2: Incorrect.** The **Wetlands (Conservation and Management) Rules, 2010** were framed independently by the Government of India and were not directly based on the recommendations of the Ramsar Convention. While Ramsar guidelines may have influenced them, they are not a direct outcome of the convention's recommendations.
- **Statement 3: Correct.** The **Wetlands (Conservation and Management) Rules, 2010** do encompass the **drainage area or catchment regions** of the wetlands, as determined by the relevant authority. This broader definition aims to protect the wetlands and their ecological balance.

11) Answer is (b) 2 only.

- **Statement 1: Incorrect.** Wetlands International is **not an intergovernmental organization** formed by the signatories to the Ramsar Convention. It is an independent, **non-profit global organization** dedicated to the conservation and restoration of wetlands. It collaborates with governments, NGOs, and other stakeholders.
- **Statement 2: Correct.** Wetlands International works at the **field level** to develop and mobilize knowledge about wetlands and uses its **practical experience** to advocate for better policies for the conservation and sustainable use of wetlands.

12) Answer: a) 1 and 2 only

- **Statement 1:** Correct. The 2018 guidelines introduced a **point-based system** for evaluating senior advocates.
- **Statement 2:** Correct. The 2023 guidelines **reduced the emphasis on publications** and stressed legal achievements.
- **Statement 3:** Incorrect. **Secret ballot voting** is used only in **exceptional cases**, not as the primary method.

13) Answer : b) 1 and 3 only

- **Statement 1:** Correct. Tantalum is a **rare metal** with a **high melting point** and **corrosion resistance**.
- **Statement 2:** Incorrect. Tantalum is primarily used in **electronics, aerospace, and medical applications**, not agriculture.
- **Statement 3:** Correct. India imports most of its Tantalum from the **Democratic Republic of the Congo**.

14) Answer: c

- The major challenge is **persistent droughts** reducing water levels in **Lake Gatun**, which is essential for the operation of the canal's locks.

15) Answer: d) **Sewage treatment and pollution abatement**

- The primary focus of **Namami Gange Mission 2.0** is **sewage treatment, pollution abatement, and rejuvenation of the River Ganga**.

16) Answer: a) **Deep mantle waves following the breakup of continental plates**

- The process of **vertical rise in stable landforms** like the Western Ghats is triggered by **deep mantle waves** following the **breakup of continental plates**.

17) Answer: b) **State Public Universities, Open Universities, and Skill Universities**

- The new categories introduced include **State Public Universities, Open Universities, and Skill Universities**.

18) Answer: d) **Neither 1 nor 2**

- **Statement 1:** Correct. The canal relies on **Lake Gatun**, an artificial lake, to provide freshwater for the locks.
- **Statement 2:** Correct. The canal **connects the Atlantic and Pacific Oceans**, serving as a crucial shipping route.

19) Answer: a) 1 and 2 only

- **Statement 1:** Correct. The sanctuary was denotified to facilitate the construction of a **transshipment port project**.
- **Statement 2:** Correct. The area is a significant **nesting site for the endangered giant leatherback turtle**.
- **Statement 3:** Incorrect. The area was classified as a **CRZ-1A zone**, where **large construction projects are generally prohibited**.

20) Answer: a)

IIT Indore has developed **advanced footwear for the armed forces**, integrating **Tribo-Electric Nanogenerator (TENG) technology that generates electricity from human motion**.

- This innovation **powers small electronic devices and features GPS and RFID technology for real-time tracking of soldiers**, enhancing safety and operational efficiency.
- Beyond military use, these shoes **have potential applications in civilian, industrial, and athletic sectors, offering benefits like location tracking and performance analysis**.

About Triboelectric nanogenerators (TENGs):

Triboelectric nanogenerators (TENGs) are devices **capable of converting mechanical movement into electrical energy**. These devices are composed of **active materials that generate electric charges and conductive electrodes** responsible for collecting and transferring the charges.

21) **Answer: a)**

The Indian government, plans to allow up to 35% bio-bitumen mixing with petroleum-based bitumen to reduce foreign exchange outflows.

- **Bio-bitumen, derived from paddy straw (parali), can also produce bio-gas and biochar.**
- This initiative aims to decrease bitumen imports, reduce air pollution from stubble burning, and create economic opportunities for farmers and MSMEs.
- Bio-bitumen, costing less than petroleum-based bitumen, offers eco-friendly benefits like reduced greenhouse gas emissions and supports projects across India for its implementation in road construction.

22) **Answer: b)**

Statement 3 is incorrect.

A comprehensive survey of Lake Turkana, Africa's fourth-largest lake, has been conducted for the first time in 50 years, revealing high fish potential.

- Led by UNESCO and the World Food Programme, and funded by the Dutch Government, the **10-year project aims to enhance the economic well-being and food security of the region's population.**

Lake Turkana is the largest desert lake in the world and is known for its unique greenish-blue colour.

It is part of the **Omo-Turkana basin**, which stretches into **four countries: Ethiopia, Kenya, South Sudan and Uganda.**

23) **(b) Only STATEMENT 2**

- **Statement 1 is incorrect:** The **Ayushman Bharat - Pradhan Mantri Jan Arogya Yojana (AB-PMJAY)** does not cover only primary care hospitalization. It covers **secondary and tertiary care hospitalization** for beneficiaries.
- **Statement 2 is correct:** The scheme provides **medical insurance coverage of Rs. 5 lakh per family per year to marginalized and economically weaker families** to cover medical expenses, especially for secondary and tertiary care hospitalization.

24) **Answer d)**

- **The Sherman Antitrust Act is not a governance framework for regulating technologies in India. It is a United States antitrust law** enacted in 1890 to combat anticompetitive practices, protect commerce, and prevent monopolies. India has its own set of laws and regulations to govern technology and competition.
- The primary legislation for antitrust issues in India is the Competition Act, 2002, which is enforced by the Competition Commission of India (CCI). Other relevant frameworks in India include the Information Technology Act, 2000, which provides a legal framework for electronic governance, and the National Strategy for Artificial Intelligence (2018), which outlines India's approach to AI development and regulation.

- These laws and strategies are specifically tailored to India's legal and technological landscape, unlike the Sherman Antitrust Act which is exclusive to the United States.

25) **Answer c)**

- The classification of government schemes is crucial for understanding their implementation and funding mechanisms. A central sector scheme is fully funded by the central government and implemented by its agencies, while a centrally sponsored scheme involves cost-sharing between the central and state governments.
- **The Ayushman Bharat Digital Mission (ABDM) is classified as a central sector scheme**, which means it is entirely funded and implemented by the central government through the National Health Authority. This allows for uniform implementation across the country and direct control over the digital health infrastructure development.
- **On the other hand, ABPM-JAY (Ayushman Bharat Pradhan Mantri Jan Arogya Yojana) is a centrally sponsored scheme**, involving financial participation from both central and state governments. This classification enables state-specific adaptations while maintaining overall national health coverage goals, reflecting the scheme's focus on providing health insurance to marginalized families across diverse state contexts.

26) **Answer: c)**

Three underwater geographical structures in the Indian Ocean have been named after **Indian historical figures and concepts: the Ashoka Seamount, Chandragupt Ridge, and Kalpataru ridge.**

- These names, proposed by India, were recently **approved by the International Hydrographic Organization (IHO) and UNESCO's Intergovernmental Oceanographic Commission (IOC).**
- These structures were discovered by the **National Centre for Polar and Ocean Research (NCPOR), Goa**, during international survey explorations.

Including these, **there are now seven structures in the Indian Ocean named after Indian scientists or figures, with previous names honoring physicist CV Raman, oceanographer NK Panikkar, geologist DN Wadia, and the research vessel Sagar Kanya.**

27) **Answer: b)**

- **The World Meteorological Organization (WMO) launched the project 'Polar Coupled Analysis and Prediction for Services' (PCAPS).**
- This initiative aims to enhance weather, water, ice, and climate forecasting in the Arctic and Antarctic regions.
- The project is designed to improve safety and security for those living or traveling in polar areas by developing better observation systems and Earth system models.

- It builds upon previous initiatives and is part of the broader World Weather Research Programme (WWRP), addressing the unique challenges posed by rapid climate change in polar regions.

28) Answer: **d) Rift Valley.**

- **Continental Shelf:** Shallow, near the coast.
- **Seamount:** Underwater mountain, not the lowest.
- **Abyssal Plain:** Deep and flat but not the lowest.
- **Rift Valley: Deepest part,** found at mid-ocean ridges (divergent plate boundaries).
- The primary objective of the **Clean Plant Programme (CPP)** approved by the Union Cabinet is:

29) Answer **c) To establish Clean Plant Centers**

- **Explanation:** The Clean Plant Programme (CPP) focuses on establishing Clean Plant Centers to provide disease-free and quality planting material to horticulture farmers. This is aimed at improving the productivity and quality of horticultural crops.

30) Answer is **d) All of the above**

The **Polar Coupled Analysis and Prediction for Services (PCAPS)** project has multiple objectives, focusing on enhancing weather and climate-related services specifically for polar regions. Here is a breakdown of the given statements:

1. **Statement a: Correct** – PCAPS aims to enhance weather, water, ice, and climate forecasting, especially in the Arctic and Antarctic regions, which are highly vulnerable to climate changes.
2. **Statement b: Correct** – The project also seeks to improve security and safety for individuals living or traveling in polar areas, as these regions are challenging due to extreme weather conditions.
3. **Statement c: Correct** – The project addresses rapid climate change in polar regions, as these regions are experiencing some of the most dramatic impacts of global climate change.

31) Answer: **d) Traditional leather football boots**

- **Traditional leather football boots** do not represent technological doping.
- **Technological doping** refers to using advanced technology to enhance performance beyond natural abilities.
- Examples: High-tech swimsuits, performance wearables, and advanced running shoes.

32) Answer: **c) Karnataka**

- The **Tungabhadra Dam** is located in **Karnataka**, in the Ballari district.
- It is a multipurpose dam built across the **Tungabhadra River**.
- Significant for **water management and flood control** in Karnataka and Andhra Pradesh.

33) Answer: **b) Only two**

- **Statement 1:** Incorrect. Most Kerala Jews migrated to **Israel** after 1948.
- **Statement 2:** Correct. **Malabar Jews** trace their origins to King Solomon's era.
- **Statement 3:** Correct. The **death of the last Paradesi Jewish woman** recently occurred.

34) Answer: **c) Both statements**

- **Article 22(7)** of the Indian Constitution allows **extended preventive detention**.
- The **Unlawful Activities (Prevention) Act (UAPA)** permits preventive detention for national security.

35) Answer: **b) Only two**

- **Statement 1:** Incorrect. The **Geneva Conventions** extend protection to **wounded soldiers at sea**.
- **Statement 2:** Correct. The conventions cover the **treatment of prisoners of war**.
- **Statement 3:** Correct. They protect **civilians from inhumane treatment**.

36) Answer: **d) Monitor and analyze performance data:**

- **Wearable technology** is primarily used to **monitor and analyze performance data**.
- Provides athletes with data to enhance performance, but concerns of **technological doping** exist.

37) Answer: **d) Obtain permission from the State Council**

- **Prior permission from the State Council** is required before establishing a new institution or increasing admission capacity in allied and healthcare professions.
- Without permission, the qualifications granted will **not be recognized** under the Act.

38) Answer: **a) 1 only**

- **Statement 1:** Correct. The **CRS is a centralized portal** for digitally registering all births and deaths in India.
- **Statement 2:** Incorrect. The CRS data **will be used to update other databases** like the NPR and electoral rolls.

39) Answer: **c) Air-launched, 1,000 kg class glide bomb**

- **Gaurav** is an **air-launched, 1,000 kg class glide bomb**.
- It is capable of **hitting targets at long distances** using a **highly accurate hybrid navigation scheme**.

40) Answer: **c) Reverse the declining trend of Parsi population**

- The scheme aims to **reverse the declining Parsi population** by providing **financial assistance for medical treatment and childcare** through a scientific protocol.
- Emphasizes stabilizing the population of the Parsi community.

41) Answer: **d) Introduction of invasive species**

- The primary environmental concern is the **introduction of invasive species** through ballast water discharge.
- These species can disrupt local ecosystems and harm native species.

42) Answer: **b) 1 and 3 only**

- **Statement 1:** Correct. The app provides **real-time flood monitoring data** from over 500 flood monitoring stations.
- **Statement 2:** Incorrect. The app is available in both **English and Hindi** and provides information in **text and audio formats**.
- **Statement 3:** Correct. The app includes **data on reservoir storage levels**, aiding in flood risk assessment.

43) Answer: **d) NMR Spectroscopy**

- **Nuclear Magnetic Resonance (NMR) Spectroscopy** is used to track **per- and polyfluoroalkyl substances (PFAS)** by identifying molecular fingerprints.

44) **PFAS Chemicals (Forever Chemicals):**

- PFAS are called "forever chemicals" because they **persist in the environment for thousands of years**, making them highly durable and difficult to break down.

45) Answer: **d) 2 only**

- **Statement 1:** Correct. DDoS attacks overwhelm a server with traffic from **multiple sources**, making it difficult for legitimate users to access.
- **Statement 2:** Incorrect. DDoS attacks are **harder to counter** because they originate from multiple sources.
- **Statement 3:** Correct. DDoS attacks can result in **slow loading times or complete inaccessibility** of services.

46) Answer: **a) Smurf Attack**

- **Smurf Attack:** A method used in DDoS attacks where **malicious ICMP broadcast packets** with a spoofed IP address are sent to flood the target's servers.

47) Answer is **(d) 2 and 3**.

- **Statement 1: Incorrect.** DNA barcoding does not assess the **age** of a plant or animal. Age determination generally requires different methods, such as radiocarbon dating for plants or examining physical characteristics for animals.

- **Statement 2: Correct.** DNA barcoding is a powerful tool for **distinguishing among species** that may look alike by comparing short, standardized regions of DNA sequences.
- **Statement 3: Correct.** DNA barcoding can be used to **identify undesirable animal or plant materials in processed foods**, ensuring food safety and authenticity.

48) Answer is **(a)**

- **Statement (a): Incorrect - Functional chromosomes cannot be created by simply joining segments of DNA taken from cells of different species.** While scientists can manipulate DNA and create synthetic DNA segments, creating fully functional chromosomes in this manner is not feasible.
- **Statement (b): Correct. Artificial functional DNA pieces** can indeed be created in laboratories through synthetic biology techniques.
- **Statement (c): Correct. DNA replication can occur outside of a living cell** in a laboratory setting through the use of techniques like polymerase chain reaction (PCR).
- **Statement (d): Correct.** Cells from plants and animals can be made to undergo **cell division in laboratory petri dishes**, which is a common practice in tissue culture and research labs.

49) Answer is **(b) 2 only**

- **Statement 1: Incorrect.** The amount of water in **rivers and lakes** is **significantly less** than the amount of **groundwater**. Groundwater accounts for a much larger portion of Earth's freshwater resources compared to surface water bodies like rivers and lakes.
- **Statement 2: Correct.** The amount of water stored in **polar ice caps and glaciers** is indeed **more than the amount of groundwater**. Ice caps and glaciers hold the majority of Earth's freshwater, followed by groundwater as the next largest reservoir.

50) Answer is (c)

The **chief characteristic of mixed farming** is the **combination of crop cultivation and livestock rearing** on the same farm. This farming system allows for diversified income sources, enhances sustainability, and helps in efficient use of farm resources. Farmers grow crops and simultaneously rear animals like cattle, poultry, or sheep.