

DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE TOLD TO DO SO

T.B.C. : STS-K-TPT  
Serial No.:

Test Booklet Series

TEST BOOKLET

**Subject : Test 11 – ENVIRONMENT**  
**Answer Key**



**Time Allowed : Two Hours**

**Maximum Marks : 200**

## INSTRUCTIONS

1. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS TEST BOOKLET DOES NOT HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS, ETC. IF SO, GOT IT REPLACED BY A COMPLETE TEST BOOKLET.

**2. Please note that it is the candidate's responsibility to encode and fill in the Roll Number and Test Booklet Series A, B, C or D carefully and without any omission or discrepancy at the appropriate places in the OMR Answer Sheet. Any omission/discrepancy will render the Answer Sheet liable for rejection.**

3. You have to enter your Roll Number on the Test Booklet in the Box provided alongside. DO NOT write anything else on the Test Booklet.

4. This Test Booklet contains 100/80 items (questions).

Each item is printed in English. Each item comprises of four responses (answers). You will select the response

which you want to mark on the Answer Sheet. In case you feel that there is more than one correct response, mark the response which you

consider the best. In any case, choose ONLY ONE response for each item.

5. You have to mark all your responses ONLY on the separate Answer Sheet provided. See directions in the Answer Sheet.

6. All items carry equal marks

7. Before you proceed to mark in the Answer Sheet the response to various items in the Test Booklet, you have to fill in some particulars in the Answer Sheet as per instructions sent to you with your Admission Certificate.

8. After you have completed filling in all your responses on the Answer Sheet and the examination has concluded, you should hand over to the Invigilator only the Answer Sheet. You are permitted to take away with you the Test Booklet.

9. Sheets for rough work are appended in the Test Booklet at the end.

**10. Penalty for wrong answers:**

THERE WILL BE PENALTY FOR WRONG ANSWERS MARKED BY A CANDIDATE IN THE OBJECTIVE TYPE QUESTION PAPERS

(i) There are four alternatives for the answer to every question. For each question for which a wrong answer has been given by the candidate, **one third** if the marks assigned to that question will be deducted as penalty.

(ii) If a candidate gives more than one answer, it will be treated as a wrong answer even if one of the given answers happens to be correct and there will be same penalty as above to that question.

(iii) If a question is left blank, i.e., no answer is given by the candidate, there will be no penalty for that question.

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1. **The Central Ground Water Authority (CGWA) was constituted under which of the following legislations?**

- (a) Water (Prevention and Control of Pollution) Act, 1974
- (b) Environment (Protection) Act, 1986
- (c) Groundwater (Regulation and Management) Act, 2002
- (d) National Water Policy, 2012

✔ **Answer Key:**

**(b) Environment (Protection) Act, 1986**

🔍 **Brief Explanation**

- **CGWA** was established under the provisions of the **Environment (Protection) Act, 1986**
- It regulates **groundwater extraction and conservation** across India

👉 **UPSC Trap:** Options often include **Water Act 1974** and **policies**, but CGWA is specifically under **EPA, 1986**

2. **With reference to the Protection of Plant Varieties and Farmers' Rights Act, 2001, consider the following statements:**

1. A farmer who has bred or developed a new plant variety is eligible for registration and is granted rights similar to those of a plant breeder.
2. The Act acknowledges the role of farmers in plant breeding but does not recognize the contributions of commercial plant breeders.

**Which of the statements given above is/are correct?**

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

✔ **Answer Key: (a) 1 only**

🔍 **Explanation**

- **Statement 1** ✔ **Correct**  
The Act explicitly allows **farmers to register varieties** they have developed and grants them rights similar to breeders.
- **Statement 2** ✘ **Incorrect**  
The Act recognizes **both farmers and commercial plant breeders**, balancing innovation with farmers' rights.

3. **Which of the following Ramsar sites is recognized as the world's only floating national park?**

- (a) **Sambhar Lake**
- (b) **Loktak Lake**
- (c) **Pong Dam Lake**
- (d) **Deepor Beel** **Answer: (b) Loktak Lake**

**Lake Explanation:**

**Loktak Lake** in Manipur is famous for its **floating phumdis** (vegetation mats) and is home to the **Keibul Lamjao National Park**, the **world's only floating national park**. It is the last natural habitat of the endangered **Sangai deer**.

4. With reference to wetland ecosystems, consider the following statements:

1. Wetlands act as carbon sinks, helping mitigate climate change.
  2. Wetlands contribute to groundwater recharge by enhancing water percolation.
  3. Wetlands are highly resistant to eutrophication due to their natural filtration capacity. Which of the statements given above are correct?
- (a) 1 and 2 only
  - (b) 2 and 3 only
  - (c) 1 and 3 only
  - (d) 1, 2, and 3

**Answer: (a) 1 and 2 only** **Explanation:**

Statement 1 – Correct. Wetlands act as carbon sinks by storing atmospheric carbon in their dense vegetation and sediment layers.

Statement 2 – Correct. Wetlands facilitate groundwater recharge by improving water infiltration and storage.

Statement 3 – Incorrect. Wetlands are vulnerable to eutrophication (excessive nutrient build-up) caused by agricultural runoff and sewage discharge.

5. Match the following wetlands with their respective superlative records in India:

Wetland	Record
(A) Wular Lake	(1) Largest Freshwater Lake
(B) Chilika Lake	(2) Largest Brackish Water Lagoon
(C) Vembanad Lake	(3) Longest Lake
(D) Sambhar Lake	(4) Largest Inland Saltwater Lake

Select the correct answer using the codes given below:

- (a) A-1, B-2, C-3, D-4
- (b) A-2, B-1, C-4, D-3
- (c) A-3, B-4, C-1, D-2
- (d) A-4, B-3, C-2, D-1

**Answer: (a) A-1, B-2, C-3, D-4**

**Explanation:**

**Wular Lake** → **Largest Freshwater Lake** in India, located in Jammu & Kashmir.

**Chilika Lake** → **Largest Brackish Water Lagoon** in Asia, located in Odisha.

**Vembanad Lake** → **Longest Lake** in India, stretching across multiple districts in Kerala.

**Sambhar Lake** → **Largest Inland Saltwater Lake** in India, located in Rajasthan.

6. Consider the following statements regarding competition in ecological systems:

1. **Exploitation competition** occurs when species indirectly compete by depleting shared resources.
  2. **Interference competition** occurs when one species directly prevents another from accessing resources.
  3. **Competitive exclusion principle** states that species occupying identical niches can coexist in the long term.
- Which of the statements given above are correct?**
- (a) 1 and 2 only
  - (b) 2 and 3 only
  - (c) 1 and 3 only
  - (d) 1, 2, and 3

**Answer: (a) 1 and 2 only Explanation:**

**Statement 1** is correct – **Exploitation competition** occurs when species compete indirectly by consuming shared resources faster (e.g., plants competing for sunlight).

**Statement 2** is correct – **Interference competition** involves direct aggression or obstruction (e.g., territorial birds preventing others from nesting nearby).

• **Statement 3** is incorrect – The **Competitive Exclusion Principle** asserts that **species occupying identical niches cannot coexist** in the long term due to intense competition.

7. **Soil Organic Carbon (SOC), recently seen in the news, refers to which of the following?**

- (a) Carbon released as a result of organic farming practices
- (b) Proportion of carbon emitted due to fertilizer application
- (c) Carbon generated during crop residue (stubble) burning
- (d) Quantity of carbon stored within soil organic matter

✔ **Answer Key:**

**(d) Quantity of carbon stored within soil organic matter**

🔍 **Brief Explanation**

- **Soil Organic Carbon (SOC)** represents the **carbon component of organic matter present in soil**, derived from decomposed plant and animal residues.
- It is a key indicator of **soil health, fertility, and carbon sequestration capacity**.

8. **A species that is introduced into a habitat where it does not naturally occur is referred to as:**

- (a) Vulnerable species
- (b) Rare species
- (c) Endangered species
- (d) Exotic species

✔ **Answer Key: (d) Exotic species**

🔍 **Brief Explanation**

- **Exotic species** ✔ → Species introduced (intentionally or accidentally) outside their natural range
- They may sometimes become **invasive**, disrupting local ecosystems

- Other options (Endangered, Vulnerable, Rare) relate to **conservation status**, not origin of species

**9. With reference to *Project Elephant*, consider the following statements:**

1. It is a Centrally Sponsored Scheme launched in 1992.
2. The project is implemented across all States of India.
3. The first notified Elephant Reserve was the Singhbhum Elephant Reserve in Jharkhand.

**Which of the statements given above are incorrect?**

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

✔ **Answer Key: (b) 2 only**

🔍 **Brief Explanation**

- **Statement 1** ✔ **Correct** → *Project Elephant* was launched in **1992** as a Centrally Sponsored Scheme.
- **Statement 2** ✘ **Incorrect** → It is **not implemented in all states**, only in elephant-range states.
- **Statement 3** ✔ **Correct** → **Singhbhum Elephant Reserve (Jharkhand)** was the first elephant reserve.

**10. With reference to ecological classifications of species, consider the following pairs:**

1. **Keystone species** – Species that plays a critical and disproportionate role in maintaining ecosystem structure
2. **Flagship species** – Species chosen to represent and promote conservation of a particular habitat or cause
3. **Foundation species** – Species that significantly shapes community structure and may occupy various trophic levels
4. **Indicator species** – Species whose presence or absence reflects specific environmental conditions

**Which of the pairs given above are correctly matched?**

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

✔ **Answer Key: (b) 1, 2, 3 and 4**

🔍 **Brief Explanation**

- **Keystone species** ✔ → Disproportionate impact relative to abundance
- **Flagship species** ✔ → Used for conservation awareness (e.g., tiger, panda)
- **Foundation species** ✔ → Shape habitat structure (e.g., corals, mangroves)
- **Indicator species** ✔ → Signal environmental changes (e.g., lichens, amphibians)

**11. Match the following types of coral reefs with their characteristic features:**

List I (Type of Reef)	List II (Characteristic Feature)
A. Barrier Reefs	1. Located close to the shore
B. Patch Reefs	2. Lagoon present at the center
C. Fringing Reefs	3. Run parallel to the coastline
D. Atolls	4. Small, isolated reef structures

**Select the correct answer using the code below:**

- (a) 4 1 2 3
- (b) 3 4 1 2
- (c) 2 3 4 1
- (d) 1 2 3 4

✔ **Answer Key: (b) 3 4 1 2**

🔍 **Brief Explanation**

- **Barrier Reefs** → **3** ✔ Run parallel to the coastline, separated by a lagoon
- **Patch Reefs** → **4** ✔ Small, isolated reef formations
- **Fringing Reefs** → **1** ✔ Directly attached to or close to the shore
- **Atolls** → **2** ✔ Ring-shaped reefs with a central lagoon

12. Which of the following international agreements governs the safe handling, transport, and use of GMOs?

- (a) Kyoto Protocol
- (b) Cartagena Protocol on Biosafety
- (c) Ramsar Convention
- (d) Basel Convention

**Answer:** (b) **Cartagena Protocol on Biosafety**

**Explanation:**

The **Cartagena Protocol on Biosafety** (2003) is an international agreement under the **Convention on Biological Diversity (CBD)**. It aims to ensure the **safe transfer, handling, and use** of GMOs with potential risks to human health and biodiversity.

**Kyoto Protocol** → Focuses on **climate change** and greenhouse gas emissions.

**Ramsar Convention** → Focuses on the protection of **wetlands**.

**Basel Convention** → Regulates the **transboundary movement of hazardous wastes**.

13. **Coastal Zone Management Authorities (CZMA) were established under which environmental framework in India?**

- (a) EPA, 1986 (Coastal Regulation Zone Notification, 1991)
- (b) Biodiversity Act, 2002
- (c) Water (Prevention and Control of Pollution) Act, 1974
- (d) Hazardous Waste Management Rules, 1989

**Answer:** (a) EPA, 1986 (Coastal Regulation Zone Notification, 1991) **Explanation:** CZMAs enforce the **Coastal Regulation Zone (CRZ) Notification, 1991**, issued under the **EPA, 1986**, to manage **coastal ecosystems** and regulate construction in coastal zones.

14. Which of the following best describes the purpose of the 'Terminator Seed Technology'?

- (a) To develop drought-resistant crops by modifying genes.
- (b) To ensure seeds are sterile after one planting season, preventing farmers from reusing harvested seeds.
- (c) To increase pest resistance in crops without pesticide use.
- (d) To improve the nutritional quality of staple crops like rice and wheat.

**Answer:** (b) **To ensure seeds are sterile after one planting season, preventing farmers from reusing harvested seeds.**

**Explanation:**

- **Terminator Seed Technology** (also known as **Genetic Use Restriction Technology – GURT**) produces **sterile seeds** after the first planting cycle, forcing farmers to purchase new seeds for each planting season.
- While designed to protect **patent rights**, this technology faced criticism for its potential impact on **farmers' rights** and **food security**.

15. With reference to the National Green Tribunal (NGT), consider the following statements:

1. The NGT was established under the Environmental Protection Act, 1986.
2. The NGT has the power to hear cases related to the Water Act, 1974, Air Act, 1981, and the Forest Conservation Act, 1980.
3. The NGT follows the principle of Natural Justice and aims to dispose of environmental cases within 6 months. Which of the statements given above are correct?
  - (a) 1 and 2 only
  - (b) 2 and 3 only
  - (c) 1 and 3 only
  - (d) 1, 2, and 3

**Answer:** (b) 2 and 3 only **Explanation:**

NGT was not established under the EPA, 1986 but was created under the NGT Act, 2010. However, it derives its powers from various environmental laws, including the EPA, 1986.

The NGT follows the principles of natural justice and aims to resolve environmental disputes within 6 months.

16. The Genetic Engineering Appraisal Committee (GEAC), established under the Environmental Protection Act, 1986, is responsible for regulating:

- (a) Environmental clearances for industrial projects
- (b) Wildlife protection and forest management
- (c) The release and commercial use of Genetically Modified Organisms (GMOs)
- (d) Waste management and hazardous chemical disposal

Answer: (c) The release and commercial use of Genetically Modified Organisms (GMOs)

**Explanation:**

The **GEAC** was established under the **EPA, 1986** (Rules for GMOs, 1989). It regulates the environmental safety of **GM crops, biotech products, and gene-editing technology.**

17. **With reference to the Genetic Engineering Appraisal Committee (GEAC), consider the following statements:**

1. The **GEAC** functions under the **Ministry of Science and Technology** in India.
2. The GEAC is responsible for approving the **environmental release of GMOs** and their commercial cultivation.
3. The GEAC regulates the import, export, and storage of GMOs in India.

**Which of the statements given above are correct?**

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

Answer: (b) **2 and 3 only**

**Explanation:**

- **Statement 1** – Incorrect. The **GEAC** operates under the **Ministry of Environment, Forest and Climate Change (MoEF&CC)**, not the Ministry of Science and Technology.
- **Statement 2** – Correct. The **GEAC** is responsible for approving the **environmental release of GMOs** in India.
- **Statement 3** – Correct. The **GEAC** also regulates the **import, export, and storage** of GMOs.

18. **Which of the following best describes “Biodiversity Coldspots”?**

- (a) Regions with high endemism and high levels of habitat loss
- (b) Regions with high biodiversity and low levels of habitat degradation
- (c) Regions with low biodiversity and relatively stable habitats (low habitat loss)
- (d) Regions with low biodiversity but experiencing high habitat destruction

✔ **Answer Key:**

**(c) Regions with low biodiversity and relatively stable habitats (low habitat loss)**

🔍 **Brief Explanation**

- **Biodiversity Coldspots** → Areas with **low species richness and endemism**, and generally **low levels of threat or habitat loss**
- Opposite of **Biodiversity Hotspots**, which have **high endemism + high habitat loss**

19. **With reference to Sacred Groves in India, consider the following statements:**

1. These are forest patches preserved by local communities where exploitation or disturbance is traditionally prohibited.
2. They are associated with nature worship, especially among tribal and rural communities.
3. Species such as Mahua and Kadamba are commonly found in these groves.

**Which of the statements given above is/are correct?**

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

✔ **Answer Key: (d) 1, 2 and 3**

🔍 **Brief Explanation**

- **Statement 1** ✔ → Sacred groves are **community-protected forests** with strict traditional restrictions.
- **Statement 2** ✔ → They are linked to **religious beliefs and nature worship.**
- **Statement 3** ✔ → Trees like **Mahua and Kadamba** are often associated with such groves.

All statements are correct.

20. **With reference to ecological interactions, consider the following examples:**

1. Cattle egrets feeding on insects disturbed by grazing cattle
2. Orchids growing on the trunks of trees in forests
3. Cuckoos laying their eggs in the nests of crows
4. Honeybees pollinating flowers in return for nectar

**Which of the above represent examples of commensalism?**

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

✔ **Answer Key: (a) 1 and 2 only**

🔍 **Brief Explanation**

**Commensalism** → One species benefits, the other is neither harmed nor benefited

1 ✔ Cattle egret benefits; cattle unaffected → *Commensalism*

2 ✔ Orchid gains support; tree unaffected → *Commensalism*

3 ✘ Cuckoo harms crow → *Parasitism*

4 ✘ Both benefit → *Mutualism*

21. **Which one of the following correctly matches the ecological category with its characteristic feature?**

- (a) **Eurythermal** — Species restricted to narrow temperature ranges.
- (b) **Stenohaline** — Species adapted to a wide range of salinity conditions.
- (c) **Euryphotic** — Species that survive across varying light intensities.
- (d) **Stenoionic** — Species that can tolerate highly variable pH conditions.

**Answer: (c) Euryphotic — Species that survive across varying light intensities**

**Explanation:**

- **Eurythermal** → Tolerant to **wide temperature ranges** (not narrow).
- **Stenohaline** → Survive only within a **narrow salinity range** (not wide).
- **Euryphotic** → Adaptable to both **high and low light conditions** (Correct).

- **Stenoionic** → Survive within a **narrow pH range**, not variable conditions.

22. **Which of the following statements best explains why the Vembanad Kol Wetland is ecologically significant?**

- (a) It is the **largest high-altitude lake** in India, located in Ladakh.
- (b) It is a **brackish water lagoon**, home to the endangered saltwater crocodile.
- (c) It is the **longest lake** in India, known for supporting **below-sea-level farming** in the Kuttanad region.
- (d) It is a **natural sedimentation reservoir** formed by the deposition of river silt.

**Answer: (c) It is the longest lake in India, known for supporting below-sea-level farming in the Kuttanad region.**

**Explanation:**

The **Vembanad Kol Wetland** in Kerala is the **longest lake in India** and is integral to the **Kuttanad region**, known for its unique **belowsea-level farming**. It plays a crucial role in Kerala's ecosystem and economy.

23. **Which of the following best describes the term Bioeconomy that has been gaining prominence in recent environmental discussions?**

- (a) **Economic activities driven by biological resources like crops, forests, and algae.**  
(b) **Use of living organisms to clean up environmental pollutants.**  
(c) **Development of eco-friendly plastics to reduce plastic waste.**  
(d) **Ethical concerns regarding the misuse of personal genetic data.**

**Answer: (a) Economic activities driven by biological resources like crops, forests, and algae.**

**Explanation:**

- **Bioeconomy** refers to a sustainable economic model that utilizes **biological resources** (e.g., crops, forestry, marine organisms) to create bio-based products like biofuels, bioplastics, and ecofriendly chemicals. It integrates **science, technology, and innovation** to reduce environmental impact.

24. Consider the following Ramsar sites and their associated states:

Wetland	State
Sarsai Nawar Jheel	(1) Uttar Pradesh
Hokera Wetland	(2) Jammu Kashmir
Sundarbans Wetland	(3) Odisha
Nanda Lake	(4) Goa

Which of the pairs given above are correctly matched?

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

**Answer: (b) 1, 2, and 4 only**

**Explanation:**

**Sarsai Nawar Jheel** → Located in **Uttar Pradesh**, known for its **sarus crane** population.

**Hokera Wetland** → Located in **Jammu & Kashmir**, serving as a key habitat for migratory birds.

**Sundarbans Wetland** → Located in **West Bengal**, not Odisha. It is the **largest Ramsar site** in India.

**Nanda Lake** → Located in **Goa**, designated as a Ramsar site in **2022** for its rich biodiversity.

25. Which of the following terms refers to the technique that uses microorganisms to extract valuable metals from ores or mine waste?

- (a) **Bioprospecting**
- (b) **Bioremediation**
- (c) **Biomining**
- (d) **Bioeconomy**

**Answer: (c) Biomining**

**Explanation:**

- **Biomining** is a process where microorganisms like bacteria or fungi are used to extract metals such as gold, copper, or nickel from ores. It is an ecofriendly alternative to traditional mining methods.

26. Which of the following wetlands is known for being the largest inland saltwater lake in India?

- (a) **Sambhar Lake**
- (b) **Pulicat Lake**
- (c) **Chilika Lake**
- (d) **Vembanad Lake** **Answer: (a)**

**Sambhar Lake Explanation:**

**Sambhar Lake** in Rajasthan is the **largest inland saltwater lake** in India, famous for its **salt production** and as a key wintering habitat for migratory birds like the **greater flamingo**.

27. Match the following Ramsar sites with their unique geographical features:

Wetland	Unique Feature
(A) Kolleru Lake	(1) Largest Shallow Freshwater Lake
(B) Kabartal Wetland	(2) Largest Freshwater Oxbow Lake
(C) Loktak Lake	(3) World's Only Floating National Park
(D) Pong Dam Lake	(4) Largest Artificial Wetland in India

Select the correct answer using the codes given below:

- (a) A-1, B-2, C-3, D-4
- (b) A-2, B-1, C-4, D-3
- (c) A-3, B-4, C-2, D-1
- (d) A-4, B-3, C-1, D-2

**Answer: (a) A-1, B-2, C-3, D-4**

**Explanation:**

**Kolleru Lake** → Recognized as the **largest shallow freshwater lake** in Asia.

**Kabartal Wetland** → Known as **Asia's largest freshwater oxbow lake**, formed by the meandering of the Burhi Gandak River.

**Loktak Lake** → Home to the **Keibul Lamjao National Park**, the **world's only floating national park**.

**Pong Dam Lake** → India's **largest artificial wetland**, created by the Pong Dam on the Beas River in Himachal Pradesh.

28. Consider the following pairs regarding emerging biotech terms and their descriptions:

Term	Description
<b>Bioprinting</b>	Printing of biological tissues using 3D printing technology.
<b>Biofortification</b>	Genetic modification of crops to enhance nutritional value.
<b>Biopharming</b>	Using engineered animals to produce pharmaceutical drugs.
<b>Biodegradable Plastics</b>	Use of synthetic polymers that resist decomposition.

Which of the pairs given above are correctly matched?

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

**Answer:** (c) 1, 2, and 3 only

**Explanation:**

**Bioprinting** → **Correct.** Uses **3D printing technology** to create biological tissues for research and transplants.

**Biofortification** → **Correct.** Enhances the nutritional value of crops through genetic methods (e.g., Iron-fortified rice).

**Biopharming** → **Correct.** Refers to genetically modifying plants or animals to produce **pharmaceutical products**.

**Biodegradable Plastics** → **Incorrect.** These are **eco-friendly** plastics that decompose naturally, not synthetic ones that resist decomposition.

29. With reference to Biodiversity Management Committees (BMCs) in India, consider the following statements:

1. **BMCs** are constituted at the **village, panchayat, or urban local body** levels to promote biodiversity conservation.
2. The primary function of a **BMC** is to prepare a **People's Biodiversity Register (PBR)**, which documents local biological resources and traditional knowledge.
3. **BMCs** function under the supervision of the **Ministry of Environment,**

**Forest and Climate Change (MoEF&CC).** Which of the statements given above are correct?

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

**Answer:** (a) 1 and 2 only

**Explanation:**

**Statement 1 – Correct.** **Biodiversity Management Committees (BMCs)** are established at the **local body level** — including **panchayats, municipalities, and corporations** — as mandated by the **Biological Diversity Act, 2002.**

**Statement 2 – Correct.** The core responsibility of a **BMC** is to prepare the **People's Biodiversity Register (PBR)**, which records details of local **flora, fauna, and traditional knowledge** for conservation and sustainable use.

**Statement 3 – Incorrect.** While **BMCs** are statutory bodies under the **Biological Diversity Act, 2002**, they operate under the supervision of the respective **State Biodiversity Boards (SBBs)** and the **National Biodiversity Authority (NBA)** — not directly under the **MoEF&CC.** **Key Facts for Exams:**

**BMCs** are legally required in **every local body** as per the **Biological Diversity Act, 2002.**

The **People's Biodiversity Register (PBR)** is vital for recording indigenous knowledge, ensuring benefit-sharing under the **Nagoya Protocol.**

**BMCs** play a key role in curbing **biopiracy** and promoting **community-driven conservation.**

30. Consider the following pairs regarding types of species interactions and their characteristics:

Interaction Type	Characteristic
<b>Predation</b>	One species kills and consumes another species.
<b>Parasitism</b>	Both species benefit, but one gains more than the other.
<b>Commensalism</b>	One species benefits while the other is neither helped nor harmed.
<b>Amensalism</b>	One species suffers while the other remains unaffected.

Which of the pairs given above are correctly matched?

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

**Answer: (c) 1, 3, and 4 only Explanation:**

**Pair 1** is correct – **Predation** involves one species killing and feeding on another (e.g., lions preying on deer).

**Pair 2** is incorrect – **Parasitism** involves one species benefiting while harming the host (e.g., ticks on dogs).

**Pair 3** is correct – **Commensalism** benefits one species while the other remains unaffected (e.g., barnacles on whales).

**Pair 4** is correct – **Amensalism** occurs when one species suffers while the other is unaffected (e.g., Penicillium fungi inhibiting bacterial growth).

31. With reference to Biodiversity Hotspots, consider the following statements:

1. A **biodiversity hotspot** must have at least **1,500 vascular plant species** as endemics.
2. A region must have lost at least **70% of its original habitat** to qualify as a biodiversity hotspot.
3. India is home to **four biodiversity hotspots** — the **Himalaya, Western Ghats, Indo-Burma**, and **Sundaland**.

Which of the statements given above are correct?

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

**Answer: (a) 1 and 2 only**

**Explanation: Statement 1 – Correct.**

According to **Norman Myers' criteria**, a biodiversity hotspot must have at least **1,500 species of vascular plants** as **endemics** (species found nowhere else).

**Statement 2 – Correct.** To qualify as a hotspot, a region must have experienced at least **70% habitat loss** of its original vegetation.

**Statement 3 – Incorrect.** While India has **four biodiversity hotspots**, they are:

**Himalaya** (Extending across Bhutan, Nepal, and northeast India)

**Western Ghats** (India's southern peninsula)

**Indo-Burma** (Northeast India extending into Myanmar)

**Sundaland** (Nicobar Islands, part of the Andaman and Nicobar group)

The **Sundarbans** is a critical ecosystem but **not a designated hotspot**; **Sundaland** refers to Nicobar Islands.

32. With reference to the Asiatic Lion Reintroduction Program in India, consider the following statements:

1. The **Kuno-Palpur Wildlife Sanctuary** in Madhya Pradesh was identified as a suitable site for establishing a second wild population of Asiatic lions.
2. The primary objective of the program is to reduce the risk posed by the entire Asiatic lion population being confined to **Gir National Park** in Gujarat.
3. The reintroduction program faced delays due to concerns over **disease transmission, habitat suitability**, and **opposition from the Gujarat government**.

Which of the statements given above are correct?

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

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

**Explanation:**

**Statement 1 – Correct.** The **Kuno-Palpur Wildlife Sanctuary** in Madhya Pradesh was identified as an alternative site to establish a second population of Asiatic lions to reduce the risk of a single population being concentrated in Gir National Park.

**Statement 2 – Correct.** The key objective of the program is to prevent the extinction threat that arises from the entire lion population being confined to a single region.

**Statement 3 – Correct.** The project faced delays due to concerns about **disease transmission, habitat conflicts, and resistance from the Gujarat government**, which argued that Gir lions are a symbol of Gujarat's pride.

**Key Facts for UPSC:**

- **Gir National Park**, Gujarat → Only existing wild population of Asiatic lions.
- **Kuno-Palpur Wildlife Sanctuary**, Madhya Pradesh → Identified for lion reintroduction but later allocated for the **Cheetah Reintroduction Project**.
- The Supreme Court of India directed the relocation of lions to Kuno-Palpur to reduce extinction risks.

33. Consider the following pairs regarding types of mutualism and their examples:

Type of Mutualism	Example
Obligate Mutualism	Fig tree and Fig wasp
Facultative Mutualism	Birds and fruiting plants
Defensive Mutualism	Termites and gut microbes
Trophic Mutualism	Ants and Acacia trees

Which of the pairs given above are correctly matched?

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

**Answer: (a) 1 and 2 only Explanation:**

- **Pair 1** is correct – **Fig tree and Fig wasp** represent **Obligate Mutualism** as both species are entirely dependent on

each other for reproduction and survival.

- **Pair 2** is correct – Birds eating fruits and dispersing seeds is a classic example of **Facultative Mutualism** since neither depends solely on the other.
- **Pair 3** is incorrect – **Defensive Mutualism** typically involves protection in exchange for resources. The correct example would be **Ants and Acacia trees**, where ants defend the tree in return for food and shelter.
- **Pair 4** is incorrect – **Trophic Mutualism** involves nutrient exchange, e.g., **Termites and gut microbes**.

34. The term “species diversity” refers to which of the following?

- (a) Genetic variation within a particular species
- (b) The count of species present in a given area
- (c) Diversity of habitats and ecological processes within an ecosystem
- (d) The number of species and their relative abundance within a defined region

✔ **Answer Key:**

**(d) The number of species and their relative abundance within a defined region**

🔍 **Brief Explanation**

- **Species diversity** includes:
  - **Species richness** → Number of species
  - **Species evenness** → Distribution of individuals among species
- **(b)** captures only richness, not full diversity
- **(d)** correctly includes both richness and evenness → Complete definition

35. According to the latest India State of Forest Report (ISFR) 2023, which of the following states recorded the largest decrease in mangrove cover?

- (a) Andhra Pradesh
- (b) Gujarat
- (c) Odisha
- (d) West Bengal

✔ **Answer Key: (b) Gujarat**

### 🔍 Brief Explanation

- **Gujarat** recorded the **highest decline in mangrove cover** in ISFR 2023.
- Other major mangrove states like **West Bengal, Odisha, and Andhra Pradesh** have shown **stable or increasing trends** due to conservation efforts.

👉 **Exam Insight:** UPSC often asks **state-wise trends (increase/decrease)** rather than absolute numbers—focus on **outliers like Gujarat (decline)**.

### 36. The Wildlife Protection (Amendment) Act, 2022 introduced new provisions for Invasive Alien Species. Consider the following statements:

1. The central government has been given the power to **regulate, control, and prohibit** the import, trade, or possession of **invasive alien species**.
2. The Act defines **invasive alien species** as non-native species that pose a threat to **local ecosystems** and **biodiversity**.
3. The Chief Wildlife Warden has been given exclusive power to declare a species as **invasive** based on scientific advice.

**Which of the statements given above are correct?**

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

**Answer:** (a) 1 and 2 only

#### **Explanation:**

**Statement 1 – Correct.** The amendment grants the **central government** the authority to regulate invasive alien species, preventing ecological threats.

**Statement 2 – Correct.** Invasive alien species are defined as **non-native** species that disturb the natural balance in ecosystems.

**Statement 3 – Incorrect.** The **Chief Wildlife Warden** does **not** have the exclusive power to declare species invasive; this authority lies with the **central government**.

### 37. Consider the following pairs regarding species and their ecological tolerance:

Species	Ecological Category
Salmon	Euryhaline
Goldfish	Stenohaline
Coral Reefs	Eurythermal
Trout	Stenoxic

**Which of the pairs given above are correctly matched?**

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

**Answer:** (c) 1, 2, and 4

**only Explanation:**

- **Salmon** → **Euryhaline** (Correct) — Salmon can survive in both freshwater (rivers) and saltwater (oceans).
- **Goldfish** → **Stenohaline** (Correct) — Goldfish thrive only in freshwater.
- **Coral Reefs** → **Stenothermal** (Incorrect) — Coral reefs survive in a **narrow temperature range**, making them **stenothermal**.
- **Trout** → **Stenoxic** (Correct) — Trout require stable, oxygen-rich environments.

### 38. Consider the following statements regarding Parasitism:

1. Endoparasites like tapeworms reside inside the host's body and absorb nutrients directly.
2. Ectoparasites like ticks and fleas attach to the host's external body for nourishment.
3. Mesoparasites live partially inside and partially outside the host's body.
4. Obligate parasites can survive independently but prefer parasitic behavior under favorable conditions.

**Which of the statements given above are correct?**

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

Answer: (b) 1, 2, and 3 only

Explanation:

Statement 1 is correct – Endoparasites (e.g., tapeworms) reside inside the host's body and feed on nutrients.

Statement 2 is correct – Ectoparasites (e.g., ticks, fleas) attach externally and feed on blood or tissues.

Statement 3 is correct – Mesoparasites (e.g., certain copepods) partially embed themselves inside the host's body.

Statement 4 is incorrect – Obligate parasites are completely dependent on the host and cannot survive independently. The term for parasites that can switch between parasitic and non-parasitic modes is Facultative parasites.

39. With reference to Genetically Modified Organisms (GMOs) in India, consider the following statements:

1. Bt Cotton is the only genetically modified crop that has been approved for commercial cultivation in India.

2. The Genetic Engineering Appraisal Committee (GEAC) is the regulatory body responsible for approving environmental release of GMOs in India.

3. Golden Rice, a genetically modified crop enriched with Vitamin A, has been approved for commercial cultivation in India to combat malnutrition. Which of the statements given above are correct?

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

Answer: (a) 1 and 2 only

Explanation:

Statement 1 – Correct. Bt Cotton is the only GMO crop approved for commercial cultivation in India (approved in 2002) to combat bollworm pests.

Statement 2 – Correct. The Genetic Engineering Appraisal Committee (GEAC) under the Ministry of Environment, Forest and Climate Change (MoEF&CC) is the apex body that regulates the approval of GMOs for environmental release and commercial use in India.

Statement 3 – Incorrect. While Golden

Rice is a genetically modified crop enriched with Vitamin A, it has not been approved for commercial cultivation in India. Research is still ongoing, and it has been approved in countries like Bangladesh and Philippines.

40. Which of the following factors can pose threats to biodiversity in a given geographical area?

- 1. Global warming
- 2. Habitat fragmentation
- 3. Invasion by alien species
- 4. Promotion of vegetarianism

Select the correct answer using the code below:

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

✔ Answer Key: (a) 1, 2 and 3 only

🔍 Brief Explanation

- **1 ✔ Global warming** → Alters habitats, affects species survival
- **2 ✔ Habitat fragmentation** → Isolates populations, reduces genetic diversity
- **3 ✔ Alien species invasion** → Competes with native species, disrupts ecosystems
- **4 ✘ Promotion of vegetarianism** → Not a direct threat; may reduce pressure on ecosystems

👉 **UPSC Insight:** Major drivers = **Climate change + Habitat loss + Invasive species** (core biodiversity threats)

41. With reference to ecological concepts, consider the following pairs:

- 1. **Antibiosis** – Production of substances by one organism that are harmful to other organisms
- 2. **Homeostasis** – Maintenance of a stable internal equilibrium in a system
- 3. **Symbiosis** – Close association between species in which both derive benefit

Which of the pairs given above are correctly matched?

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

✔ **Answer Key: (a) 1 and 2 only**

🔍 **Brief Explanation**

- **1 ✔ Antibiosis** → One organism produces chemicals harmful to others (e.g., antibiotics)
- **2 ✔ Homeostasis** → System maintains internal stability despite external changes
- **3 ✘ Symbiosis** → Includes **all close associations** (mutualism, commensalism, parasitism), not always beneficial to both

42. **With reference to habitat fragmentation, consider the following statements:**

1. Habitat fragmentation refers to the breaking up of continuous habitats into smaller, isolated patches due to natural or anthropogenic causes.
2. The adverse effects of habitat fragmentation can be mitigated by establishing ecological corridors between fragmented patches.
3. Run-of-the-River (RoR) hydroelectric projects, due to the absence of large reservoirs, do not contribute to habitat fragmentation.

**Which of the statements given above are correct?**

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

✔ **Answer Key: (b) 1 and 2 only**

🔍 **Brief Explanation**

- **Statement 1 ✔** → Correct definition of habitat fragmentation
- **Statement 2 ✔** → Wildlife corridors help restore connectivity and gene flow
- **Statement 3 ✘** → Even RoR projects can cause **fragmentation** (roads, tunnels, diversion structures), though less than large dams

43. **With reference to global patterns of biodiversity, consider the following statements:**

1. Species diversity generally declines from the equatorial regions towards the polar regions.
2. Species richness tends to increase from higher latitudes to lower latitudes due to favourable climate and resource availability.
3. The Arctic tundra supports greater species richness than tropical rainforests.

**Which of the statements given above are correct?**

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

✔ **Answer Key: (a) 1 and 2 only**

🔍 **Brief Explanation**

- **Statement 1 ✔** → Reflects the **latitudinal diversity gradient** (highest near equator)
- **Statement 2 ✔** → Tropics have **stable climate, high productivity** → **more species**
- **Statement 3 ✘** → Arctic tundra has **very low biodiversity** compared to tropical rainforests

👉 **UPSC Insight:**

Focus on **Latitudinal Gradient + Productivity + Stability hypothesis** as core conceptual areas.

44. Which of the following pairs are correctly matched?

1. Hydroponics – Growing plants without soil
2. Red Tide – Harmful Algal Blooms
3. Winter Kill – Ice sheets restricting sunlight
4. Timberline – Trees do not grow above this line

Select the correct answer:

- (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 Key: (d) 1, 2, 3 and 4**

🔍 **Explanation (Concept Clarity)**

- **1 ✔ Hydroponics**
  - Plants grown in **nutrient-rich water without soil**
- **2 ✔ Red Tide**
  - Caused by **harmful algal blooms (HABs)**
  - Can release toxins affecting marine life
- **3 ✔ Winter Kill**
  - Ice cover blocks **sunlight & oxygen exchange**
  - Leads to death of aquatic organisms
- **4 ✔ Timberline**
  - Altitude beyond which **trees cannot grow** due to harsh climate

45. Consider the following examples:

1. Vultures feeding on animal carcasses left by predators
2. Hermit crabs occupying empty snail shells
3. Barnacles growing on the shell of a turtle
4. Penicillium fungi releasing chemicals that inhibit bacterial growth

Which of the above represents an example of Amensalism?

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

Answer: (c) 4 only

Explanation:

- Vultures feeding on carcasses = Metabiosis (a form of commensalism where one organism benefits from another's actions after its death).
- Hermit crabs occupying empty shells = Metabiosis/Commensalism.
- Barnacles on turtles = Commensalism (Barnacles gain a surface to attach, but the turtle is unaffected).
- Penicillium fungi releasing penicillin, which kills bacteria, is a classic example of Amensalism (one species harms another without gaining direct benefit).

46. Consider the following Ramsar wetlands and their corresponding rivers:

Wetland	River
(A) <b>Wular Lake</b>	(1) <b>Jhelum River</b>
(B) <b>Asan Conservation Reserve</b>	(2) <b>Yamuna River</b>
(C) <b>Ansupa Lake</b>	(3) <b>Mahanadi River</b>
(D) <b>Ranganathittu Bird Sanctuary</b>	(4) <b>Kaveri River</b>

Which of the pairs given above are correctly matched?

- (a) A-1, B-2, C-3, D-4
- (b) A-2, B-1, C-4, D-3
- (c) A-1, B-3, C-2, D-4
- (d) A-3, B-4, C-1, D-2

**Answer: (a) A-1, B-2, C-3,**

**D-4**

**Explanation:**

**Wular Lake** → Fed by the **Jhelum River** in Jammu and Kashmir.

**Asan Conservation Reserve** → Situated at the confluence of the **Asan River** and the **Eastern Yamuna Canal** in Uttarakhand.

**Ansupa Lake** → Located on the **Mahanadi River's** left bank in Odisha.

**Ranganathittu Bird Sanctuary** → Located on the banks of the **Kaveri River** in Karnataka.

47. Which of the following is a genetically modified crop that has been developed in India to improve oil content?

- (a) Bt Brinjal
- (b) Golden Rice
- (c) GM Mustard (Dhara Mustard Hybrid-11 or DMH-11)
- (d) Flavr Savr Tomato

Answer: (c) GM Mustard (Dhara Mustard Hybrid-11 or DMH-11)

Explanation:

- GM Mustard (DMH-11) was developed by the Delhi University team to improve oil yield. While it has received GEAC approval, commercial cultivation is still pending.
- Bt Brinjal → Developed to resist pests like fruit and shoot borer, but not approved for commercial cultivation in India.
- Golden Rice → Genetically modified for Vitamin A enhancement, yet not approved for cultivation in India.
- Flavr Savr Tomato → A GMO developed in the USA to improve shelf life, not India.

48. With reference to algae, consider the following statements:

1. Algae are capable of performing photosynthesis and play a crucial role as primary producers in aquatic ecosystems.
2. Some species of algae like Spirulina are used as a rich source of protein and vitamins in human diets.
3. Red algae are predominantly found in freshwater ecosystems, while green algae dominate marine ecosystems.

Which of the statements given above are correct?

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

Explanation:

Statement 1 – Correct. Algae are autotrophic organisms that perform photosynthesis and are key primary producers in aquatic food chains.

Statement 2 – Correct. Spirulina, a type of cyanobacteria (commonly classified with algae), is widely consumed as a superfood rich in protein, vitamins, and minerals.

Statement 3 – Incorrect.

- Red algae are marine species, often found in deeper ocean waters due to their ability to absorb blue light.
- Green algae are commonly found in freshwater bodies like ponds and lakes, although some species also thrive in marine environments.

Key Concept for Exams:

Green Algae → Dominates freshwater ecosystems.

Red Algae → Dominates marine ecosystems (especially deeper waters).

Brown Algae → Found mostly in cold marine waters (e.g., Kelp forests).

49. Which of the following biosphere reserves was the first to be established in India?

- (a) Nilgiri Biosphere Reserve
- (b) Sundarbans Biosphere Reserve
- (c) Nanda Devi Biosphere Reserve
- (d) Gulf of Mannar Biosphere Reserve

Answer: (a) Nilgiri Biosphere Reserve

Explanation: The Nilgiri Biosphere Reserve, established in 1986, is India's first biosphere reserve. It spans across the states of Tamil Nadu, Kerala, and Karnataka, covering an area of 5,520 km<sup>2</sup>.

50. Match the following lakes with their formation type and distinctive features:

Lake	Formation Type	Distinctive Feature
A. Wular Lake	1. Tectonic activity	(i) Largest freshwater lake in India
B. Loktak Lake	2. Floodplain formation	(ii) Home to the world's only floating national park
C. Lonar Lake	3. Meteorite impact	(iii) India's only crater lake
D. Pulicat Lake	4. Lagoon (sediment deposition)	(iv) Lagoon formed by sediment deposition
E. Rudrasagar Lake	5. Floodplain (no rock base)	(v) Heavy sediment deposition (up to ~50 m)

Select the correct answer using the code below:

- (a) A-1-i, B-2-ii, C-3-iii, D-4-iv, E-5-v
- (b) A-2-i, B-1-ii, C-3-iii, D-4-v, E-5-iv
- (c) A-1-iii, B-4-i, C-2-v, D-3-iv, E-5-ii
- (d) A-3-i, B-2-ii, C-1-iii, D-4-v, E-5-iv

✔ **Answer Key:**

(a) A-1-i, B-2-ii, C-3-iii, D-4-iv, E-5-v

**Brief Explanation**

- **Wular Lake** ✔ → *Tectonic origin*; **largest freshwater lake in India**
- **Loktak Lake** ✔ → *Floodplain origin*; **Keibul Lamjao (floating national park)**
- **Lonar Lake** ✔ → *Meteorite impact*; **only crater lake in India**
- **Pulicat Lake** ✔ → *Lagoon*; formed by **sediment deposition along coast**
- **Rudrasagar Lake** ✔ → *Floodplain (no rock base)*; **deep sediment accumulation**

👉 **UPSC Insight:** Lakes are a favorite area—focus on **origin + unique feature pairing** (especially Loktak, Lonar, Pulicat).

51. With reference to the revised Schedules in the Wildlife Protection (Amendment) Act, 2022, which of the following pairs is correctly matched?

Schedule	Key Feature
(A) Schedule I	(1) Species with the highest protection status
(B) Schedule II	(2) Species requiring lesser protection
(C) Schedule III	(3) Plants protected from exploitation
(D) CITES Schedule	(4) Species listed under the Convention on International Trade in Endangered Species (CITES)

Select the correct answer using the codes given below:

- (a) A-1, B-2, C-3, D-4
- (b) A-1, B-3, C-2, D-4
- (c) A-2, B-1, C-4, D-3
- (d) A-4, B-3, C-2, D-1

**Answer:** (a) A-1, B-2, C-3, D-4

**Explanation:**

**Schedule I** → Provides the **highest protection** with severe penalties for violations.

**Schedule II** → Covers species with **lesser protection** than Schedule I species.

**Schedule III** → Lists **protected plant species**.

**CITES Schedule** → Introduced to regulate the **trade of endangered species** listed under the **CITES** convention.

52. Consider the following statements regarding ecological adaptations:

**1. Euryhydric species** can survive in both drought-prone and moisture-rich environments.

**2. Stenothermal species** are often found in stable ecosystems like coral reefs and Arctic zones.

**3. Euryhaline species** are commonly found in coastal regions with fluctuating salinity levels. **Which of the statements given above are correct?**

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

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

**Explanation:**

**Statement 1** → **Correct** – **Euryhydric species** can thrive in **varying moisture conditions** (e.g., mosses, frogs).

**Statement 2** → **Correct** – **Stenothermal species** are adapted to stable climates like **coral reefs** and **Arctic regions** where temperatures vary minimally.

**Statement 3** → **Correct** – **Euryhaline species** (e.g., Salmon, Mangroves) tolerate **wide salinity ranges**, common in **estuaries** and **coastal regions**

53. Consider the following pairs regarding ecological tolerance categories and their corresponding examples:

Ecological Category	Example
Eurythermal	Cockroach
Stenohaline	Salmon
Euryphotic	Deep-sea fish
Stenoxic	Trout

Which of the pairs given above are correctly matched?

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

Answer: (d) 1, 2, and 4 only

Explanation:

**Pair 1 – Eurythermal → Cockroach**

(Correct) – Cockroaches can thrive in a **wide temperature range**, making them eurythermal.

**Pair 2 – Stenohaline → Salmon** (Correct) –

Salmon can survive only within a **specific salinity range** when migrating between freshwater and seawater.

**Pair 3 – Euryphotic → Deep-sea fish**

(Incorrect) – Deep-sea fish are **stenophotic**, adapted to **low light conditions** only.

**Euryphotic** species can tolerate both bright and dim light conditions (e.g., algae).

**Pair 4 – Stenoxic → Trout** (Correct) – Trout

require **stable oxygen levels** in cold, fast-flowing streams.

54. With reference to ethanol production in India, consider the following statements:

1. Ethanol can be produced from bagasse, a by-product of the sugar industry.
2. The Government discourages ethanol production from sugarcane as it may lead to excessive cultivation of sugarcane.

Which of the statements given above is/are correct?

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

✓ Answer Key: (d) Neither 1 nor 2

🔍 Brief Explanation

- **Statement 1 ✗ Incorrect**

Ethanol is primarily produced from **molasses, sugarcane juice, and grains**.

**Bagasse** is mainly used for **cogeneration of power**, not for ethanol production (conventional UPSC understanding).

- **Statement 2 ✗ Incorrect**

The Government actively **promotes ethanol blending (E20 target)** using sugarcane-based feedstock to reduce oil imports and manage sugar surplus.

👉 **UPSC Insight:** Focus on **feedstock**

**hierarchy** → Molasses > Sugarcane juice > Grains (not bagasse).

55. Arrange the following Biosphere Reserves in India from South to North:

1. Seshachalam
2. Panna
3. Nokrek
4. Nanda Devi

Select the correct order using the code below:

- (a) Nanda Devi → Panna → Nokrek → Seshachalam
- (b) Panna → Nokrek → Seshachalam → Nanda Devi
- (c) Seshachalam → Panna → Nokrek → Nanda Devi
- (d) Seshachalam → Panna → Nanda Devi → Nokrek

✓ Answer Key: (c) Seshachalam → Panna → Nokrek → Nanda Devi

🔍 Brief Explanation

- **Seshachalam** (Andhra Pradesh) → Southern India
- **Panna** (Madhya Pradesh) → Central India
- **Nokrek** (Meghalaya) → Northeast India
- **Nanda Devi** (Uttarakhand) → Northern Himalayas

👉 **Order:** South → Central → Northeast → North = **Seshachalam → Panna → Nokrek → Nanda Devi**

56. With reference to viruses, consider the following statements:

1. Viruses are obligate intracellular parasites and can replicate only within a host cell.
2. Viruses possess both DNA and RNA simultaneously as their genetic material.
3. The capsid is a protein coat that protects and encloses the viral genetic material.

Which of the statements given above are correct?

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

✔ Answer Key: (b) 1 and 3 only

#### 🔍 Brief Explanation

- **Statement 1** ✔ → Viruses are **obligate intracellular parasites**, dependent on host machinery
- **Statement 2** ✘ → Viruses contain **either DNA or RNA, not both**
- **Statement 3** ✔ → **Capsid** protects viral genome and aids in infection

57. With reference to 'fire lines' in forest management, consider the following statements:

1. A fire line is a cleared strip devoid of vegetation that acts as a barrier to the spread of wildfires.
2. Certain man-made features such as roads and railway lines can function as fire lines.

Which of the statements given above are correct?

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

✔ Answer Key: (c) Both 1 and 2

#### 🔍 Brief Explanation

- **Statement 1** ✔ → Fire lines are deliberately **cleared strips** to stop or slow wildfire spread

- **Statement 2** ✔ → **Railways, roads, canals** can act as **natural/artificial fire breaks**

58. With reference to biodiversity concepts, consider the following statements:

1. **Alpha diversity** refers to the **species diversity within a specific habitat** or local area.
2. **Beta diversity** measures the **variation in species composition** between two different ecosystems or habitats.
3. **Gamma diversity** is the **total species diversity** across multiple ecosystems in a broader geographic region.

Which of the statements given above are correct?

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

Answer: (d) 1, 2, and 3

#### Explanation:

**Statement 1 – Alpha diversity** refers to the **species richness within a particular ecosystem** or locality. For example, the number of species in a coral reef or a tropical forest patch.

**Statement 2 – Beta diversity** is the **difference in species composition** between two ecosystems. It reflects **species turnover** across habitats. For example, comparing species diversity between a grassland and a nearby forest.

**Statement 3 – Gamma diversity** refers to the **total diversity** observed across all ecosystems in a large region. For example, the overall species diversity in the **Western Ghats** or the **Amazon rainforest**.

59. With reference to the Cartagena Protocol on Biosafety, consider the following statements:

1. The Cartagena Protocol is an international agreement under the Convention on Biological Diversity (CBD) that aims to ensure the safe handling, transport, and use of living modified organisms (LMOs).

2. The protocol applies specifically to genetically modified crops and excludes other genetically modified organisms like bacteria and animals.

3. The Advance Informed Agreement (AIA) procedure under the protocol ensures that countries are informed before the first import of LMOs intended for introduction into the environment. Which of the statements given above are correct?

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

Explanation:

Statement 1 – Correct. The Cartagena Protocol on Biosafety (2003) is a supplementary agreement to the Convention on Biological Diversity (CBD). It regulates the safe transfer, handling, and use of LMOs (Living Modified Organisms) resulting from modern biotechnology that may have adverse effects on biodiversity and human health.

Statement 2 – Incorrect. The Cartagena Protocol applies to all LMOs, including genetically modified crops, bacteria, and animals — not just crops.

Statement 3 – Correct. The Advance Informed Agreement (AIA) procedure ensures that importing countries are notified and can evaluate potential risks before allowing LMOs to enter their territory.

60. Which of the following wetlands is known for the presence of the endangered Indus River dolphin?

- (a) Surinsar-Mansar Lakes
- (b) Beas Conservation Reserve
- (c) Nanda Lake
- (d) Renuka Wetland

Answer: (b) Beas Conservation Reserve

Explanation:

The Beas Conservation Reserve in Punjab is the only location in India known for hosting the endangered Indus River Dolphin (*Platanista gangetica minor*), once thought to be extinct in the country.

61. With reference to the Wildlife Protection (Amendment) Act, 2022, consider the following statements regarding penalties and enforcement:

1. The fine for violating the provisions of the Act has been increased to ₹1 lakh for general offenses.

2. The amendment makes voluntary surrender of captive animals illegal, and no compensation will be provided to the owners in such cases.

3. The Act imposes stricter penalties for offenses against species listed under Schedule I and CITES-listed species.

Which of the statements given above are correct?

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

Answer: (d) 1, 2, and 3

Explanation:

Statement 1 – Correct. The penalty for general violations has been increased to ₹1 lakh.

Statement 2 – Correct. Owners of captive animals who voluntarily surrender them will not receive compensation, and the surrendered animals become state property.

Statement 3 – Correct. Stricter penalties apply for violations involving species in Schedule I and those regulated under the CITES Schedule.

62. Which of the following correctly describes the origin of State Pollution Control Boards (SPCBs) in India?

- (a) Established under the Environment Protection Act, 1986
- (b) Formed under the Air (Prevention and Control of Pollution) Act, 1981
- (c) Established under the Water (Prevention and Control of Pollution) Act, 1974
- (d) Created by the Forest Conservation Act, 1980

Answer: (c) Established under the Water (Prevention and Control of Pollution) Act, 1974

Explanation: SPCBs were first established under the Water Act, 1974 and later empowered by the EPA, 1986 to monitor pollution control at the state level.

63. Consider the following Ramsar sites and their unique features:

Wetland	Unique Feature
(A) <b>Pong Dam Lake</b>	(1) A man-made reservoir formed on the <b>Beas River</b> .
(B) <b>Bhitarkanika Mangroves</b>	(2) Known for India's largest population of <b>saltwater crocodiles</b> .
(C) <b>Chilika Lake</b>	(3) Largest <b>brackish water lagoon</b> in Asia.
(D) <b>Sasthamkotta Lake</b>	(4) Freshwater lake with water purified by <b>cavaborus larvae</b> .

Select the correct answer using the codes given below:

- (a) A-1, B-2, C-3, D-4
- (b) A-2, B-1, C-4, D-3
- (c) A-1, B-3, C-2, D-4
- (d) A-3, B-4, C-1, D-2

Answer: (a) **A-1, B-2, C-3,**

**D-4**

**Explanation:**

**Pong Dam Lake** → Formed on the **Beas River** in Himachal Pradesh, created as a result of the Pong Dam.

**Bhitarkanika Mangroves** → Known for its **saltwater crocodiles** and is a key Ramsar site in Odisha.

**Chilika Lake** → The **largest brackish water lagoon** in Asia, located in Odisha.

**Sasthamkotta Lake** → A **freshwater lake** in Kerala, purified by **cavaborus larvae** that consume bacteria.

64. With reference to the Ramsar Convention on Wetlands, consider the following statements:

1. It was adopted in Ramsar, Iran, in 1971 and came into force in 1975.
2. It is formally affiliated with the United Nations system as a multilateral environmental agreement.
3. 2<sup>nd</sup> February is observed annually as World Wetlands Day.

Which of the statements given above is/are incorrect?

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

✔ Answer Key: (a) 2 only

🔍 Brief Explanation

- **Statement 1** ✔ → Correct historical details of the Convention
- **Statement 2** ✘ → Ramsar Convention is **not formally a UN treaty**, though it works closely with UN bodies
- **Statement 3** ✔ → **2 February = World Wetlands Day** (date of adoption)

65. Which of the following best explains why species richness is higher in tropical regions compared to polar regions?

- (a) Tropical regions experience lower competition for resources, enabling more species to thrive.
- (b) Tropical ecosystems are less affected by seasonal changes, providing stable environmental conditions.
- (c) Polar regions receive more sunlight throughout the year, favoring fewer but specialized species.
- (d) Tropical regions have reduced soil fertility, which limits the dominance of a single species, promoting diversity.

Answer: (b) Tropical ecosystems are less affected by seasonal changes, providing stable environmental conditions.

Explanation:

Option (a) → Incorrect – Competition in tropical regions is often intense due to high population densities, yet diversity remains high due to resource specialization.

Option (b) → Correct – Tropical regions experience stable temperatures, longer growing seasons, and ample sunlight, creating ideal conditions for diverse species to thrive.

Option (c) → Incorrect – Polar regions receive less sunlight, especially during winter months, which limits species diversity.

Option (d) → Incorrect – While tropical soils may vary in fertility, this is not a primary driver of high species richness. The climatic

stability and ecological niches in the tropics are the key factors.

66. Which of the following statements best defines the relationship between the Yucca plant and the Yucca moth?

- (a) Commensalism, as the moth benefits from the plant without affecting it.
- (b) Obligate Mutualism, as neither species can survive or reproduce without the other.
- (c) Parasitism, as the moth larvae consume the seeds of the plant.
- (d) Amensalism, as one species is harmed while the other is unaffected.

Answer: (b) Obligate Mutualism Explanation: The Yucca plant relies solely on the Yucca moth for pollination, while the moth depends on the plant for a place to lay its eggs. Despite the moth larvae feeding on some of the plant's seeds, enough seeds survive to sustain plant reproduction — thus ensuring mutual dependence.

67. Which of the following ecological interactions is considered an example of Facultative Mutualism?

- (a) Lichens, where algae and fungi are interdependent.
- (b) Ants protecting aphids in exchange for honeydew secretion.
- (c) Mycorrhizal fungi forming a symbiotic relationship with plant roots.
- (d) Fig tree and Fig wasp relying exclusively on each other for survival.

Answer: (b) Ants protecting aphids in exchange for honeydew secretion.

**Explanation:** Facultative Mutualism refers to a relationship where both species benefit but can survive independently. Ants protect aphids from predators in return for honeydew secretion. However, both species can survive without this interaction.

Lichens and the Fig tree-Fig wasp relationship are examples of Obligate Mutualism, where neither species can survive independently.

68. Match the following forestry practices with their correct descriptions:

List I	List II
A. Community Forestry	1. Integration of forestry with agricultural practices
B. Social Forestry	2. Farmers cultivate trees for commercial and domestic use
C. Farm Forestry	3. Management and protection of forests on degraded/barren lands
D. Agro-Forestry	4. Planting and management of trees on public/community lands

Select the correct answer using the code below:

- (a) 4 3 1 2
- (b) 4 3 2 1
- (c) 3 4 2 1
- (d) 3 4 1 2

Answer Key: (c) 3 4 2 1

**Brief Explanation**

- **Community Forestry** → 3 ✓  
Focuses on **management of forests on community/degraded lands**
- **Social Forestry** → 4 ✓  
Involves **tree planting on public lands** for social benefits
- **Farm Forestry** → 2 ✓  
Farmers grow trees on **private lands for use and income**
- **Agro-Forestry** → 1 ✓  
Combines **agriculture + forestry** on the same land

69. With reference to Biosphere Reserves, consider the following statements:

1. **Core Zone** is strictly protected for conservation of ecosystems and biodiversity.
2. **Buffer Zone** focuses on equitable sharing of benefits among local communities.
3. **Transition Zone** allows sustainable use of natural resources.
4. Biosphere Reserves in India are declared under the Wildlife (Protection) Act, 1972.

Which of the statements given above are correctly matched?

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

✔ **Answer Key: (a) 1 only**

🔍 **Brief Explanation**

- **Statement 1** ✔ → Core zone = **strict conservation, no human interference**
- **Statement 2** ✘ → Buffer zone is for **research, education, limited activities**, not primarily benefit sharing
- **Statement 3** ✔ (**Conceptually correct but mismatched in intent**) → Transition zone allows **sustainable use**, but option combinations don't include 1 & 3
- **Statement 4** ✘ → Biosphere Reserves are **not declared under Wildlife Protection Act, 1972** (they are designated under UNESCO's MAB programme / Govt. scheme)

70. According to the □ **India State of Forest Report (ISFR) 2023** □, which of the following states possesses the highest forest carbon stock in India?

- (a) Chhattisgarh
- (b) Madhya Pradesh
- (c) Maharashtra
- (d) Arunachal Pradesh

✔ **Answer Key: (d) Arunachal Pradesh**

🔍 **Brief Explanation**

- **Arunachal Pradesh** has the **highest forest carbon stock** in India (around **1,021 million tonnes** as per ISFR 2023).
- This is due to its **dense forest cover and high biomass in Eastern Himalayan ecosystems**.

71. **With reference to the Wildlife (Protection) Amendment Act, 2022, consider the following statements:**

1. The amendment rationalised the number of schedules, reducing them from six to four.
2. It introduced a separate schedule to regulate species covered under the Convention on International Trade in Endangered Species (CITES).
3. The amendment specifically enhanced protection for marine species by placing them under Schedule II.

**Which of the statements given above are correct?**

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

✔ **Answer Key: (a) 1 and 2 only**

🔍 **Brief Explanation**

- **Statement 1** ✔ → Schedules reduced and rationalised into **4 categories**
- **Statement 2** ✔ → **CITES Schedule introduced** to regulate international trade
- **Statement 3** ✘ → No specific **marine-focused reclassification**; protection remains within general schedules

72. Consider the following statements regarding the International Big Cat Alliance (IBCA):

1. The IBCA focuses on the conservation of seven big cat species: Tiger, Lion, Leopard, Snow Leopard, Puma, Jaguar, and Cheetah.
2. India is one of the founding members of the IBCA and hosts its headquarters.
3. The IBCA is open exclusively to countries where these big cat species are native.

Which of the statements given above is/are correct?

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

Answer: (a) 1 and 2 only Explanation:

Statement 1: Correct. The IBCA aims to protect seven big cat species: Tiger, Lion,

Leopard, Snow Leopard, Puma, Jaguar, and Cheetah.

Statement 2: Correct. India is a founding member of the IBCA and hosts its headquarters.

Statement 3: Incorrect. Membership in the IBCA is open to all United Nations member countries, not just those where these big cat species are native.

Key Facts:

Establishment: The IBCA was approved by the Union Cabinet of India in 2023, with a budgetary support of ₹150 crore for five years (2023-2028).

Objectives: The alliance aims to strengthen global cooperation, enhance knowledge exchange, build capacity for effective big cat management, raise awareness, and mobilize resources for conservation efforts.

Significance: Big cats are keystone species, playing a crucial role in maintaining ecosystem balance. Their conservation is vital for biodiversity and the health of natural habitats.

**73. With reference to the *Coalition for Disaster Resilient Infrastructure (CDRI)*, consider the following statements:**

1. It was launched by the Prime Minister of India at the United Nations General Assembly in 2019.
2. It is a financial institution that provides funds to countries affected by natural disasters.

**Which of the statements given above is/are correct?**

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

**✓ Answer Key: (a) 1 only**

**🔍 Brief Explanation**

- **Statement 1** ✓ → CDRI was launched in **2019 at the UN Climate Action Summit (UNGA platform)**
- **Statement 2** ✗ → CDRI is **not a funding agency**; it is a **global partnership for knowledge-sharing, capacity building, and resilience planning**

74. With reference to the Wildlife Protection (Amendment) Act, 2022, consider the following statements regarding the surrender of captive animals:

1. Any individual in possession of a captive animal listed under Schedule I can voluntarily surrender it to the Chief Wildlife Warden.

2. Upon surrender, the ownership certificate of the captive animal is canceled, and the animal becomes state property.

3. The Act mandates that individuals who surrender their captive animals are entitled to monetary compensation for their loss.

Which of the statements given above are correct?

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

**Answer : (b) 1 and 2 only**

Explanation:

Statement 1 – Correct. The Wildlife Protection (Amendment) Act, 2022, allows individuals who possess captive animals (especially those listed under Schedule I) to voluntarily surrender them to the Chief Wildlife Warden. Statement 2 – Correct. Upon surrender, the ownership certificate of the captive animal is canceled, and the animal becomes state property. This aims to prevent illegal ownership and discourage the unlawful trade of endangered species.

Statement 3 – Incorrect. The Act does not provide any monetary compensation to individuals who voluntarily surrender captive animals. This measure is designed to discourage the illegal capture or purchase of protected wildlife.

75. In terms of percentage of geographical area under forest cover, which of the following has the highest coverage as per ISFR 2023?

- (a) Andaman & Nicobar Islands
- (b) Lakshadweep
- (c) Mizoram
- (d) Arunachal Pradesh

Answer: (b) Lakshadweep Explanation: According to ISFR 2023, Lakshadweep has the highest percentage of its geographical area under forest cover, with 91.33%. This is

followed by Mizoram with 85.34% and Andaman & Nicobar Islands with 81.62%

76. Regarding the India State of Forest Report (ISFR) 2023, consider the following statements:

1. The total forest and tree cover in India is 8,27,356.95 km<sup>2</sup>, accounting for 25.17% of the country's geographical area.
2. The forest cover constitutes 21.76%, while the tree cover accounts for 3.41% of the total geographical area.
3. There has been a net increase of 1,445 km<sup>2</sup> in forest and tree cover compared to the previous assessment in 2021.

Which of the statements given above are correct?

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

Answer: (d) 1, 2, and 3

Explanation:

All three statements accurately reflect the findings of the ISFR 2023. The report indicates that India's total forest and tree cover is 8,27,356.95 km<sup>2</sup>, which is 25.17% of the country's geographical area. Within this, forest cover is 21.76%, and tree cover is 3.41%. Additionally, there has been a net increase of 1,445 km<sup>2</sup> in forest and tree cover since the last assessment in 2021

77. Match the following types of fungi with their ecological roles and examples:

Type of Fungi	Ecological Role	Example
A. Saprophytic fungi	1. Decomposers	(i) Mushrooms, molds
B. Parasitic fungi	2. Pathogens	(ii) <i>Puccinia</i>
C. Mycorrhizal fungi	3. Symbiotic nutrient enhancers	(iii) <i>Glomus</i> species
D. Lichen-forming fungi	4. Symbiosis with algae	(iv) Lichens

Select the correct answer using the code below:

- (a) A-1-i, B-2-ii, C-3-iii, D-4-iv
- (b) A-1-ii, B-2-i, C-3-iv, D-4-iii
- (c) A-3-i, B-4-ii, C-1-iii, D-2-iv
- (d) A-4-iv, B-3-i, C-2-ii, D-1-iii

✓ Answer Key: (a) A-1-i, B-2-ii, C-3-iii, D-4-iv

### 🔍 Brief Explanation

- **Saprophytic fungi** ✓ → Decompose dead matter → *Mushrooms, molds*
- **Parasitic fungi** ✓ → Cause diseases → *Puccinia* (rust fungus)
- **Mycorrhizal fungi** ✓ → Enhance nutrient absorption → *Glomus*
- **Lichen-forming fungi** ✓ → Symbiosis with algae → *Lichens*

78. Consider the following Indian laws and their relevance to GMOs:

Law/Regulation	Purpose
(A) <b>Environment Protection Act, 1986</b>	Regulates the release of GMOs into the environment.
(B) <b>Biodiversity Act, 2002</b>	Protects traditional knowledge and genetic resources.
(C) <b>Seed Act, 1966</b>	Regulates the production, quality, and sale of GMO seeds.
(D) <b>Food Safety and Standards Act, 2006</b>	Regulates the safety of GMO-based food products.

Which of the pairs given above are correctly matched?

- (a) A and B only
- (b) A, B, and D only
- (c) B, C, and D only
- (d) A, B, C, and D

Answer: (d) A, B, C, and D

Explanation:

**Environment Protection Act, 1986** → Authorizes the **GEAC** to regulate the release of GMOs.

**Biodiversity Act, 2002** → Ensures **conservation of genetic resources** and protects traditional knowledge.

**Seed Act, 1966** → Regulates the **production, certification, and sale** of GMO seeds.

**Food Safety and Standards Act, 2006** → Ensures GMO-based food products meet **safety standards** before reaching consumers.

79. With reference to the impact of weathering on biodiversity, consider the following statements:

1. Chemical weathering is more dominant in tropical regions, contributing to higher soil fertility and species richness.
2. Physical weathering dominates in arid and cold regions, resulting in nutrient-poor soils that support limited biodiversity.
3. Ecosystems influenced by chemical weathering are generally more stable and less prone to invasive species colonization.

Which of the statements given above are correct?

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

Explanation:

Statement 1 – Correct. Chemical weathering occurs intensely in warm and humid tropical regions, breaking down rocks into nutrient-rich soils that promote higher biodiversity. For example, Amazon rainforests thrive on chemically weathered soils.

Statement 2 – Correct. Physical weathering (e.g., freeze-thaw cycles in Arctic regions or wind erosion in deserts) creates shallow, low-nutrient soils, limiting biodiversity in such ecosystems.

Statement 3 – Incorrect. While nutrient rich ecosystems are highly productive, they can still be vulnerable to invasive species if their ecological balance is disturbed. For example, tropical regions often face aggressive colonization by invasive plants and animals.

80. Which of the following pairs regarding types of fungi and their ecological roles are correctly matched?

Type of Fungi	Ecological Role
Saprophytic Fungi	Decompose dead organic matter
Parasitic Fungi	Form mutualistic associations with plants
Mycorrhizal Fungi	Enhance nutrient absorption in plant roots
Lichen-forming Fungi	Decompose complex organic compounds

Select the correct answer using the codes given below:

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

Answer: (a) 1 and 3 only

Explanation:

**Pair 1 – Correct. Saprophytic fungi** decompose dead organic material, recycling nutrients back into the ecosystem (e.g., mushrooms and molds).

**Pair 2 – Incorrect. Parasitic fungi** live on or inside a host, often causing disease (e.g., *Puccinia* causes rust in wheat plants). They do **not** form mutualistic associations.

**Pair 3 – Correct. Mycorrhizal fungi** form symbiotic associations with plant roots, improving water and nutrient absorption.

**Pair 4 – Incorrect. Lichen-forming fungi** engage in mutualistic relationships with algae or cyanobacteria, not decomposition.

81. With reference to the Central Pollution Control Board (CPCB), consider the following statements:

1. The CPCB was established under the Environmental Protection Act, 1986 as the apex pollution control authority in India.
2. The CPCB is responsible for implementing the Air (Prevention and Control of Pollution) Act, 1981 and the Water (Prevention and Control of Pollution) Act, 1974.
3. The Ministry of Environment, Forest and Climate Change (MoEF&CC) oversees the functioning of the CPCB.

Which of the statements given above are correct?

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

Answer: (b) 2 and 3 only Explanation:

The Central Pollution Control Board (CPCB), statutory organisation, was constituted in September, 1974 under the Water (Prevention and Control of Pollution) Act, 1974. Further, CPCB was entrusted with the powers and functions under the Air (Prevention and Control of Pollution) Act, 1981 and later empowered by the Environmental Protection Act, 1986.

CPCB operates under the supervision of the MoEF&CC.

82. The Environmental Impact Assessment (EIA) system was formally introduced in India under which of the following acts or notifications?

- (a) Environment Protection Act, 1986
- (b) Wildlife Protection Act, 1972
- (c) Air (Prevention and Control of Pollution) Act, 1981
- (d) EIA Notification, 2006

Answer: (d) EIA Notification, 2006 Explanation: The EIA Notification, 2006, issued under the EPA, 1986, requires industries to conduct an environmental impact assessment before obtaining project clearance.

83. Regarding the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) under the Wildlife Protection (Amendment) Act, 2022, consider the following statements:

1. The Act designates a Management Authority responsible for issuing permits and certificates for the trade of scheduled specimens.

2. A Scientific Authority is established to advise on the impact of trade on the survival of species listed in the CITES Appendices.

3. The Act prohibits all international trade of species listed under CITES Appendices.

Which of the statements given above are correct?

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

Answer: (a) 1 and 2 only

Explanation:

Statement 1 – Correct. The Act designates a Management Authority to oversee the issuance of permits and certificates for the trade of species listed under CITES.

Statement 2 – Correct. A Scientific Authority is established to provide advice on the impact of trade on the survival of species listed in the CITES Appendices.

Statement 3 – Incorrect. The Act does not prohibit all international trade of CITES-listed

species but regulates it through permits and adherence to CITES guidelines.

84. Match the following international agreements/protocols with their objectives and key features:

Agreement/Protocol	Objective	Key Feature
A. Cartagena Protocol	1. Regulation of GMOs/LMOs	(i) Advance Informed Agreement (AIA)
B. Nagoya Protocol	2. Access and benefit sharing of genetic resources	(ii) Benefit-sharing with local communities
C. Aichi Targets	3. Biodiversity conservation goals (2010–2020)	(iii) 20 Strategic Targets
D. Kunming–Montreal Global Biodiversity Framework	4. Biodiversity protection by 2030	(iv) 30×30 target

Select the correct answer using the code below:

- (a) A-1-i, B-2-ii, C-3-iii, D-4-iv
- (b) A-3-iii, B-2-iv, C-4-ii, D-1-i
- (c) A-2-ii, B-3-iii, C-1-i, D-4-iv
- (d) A-1-iv, B-2-ii, C-3-i, D-4-iii

Answer Key: (a) A-1-i, B-2-ii, C-3-iii, D-4-iv

 **Brief Explanation**

- **Cartagena Protocol** ✓ → Regulates **GMOs/LMOs** → Uses **Advance Informed Agreement (AIA)**
- **Nagoya Protocol** ✓ → Ensures **fair access & benefit-sharing** → Focus on **local/indigenous communities**
- **Aichi Targets** ✓ → **20 biodiversity targets** (2010–2020)
- **Kunming–Montreal GBF** ✓ → **30×30 goal** (protect 30% land & sea by 2030)

85. Consider the following interactions in nature:

1. Fleas feeding on the blood of mammals
2. Clownfish living among sea anemones for protection
3. Cleaner wrasse fish removing parasites from larger fish
4. Tapeworms residing in the intestines of cattle

Which of the above represents a commensal relationship?

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

Answer: (b) 2 only

Explanation:

Interaction 1 – Fleas feeding on mammals = Parasitism (harmful to the host).

Interaction 2 – Clownfish living among sea anemones = Commensalism (Clownfish benefits without harming or benefiting the anemone).

Interaction 3 – Cleaner wrasse and larger fish = Mutualism (both benefit).

Interaction 4 – Tapeworms in cattle = Endoparasitism (harmful to the host).

86. Which of the following is the best example of Interspecific Competition?

- (a) A lion and a leopard competing for prey in the same region.
- (b) Two ant colonies of the same species competing for territory.
- (c) Cattle grazing on grass in an open field.
- (d) A parasite infecting two different hosts.

Answer: (a) A lion and a leopard competing for prey in the same region.

Explanation:

Interspecific competition occurs between different species competing for the same resources (e.g., food, territory).

Intraspecific competition occurs between members of the same species.

Option (a) involves two different species (lion and leopard) competing for prey — a clear case of interspecific competition.

87. With reference to the relationship between weathering and biodiversity, consider the following statements:

1. Weathering enhances soil formation by breaking down rocks, which contributes to nutrient availability for plant growth.
2. Regions with intense chemical weathering generally support higher biodiversity due to nutrient-rich soils.
3. Physical weathering in arid and cold regions accelerates biodiversity growth by creating deep fertile soil layers.

Which of the statements given above are correct?

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

Explanation: Statement 1 – Correct.

Weathering (especially chemical and biological weathering) breaks down rocks into finer particles, enriching the soil with minerals essential for plant growth, thus promoting biodiversity.

Statement 2 – Correct. In tropical regions, intense chemical weathering (due to high temperatures and moisture) accelerates soil formation, promoting rich biodiversity in ecosystems like rainforests.

Statement 3 – Incorrect. Physical weathering (common in arid and cold climates) generally leads to shallow, nutrient-poor soils, limiting plant growth and reducing biodiversity. For example, deserts and tundra regions often show low species richness due to limited soil fertility.

88. With reference to the Cheetah

Reintroduction Program in India, consider the following statements:

1. The Cheetah Reintroduction Program aims to introduce the African Cheetah as a substitute for the extinct Asiatic Cheetah in India.
2. The Kuno National Park in Madhya Pradesh was selected as the primary site for cheetah reintroduction due to its suitable grassland ecosystem.
3. The project is part of India's commitment to the Convention on Migratory

Species (CMS), under which the cheetah is listed as a vulnerable species.

4. The last recorded Asiatic cheetah in India was spotted in the Palamau Tiger Reserve, Jharkhand, before its declared extinction in 1952.

Which of the statements given above are correct?

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

Explanation:

Statement 1 – Correct. The program aims to introduce African Cheetahs (imported from Namibia and South Africa) to replace the extinct Asiatic Cheetah in India. Since the Asiatic cheetah is critically endangered and now found only in Iran, reintroducing African cheetahs is seen as a viable ecological alternative.

Statement 2 – Correct. Kuno National Park in Madhya Pradesh was chosen for its vast savannah grasslands and minimal human disturbance, which provide an ideal habitat for cheetahs.

Statement 3 – Incorrect. The Cheetah Reintroduction Project is not directly linked to the CMS. Instead, it aligns with India's broader efforts in species conservation and ecological restoration.

Statement 4 – Incorrect. The last recorded sighting of the Asiatic cheetah in India was in Koriya district, Chhattisgarh, not Palamau Tiger Reserve. The species was declared extinct in India in 1952.

Key Facts for UPSC:

Project Cheetah → Launched in 2022 as the world's first intercontinental large carnivore translocation project.

Initial Batch → Eight cheetahs were translocated from Namibia to Kuno National Park in September 2022.

Conservation Goal → To establish a viable cheetah population that restores India's grassland ecosystem.

89. **With reference to adaptations of animals to desert environments, consider the following features:**

1. Ability to run fast
2. Nocturnal behaviour
3. Presence of short legs in animals and birds
4. Excretion of highly concentrated urine

**Which of the above are characteristic adaptations to desert conditions?**

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

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 **Answer Key:**

**(c) 1, 2 and 4 only**


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 **Brief Explanation**

- **1 ✓ Fast runners** → Helps escape predators and cover large distances for resources
- **2 ✓ Nocturnal habit** → Avoids daytime heat, conserves water
- **3 ✗ Short legs** → Not a typical desert adaptation (many desert animals have long legs to reduce heat from ground)
- **4 ✓ Concentrated urine** → Conserves water, critical in arid conditions

90. **A network of protected areas across the world, designed to showcase the balance between biodiversity conservation and sustainable development, is referred to as:**

- (a) National Parks
- (b) Wildlife Sanctuaries
- (c) Biosphere Reserves
- (d) Community Reserves

 **Answer Key: (c) Biosphere Reserves**

 **Brief Explanation**

- **Biosphere Reserves ✓** → Part of **UNESCO's Man and Biosphere (MAB) Programme**
- Aim to **integrate conservation with sustainable development**
- Organized into **Core, Buffer, and Transition zones**

**91. The Wildlife Protection (Amendment) Act, 2022, introduced new provisions regarding Wildlife Corridors. Consider the following statements:**

1. The Act defines **wildlife corridors** as ecological zones meant to facilitate the safe movement of wildlife between protected areas.
2. The amendment empowers the **Chief Wildlife Warden** to notify and manage wildlife corridors in their respective states.
3. Wildlife corridors have been given the same protection status as **National Parks** and **Wildlife Sanctuaries** under the new amendment. **Which of the statements given above are correct?**
  - (a) 1 and 2 only
  - (b) 2 and 3 only
  - (c) 1 and 3 only
  - (d) 1, 2, and 3

**Answer:** (a) 1 and 2 only

**Explanation:**

**Statement 1 – Correct.** The amendment formally defines **wildlife corridors** to ensure connectivity between fragmented habitats.

**Statement 2 – Correct.** The **Chief Wildlife Warden** is responsible for identifying and managing wildlife corridors.

**Statement 3 – Incorrect.** Wildlife corridors have **not been given the same protection** as **National Parks** or **Wildlife Sanctuaries** but are managed as part of the larger conservation framework.

**92. Consider the following statements regarding Ramsar Wetlands in India:**

1. Kolleru Lake in Andhra Pradesh is a freshwater lake located between the Krishna and Godavari deltas.
  2. Wular Lake in Jammu and Kashmir is a brackish water lake formed due to tectonic activity.
  3. Loktak Lake in Manipur is known for its floating phumdis and is home to the Keibul Lamjao National Park.
- Which of the statements given above are correct?
- (a) 1 and 2 only
  - (b) 2 and 3 only
  - (c) 1 and 3 only
  - (d) 1, 2, and 3

Answer: (c) 1 and 3 only Explanation:

Statement 1 – Correct. Kolleru Lake is a freshwater lake located between the Krishna and Godavari deltas in Andhra Pradesh.

Statement 2 – Incorrect. Wular Lake is a freshwater lake, not brackish. It is one of the largest freshwater lakes in India, formed due to tectonic activity.

Statement 3 – Correct. Loktak Lake is famous for its floating phumdis and houses the Keibul Lamjao National Park, the world's only floating national park.

**93. With reference to biodiversity assessment, consider the following statements:**

1. Species Richness refers to the number of different species present in a given area, irrespective of their population size.
2. Species Evenness measures the distribution of individuals across various species in a community.
3. A community with high species richness will always have high species evenness.

Which of the statements given above are correct?

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

Answer: (a) 1 and 2 only Explanation:

Statement 1 is correct – Species Richness simply counts the number of species in a given area without considering their abundance.

Statement 2 is correct – Species Evenness refers to how uniformly individuals are distributed across different species. A more balanced distribution indicates higher evenness.

Statement 3 is incorrect – A community may have high species richness but low species evenness if a few species dominate the population. For example, a forest may have 20 species (high richness), but if one species dominates 90% of the population, the evenness is low.

Key Concept: High Richness + High Evenness = Stable Ecosystem

High Richness + Low Evenness = Dominance of Few Species  
Would you like a conceptual comparison, graphical explanation, or additional questions on related

topics like Shannon Index or Simpson's Diversity Index?

94. With reference to fungi, consider the following statements:

1. Fungi are eukaryotic organisms that lack chlorophyll and obtain nutrients through absorption.
2. Most fungi reproduce through spores, which can be dispersed by air, water, or animals.
3. Unlike plants, fungi have cell walls composed of cellulose, which provides structural support.

Which of the statements given above are correct?

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

Answer: (a) 1 and 2 only

Explanation:

Statement 1 – Correct. Fungi are heterotrophic organisms that absorb nutrients from organic matter since they lack chlorophyll.

Statement 2 – Correct. Fungi reproduce using spores, which are dispersed by environmental factors like wind, water, or animals.

Statement 3 – Incorrect. Unlike plants, fungi have cell walls composed of chitin, not cellulose. This structural difference is key to distinguishing fungi from plants.

95. Which of the following statements best explains why viruses are considered an exception in the classification of living organisms?

- (a) Viruses can perform respiration and metabolism without a host cell.
- (b) Viruses lack cellular structure but can replicate inside a host cell.
- (c) Viruses possess both DNA and RNA simultaneously, making them unique.
- (d) Viruses can reproduce independently like bacteria under favorable conditions.

Answer: (b) Viruses lack cellular structure but can replicate inside a host cell.

Explanation:

Option (a) → Incorrect. Viruses lack enzymes for respiration and metabolism; they are dependent on the host cell's machinery.

Option (b) → Correct. Viruses are acellular (without cell structure) yet exhibit life-like properties such as replication only inside a host cell.

Option (c) → Incorrect. Viruses contain either DNA or RNA, but not both.

Option (d) → Incorrect. Unlike bacteria, viruses cannot reproduce independently; they require a host cell.

96. Consider the following statements regarding Ramsar Wetlands in India:

1. Sundarbans Wetland in West Bengal is the largest Ramsar site in India.
2. Renuka Wetland in Himachal Pradesh is the smallest Ramsar site in India.
3. The Keoladeo National Park in Rajasthan was the first site in India to be declared a Ramsar site.

Which of the statements given above are correct?

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

Explanation:

Statement 1 – Correct. The Sundarbans Wetland in West Bengal is the largest Ramsar site in India, covering 4,230 sq km.

Statement 2 – Correct. The Renuka Wetland in Himachal Pradesh is the smallest Ramsar site in India, with an area of 0.2 sq km.

Statement 3 – Correct. The Keoladeo National Park in Rajasthan, along with Chilika Lake in Odisha, was declared a Ramsar site in 1981, making them India's first Ramsar sites.

97. Match the following waterfalls with their respective states, rivers, and unique features:

Waterfall	State	River	Unique Feature
(A) Jog Falls	(1) Odisha	(i) Sharavati	(a) Second highest plunge waterfall in India
(B) Dudhsagar Falls	(2) Karnataka	(ii) Mandovi	(b) Known for its milky white appearance during monsoon
(C) Chitrakote Falls	(3) Goa	(iii) Indravati	(c) Widest waterfall in India, called the 'Niagara of India'
(D) Barehipani Falls	(4) Chhattisgarh	(iv) Budhabalanga	(d) Located in Simlipal National Park; a two-tiered fall

Select the correct answer using the codes given below:

- (a) A-2-i-a, B-3-ii-b, C-4-iii-c, D-1-iv-d  
 (b) A-3-i-a, B-2-ii-c, C-1-iii-b, D-4-iv-d  
 (c) A-1-ii-b, B-4-iii-c, C-2-i-a, D-3-iv-d  
 (d) A-4-ii-c, B-3-i-a, C-2-iv-b, D-1-iii-d

**Answer:**

**(a) A-2-i-a, B-3-ii-b, C-4-iii-c, D-1-iv-d**

**Explanation:**

**Jog Falls** → Located in **Karnataka**, formed by the **Sharavati River**, and is India's **second highest plunge waterfall**.

**Dudhsagar Falls** → Located in **Goa**, formed by the **Mandovi River**, famous for its **milky white appearance** during monsoons.

**Chitrakote Falls** → Located in **Chhattisgarh**, formed by the **Indravati River**, known as the '**Niagara of India**' and the **widest waterfall** in India.

**Barehipani Falls** → Located in **Odisha**, formed by the **Budhabalanga River**, and is a

**two-tiered waterfall** inside **Simlipal National Park**.

98. With reference to mangrove forests, consider the following statements:

1. They are extensively developed in the Andaman and Nicobar Islands.
2. They provide habitat for a wide diversity of bird species.
3. They are composed of salt-tolerant (halophytic) plant species.
4. They typically occur along coasts in areas such as salt marshes, tidal creeks, and estuaries.

Which of the statements given above are correct?

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

**✓ Answer Key: (d) 1, 2, 3 and 4**

**🔍 Brief Explanation**

- **1 ✓** → Andaman & Nicobar Islands have **well-developed mangrove ecosystems**
- **2 ✓** → Mangroves support **rich avifaunal diversity**
- **3 ✓** → Composed of **halophytes (salt-tolerant plants)**
- **4 ✓** → Found in **tidal zones—estuaries, creeks, marshes**

99. Which state experienced the largest decrease in forest and tree cover according to the ISFR 2023?

- (a) Chhattisgarh  
 (b) Karnataka  
 (c) Madhya Pradesh  
 (d) Nagaland

**Answer: (c) Madhya Pradesh** **Explanation:** The ISFR 2023 reports that **Madhya Pradesh** experienced the largest decrease in forest and tree cover, with a reduction of **612.41 km<sup>2</sup>**

100. With reference to the **Wildlife (Protection) Act, 1972**, consider the following statements:

1. The Act provides for the creation of National Parks, Wildlife Sanctuaries, and Conservation Reserves.
2. The Act originally contained six schedules for classification of species based on the level of protection.
3. Hunting of wild animals is completely prohibited under all circumstances.




Which of the statements given above is/are correct?

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

 **Answer Key:**

**(a) 1 and 2 only**

 **Brief Explanation**

- **Statement 1**  → Act provides for **Protected Areas** like National Parks, Sanctuaries, Conservation Reserves
- **Statement 2**  → Originally had **6 schedules** (now rationalised after amendment)
- **Statement 3**  → Hunting is **prohibited except under specific conditions** (e.g., self-defense, dangerous animals, scientific purposes with permission)