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1) 'Rhodamine B', recently seen in the news, is most commonly associated with which of the following?

- (a) A newly developed high-yielding variety of rice
- (b) A rare mineral discovered in deep-sea regions
- (c) A plant-based extract used in malaria treatment
- (d) An industrial dye illegally used in street food

Answer: (d)

Explanation

- Rhodamine B is a **synthetic industrial dye** widely used in textile coloring, paper industries, and laboratory applications such as fluorescent tracers. It imparts a **bright pink or reddish hue** and belongs to the class of xanthene dyes.
- However, Rhodamine B is **not permitted for use in food products** due to its harmful effects on human health. Scientific studies indicate that prolonged exposure to this chemical can lead to **toxicity, organ damage, and even carcinogenic risks**.
- Despite strict regulations, instances have been reported where Rhodamine B is **illegally added to street foods and processed items** to enhance visual appeal. It has been detected in artificially colored sweets, sauces, and even chili powder.
- Recognizing these risks, the Food Safety and Standards Authority of India has **strictly prohibited its use in food items**, and regular inspections are conducted to identify and prevent such violations.

2) Consider the following statements regarding 'Blue Dragons' (*Glaucus atlanticus*):

1. They are large, fire-breathing lizards found in caves of the Mediterranean region.
2. They are shell-less mollusks that spend their entire lives floating upside down on the ocean surface.
3. These organisms are herbivores and feed exclusively on underwater sea grasses.

How many of the above statements are correct?

- (a) Only one
- (b) Only two

(c) All three

(d) None

Answer: (a) Only one

Explanation

- Statement 2 is correct. The **Glaucus atlanticus**, commonly known as the Blue Dragon, is a **small marine nudibranch (sea slug)** rather than a reptile. It floats upside down at the ocean surface using **surface tension and a gas-filled sac** in its body.
- Statement 1 is incorrect. Blue Dragons are not mythical or reptilian creatures; they are **tiny marine invertebrates**, usually only a few centimeters long.
- Statement 3 is also incorrect. These organisms are **carnivorous predators**, not herbivores. They primarily feed on venomous organisms such as the **Portuguese Man O' War**.
- A remarkable adaptation seen in Blue Dragons is **kleptocnidia**, a process through which they **store the stinging cells (nematocysts)** of their prey in their own appendages. This allows them to use these stinging cells for defense, often making their sting more potent than that of their prey.
- Although typically found in tropical and subtropical oceans, recent sightings in the Mediterranean—especially near Spain—have been linked to **warming ocean temperatures and shifting currents**, making them a potential **bioindicator of climate change**.

3) Regarding the Geographical Indication (GI) Tag, consider the following statements:

Statement I: Once registered, a GI tag remains valid for a period of 10 years and can be renewed indefinitely.

Statement II: It provides a legal right to prevent third parties from using the same name for products that do not originate from the designated geographical region.

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

- Both statements are correct; however, they relate to **different dimensions of the Geographical Indication (GI) framework** and are not causally linked.
- Statement I correctly explains that a GI tag is granted for an initial period of **10 years**, after which it can be **renewed indefinitely**. This feature distinguishes GIs from other intellectual property rights such as patents, which have a fixed non-renewable duration.
- Statement II accurately describes the **legal protection conferred by a GI tag**. It grants the registered proprietor the authority to **prevent unauthorized use of the product name** by entities that do not belong to the specified geographical region.

- However, the **renewability of the GI (Statement I)** is a procedural aspect of maintaining the registration, whereas the **right to prohibit misuse (Statement II)** is a substantive legal right. Therefore, Statement II does not explain Statement I.

4) With reference to the “Piracy Paradox” in the context of the Orange Economy, which one of the following is the most accurate description?

- (a) A scenario where digital piracy leads to an absolute collapse of all creative industries.
- (b) A phenomenon where fast-paced copying of designs ensures renewed consumer demand but harms marginalized creators.
- (c) A legal principle that allows any government to seize intellectual property without compensation.
- (d) A market condition where creators voluntarily give away their rights to avoid being pirated.

Answer: (b)

Explanation:

- The “Piracy Paradox” is a concept discussed in the context of cultural appropriation and fashion. It refers to a situation where the rapid imitation or “piracy” of traditional designs—such as those used in Kolhapur chappals or tribal textiles—actually helps drive trends and demand for the “new” look in the fashion industry.
- However, this comes at the cost of cultural fairness, as the original, marginalized creators are neither acknowledged nor compensated, while large fashion houses profit from the repurposed designs. This paradox highlights the inadequacy of current IP laws (like the GI Act’s lack of design protection) to safeguard traditional cultural expressions that are often technically in the “public domain”.

5) With reference to the National Industrial Classification (NIC) 2025, consider the following statements:

1. It introduces a separate category for the “Gig Economy” and platform-based services for the first time.
2. The classification is “technology-agnostic,” meaning it does not distinguish between traditional and modern methods of performing an activity.

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

- Statement 1 is correct. The **National Industrial Classification (NIC) 2025** represents a significant update to India’s statistical framework by incorporating **emerging economic activities**. A key feature of this revision is the introduction of dedicated categories for the **gig economy and platform-based services**, including app-based delivery, ride-hailing, and digital platform work.
- This ensures that evolving forms of employment and economic participation are **accurately captured in official statistics**, improving the quality of national income accounting and labour data.

- Statement 2 is also correct. The NIC framework follows a “**technology-agnostic**” approach, meaning that industries are classified based on the **nature of economic activity rather than the technology used**.
- For example, whether a service is delivered through conventional means or via digital platforms, classification depends primarily on the **type of output or service provided**. This ensures **consistency, comparability, and continuity** in economic data across time periods despite technological changes.

6) Which of the following best describes the primary mandate of the National Cooperative Development Corporation (NCDC)?

- (a) To conduct elections for cooperative societies at the state level
- (b) To provide agricultural subsidies directly to farmers
- (c) To plan, promote, and finance programs for the development of cooperatives
- (d) To regulate the functioning of cooperative banks in India

Answer: (c)

Explanation

- The **National Cooperative Development Corporation** is a statutory body established under an Act of Parliament in 1963. Its primary role is to function as a **development finance institution dedicated to the cooperative sector**.
- Its core mandate involves the **planning, promotion, and financing of cooperative-based programs**, particularly in areas such as:
 - Agricultural production
 - Processing and storage
 - Marketing and distribution
 - Import and export of agricultural commodities and related services
- The NCDC provides financial assistance in the form of **loans and grants** to state governments and eligible cooperative societies to strengthen cooperative infrastructure and operations.
- It is important to note that:
 - It does **not conduct elections** for cooperative societies
 - It does **not provide direct subsidies** to farmers
 - It does **not regulate cooperative banks**, which falls primarily under the jurisdiction of the Reserve Bank of India

7) Consider the following statements regarding the S.H.I.N.E. (Science, Health and Innovation for Nextgen Explorers) initiative:

1. It is a scholarship programme for students pursuing postgraduate studies in biomedical research.
2. The initiative is a collaboration between the Indian Council of Medical Research (ICMR) and the Ministry of Education.
3. The programme aims to inspire school students to pursue careers in health and biomedical research through outreach activities.

How many of the above statements are incorrect?

- (a) Only one
- (b) Only two

(c) All three

(d) None

Answer: (b) Only two

Explanation

- Statement 1 is incorrect. The **S.H.I.N.E. initiative** is not a scholarship programme designed for postgraduate students. Instead, it functions as an **outreach and awareness initiative**, primarily targeting younger students to generate interest in scientific fields, particularly health and biomedical research.
- Statement 2 is incorrect. The programme is not a formal collaboration between the **Indian Council of Medical Research** and the Ministry of Education. Rather, it is associated with **science outreach efforts led by health research institutions**, especially those involved in biomedical research promotion.
- Statement 3 is correct. The principal objective of the initiative is to **encourage school students to explore careers in health sciences and biomedical innovation**.
- Through activities such as interactive sessions, laboratory exposure, mentorship programmes, and awareness campaigns, it seeks to **foster scientific curiosity and guide students toward research-oriented careers in the health sector**.

8) Regarding the “Heeng” (Asafoetida) mission in India, which of the following statements is correct?

- (a) Heeng is a tropical plant that was historically grown in the coastal regions of Southern India.
- (b) India is the world's largest producer of Heeng and exports it primarily to Central Asian countries.
- (c) The first successful flowering and seed setting of Heeng in India was reported by CSIR-IHBT Palampur in 2025.
- (d) Heeng resin is extracted from the leaves of the plant during the monsoon season.

Answer: (c)

Explanation:

- Option (c) is the correct statement. In May 2025, scientists at the CSIR-Institute of Himalayan Bioresource Technology (IHBT) in Palampur reported a landmark technical breakthrough: the first flowering and seed setting of Heeng (*Ferula assa-foetida*) in India. This event is significant because it proves that the plant has successfully acclimatized to Indian conditions and completed its full reproductive cycle. Historically, India was 100% dependent on imports from Afghanistan, Iran, and Uzbekistan, spending over ₹900 crore annually. Heeng is not a tropical plant; it requires cold and arid (desert) conditions typical of high-altitude regions like Lahaul-Spiti.
- Options (b) and (d) are incorrect because India is a consumer, not a producer, and the resin is actually extracted from the taproot and stem of the perennial plant after it reaches maturity in about five years. The mission, launched in 2020, utilized ecological niche modelling to find suitable semi-arid Himalayan sites for these trials.

9) Consider the following statements regarding the regulatory bodies established under the Insecticides Act, 1968:

1. **Statement-I:** The Central Insecticides Board (CIB) is the statutory authority empowered to grant registration certificates for new insecticides in India.
2. **Statement-II:** The Registration Committee (RC) advises the Central and State Governments on technical matters such as safety measures and risk assessment.

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

Answer: (d)

Explanation:

- Under the Insecticides Act, 1968, the regulatory structure clearly distinguishes between advisory and executive functions. The **Central Insecticides Board (CIB)** is primarily an advisory body. It advises the Central and State Governments on technical matters related to the administration of the Act, including safety precautions, risk minimization, and regulatory standards. It does **not** grant registration certificates for insecticides. Therefore, Statement-I is incorrect.
- The authority empowered to grant registration certificates for insecticides is the **Registration Committee (RC)**. The RC scrutinizes applications for registration, evaluates data on efficacy and safety, and decides whether a particular insecticide can be manufactured, imported, or sold in India. Hence, Statement-II is also incorrect because advisory functions belong to the CIB, not the RC.

10) Match the following Geographical Indication (GI) products with their respective states:

GI Product	State
1. Sirsi Supari	Karnataka
2. Kovilpatti Kadalai Mittai	Tamil Nadu
3. Chakhao	Manipur
4. Sojat Mehndi	Rajasthan

Select the correct answer using the code given below:

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

Answer: (d)

Explanation

- All the given pairs are correctly matched, as each product has been granted **Geographical Indication (GI) status** for its unique regional identity.
- **Sirsi Supari** is a well-known variety of arecanut cultivated in the Uttara Kannada district of Karnataka.

It is recognized for its **distinct quality, taste, and traditional processing techniques**, which are specific to this region, leading to its GI recognition.

- Kovilpatti Kadalai Mittai – Tamil Nadu: This is a traditional peanut-based sweet from Kovilpatti in Tamil Nadu. Prepared using **locally sourced groundnuts and jaggery**, it is known for its **unique taste and texture**, earning it a GI tag that highlights its regional authenticity.
- **Chakhao**, often referred to as black rice, is cultivated in Manipur. It is valued for its **aromatic quality, nutritional richness, and cultural importance**, and has been granted GI status due to its distinctive characteristics.
- **Sojat Mehndi**, produced in the Sojat region of Rajasthan, is renowned for its **high lawsone content**, which gives it a **deep and long-lasting color**. Its superior quality has earned it Geographical Indication recognition.

11) Consider the following statements regarding “Nanoplastics” and their health impacts:

1. They can induce “Cellular Senescence,” a condition in which cells stop dividing and contribute to chronic inflammation.
2. Direct interaction with immune cells can trigger the release of pro-inflammatory cytokines.
3. Unlike larger particles, nanoplastics are easily metabolized and excreted by the human liver within 24 hours.

How many of the above statements are correct?

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

Answer: (b) Only two

Explanation

- Statement 1 is correct. Exposure to nanoplastics can initiate a range of toxic effects, including **cellular senescence**, a condition where cells remain metabolically active but cease to divide. These senescent cells release inflammatory factors that contribute to **chronic inflammation** in surrounding tissues.
- Statement 2 is also correct. Nanoplastics can directly interact with immune cells such as macrophages. This interaction stimulates the immune system, leading to the release of **pro-inflammatory cytokines**, which are associated with diseases such as cardiovascular disorders and neurodegenerative conditions.
- Statement 3 is incorrect. Nanoplastics are **not easily metabolized or excreted** by the human body. Due to their extremely small size, they can cross biological barriers and accumulate in tissues over time (**bioaccumulation**). Their persistence in the body is a major concern for long-term health risks.

12) With reference to the Cold Desert Biosphere Reserve, consider the following statements:

1. It is India’s first high-altitude biosphere reserve to be included in the UNESCO World Network of Biosphere Reserves (WNBR).
2. The reserve includes Pin Valley National Park, Kibber Wildlife Sanctuary, and Chandratul Wildlife Sanctuary.
3. The Snow Leopard acts as the apex predator regulating populations of species such as the Himalayan Ibex.

How many of the above statements are correct?

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

Answer: (c) All three

Explanation

- Statement 1 is correct. The **Cold Desert Biosphere Reserve**, located in Himachal Pradesh, has been included in the **UNESCO World Network of Biosphere Reserves (WNBR)**, marking it as a significant high-altitude ecological region.
- Statement 2 is correct. The reserve spans approximately 7,770 sq km and encompasses key protected areas such as **Pin Valley National Park**, along with the **Kibber** and **Chandratal Wildlife Sanctuaries**, forming a critical part of the trans-Himalayan ecosystem.
- Statement 3 is correct. The **Snow Leopard** serves as the flagship species and apex predator in this region. It regulates populations of herbivores like the **Himalayan Ibex** and blue sheep, thereby maintaining ecological balance.

13) With reference to the “Black Tigers” of Simlipal, which of the following statements are correct?

1. Their distinctive coat pattern is caused by a mutation in the Taqpep gene.
2. This condition is an example of “pseudo-melanism” rather than true melanism.
3. The high frequency of this trait is linked to inbreeding and genetic isolation.

Select the correct answer using the code given below:

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

Answer: (d)

Explanation

- Statement 1 is correct. Research by the **National Centre for Biological Sciences** has shown that the unusual coat pattern of Black Tigers is caused by a **missense mutation in the Taqpep gene**, which affects stripe formation.
- Statement 2 is correct. This phenomenon is termed **pseudo-melanism**, where the black stripes become broader and merge, giving the tiger a darker appearance. Unlike true melanism, the coat does not turn completely black.
- Statement 3 is correct. The high occurrence of this trait in **Simlipal Tiger Reserve** is due to **genetic isolation and inbreeding**. The population is relatively isolated, with the nearest tiger habitats located far away, leading to increased expression of this rare genetic trait.
- This isolation creates a “genetic bottleneck,” raising concerns about long-term survival. Conservationists recommend improving genetic diversity through **habitat connectivity and tiger corridors** to enable natural gene flow and reduce risks of genetic decline.

14) The Darien Gap is a roadless, dense rainforest that serves as a hazardous transit route for migrants between which two countries?

- (a) Mexico and Guatemala
- (b) Thailand and Myanmar
- (c) Brazil and Venezuela
- (d) Colombia and Panama

Answer: (d)

Explanation

- The **Darien Gap** is a roughly 60-mile stretch of rugged rainforest and swamp located between **Colombia** and **Panama**.
- It represents the only interruption in the **Pan-American Highway**, which otherwise connects Alaska to Argentina.
- Despite being one of the most inaccessible and dangerous terrains in the world—characterized by dense जंगल, नदी systems, and lack of infrastructure—it has become a major corridor for **irregular migration**, particularly for people attempting to reach North America.

15) Consider the following statements regarding the new rice varieties DRR Dhan 100 (Kamla) and Pusa DST Rice 1:

1. They are India's first genome-edited rice varieties, developed using Site-Directed Nuclease (SDN-1) technology.
2. Both varieties are classified as Genetically Modified (GM) crops and require mandatory approval from the Genetic Engineering Appraisal Committee (GEAC).

Which of the above statements are correct?

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

Answer: (a)

Explanation:

- DRR Dhan 100 (Kamla), developed by the Indian Institute of Rice Research, and Pusa DST Rice 1, developed by the Indian Agricultural Research Institute, are India's first genome-edited rice varieties released for cultivation. They were created using Site-Directed Nuclease-1 (SDN-1) technology, which enables precise edits in the plant's own DNA without inserting foreign genetic material. Therefore, Statement 1 is correct.
- Statement 2 is incorrect. Under India's regulatory framework (2022 guidelines), SDN-1 and SDN-2 genome-edited crops that do not contain transgenes are exempted from the stringent approval process applicable to conventional Genetically Modified (GM) crops. Hence, they do not require mandatory clearance from the Genetic Engineering Appraisal Committee (GEAC) like transgenic crops such as Bt cotton.