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1) The “Past Risk and Return Verification Agency” (PaRRVA), which recently became fully operational, was launched by which organization?

- (a) Reserve Bank of India (RBI)
- (b) Pension Fund Regulatory and Development Authority (PFRDA)
- (c) Securities and Exchange Board of India (SEBI)
- (d) Insurance Regulatory and Development Authority of India (IRDAI)

**Answer: (c)**

**Explanation:**

The **Past Risk and Return Verification Agency (PaRRVA)** is an initiative launched by Securities and Exchange Board of India to improve transparency and investor protection in financial markets. It aims to authenticate historical risk and return claims made by regulated entities such as investment advisers and algorithmic trading platforms.

The framework designates CARE Ratings Limited as the verification agency and National Stock Exchange as the Data Centre. Through this mechanism, investors can access verified performance metrics and avoid misleading claims.

PaRRVA standardizes the presentation of risk-return data and moved from the pilot stage in late **2025** to full operations in **May 2026**, strengthening market integrity and digital investor protection mechanisms.

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2) Ru-Soam bridges in Sikkim are often described as “mechanical marvels.” Which engineering feature mainly enhances their resistance to seismic activity?

- (a) Use of dense concrete supports to absorb vibrations
- (b) Rigid anchoring of the bridge deck to mountain escarpments
- (c) Lightweight structure and longitudinal flexibility of cane and bamboo
- (d) Absence of horizontal braces allowing unrestricted movement

**Answer: (c)**

**Explanation:**

The earthquake resilience of **Ru-Soam bridges** is primarily due to the **lightweight and flexible properties of cane and bamboo**. Unlike rigid steel or concrete structures, these materials can sway and absorb seismic energy, reducing the risk of structural failure during earthquakes.

Bamboo possesses high tensile strength (“green steel” properties), while the bridge design incorporates horizontal bamboo braces and rails that provide longitudinal flexibility. Vertical posts contribute flexural support.

The main cables (**Soamgyang**) are tied to living trees, integrating the structure with the ecosystem. Developed by the **Lepcha community** of the Dzongu region in Sikkim, these bridges are increasingly recognized as examples of indigenous climate-resilient engineering.

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**3) Consider the following statements regarding the E-PRAAPTI portal:**

1. It is an EPFO initiative aimed at linking inoperative EPF accounts with the Universal Account Number (UAN).
2. The portal uses Aadhaar-based authentication to reduce physical documentation and employer intervention.
3. It is intended exclusively for members retiring after the age of 55 years.

How many of the statements given above are correct?

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

**Answer: (b)**

**Explanation:**

**Statement 1 is correct: E-PRAAPTI (EPF Aadhaar-Based Access Portal for Tracking Inoperative Accounts)** was introduced by Employees' Provident Fund Organisation to connect legacy inoperative EPF accounts with the digital UAN ecosystem and help recover dormant accounts.

**Statement 2 is correct:** The portal relies on **Aadhaar-based authentication**, reducing dependence on manual procedures, physical visits, and employer intervention while simplifying verification.

**Statement 3 is incorrect:** The portal is **not limited to retirees above 55 years**. It also covers accounts that became inoperative due to prolonged non-contribution periods, irrespective of the member's age.

The phased rollout initially covered accounts with **Member IDs** and later expanded further, supporting broader recovery and settlement of dormant EPF balances.

**4) Match the following Tathagatas with their respective Wisdoms and Mudras (Gestures):**

Buddha	Wisdom	Mudra (Gesture)
I. Akshobhya	A. Mirror-like Wisdom	1. Bhumisparsha
II. Amitabha	B. Discriminating Wisdom	2. Dhyana
III. Ratnasambhava	C. Wisdom of Equality	3. Varada

Select the correct answer using the code given below:

- (a) I-A-3, II-C-2, III-B-1
- (b) I-B-1, II-A-2, III-C-3
- (c) I-A-1, II-B-2, III-C-3
- (d) I-C-1, II-B-3, III-A-2

**Answer: (c)**

**Explanation:**

In **Mahayana** and **Vajrayana Buddhism**, the **Five Tathagatas (Dhyani Buddhas)** are represented through distinct directions, wisdoms, and mudras, symbolizing the transformation of human emotions into enlightened awareness.

Tathagata	Direction	Wisdom	Mudra	Significance
Akshobhya	East	Mirror-like Wisdom	Bhumisparsha (Earth-touching)	Transforms anger into clarity and unwavering insight
Amitabha	West	Discriminating Wisdom	Dhyana (Meditation)	Transforms attachment into compassion and deep awareness
Ratnasambhava	South	Wisdom of Equality	Varada (Giving/Charity)	Transforms pride into equality and generosity

**Akshobhya** is associated with **Mirror-like Wisdom**, reflecting reality clearly without distortion. His **Bhumisparsha Mudra** symbolizes steadfastness and enlightenment.

**Amitabha** embodies **Discriminating Wisdom**, enabling recognition of the uniqueness of all beings while cultivating compassion. His **Dhyana Mudra** represents meditation and inner concentration.

**Ratnasambhava** signifies the **Wisdom of Equality**, emphasizing unity among all beings. His **Varada Mudra** denotes generosity and the granting of blessings.

The broader mandala system also includes:

Tathagata	Wisdom	Mudra
Vairocana	Wisdom of Dharmadhatu (Ultimate Reality)	Dharmachakra
Amoghasiddhi	All-Accomplishing Wisdom	Abhaya

These symbolic associations serve as meditative tools for spiritual transformation and remain significant in Buddhist philosophical traditions.

5) In the context of conservation efforts for the Great Indian Bustard (GIB), what is the main objective of 'Operation Egg Transfer'?

- (a) To shift GIB eggs from Rajasthan to Gujarat for improving genetic diversity in the Thar population
- (b) To substitute unfertilized eggs in wild nests with fertilized eggs obtained through captive breeding in areas lacking male bustards

- (c) To safeguard eggs from predators by relocating them to artificial elevated nests
- (d) To stimulate double-clutching by removing the first egg for captive incubation

**Answer: (b)**

**Explanation:**

'**Operation Egg Transfer**' is an innovative conservation approach designed to revive declining populations of the Great Indian Bustard.

In regions such as **Kutch (Gujarat)**, the GIB population has become highly skewed due to the scarcity of adult males. As a result, wild females often lay **unfertilized eggs**, which cannot hatch.

To address this issue, the Forest Departments of **Gujarat** and **Rajasthan**, together with the Wildlife Institute of India, developed a strategy of replacing unfertilized eggs with **fertilized eggs** sourced from captive breeding centres or stable populations such as those in Rajasthan.

The process involves a carefully managed **decoy exchange**, where the unfertilized egg is replaced while the female is away from the nest. The female then continues incubation naturally and raises the chick after hatching.

The operation requires a strict **cold-chain system**, portable incubators, and controlled temperature-humidity conditions to ensure embryo survival during transport.

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**6) Consider the following statements regarding the Sahiwal breed of cattle:**

1. It is a temperate breed originating from Himalayan high-altitude regions.
2. The breed possesses strong resistance to heat stress and tick infestation, making it suitable for tropical climates.
3. Sahiwal milk contains **A1 beta-casein protein**, known for easier digestibility.

Which of the statements given above is/are correct?

- (a) 1 and 2 only
- (b) 2 only
- (c) 1 and 3 only
- (d) None

**Answer: (b)**

**Explanation:**

**Statement 1 is incorrect:** The **Sahiwal** is an indigenous **Zebu dairy breed** originating from the **Montgomery region (present-day Pakistan)** and adjoining Punjab areas. It evolved in **arid and semi-arid climates**, not in temperate Himalayan regions.

**Statement 2 is correct:** The breed exhibits remarkable **heat tolerance** and **resistance to parasites such as ticks**, making it one of the most suitable dairy breeds for tropical and subtropical environments worldwide.

**Statement 3 is incorrect:** Sahiwal milk is known for containing **A2 beta-casein protein**, not A1. The A2 variant is widely regarded as more digestible and has increased market demand.

Characteristic features of the breed include:

- Reddish-brown coat colour
- Prominent hump and loose skin
- Large dewlap

The breed is also locally referred to as “**Lola**” because of its loose skin folds.

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**7) Consider the following statements regarding OPU–IVF–ET technology (Ovum Pick-Up – In Vitro Fertilization – Embryo Transfer):**

**Statement I:** OPU–IVF–ET technology is considered more effective than traditional breeding methods for conserving indigenous breeds such as Sahiwal.

**Statement II:** The technology enables production of multiple offspring from a single elite donor cow within one year.

**Statement III:** IVF-derived embryos can be cryopreserved and transported across regions for implantation.

Which one of the following is correct?

- Both Statement II and Statement III are correct and both explain Statement I
- Both Statement II and Statement III are correct but only one explains Statement I
- Only one of Statements II and III is correct and explains Statement I
- Neither Statement II nor Statement III is correct

**Answer: (a)**

**Explanation:**

**Statement I is correct: OPU–IVF–ET technology** is an advanced reproductive tool used for rapid multiplication and conservation of valuable indigenous breeds such as **Sahiwal**, which are important for climate-resilient livestock development.

**Statement II is correct:** Under conventional breeding, a cow generally produces **one calf annually**. However, in OPU–IVF systems, eggs are collected from an elite donor while surrogate mothers carry the embryos, enabling production of **multiple offspring in a year**. This accelerates breed improvement and directly supports Statement I.

**Statement III is correct:** Embryos produced through IVF can be **cryopreserved (frozen)** and transported to distant locations without moving the donor animal itself. This facilitates wide-scale dissemination of superior genetics and also strengthens conservation efforts, thereby supporting Statement I.

Thus, **both Statements II and III explain why OPU–IVF–ET is considered a superior conservation and breeding technology.**

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**8) Consider the following statements regarding volcanoes and supervolcanoes:**

1. Supervolcanoes erupt more frequently than ordinary volcanoes.
2. Ordinary volcanoes generally exhibit steep, cone-shaped landforms.
3. Supervolcanic eruptions can produce global effects, whereas ordinary volcanic eruptions are mostly limited to local or regional impacts.

Which of the statements given above is/are correct?

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

**Answer: (b)**

**Explanation:**

**Statement 1 is incorrect:** Supervolcanoes erupt **very rarely**, often after intervals extending over thousands of years. In contrast, regular volcanoes experience eruptions comparatively more frequently.

**Statement 2 is correct:** Ordinary volcanoes are commonly characterized by **steep, conical structures**, formed through repeated deposition of lava, ash, and volcanic material.

**Statement 3 is correct:** Supervolcano eruptions can trigger **global consequences**, including climatic disturbances and ecosystem disruption, whereas regular volcanic eruptions generally affect surrounding local or regional areas.

### Difference between Volcano and Supervolcano

Aspect	Volcano	Supervolcano
Size	Relatively smaller, cone-shaped structure	Massive caldera systems extending across tens of kilometres
Eruption Volume	Less than <b>1,000 km<sup>3</sup></b> of erupted material	More than <b>1,000 km<sup>3</sup></b> of erupted material
Frequency	Comparatively frequent eruptions	Extremely rare; intervals may span millennia
Impact	Mostly local or regional effects	Global climatic and ecological consequences
Visibility	Usually visible as steep mountains	Often appears as broad depressions or calderas, difficult to identify

### 9) Consider the following statements regarding Notifiable Diseases:

**Statement-I:** Declaring a disease as notifiable under Indian law enables the government to strengthen surveillance and control measures.

**Statement-II:** Declaration of a notifiable disease automatically results in intervention by the **World Health Organization** in India's domestic public health system.

Which one of the following is correct?

- (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: (c)**

**Explanation:**

**Statement-I is correct:** Notification of a disease legally requires healthcare providers to report cases to authorities, enabling surveillance, contact tracing, quarantine, and timely public health responses.

**Statement-II is incorrect:** Declaring a disease as notifiable does not automatically involve WHO intervention. International involvement occurs only under specific mechanisms such as the **International Health Regulations (IHR)** for diseases of global concern.

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**10) Which one of the following best describes India's approach toward international refugee law?**

- (a) India follows only regional refugee agreements and not international frameworks
- (b) India adopts a case-by-case administrative approach despite not being a party to the 1951 Refugee Convention
- (c) India has signed but not ratified the 1951 Refugee Convention
- (d) India has enacted a dedicated refugee law aligned with the Convention

**Answer: (b)**

**Explanation:**

India is **not a signatory** to the **1951 Refugee Convention** or its **1967 Protocol** and has no dedicated refugee legislation. Refugees are managed through **administrative and executive decisions** based on humanitarian and strategic considerations.

Different refugee groups are addressed through **case-specific policies** rather than a codified legal framework.

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**11) Which of the following best explains why angstrom-scale chips, recently in news, could transform post-silicon computing?**

- (a) They eliminate the need for large data centres
- (b) They function without using transistors
- (c) They enable memory storage within biological tissues
- (d) They permit atomic-scale engineering of electronic properties

**Answer: (d)**

**Explanation:**

Angstrom-scale chips use **2D materials** such as **graphene** and **Transition Metal Dichalcogenides (TMDs)**, enabling manipulation of electronic properties at the atomic level.

These ultra-thin materials provide **high-speed switching**, **lower leakage currents**, and **energy-efficient performance**, offering capabilities beyond conventional silicon-based chips.

**About Angstrom-scale Chips:**

Aspect	Details
Scale	1 angstrom = 0.1 nanometre
Developed by	Indian Institute of Science
Materials Used	Graphene, TMDs
Applications	AI, quantum computing, flexible electronics, 5G/6G, space technologies

**12) Consider the following statements regarding the Eighth Schedule of the Indian Constitution:**

**Statement-I:** Inclusion of a language in the Eighth Schedule automatically grants it official language status in India.

**Statement-II:** Languages included in the Eighth Schedule receive constitutional and institutional support for promotion and development.

Which one of the following is correct?

- (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: (d)**

## Explanation:

**Statement-I is incorrect:** Inclusion in the **Eighth Schedule** does not automatically make a language an **official language**. Official language provisions are governed separately under **Articles 343–347**.

**Statement-II is correct:** Scheduled languages receive institutional support through education systems, examinations, literary promotion, and cultural preservation mechanisms.

## About the Eighth Schedule:

- Constitutional references: **Articles 344(1) and 351**
- Presently includes **22 languages**
- Originally contained **14 languages (1950)**
- Later additions: **Sindhi (1967); Konkani, Manipuri, Nepali (1992); Bodo, Dogri, Maithili, Santhali (2004)**

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## 13) What makes Perovskite Solar Cells (PSCs) promising for next-generation solar technologies?

- (a) They use silicon wafers for better photon trapping
- (b) They achieve high efficiency through organic dyes
- (c) They combine high efficiency with low-cost manufacturing methods
- (d) They generate electricity without sunlight

**Answer: (c)**

## Explanation:

**Perovskite Solar Cells (PSCs)** are emerging photovoltaic technologies known for **high power conversion efficiency** and **low-cost fabrication** through solution-based, low-temperature methods.

Unlike conventional silicon cells, PSCs can be manufactured through **printing and coating techniques**, reducing production costs and enabling scalability.

## About Perovskite Solar Cells:

Aspect	Details
Active Layer	Perovskite-structured compounds
Advantages	High efficiency, lightweight, flexible design
Fabrication	Low-temperature processing
Applications	Flexible electronics, transparent panels
Challenge	Toxicity (lead content) and shorter lifespan

**14) Consider the following statements regarding Moonlight Solar Panel Technology:**

**Statement-I:** Moonlight Solar Panels generate electricity at night by utilizing heat radiated away from their surfaces.

**Statement-II:** The technology works through thermoelectric generators that capture temperature differences created by radiative cooling.

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:**

**Statement-I is correct:** Moonlight Solar Panels can produce small amounts of electricity at night by utilizing heat lost from panel surfaces through **radiative cooling**.

**Statement-II is correct:** The technology uses **thermoelectric generators (TEGs)** to convert the temperature gradient created between the cooled panel surface and surrounding air into electrical energy. Thus, Statement-II correctly explains Statement-I.

## About Moonlight Solar Panel Technology:

Aspect	Details
<b>Working Principle</b>	Based on radiative cooling and thermoelectric conversion
<b>Mechanism</b>	Heat radiated into space creates a temperature difference captured by TEGs
<b>Night Output</b>	Around <b>50 mW/m<sup>2</sup></b>
<b>Applications</b>	LEDs, IoT devices, environmental sensors
<b>Advantage</b>	Can be retrofitted into existing solar installations

This technology is considered promising for **night-time energy harvesting** and improving overall solar energy utilization.

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