

# Solutions

**DATE : 12<sup>th</sup>- 18<sup>th</sup> AUGUST**

## 1) Solution: b)

India's schoolgirls are quietly leading a cycling revolution, driven by **state-run free bicycle schemes**. In rural areas, cycling among girls has **more than doubled over a decade**, boosting school attendance and reducing dropout rates. This movement, though underreported, is transforming lives, especially in states like **Bihar, West Bengal, Assam, and Chhattisgarh**, where bicycles are empowering girls with mobility and education.

### Impact of the Cycling Revolution:

1. **Increased School Attendance:** More girls are attending school regularly.
2. **Reduced Dropout Rates:** Fewer girls are dropping out of school.
3. **Empowerment:** Enhanced confidence and mobility for girls.
4. **Gender Gap Reduction:** A rise in cycling in India had occurred **among rural girls** – increasing more than two times from **4.5% in 2007 to 11% in 2017** – narrowing the gender gap in education and transportation.
5. **Educational Access:** Improved access to education in rural areas.
6. **Economic Mobility:** Potential for better employment opportunities in the future.
7. **Social Change:** Challenging traditional gender roles and promoting self-reliance.

## 2) Solution: d)

The **North Eastern Handicrafts and Handlooms Development Corporation (NEHHDC)** has achieved the **Oeko-Tex certification for Eri Silk**, the world's only **vegan silk**.

- This certification, awarded directly from Germany, **highlights Eri Silk's ethical and eco-friendly production process**, where

**the moth naturally exits the cocoon**, unlike other silk types where the moth is killed.

- The **Oeko-Tex certification confirms that Eri Silk is free from harmful substances** and produced under environmentally friendly conditions.

This accomplishment **enhances the global recognition of Eri Silk**, a **Geographical Indication (GI)** product of Assam, and **paves the way for its expansion into international markets**.

## 3) Solution: c)

- The directive issued by the **Directorate General of Health Services (DGHS)** mandates that **heads of government hospitals are responsible for filing a First Information Report (FIR) within six hours of any violence against healthcare workers on duty**.
- This policy places the onus on hospital leadership to take immediate action in cases of violence, reflecting a systemic approach to addressing the issue.

By designating hospital heads as the responsible parties for initiating legal proceedings, the directive aims to ensure a swift and standardized response to incidents of violence against healthcare workers, potentially deterring such acts and providing better protection for medical staff.

## 4) Solution: b)

- Statement 1 is correct as an FIR is a written document prepared by the police upon receiving information about a cognizable offense.
- Statement 3 is correct as per the directive from the Union Health Ministry, which

requires FIRs to be filed within six hours of any violence against healthcare workers on duty.

- Statement 2 is incorrect because **public health is a State subject**, and there is no specific Central law for preventing violence against healthcare workers.

### 5) Solution: d)

The Department of Pension and Pensioners' Welfare

(DOPPW) introduced "Bhavishya," a centralized pension processing software, to address delays, errors, and financial losses in pension processing for central government employees.

- The software integrates 99 Ministries/Departments, 1020 Offices, and 8320 Drawing and Disbursing Officers (DDOs), with over 2,50,845 Pension Payment Orders (PPOs) issued by August 2024.

"Bhavishya" streamlines the pension process by auto-registering retirees, enforcing strict timelines, and providing transparency and accountability.

The system automates pension calculations, offers real-time updates via email/SMS, and enables paperless processing through e-PPOs, which are integrated with the Public Financial Management System (PFMS) and banks.

The software also supports Digilocker for easy access to pension documents and issues pensioner identity cards.

### 6) Solution: c)

The Green Tug Transition Program (GTTP), is a significant initiative aimed at replacing diesel-powered harbor tugs in India with zero-emission, environmentally friendly alternatives.

- A tug is a particular class of boat which helps mega-ships enter or leave a port.
- Major ports will procure or charter green tugs powered by emerging technologies such as battery-electric, hybrid, methanol, and green hydrogen.

- The program aligns with India's broader goals for sustainability and innovation in the maritime sector, as outlined in the Maritime India Vision 2030 and the Maritime Amrit Kaal Vision 2047.
- These visions aim to reduce greenhouse gas emissions, increase the use of renewable energy in ports, and promote domestic manufacturing under the 'Make in India' initiative.

By 2040, all tugs operating in Indian Major Ports are expected to transition to green technologies, marking a significant step towards a greener, more sustainable maritime future for India.

### 7) Solution: a)

Statement 2 is incorrect.

Increased prokaryote dominance in warming oceans could reduce fish populations, which are crucial for global food supply. However, this dominance is likely to reduce, not enhance, the ocean's ability to absorb carbon emissions, making statement 2 incorrect.

### 8) Solution: a)

Kazhuveli Bird Sanctuary is located on the Coromandel Coast in Tamil Nadu, connected to the Bay of Bengal via Uppukalli Creek and Yedayanthittu estuary. It plays a significant ecological role but is not part of the Western Ghats biodiversity hotspot.

### 9) Solution: c)

The 90 MW Omkareshwar Floating Solar Project, commissioned by SJVN Green Energy Limited, is located in Khandwa, Madhya Pradesh. It is one of the largest floating solar initiatives in Central and North India.

### 10) Solution: a)

Statements 2 and 3 are correct. DNA profiling is increasingly accurate but can be affected by issues like sample contamination, making it unreliable as the sole basis for establishing guilt or innocence. Statement 1 is incorrect because DNA profiling involves analyzing specific locations in the 0.1% of human DNA



that varies between individuals, not the entire genome.

### 11) Solution: b)

The primary objective of the FSSAI's initiative is to **develop and validate methods for detecting microplastics in various food products** and to assess their prevalence and exposure levels among consumers in India.

### 12) Solution: a)

- **Statement 1 is correct:** The Arogya Maitri Disaster Management Cube is indeed a part of the **Indian Army's BHISHM initiative**, which stands for **Bharat Health Initiative for Sahyog, Hita, and Maitri**.
- **Statement 2 is correct:** The cube integrates **Artificial Intelligence (AI) and data analytics** to enable **effective coordination and real-time monitoring** during disaster management operations, which enhances decision-making and response efforts.
- **Statement 3 is incorrect:** Contrary to the statement, the cube's components are designed to be **lightweight and transportable**, allowing them to be easily moved by **hand, cycle, or drone** without the need for heavy machinery.

### 13) Solution: b)

- **Statement 1 is correct:** The deep-winter heatwave in Antarctica could contribute to a **reduction in the Antarctic Ice Sheet**, which would subsequently lead to **rising global sea levels**.
- **Statement 2 is correct:** The heatwave could also **disrupt the global ocean circulation system** (such as the thermohaline circulation), which is crucial for **regulating global climate patterns**.
- **Statement 3 is incorrect:** The deep-winter heatwave is typically associated with a **weakening** of the polar vortex, not a strengthening. A weakened polar vortex can lead to **warmer temperatures** in polar regions, rather than colder global temperatures.

### 14) Solution: a)

- **Statement 1 is incorrect:** While **Uttar Pradesh** has several Ramsar sites, it is **Tamil Nadu** that currently holds the title for the **highest number of Ramsar sites** in India.
- **Statement 2 is correct:** Both the **Nanjarayan Bird Sanctuary** and the **Kazhuveli Bird Sanctuary** are located in **Tamil Nadu**.
- **Statement 3 is incorrect:** The **Tawa Reservoir**, which was recently added as a Ramsar site, is located in **Madhya Pradesh**, not in Uttar Pradesh.

### 15) Solution: b)

- **Statement 1: Correct** – CAS operates under the **International Council of Arbitration for Sport (ICAS)**.
- **Statement 2: Correct** – CAS adapts **procedural rules** to the sports world's needs.
- **Statement 3: Incorrect** – CAS **does not have the authority** to modify the rules of international sports federations.

### 16) Solution: b)

- **Statement 1: Incorrect** – A "Super Moon" occurs when the moon is at its **closest point to Earth**, not its farthest.
- **Statement 2: Correct** – A "Blue Moon" is the **second full moon** in a calendar month or the **third full moon** in a season with four full moons.
- **Statement 3: Incorrect** – The occurrence of a **Super Moon and Blue Moon together** is a **rare event**, not common.

### 17) Solution: a)

- **Objective:** The mission aims to **map Jupiter's moons** and **investigate subsurface water bodies** for **potential habitability**.

### 18) Solution: c)

- **Anaphylaxis:** A **rapid release of chemicals** by the **immune system** that can cause the body to **go into shock**.
- Example triggers: **Peanuts or bee stings**.

- Recent development: The FDA approved **Neffy**, a **nasal spray** for treating **severe allergic reactions**, offering an alternative to traditional injectors like **EpiPen**.
- 19) **Solution: d)**
- **Statement 1: Correct** – The **FPS Sahay application** was launched for **paperless financing** for Fair Price Shop dealers.
  - **Statement 2: Correct** – **Mera Ration App 2.0** was introduced to **enhance services** for beneficiaries.
  - **Statement 3: Correct** – The program includes **NABL accreditation** of laboratories to improve **food quality control** in the Public Distribution System (PDS).
- 20) **Solution: b)**
- **Statement 1: Incorrect** – **Tornadic waterspouts** can be as **destructive** as tornadoes.
  - **Statement 2: Correct** – **Tornadic waterspouts** are associated with **severe thunderstorms** and can cause significant destruction.
  - **Statement 3: Correct** – **Fair-weather waterspouts** are usually **weaker** and form during **calm conditions**.
- 21) **Solution: d)**
- **Prokaryotes**, including **bacteria** and **archaea**, play a **vital role** in supporting **marine food chains** and **balancing carbon emissions**. Despite the warming of oceans, **prokaryotes** are expected to **decline less** than other marine life, potentially **increasing their dominance** in marine ecosystems.
- 22) **Solution: c)**
- The **Small Satellite Launch Vehicle (SSLV)** provides a **cost-effective, flexible, and rapid solution** for satellite launches, designed to carry payloads between **10 to 500 kg**, making it suitable for a variety of space missions.
- 23) **Solution: c)**
- **Scientists discovered liquid water** deep within Mars' crust using data from **NASA's Mars Insight Lander**. This discovery, at depths of **10 to 20 kilometers**, suggests water from Mars' ancient rivers and lakes seeped into the crust billions of years ago.
- 24) **Solution: a)**
- **Zoopharmacognosy** is the study of how animals **self-medicate** using **natural substances**. This behavior has been observed in species like **primates, elephants, and dogs**, using plants and other natural resources to treat infections and maintain health.
- 25) **Solution: d)**
- **Statement 1: Correct** – The **Rajasthan Atomic Power Station** is the only operational nuclear power plant in **Rajasthan**.
  - **Statement 2: Correct** – The **Kudankulam Nuclear Power Plant**, located in **Tamil Nadu**, is the **southernmost nuclear power plant** in India.
  - **Statement 3: Correct** – The **Narora Atomic Power Station** is located in **Uttar Pradesh**.
- 26) **Solution: a)**
- The new genome-editing tool is based on a protein called **ISDra2TnpB** from the bacterium **Deinococcus radiodurans**, developed by researchers from **ICAR-National Rice Research Institute** and **Pennsylvania State University**. It holds promise for **agricultural applications**.
- 27) **Solution: d)**
- **Statement 1: Correct** – Tensions in the **South China Sea** could disrupt the **global supply chain**.



- **Statement 2: Correct** – Increased tensions may lead to **rerouting vessels**, resulting in **higher shipping costs**.
  - **Statement 3: Correct** – Disruption in the **South China Sea** could significantly reduce the **global transport of petroleum products**.
- 28) **Solution: b)**
- **KAPS-4 at Kakrapar Atomic Power Station (KAPS)** in Gujarat is India's **second indigenous 700 MW Pressurised Heavy Water Reactor (PHWR)** to operate at **full capacity**, marking a milestone in India's **nuclear power capabilities**.
- 29) **Solution: b)**
- **Statement 1: Correct** – The **ONDC** aims for **inclusivity and access** for sellers, particularly **small businesses and MSMEs**.
  - **Statement 2: Incorrect** – ONDC is focused on **decentralizing e-commerce**, not centralizing it.
  - **Statement 3: Correct** – ONDC provides **more independence and choices** for consumers.
  - **Statement 4: Incorrect** – ONDC is a **not-for-profit** entity, not focused on **profit maximization**.
- 30) **Solution: c)**
- **Approximately 40%** of the world's **petroleum products** are transported through the **South China Sea** annually. Any **disruption** in this region could have a **significant impact** on **global energy supplies** and prices.
- 31) **Solution: b)**
- The **Alpha Particle X-ray Spectrometer (APXS)** on the **Pragyan Rover** of **Chandrayaan-3** provided the **first in-situ elemental abundance measurements** of **lunar soil** in the **South Polar Region** of the Moon. This supports the **Lunar Magma Ocean (LMO) hypothesis** and provides insights into the Moon's **primordial crust**.
- 32) **Solution: b)**
- **Statement 1: Correct** – The **Scarborough Shoal** is a **disputed territory** between **China** and the **Philippines**.
  - **Statement 2: Correct** – The **Spratly Islands** are claimed by multiple countries, including **China, Vietnam, and the Philippines**.
  - **Statement 3: Incorrect** – **Taiwan** also makes claims in the **South China Sea**, including over the **Spratly Islands** and the **Paracel Islands**.
- 33) **Solution: a)**
- **Pair 1: Correct** – The **Kaiga Generating Station** is located in **Karnataka**.
  - **Pair 2: Incorrect** – The **Kakrapar Atomic Power Station** is located in **Gujarat**, not **Maharashtra**.
  - **Pair 3: Incorrect** – The **Tarapur Atomic Power Station** is located in **Maharashtra**, not **Uttar Pradesh**.
- 34) **Solution: a)**
- **Statement 1: Incorrect** – The **Hayflick limit** refers to the **maximum number of times** a normal human cell can divide before cell division stops, not the minimum.
  - **Statement 2: Correct** – The **Hayflick limit** plays a crucial role in **aging** and the development of **age-related diseases** because as cells reach their division limit, they enter a state of **senescence**, contributing to aging.
- 35) **Solution: d)**
- **Location:** The **Banni Grasslands** are located in **Gujarat**, specifically in the **Kachchh district**. These grasslands are one of the largest tropical grasslands in Asia and are known for their unique ecosystem and wildlife.
- 36) **Solution: a)**
- **Statement 1: Correct** – Vaccine-derived poliovirus is a **documented variant** of poliovirus that originates from the strain used in the **oral polio vaccine (OPV)**.

- **Statement 2: Correct** – The excreted **vaccine virus** can circulate, undergo **genetic changes**, and in under-immunized populations, it can cause paralysis.

Thus, both statements are correct, and **Statement II is the correct explanation for Statement I**. The correct answer is **a) Both Statement-I and Statement-II are correct and Statement II is the correct explanation for Statement-I**.

37) **Solution:a)**

- **Statement 1: Incorrect** – Senior advocates are designated under **Section 16 of the Advocates Act 1961**, not the **Bar Council of India Act**.
- **Statement 2: Incorrect** – A senior advocate is **not permitted** to appear without an **Advocate-on-record** or junior advocate.
- **Statement 3: Correct** – A senior advocate **shall not accept** briefs or instructions directly from a client.

Thus, only **Statement 3** is correct. The correct answer is **a) Only one**.

38) **Solution:b)**

- **Statement 1: Correct** – India hosted the **inaugural Voice of Global South Summit (VOGSS)** in **January 2023**, with the second edition in **November 2023**.
- **Statement 2: Incorrect** – The theme of the **3rd Voice of Global South Summit** is **"An Empowered Global South for a Sustainable Future,"** not "Century of the Global South."

Thus, the **incorrect statement is 2 only**. The correct answer is **b) 2 only**.

39) **Solution:b)**

- **Statement 1: Correct** – **Antihyper Hydrogen-4** is made up of an **antiproton**, two **antineutrons**, and one **antihyperon** (a baryon containing a strange quark). It was discovered at the **Relativistic Heavy Ion Collider (RHIC)**.
- **Statement 2: Correct** – Both **hyperhydrogen-4** and its antimatter

counterpart **antihyper hydrogen-4** seem to **wink out of existence quickly**, and there was no significant difference in their lifetimes.

Thus, both statements are correct, but **Statement II is not the explanation for Statement I**. The correct answer is **b) Both Statement-I and Statement-II are correct and Statement II is not the correct explanation for Statement-I**.

40) **Solution:b)**

- **Statement 1: Correct** – **Atomic clocks** are the **most precise timekeeping devices**, critical for applications like **GPS systems**, telecommunications, and scientific research.
- **Statement 2: Correct** – These clocks measure time using the **resonant frequencies of atoms**, such as **cesium-133**.
- **Statement 3: Incorrect** – **Cesium atomic clocks** are **common** but not the most accurate. **Hydrogen maser atomic clocks** are known to be **more accurate** than cesium clocks.

Thus, **only two statements** are correct. The correct answer is **b) Only two**.

41) **Solution:c)**

- **ISDra2TnpB** is a **genome editor**. It is a protein-based tool used for **genome editing**, potentially revolutionizing the field of **genetic research**.

Thus, the correct answer is **c) Genome editor**.

42) **Solution:d)**

- **Statement 1: Incorrect** – **Quantum nonlocality** occurs due to **entanglement**, not superposition, whereby particles become permanently correlated and lose their individuality.
- **Statement 2: Correct** – Quantum nonlocality describes the ability of objects to **instantaneously know about each other's state**, even when separated by large distances.

Thus, the correct answer is **d) Statement-I is incorrect but Statement-II is correct**.



43) **Solution:a)**

- **Statement 1: Correct** – The **Joint Consultative Machinery (JCM)** is a platform for **constructive dialogue** between the government as an employer and the employees.
- **Statement 2: Incorrect** – The scheme is **non-statutory**, mutually agreed upon between the staff side and the official side.
- **Statement 3: Incorrect** – The scheme **does not cover all** regular civil employees of the Central Government; certain classes, such as **Class-I services** and police personnel, are excluded.

Thus, only **one statement** is correct. The correct answer is **a) Only one**.

44) **Solution:b)**

- **Statement 1: Correct** – Diamonds form in the **Earth's mantle** and are brought to the surface through **volcanic activity**.
- **Statement 2: Incorrect** – The **US** is the largest producer of **synthetic industrial diamonds**, not Botswana.

Thus, the **incorrect statement** is **2 only**. The correct answer is **b) 2 only**.

45) **Solution:c)**

- **Statement 1: Correct** – A **glacial lake** typically forms at the **foot of a glacier**, but may also form on, in, or under it.
- **Statement 2: Correct** – Most glacial lakes form when a **glacier retreats** and **meltwater** fills the hole left behind.

Thus, **both statements** are correct. The correct answer is **c) Both 1 and 2**.

46) **Solution:a)**

**Indian Remote Sensing (IRS) Satellites:**

- **Statement 1: Correct** – IRS satellites are used for the **assessment of crop productivity**.

- **Statement 2: Correct** – IRS satellites are used for **locating groundwater resources**.
- **Statement 3: Correct** – IRS satellites aid in **mineral exploration**.
- **Statement 4 (Telecommunications): Incorrect** – IRS satellites are not primarily used for **telecommunications**; this is typically done by communication satellites.
- **Statement 5 (Traffic Studies): Incorrect** – IRS satellites are not generally used for **traffic studies**.

Thus, the correct answer is **(a) 1, 2 and 3 only**.

47) **Solution:a)**

- **Statement 1: Correct** – PSLVs are used for **Earth resources monitoring**, while GSLVs are designed mainly for **communication satellites**.
- **Statement 2: Incorrect** – Satellites launched by PSLV do not appear to remain permanently fixed in the same position in the sky; this is a characteristic of **geostationary satellites**, which are launched by GSLVs.
- **Statement 3: Incorrect** – **GSLV Mk III** is a **three-staged** launch vehicle, not four-staged. It uses **solid rocket motors** in the first stage and **liquid rocket engines** in the second stage, while the third stage uses a **cryogenic engine**.

Thus, the correct answer is **(a) 1 only**.

48) **Solution:a)**

The G20 comprises Argentina, Australia, Brazil, Canada, China, EU, France, Germany, India, Indonesia, Italy, Japan, Mexico, Russia, Saudi Arabia, South Africa, South Korea, Turkey, UK and USA. Hence Option(a) is correct.

49) **Solution:c)**

- **Statement 1: Correct** – The **Mangalyaan** mission launched by ISRO is also known as the **Mars Orbiter Mission**.
- **Statement 2: Incorrect** – While **Mangalyaan** made India the first Asian country to reach Mars, **India** was

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the **fourth** space agency to successfully place a spacecraft in Mars orbit after the **USA, Soviet Union, and European Space Agency**.

- **Statement**

**3: Correct** – **Mangalyaan** made **India** the **only country** to be successful in making its spacecraft orbit Mars on its **very first attempt**.

Thus, the correct answer is **(c) 1 and 3 only**.

50) **Solution:a)**

- **Statement 1: Correct** – A country that becomes a member of the **Nuclear Suppliers Group (NSG)** gains access to the **latest and most efficient nuclear technologies** from other member countries, aiding in peaceful nuclear energy development.
- **Statement 2: Incorrect** – Membership in the **NSG** does not automatically make a country a member of the **Treaty on the Non-Proliferation of Nuclear Weapons (NPT)**. These are separate frameworks with distinct membership criteria.

Thus, the correct answer is **(a) 1 only**.



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