

**NEXT IAS**

# UPSC CSE PRELIMS

*Topicwise*

**PREVIOUS YEARS SOLVED PAPERS**

**2011-2023**

## GENERAL STUDIES

**13** YEARS  
SOLVED  
PAPERS

- ✓ Detailed explanation of options with additional information.
- ✓ Pictographic presentation through maps & graphs.
- ✓ Matched and Verified with the official answer key of UPSC.

[www.madeeasypublications.org](http://www.madeeasypublications.org)



**MADE EASY Publications Pvt. Ltd.**

Corporate Office: 44-A/4, Kalu Sarai  
(Near Hauz Khas Metro Station), New Delhi-110016  
Contact: 011-45124660, 8860378007  
E-mail: infomep@madeeasy.in  
Visit us at: [www.madeeasypublications.org](http://www.madeeasypublications.org)

**UPSC CSE (PRELIMS) PREVIOUS YEARS SOLVED PAPERS: GENERAL STUDIES**

© Copyright, by MADE EASY Publications Pvt. Ltd.

All rights are reserved. No part of this publication may be reproduced, stored in or introduced into a retrieval system, or transmitted in any form or by any means (electronic, mechanical, photo-copying, recording or otherwise), without the prior written permission of the above mentioned publisher of this book.

**First Edition: Jan 2023**

**Second Edition: July 2023 (Revised & Updated)**

MADE EASY PUBLICATIONS has taken due care in collecting the data and providing the solutions, before publishing this book. In spite of this, if any inaccuracy or printing error occurs then MADE EASY PUBLICATIONS owes no responsibility. MADE EASY PUBLICATIONS will be grateful if you could point out any such error. Your suggestions will be appreciated.

---

© All rights reserved by MADE EASY PUBLICATIONS PVT. LTD. No part of this book may be reproduced or utilized in any form without the written permission from the publisher.



### *Director's Message*

History is full of lessons, and History of UPSC Civil Services Examination lies in its previous year questions. I often tell students that the first and most important step to conquer an examination like UPSC Civil Services is to understand it thoroughly. The best way to understand the exam is through the syllabus and analysis of the previous year's questions. This book is an effort to make sure that you learn the most out of the history of the Civil Services Examination.

The book contains solved previous year questions of UPSC Civil Services (Preliminary) Examination from 2011-2023. The questions have been segregated subject-wise as well as topic-wise to make it more accessible for the students. The rationale behind including the questions starting from 2011 is the major shift in the pattern and difficulty level of the preliminary examination post-2011. A compilation from 2011-2023 ensures that the questions are in-line with the latest trend of the exam.

There are three distinctive features that make this book stand apart from the existing options. First, the answers have been thoroughly verified with the official answer key of UPSC. Second, all the options have been explained comprehensively with special emphasis on conceptual clarity. Third and the most important distinctive feature is its futuristic approach through a section of "Additional information" for each question. The recent trend shows that UPSC often frames questions around the core theme and the options of previous year questions. The section of "Additional Information" is intended to make students future-ready for such types of questions.

The NEXT IAS team has put sincere efforts in preparing this valuable resource for students. I hope this book will stand upto the expectations of aspirants and my desire to serve the student community by providing the best study material will get accomplished.

**B. Singh (Ex. IES)**

CMD, NEXT IAS & MADE EASY Group

# CSE (PRELIMS) PREVIOUS YEARS SOLVED PAPERS (2011-2023)

---

## C O N T E N T S

|     |                                   |         |
|-----|-----------------------------------|---------|
| 1.  | Indian Economy                    | 1-121   |
| 2.  | Indian Polity                     | 122-211 |
| 3.  | Geography                         | 212-297 |
| 4.  | History of Ancient India          | 298-323 |
| 5.  | History of Medieval India         | 324-341 |
| 6.  | History of Modern India           | 342-389 |
| 7.  | Art and Culture                   | 390-415 |
| 8.  | Ecology and Environment           | 416-513 |
| 9.  | Science and Technology            | 514-592 |
| 10. | Current Affairs and Miscellaneous | 593-640 |

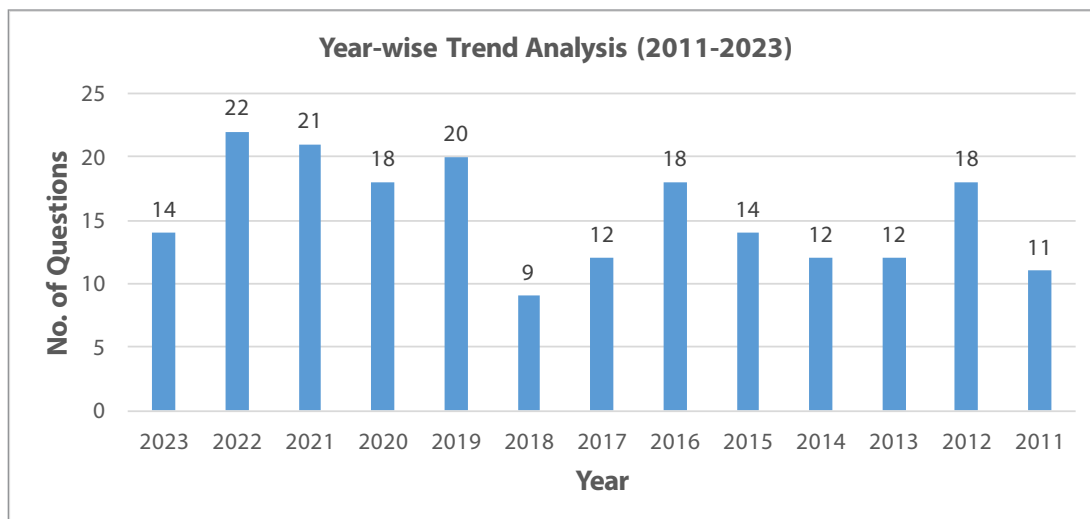
# ECOLOGY AND ENVIRONMENT

## UNIT VIII

### CONTENTS

|    |  |     |
|----|--|-----|
| 1. | Environment and Ecology: Basic Concepts                              | 418 |
| 2. | Biodiversity   | 424 |
| 3. | Climate Change   | 459 |
| 4. | Environment Degradation and Pollution                                | 471 |
| 5. | Environmental Governance and Environmental<br>Organizations in India | 484 |
| 6. | Environmental Organizations in the World                             | 489 |
| 7. | Miscellaneous  | 492 |

# ECOLOGY AND ENVIRONMENT



## TOPIC-WISE TREND ANALYSIS (2011-2023)

| S.No. | Topics  | Total Number of Questions |
|-------|---|---------------------------|
| 1.    | Environment and Ecology: Basic Concepts                           | 14                        |
| 2.    | Biodiversity  | 71                        |
| 3.    | Climate Change  | 22                        |
| 4.    | Environment Degradation and Pollution                             | 30                        |
| 5.    | Environmental Governance and Environmental Organizations in India | 10                        |
| 6.    | Environmental Organizations in the World                          | 7                         |
| 7.    | Miscellaneous   | 45                        |

# UNIT VIII

# ECOLOGY AND ENVIRONMENT

## 1. ENVIRONMENT AND ECOLOGY: BASIC CONCEPTS

1. "Leaf litter decomposes faster than in any other biome and as a result the soil surface is often almost bare. Apart from trees, the vegetation is largely composed of plant forms that reach up into the canopy vicariously, by climbing the trees or growing as epiphytes, rooted on the upper branches of trees". This is the most likely description of:

- (a) coniferous forest    (b) dry deciduous forest  
(c) mangrove forest    (d) tropical rainforest

(2021)

Ans. (d)

- **The above description is of Tropical rainforest.**  
The tropical rainforest is a hot, moist biome found near Earth's equator. The high temperature and moisture of tropical rainforests cause dead organic matter in the soil to decompose more quickly than other biomes. Leaves that fall to the forest floor decay quickly, leaving the soil surface almost bare.
- **More about Tropical rainforest:**
  - ♦ These thick forests occur in the regions near the equator and close to the tropics.
  - ♦ These regions are hot and receive heavy rainfall throughout the year.
  - ♦ As there is no particular dry season, the trees do not shed their leaves altogether. That's why they are also called **Tropical Evergreen Forests**.
  - ♦ Thick canopies of the closely spaced trees do not allow the sunlight to penetrate inside the forest even in the daytime.
  - ♦ Important trees found are hardwood trees like mahogany, ebony and rosewood.
  - ♦ About **80% of the world's documented species can** be found in tropical rainforests,

even though they **cover only about 6% of the Earth's land surface**.

- ♦ In India, these forests are found in Andaman and Nicobar Islands, parts of North-Eastern states and a narrow strip of the Western slope of the Western Ghats.
- ♦ The soil of most tropical rainforests contains few nutrients. The rich biodiversity in the canopy and quick decomposition of leaf litter from fungi and bacteria prevent the accumulation of nutrient-rich humus. Nutrients are confined to the rain forest's thin layer of topsoil. **Hence, option (d) is the correct answer.**

2. Consider the following kinds of organisms:

1. Copepods
2. Cyanobacteria
3. Diatoms
4. Foraminifera

**Which of the above are primary producers in the food chains of oceans?**

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

(2021)

Ans. (b)

- Primary producers or **Autotrophs** synthesize their own energy without needing to eat. Many primary producers photosynthesize, using the sun's energy to build carbohydrates. However, some of them can create **energy without sunlight using chemosynthesis** to metabolize chemicals released from hydrothermal vents, methane seeps, and other geological features. In terrestrial ecosystems, major producers are plants and photosynthetic bacteria. In aquatic ecosystems primary producers are various species of:
1. **Phytoplankton:**
    - ♦ Also known as **microalgae**, they are similar to terrestrial plants in that they contain chlorophyll and require sunlight in order to

live and grow. Most phytoplankton float in the upper part of the ocean.

- ♦ **The two main classes of phytoplankton are dinoflagellates and diatoms.** Dinoflagellates use a whip-like tail, or flagella, to move through the water, whereas Diatoms rely on ocean currents to travel through the water.

## 2. Algae:

- ♦ Algae are chlorophyll-bearing and largely aquatic (both freshwater and marine) organisms. They occur in a variety of other habitats like moist stones, soils and wood.

## 3. Cyanobacteria:

- ♦ Cyanobacteria, also called **blue-green algae**, are microscopic organisms found naturally in all types of water. These single-celled organisms live in fresh, brackish (combined salt and freshwater), and marine water. They have chlorophyll similar to green plants and are photosynthetic autotrophs.
- ♦ Though they are commonly called blue-green algae, they are not algae.
- ♦ Cyanobacteria blooms form when cyanobacteria, which are normally found in the water, start to multiply very quickly. Cyanobacteria blooms that harm people, animals, or the environment are called cyanobacteria harmful algal blooms.

## 3. In case of which one of the following biogeochemical cycles, the weathering of rocks is the main source of release of nutrient to enter the cycle?

- Carbon cycle
- Nitrogen cycle
- Phosphorus Cycle
- Sulphur Cycle

(2021)

Ans. (c)

- Phosphorus is a major constituent of biological membranes, nucleic acids and cellular energy transfer systems. Many animals also need large quantities of this element to make shells, bones and teeth. Phosphorus is generally found as phosphates in ocean sediments or rocks. Much of it gets deposited in the sea and shallow

sediments. The sedimentary rocks are the largest reservoir of phosphorus. **The phosphorus cycle begins in sedimentary rocks where it is released from these deposits by weathering, leaching and mining.** When it rains, phosphates are removed from the rocks (weathering) and distributed in soil and water.

## ADDITIONAL INFORMATION

- **Carbon cycle:** Carbon cycle involves assimilation of atmospheric carbon dioxide by plants, conversion of carbon into carbohydrates by plants and their utilization to release energy via respiration. The release of carbon back into the environment occurs via decomposition. The ocean contains the largest pool of carbon near the surface of the Earth, but most of that pool is not involved with rapid exchange with the atmosphere.
- **Nitrogen cycle:** The largest reservoir of nitrogen is the atmosphere, which contains about 78% of nitrogen gas (N<sub>2</sub>). Nitrogen cycles are characterized by fixing of atmospheric nitrogen by microbes, mainly bacteria. The processes such as nitrification, ammonification and denitrification help in fixation and conversion of atmospheric nitrogen to other forms that can be taken up by plants and animals. Nitrogen gets assimilated as nitrate and ammonium by plants.
- **Sulphur cycle:** The sulphur reservoir is in the soil and sediments where it is locked in organic (coal, oil and peat) and inorganic deposits (sulphur rock). It is released by weathering of rocks, erosional runoff and decomposition of organic matter and is carried to terrestrial and aquatic ecosystems in salt solution. Sulphur enters the atmosphere from several sources like volcanic eruptions, combustion of fossil fuels (coal, diesel etc.), from the surface of the ocean and from gases released by decomposition. Atmospheric sulphur dioxide is carried back to the earth after being dissolved in rainwater as weak sulphuric acid.

## 4. Which of the following are detritivores?

1. Earthworms
2. Jellyfish
3. Millipedes
4. Seahorses
5. Woodlice



Select the correct answer using the code given below:

- (a) 1, 2 and 4 only      (b) 2, 3, 4 and 5 only  
(c) 1, 3 and 5 only      (d) 1, 2, 3, 4 and 5

(2021)

Ans. (c)

- Among the given choices, only Earthworms, Millipedes and Woodlice are detritivores.
- A detritivore is a heterotrophic organism, which obtains its nutrition by feeding on detritus. Detritus is the organic matter made up of dead plant and animal material. Detritivores may also obtain nutrition by coprophagy, which is a feeding strategy involving the consumption of feces.
- Detritivores play a crucial role in the decomposition of organic matter. Detritivores break down detritus (dead organic material) into smaller particles. This process is called fragmentation. They also play a significant role in the cycling of nutrients and are an essential part of most biogeochemical cycles, such as the carbon cycle, phosphorus cycle and the nitrogen cycle.
- **Some typical terrestrial detritivores are earthworm, woodlice, millipedes** and other smaller (< 0.5 mm) animals such as **mites, springtail and nematodes**.
- Examples of detritivores in marine environments are crustaceans such as crabs and lobsters, echinoderms such as sea stars or sea cucumbers.

### ADDITIONAL INFORMATION

#### About Jellyfish:

- They aren't actually fish but are a group of invertebrate marine animals.
- Jellyfish have tiny stinging cells in their tentacles to stun or paralyze their prey before they eat them. They feed on fish, shrimp, crabs and tiny plants.
- Jellyfish live in all oceans around the world.

#### About Seahorse:

- Seahorses are tiny fishes that are named for the shape of their head, which looks like the head of a tiny horse.
- Their habitats include coral reefs, mangroves, seagrass beds, and estuaries.
- They feed on krill, copepods, fish larvae, and other tiny edibles.

5. Which of the following have species that can establish symbiotic relationship with other organisms?

1. Cnidarians
2. Fungi
3. Protozoa

Select the correct answer using the codes given below:

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

(2021)

Ans. (d)

- **Mutualism** is a close association between two species in which **both the species benefit**. However, some mutualisms are so intimate that the interacting species can no longer live without each other as they depend totally on each other to survive. Such close associations are called **symbiotic relationships**.
- Among the given choices, all three organisms form symbiotic relationships with other organisms.
- **Cnidarians:** The sea anemone, a cnidarian gets attached to the shell of hermit crabs for benefit of transport and obtaining new food while the anemone provides camouflage and protection by means of its stinging cells to the hermit crab
- **Fungi:** Certain fungi live in the roots of trees. The tree provides nutrients to the fungus and, in return, receives help from it to take up water and nutrients from the soil. Also, in organisms called lichens, algae and fungus live together. The fungus provides shelter, water and minerals to the alga and, in return, the alga provides food which it prepares by photosynthesis.
- **Protozoa:** Termites can eat wood but have **no enzymes to digest** it. However, their intestine contains certain flagellate protists (protozoans) that have the necessary enzymes to digest the cellulose of the wood eaten by termites and convert it into sugar.

6. In the nature, which of the following is/are most likely to be found surviving on a surface without soil?

1. Fern
2. Lichen
3. Moss
4. Mushroom

Select the correct answer using the code given below:

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

(2021)

Ans. (c)

- Among the given choices, Lichens and Moss can survive on a surface without soil.
- Lichens:**
  - Lichens are **symbiotic associations** i.e. mutually useful associations, between **algae and fungi**. Algae prepare food for fungi and fungi provide shelter and absorb mineral nutrients and water for its partner.
  - In general, lichens need only three things to grow - Undisturbed surface, time and clean air. Lichens can grow on any undisturbed surface such as tree bark, dead wood, bare rock, cleared soil, rusty metal, animal bones, glass, plastic etc.
  - Lichens** are very good **pollution indicators** – they do not grow in polluted areas.



- Moss:**
  - Moss is a seedless, flowerless, and rootless plant. It only has leaves, stems and stringy filaments known as rhizoids.
  - They are distributed throughout the world **except in salt water** and are commonly found in moist shady locations especially in woodland and forest floors.
  - Mosses along with lichens are the first organisms to colonize rocks and hence, are of great ecological importance. They decompose rocks making the substrate

suitable for the growth of higher plants. Since moss form dense mats on the soil, they also reduce the impact of falling rain and prevent soil erosion.



#### ADDITIONAL INFORMATION

- Ferns:** Ferns are non- flowering vascular plants. They have true roots, stems and complex leaves and reproduce by spores. Its roots penetrate into the soil to absorb water, and minerals. Ferns require indirect sunlight, moist soil, and a humid atmosphere.
- Mushroom:** Mushrooms are fungi. They belong in a kingdom of their own, separate from plants and animals. Most of a mushroom grows underground in tiny threadlike strands. The strands form a tangled mass called a mycelium. The part of the mushroom that grows above the ground is the fruiting, or reproductive part. It produces spores, similar to pollen or seeds, which allows them to spread or travel by the wind.

7. Which of the following leaf modifications occurs/ occur in desert areas to inhibit water loss?

- Hard and waxy leaves
- Tiny leaves or no leaves
- Thorns instead of leaves

Select the correct answer using the codes given below:

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

(2018)

Ans. (d)

- Adaptation is any attribute of the organism (morphological, physiological, behavioral) that enables the organism to survive and reproduce in its habitat. Many adaptations have evolved over a long evolutionary time and are genetically fixed.

• **Adaptations by desert plants:**

- ♦ thick cuticle on their leaf surfaces (**thick and waxy leaves**) to reduce loss of water and to reflect heat.
- ♦ stomata arranged in deep pits (sunken) to minimize water loss through transpiration.
- ♦ special photosynthetic pathway (CAM) that enables their stomata to remain closed during day time.
- ♦ some desert plants like **Opuntia, have no leaves – they are reduced to spines**– and the photosynthetic function is taken over by the flattened stems.
- ♦ large, fleshy stems to store water
- ♦ **thorns and thin, spiky or glossy leaves to reduce water loss**
- ♦ spikes protect cacti from animals wishing to use stored water
- ♦ deep roots to tap groundwater
- ♦ long shallow roots which spread over a wide area
- ♦ plants lie dormant for years until rain falls

Hence, option (d) is the correct answer.

8. Which one of the following is the best description of the term 'ecosystem'?

- (a) A community of organisms interacting with one another
- (b) That part of the Earth which is inhabited by living organisms
- (c) A community of organisms together with the environment in which they live
- (d) The flora and fauna of a geographical area

(2015)

Ans. (c)

- An **ecosystem** can be visualized as a **functional unit of nature**, where **living organisms interact among themselves and also with the surrounding physical environment**.

**ADDITIONAL INFORMATION**

- Ecosystem comprises abiotic and biotic components. Abiotic components are inorganic materials- air, water and soil, whereas biotic components are producers (autotrophs), consumers (heterotrophs) and decomposers.

9. Which one of the following is the correct sequence of a food chain?

- (a) Diatoms-Crustaceans-Herrings
- (b) Crustaceans-Diatoms-Herrings
- (c) Diatoms-Herrings-Crustaceans
- (d) Crustaceans-Herrings-Diatoms

(2014)

Ans. (a)

- Diatoms are primary producers in the ocean food chain. So, among the given choices, the food chain will start with Diatoms. Crustaceans feed on diatoms and herring is a type of fish which feeds on crustaceans. **Therefore, the correct order is Diatoms-Crustaceans-Herrings.**

• **Diatoms:**

- ♦ Diatoms are a type of phytoplankton (microalgae) found in almost every aquatic environment.
- ♦ They contain chlorophyll and only require sunlight in order to live and grow.

• **Crustaceans:**

- ♦ Crustaceans make up a very large group of the **Arthropods** which include the crabs, lobsters, crayfish, shrimp, krill, barnacles, brine shrimp, copepods, ostracods and mantis shrimp. Crustaceans are found in a wide range of habitats - most are free-living freshwater or marine animals, but some are terrestrial (e.g. woodlice), some are parasitic (e.g. fish lice) and some do not move (e.g. barnacles).

• **Herrings:**

- ♦ Herring is a white fish that hatches in freshwater but spends most of its life in the ocean. Herring can be found in oceans around the world, though the vast majority of herring are caught in the waters near Scotland and Northern Ireland.

- ♦ **Hence, option (a) is the correct answer.**

10. Which one of the following is the correct sequence of ecosystems in the order of decreasing productivity?

- (a) Oceans, lakes, grasslands, mangroves
- (b) Mangroves, oceans, grasslands, lakes
- (c) Mangroves, grasslands, lakes, oceans
- (d) Oceans, mangroves, lakes, grasslands

(2013)

Ans. (c)

- The rate of biomass production in an ecosystem is called productivity. It can be divided into gross primary productivity (GPP) and net primary productivity (NPP).
  - ♦ **Gross primary productivity** of an ecosystem is the rate of production of organic matter during photosynthesis. Gross primary productivity minus respiration losses, is the net primary productivity (NPP). Net primary productivity is the available biomass for the consumption to heterotrophs (herbivores and decomposers).
  - ♦ Secondary productivity is defined as the rate of formation of new organic matter by consumers.
- Primary productivity depends on the plant species inhabiting a particular area. It also depends on a variety of **environmental factors, availability of nutrients and photosynthetic capacity of plants**. Therefore, it varies in different types of ecosystems.
- Among the given choices, the correct order of ecosystems in order of decreasing productivity is **Mangroves > grasslands > lakes > oceans**.

#### ADDITIONAL INFORMATION

- **E.P Odum** has identified **three levels of productivity** on a world scale:
  - ♦ Shallow water areas, moist forests (tropical and temperate), alluvial plains, and regions of intensive farming represent the regions of high ecological productivity.
  - ♦ Arctic snow-covered wastelands, deserts, and deep ocean areas represent the regions of low ecological productivity.
  - ♦ Grasslands, shallow lakes, and farmlands represent regions of intermediate ecological productivity.

11. With reference to the food chains in ecosystems, which of the following kinds of organism is/are known as decomposer organism/organisms?

- 1. Virus
- 2. Fungi
- 3. Bacteria

Select the correct answer using the codes given below:

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

(2013)

Ans. (b)

- Among the given options, only fungi and bacteria are decomposers.
- Decomposers are heterotrophic organisms which **meet their energy and nutrient requirements by degrading dead organic matter or detritus**. These are also known as **saprotrophs**. Decomposers secrete digestive enzymes that break down dead and waste materials into simple, inorganic materials, which are subsequently absorbed by them. **Fungi and bacteria are examples of true decomposers**.
  - On the other hand, **Viruses are intracellular parasites**. They don't have their own metabolism. They rely on their host cells for the energy and cellular machinery required for their replication.

12. Which one of the following terms describes not only the physical space occupied by an organism, but also its functional role in the community of organisms?

- (a) Ecotone
- (b) Ecological niche
- (c) Habitat
- (d) Home range

(2013)

Ans. (b)

- **Ecotone**: It is a **transitional zone** between two ecosystems. Examples are **swamps, marshes and mangroves**.
- **Habitat**: A population always lives in a specific **place known** as its habitat. Habitat is thus the physical environment in which an organism lives.
- **Ecological niche**: In nature, many species occupy the same habitat but they perform different functions. The functional characteristics of a species in its habitat is referred to as "**niche**" A



niche is **unique for a species** while many species may share the same habitat. No two species in a habitat can have the same niche. **Hence, option (b) is the correct answer.**

- **Home range:** The area in which an **animal forages and spends most of its time**. The size varies according to the size of the animal and its feeding habits.
13. In the grasslands, trees do not replace the grasses as a part of an ecological succession because of:
- (a) Insects and fungi
  - (b) Limited sunlight and paucity of nutrients
  - (c) Water limits and fire
  - (d) None of the above

(2013)

Ans. (c)

- **Ecological succession:** Gradual change in the species composition of a given area
- **Grasslands:** They are regions where grasses form the dominant type of plant life.
- In grasslands, trees do not replace the grasses as a part of an ecological succession because grasslands are found in regions where rainfall is enough to nourish grasses but not enough for growth of trees. Moreover, low rainfall in these regions also triggers drought and fires. The frequent fires also play a role in maintaining grassland ecosystems as grasses are well adapted to grow back after a fire (which is not the case with trees). **Hence option (c) is the correct answer.**

#### ADDITIONAL INFORMATION

|                     | Places        | Name of grassland |
|---------------------|---------------|-------------------|
| Tropical grassland  | East Africa   | Savanna           |
|                     | Brazil        | Campos            |
|                     | Venezuela     | Llanos            |
| Temperate grassland | North America | Prairies          |
|                     | South Africa  | Veld              |
|                     | Argentina     | Pampas            |
|                     | Australia     | Down              |
|                     | Central Asia  | Steppes           |

14. With reference to food chains in ecosystems, consider the following statements:

1. A food chain illustrates the order in which a chain of organisms feed upon each other.
2. Food chains are found within the populations of a species.
3. A food chain illustrates the numbers of each organism which are eaten by others.

Which of the statements given above is/are correct?

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

(2013)

Ans. (a)

- **Statement 1 is correct:** The food chain describes who eats whom in the wild. Each food chain is a possible pathway that **energy and nutrients can follow through the ecosystem.**
- **Statement 2 is not correct:** Food chains describe the feeding relationship between different species, and not within the populations of one species.
- **Statement 3 is not correct:** Food chain doesn't illustrate the numbers of each organism that are eaten by others.

## 2. BIODIVERSITY

1. Consider the following statements :

Once the Central Government notifies an area as a 'Community Reserve'

1. the Chief Wildlife Warden of the State becomes the governing authority of such forest
2. hunting is not allowed in such area
3. people of such area are allowed to collect non-timber forest produce
4. people of such area are allowed traditional agricultural practices

How many of the above statements are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

(2023)

Ans. (c)

- Conservation reserves and community reserves in India are terms denoting

protected areas of India which typically act as buffer zones to or connectors and migration corridors between established national parks, wildlife sanctuaries and reserved and protected forests of India.

- **Statement 1 is correct:** The provisions of the Wildlife (Protection) Act (WPA), 1972 apply to an area once it has been declared a community reserve. Section 33 of the WPA passes the authority of the sanctuary to the chief wildlife warden.
- **Statement 2 is correct and statement 4 is not correct:** After a forest has been made into a community reserve, people cannot hunt there, nor can they use it for agricultural practices, leave alone jhum cultivation. So, traditional agricultural practices can't be practiced in community reserves.
- **Statement 3 is correct:** Community Reserves can be used for subsistence by communities and community areas if part of the lands are privately owned. It implies that people can collect non-timber forest produce in such areas.
- Therefore, only three statements are correct.

2. Consider the following statements:

1. In India, the Biodiversity Management Committees are key to the realization of the objectives of the Nagoya Protocol.
2. The Biodiversity Management Committees have important functions in determining access and benefit sharing, including the power to levy collection fees on the access of biological resources within its jurisdiction.

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

(2023)

Ans. (c)

- **Statements 1 and 2 are correct:** Under Section 41(1) of the **Biological Diversity Act, 2002**, every local body in the State shall constitute a **Biodiversity Management Committee (BMC)** within its area of jurisdiction for the purpose of promoting conservation, sustainable use

and documentation of biological diversity. **BMCs also have important functions in determining access and benefit-sharing (ABS), including the power to levy collection fees on the access of biological resources** within its jurisdiction. BMCs are, thus, **key to the realisation of the objectives of the Nagoya Protocol (2010)**, negotiated within the Convention on Biological Diversity, which aims at sharing the benefits arising from the utilization of genetic resources in a fair and equitable way.

#### ADDITIONAL INFORMATION

##### Convention on Biological Diversity:

- It is the international legal instrument for “the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources”
- Signed by 150 government leaders at the **1992 Rio Earth Summit**
- Conceived as a practical tool for translating the principles of **Agenda 21** into reality
- It covers biodiversity at all levels: ecosystems, species and genetic resources.
- Its secretariat is based in **Montreal, Canada**
- **Cartagena Protocol on Biosafety under CBD:** It is an international agreement which aims to ensure the safe handling, transport and use of living modified organisms (LMOs) resulting from modern biotechnology that may have adverse effects on biological diversity, taking also into account risks to human health.

3. Consider the following statements :

**Statement-1:** Marsupials are not naturally found in India.

**Statement-II:** Marsupials can thrive only in montane grasslands with no predators.

Which one of the following is correct in respect of the above statements?

- (a) Both Statement-I and Statement-II are correct and Statement-II is the correct explanation for Statement-I
- (b) Both Statement-I and Statement-II are correct and Statement-II is not the correct explanation for Statement-I

(c) Statement-I is correct but Statement-II is incorrect

(d) Statement-I is incorrect but Statement-II is correct

(2023)

Ans. (c)

- **Marsupials** are the group of mammals commonly thought of as pouched mammals (like kangaroos). They give live birth, but they do not have long gestation times. Instead, they give birth very early and the young animal, essentially a helpless embryo, climbs from the mother's birth canal to the nipples. They carry the young animal within an external pocket or pouch formed by a flap of dermal tissue on the abdomen. **Examples of marsupials include kangaroos, wallabies, wombats, the koala, the Tasmanian devil, and opossums.**
- **Statement I is correct:** Many species of marsupial (like kangaroos and koalas) are native to Australia. Some other marsupials are native to New Guinea, Tasmania, and the Americas. **But they are not naturally found in India.**
- **Statement II is not correct:** Marsupials occupy an enormous variety of terrestrial habitats ranging from deserts and dry scrubland in Australia to tropical rainforests in South America.

#### ADDITIONAL INFORMATION

- Mammals can be generally classified into three broad groups: Placentals, Marsupials and monotremes.
- Placental is a mammal that completes embryo development inside the mother, nourished by an organ called the placenta. Example: Humans.
- A marsupial is a mammal that raises its newborn offspring inside an external pouch at the front or underside of their bodies.
- Monotremes are the only group of mammals that lay eggs, rather than bearing live young. E.g. Platypus

4. 'Invasive Species Specialist Group' (that develops Global Invasive Species Database) belongs to which one of the following organizations?

(a) The International Union for Conservation of Nature

(b) The United Nations Environment Programme

(c) The United Nations World Commission for Environment and Development

(d) The World Wide Fund for Nature

(2023)

Ans. (a)

- The **Invasive Species Specialist Group (ISSG)** is a global network of scientific and policy experts on invasive species, organized under the auspices of the Species Survival Commission (SSC) of the **International Union for Conservation of Nature (IUCN)**. The ISSG promotes and facilitates the exchange of invasive species information and knowledge across the globe and ensures the linkage between knowledge, practice and policy so that decision making is informed.

#### ADDITIONAL INFORMATION

##### • About IUCN:

- ♦ IUCN is a membership Union composed of both government and civil society organisations.
- ♦ It was established in 1948 as the International Union for the Protection of Nature (or IUPN) following an international conference in Fontainebleau, France.
- ♦ It has headquarters in Switzerland.
- ♦ IUCN works to tackle three of the most important challenges: climate change, biodiversity loss and pollution.
- ♦ IUCN Red List of Threatened Species (Red data book): It is the world's most comprehensive information source on the global extinction risk status of animal, fungus and plant species.
- ♦ IUCN congresses have produced several key international environmental agreements including the Convention on Biological Diversity (CBD), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the World Heritage Convention, and the Ramsar Convention on Wetlands.
- ♦ India is also a member of IUCN

5. Consider the following fauna :

1. Lion-tailed Macaque
2. Malabar Civet
3. Sambar Deer

How many of the above are generally nocturnal or most active after sunset?

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

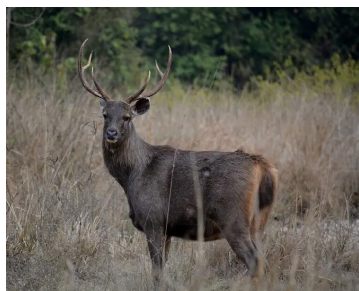
(2023)

Ans. (b)

- Among the given options, only Malabar Civet and Sambar deer are nocturnal (active at night). Whereas, **Lion-tailed macaques are diurnal (active chiefly in the daytime).**
- Malabar Civet:**
  - Endemic to the Western Ghats of India
  - IUCN status: Critically Endangered
  - Last seen half a century ago in the forests of Kerala, and is presumed to be extinct.
  - Nocturnal
  - Threat:** Widespread hunting and habitat loss.



- There are three other species of civets found in India – the Common Palm Civet, the Brown Palm Civet and the Small Indian Civet, however, their status is not as threatened as the Malabar civet.
- Sambar Deer:**
  - A large deer native to the Indian subcontinent and Southeast Asia.
  - Sambar have developed more of a nocturnal activity pattern as a response to hunting by humans, who hunt them for trade and for food.



6. Which of the following organisms perform waggle dance for others of their kin to indicate the direction and the distance to a source of their food?

- (a) Butterflies                      (b) Dragonflies  
(c) Honeybees                      (d) Wasps

(2023)

Ans. (c)

- The waggle dance of honeybees is a unique form of communication, which occurs during **foraging (searching for food)**. When a bee discovers a food source, it returns to the hive and communicates its location to the other bees with a dance describing the direction and distance.

7. Consider the following statements:

- Some mushrooms have medicinal properties.
- Some mushrooms have psychoactive properties.
- Some mushrooms have insecticidal properties.
- Some mushrooms have bioluminescent properties.

How many of the above statements are correct?

- (a) Only one                      (b) Only two  
(c) Only three                      (d) All four

(2023)

Ans. (d)

- Statement 1 is correct:** Medicinal mushrooms have been used for hundreds of years, mainly in Asian countries, for treatment of infections. More recently, they have also been used in the treatment of pulmonary diseases and cancer. Example: Oyster mushroom (*Pleurotus* sp.)
- Statement 2 is correct: Psilocybin or magic mushrooms** are naturally occurring and are consumed for their **hallucinogenic effects**. When psilocybin is taken, it's converted in the body to psilocin, which is the chemical with the psychoactive properties. It can affect all the senses, altering a person's thinking, sense of time and emotions.
- Statement 3 is correct:** Recently, an increasing number of mushrooms have been found to contain insecticidal compounds. Among these are species of *Lactarius* (Russulaceae), which react to wounding by exuding a milky fluid and/or color change reactions, which could be a warning reaction.



- **Statement 4 is correct:** Some of the mushrooms use **luciferins—light-emitting compounds** found in other glowing animals and plants—to attract insects. Recently, a mushroom documentation project in the forests of Northeast India had revealed a bioluminescent — or light emitting — variety of mushroom. The new species was named *Roridomyces phyllostachydis*.

#### ADDITIONAL INFORMATION

- Although considered a vegetable, mushrooms are neither a plant nor animal food. They are a type of fungus. In specific, mushrooms are reproductive structures produced by some fungi.
- Mushrooms are one of the only few non-animal sources of Vitamin D. Mushrooms contain a substance called ergosterol, similar in structure to cholesterol in animals. Ergosterol can be transformed into vitamin D with exposure to ultraviolet light.

#### 8. Consider the following statements regarding the Indian squirrels:

1. They build nests by making burrows in the ground.
2. They store their food materials like nuts and seeds in the ground.
3. They are omnivorous.

How many of the above statements are correct?

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

(2023)

Ans. (b)

- **Statement 1 is not correct:** Indian palm squirrels do not make nests by making burrows in the ground, rather they build nests in the treetops using the grass and branches.
- **Statement 3 is correct:** Indian palm squirrel is an omnivore. Its diet is mostly based on fruit and nuts, but it also consumes eggs, small birds, larvae and insects. Indian palm squirrel collects food and protects its stashes aggressively from other squirrels and birds.
- **Statement 2 is correct:** Indian palm squirrels bury their nuts in the ground, a behavior called caching. They dig up and eat most of the food they bury, but some of it remains forgotten. The nuts and seeds that are not

recovered sprout out in the spring and grow up into plants and trees, thus assisting in forest renewal.

#### 9. Consider the following statements :

1. Some microorganisms can grow in environments with temperature above the boiling point of water.
2. Some microorganisms can grow in environments with temperature below the freezing point of water.
3. Some microorganisms can grow in highly acidic environment with a pH below 3.

How many of the above statements are correct?

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

(2023)

Ans. (c)

- **Statement 1 is correct:** "Thermophiles" are microorganisms with optimal growth temperatures between 60 and 108 degrees Celsius, isolated from a number of marine and terrestrial geothermally-heated habitats including shallow terrestrial hot springs, hydrothermal vent systems, sediment from volcanic islands, and deep-sea hydrothermal vents. The boiling point of water is 100 degrees Celsius.

- **Statement 2 is correct:** Microbial growth or metabolic activity has been reported in permafrost bacteria at  $-10^{\circ}\text{C}$  and in the antarctic cryptoendolithic microbial community at temperatures between  $-5$  and  $-10^{\circ}\text{C}$ .

- **Statement 3 is correct:** Microorganisms of the archaeal genus *Sulfolobus* are found in a variety of acidic freshwater hot springs with water pH below 3, making them extreme thermoacidophiles.

#### 10. Which one of the following makes a tool with a stick to scrape insects from a hole in a tree or a log of wood?

- (a) Fishing cat                      (b) Orangutan  
(c) Otter                      (d) Sloth bear

(2023)

Ans. (b)

- Orangutans are the largest arboreal (animals that live on trees) mammal known for their distinctive red fur. Orangutans use sticks to

remove insects from tree holes, poke logs for honey, and when eating *Neesia* fruits, which are known for their irritant hairs.

11. Which of the following is not a bird ?

- (a) Golden Mahseer      (b) Indian Nightjar  
(c) Spoonbill          (d) White Ibis

(2022)

**Ans. (a)**

- **Golden Mahseer (Tor Putitora) is an endangered species of cyprinid fish.** Mahseer roughly translates as mahi – fish and sher – tiger, and hence is also referred as tiger among fish. It is a large cyprinid and known to be the toughest among the freshwater sport fish.



- **About Golden Mahseer:**

- ◆ They are characterized by their **large scales and thick powerful lips with relatively longer barbels (*sensory hair-like organs in front of the mouth*)**.
- ◆ Body color of an adult Golden Mahseer is golden on the dorsal side and the fins are reddish-yellow.
- ◆ Golden Mahseer **lives in fast-moving waters**, inhabiting hill streams with a rocky and stony substrate.
- ◆ In India, it inhabits the Himalayan foothills, the Indus, Ganga and Brahmaputra basins and can also be found down south in the Balamore, Cauvery, Tambraparini, and Kosi Rivers.
- ◆ **IUCN status: Endangered**

## ADDITIONAL INFORMATION

- Recently, Blue-finned Mahseer (a sub-specie of Mahseer fish) was moved out of the International Union for Conservation of Nature's (IUCN) red list of endangered species. It has now moved to the 'least concern' status. But the Golden Mahseer is still on the list of endangered species. Tata group is involved in the conservation of Mahseers.

- **Indian Nightjar:** Indian nightjar (*Caprimulgus asiaticus*) is a small nightjar belonging to the family Caprimulgidae. The first bird to be called a “nightjar” was the European Nightjar which was so named in the 17th-century because it was active at night and made a jarring noise (night + jar = nightjar). Indian nightjar species have very low forest dependency. These nightjar species are distributed in Afghanistan, Iran, Indian subcontinent, Myanmar, Thailand, Cambodia, Vietnam and Laos.
- **Spoonbill:** Spoonbills are tall white water birds with long spatulate black bills and long black legs.
- **White Ibises:** They are large wading birds with football-shaped bodies. White Ibises are wetland birds. They use freshwater marshes, coastal estuaries, mangroves, flooded pastures, mudflats, and swamps.

12. Certain species of which one of the following organisms are well known as cultivators of fungi?

- (a) Ant (b) Cockroach  
(c) Crab (d) Spider

(2022)

Ans. (a)

- The **ant-fungus mutualism** is a symbiosis seen between certain ant and fungal species, in which ants actively cultivate fungus as a food source. An important example is that of **Leaf-cutter ants** which cultivate the fungus by providing them fresh plant material, and protecting them from molds and pests. The fungus in turn is a food source for the ants' larva. **Hence, option (a) is the correct answer.**

13. With reference to Indian laws about wildlife protection, consider the following statements:

1. Wild animals are the sole property of the government.
2. When a wild animal is declared protected, such animal is entitled for equal protection whether it is found in protected areas or outside.
3. Apprehension of a protected wild animal becoming a danger to human life is sufficient ground for its capture or killing.

Which of the statements given above is/are correct?

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

(2022)

Ans. (b/a)

- As per the official answer key of the UPSC, option (b) is the correct answer. However, as per our opinion, the correct option is (a).

Our opinion:

- **Statement 1 is correct:** Section 39 of the Wildlife Protection Act 1972 states every wild animal—other than vermin kept or bred in captivity or hunted shall be the property of the State Government. If such an animal is hunted in a sanctuary or National Park declared by the Central Government such animal or any article, trophy, meat etc shall be the property of the Central Government.
- **Statement 2 is correct:** Wildlife (Protection) Act, 1972, does not discriminate between animals found in protected areas and outside. It provides for equal protection for wild animals irrespective of where they are found.
- **Statement 3 is not correct:** Mere apprehension of a protected wild animal becoming a danger can not be a sufficient ground for the capture or killing of a protected animal. As per the provisions of the Act, the Chief Wildlife Warden's order is required in such cases. He/She has to be satisfied enough to give order in writing to allow for killing/hunting of the concerned animal.

UPSC's version:

- UPSC has considered Statement 1 as incorrect.
- The statements given in the question seem to be directly framed out of an article published in "**The Hindu**" newspaper (Dated: December 21, 2016). The article states the following: "Wild animals are not the property of the government, and an animal which is wild in nature and free cannot be in the ownership of either the government or a private party." UPSC's official answer key appears to be based on this article.

14. Which one of the following is a filter feeder?

- (a) Catfish (b) Octopus  
(c) Oyster (d) Pelican

(2021)

Ans. (c)

- **Filter feeders are aquatic animals** that feed by filtering small organisms or organic particles from water. Filter feeding is a form of suspension feeding which means ingestion of food particles that are suspended in water.
- **Oysters** are an important example of Filter feeders. Oysters feed by filtering algae from the water, ultimately removing nutrients from the water, which, in excess, can degrade the aquatic

environment. As efficient filter-feeders, oysters also remove nitrogen and incorporate it into their shells and tissue. Near oyster reefs, the water is often clearer.

- Other examples of filter feeders are clams, sponges, krill, baleen whales and many fishes. Some birds, such as flamingos and certain species of duck, are also filter feeders.

15. Consider the following animals:

1. Hedgehog
2. Marmot
3. Pangolin

To reduce the chance of being captured by predators, which of the above organisms rolls up/roll up and protects/protect its/their vulnerable parts?

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

(2021)

Ans. (d)

- Among the given choices, Hedgehog and Pangolin show this survival characteristic where they roll up to protect their vulnerable parts.

• **About Hedgehog:**

- ♦ They are a small mammal with short limbs and a body low to the ground.
- ♦ Their most distinctive characteristic is the thousands of stiff, sharp spines — harder and sharper than those of a porcupine.
- ♦ This small, spiky animal can curl into a tight ball with spines sticking out in all directions, if disturbed or frightened and also they sleep in this position.
- ♦ The hedgehog can live in many different habitats, from desert to forest in Europe, Asia, Africa and New Zealand.

• **About Pangolin:**

- ♦ They are the only mammals wholly-covered in scales.
- ♦ These are solitary, primarily nocturnal animals.
- ♦ A startled pangolin will cover its head with its front legs, exposing its scales to any potential predator. If touched or grabbed it will roll up completely into a ball, while the sharp scales on the tail can be used to lash out.
- ♦ Eight species of pangolins are found on two continents- four in Africa and four in Asia. They range from Vulnerable to Critically Endangered.

- They are the most trafficked mammal in the world as their meat is considered a delicacy and pangolin scales are used in traditional medicine and folk remedies.

### ADDITIONAL INFORMATION

#### About Marmot:

- Marmot are giant ground squirrels. There are 14 species of marmots found primarily in North America and Eurasia- north of Mexico and in Eurasia from the European Alps through north-central Asia, the Himalayas, and northeastern Siberia to the Kamchatka Peninsula.
- They are well suited for life in cold environments and have small fur-covered ears, short legs, and strong claws for digging.
- They inhabit open country in mountains and plains, preferring montane meadows, steppes, tundra, and forest edges.
- They live in burrows that they excavate. When alarmed, marmots emit a sharp, piercing whistle and scurry to their burrows if danger persists.
- **Two species of Marmot are found in India:** Himalayan Marmot and Long-tailed Marmot.

- **Statement 2 is not correct:** Human habitation, although scarce, is not entirely absent within the Desert National Park. There are numerous villages and settlements or Dhanis within the Park. They have been inhabited by communities for hundreds of years and with their rich culture and tradition they have become an integral part of the ecosystem.

### ADDITIONAL INFORMATION

- The Great Indian bustard (GIB) is the state bird of Rajasthan.
- Great Indian bustards prefer grasslands as their habitat. They are terrestrial birds and therefore spend most of their time on ground with occasional flights to go from one part of their habitat to the other.
- Great Indian Bustards are "Critically Endangered" as per the IUCN Red List.

16. With reference to India's Desert National Park, which of the following statements are correct?

1. It is spread over two districts.
2. There is no human habitation inside the Park.
3. It is one of the natural habitats of the Great Indian Bustard.

Select the correct answer using the code given below:

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

(2020)

Ans. (c)

- **Statement 1 is correct:** Desert National Park is spread over two districts of *Rajasthan-Jaisalmer and Barmer*. It is the largest national park of Rajasthan. It displays the **best of the Thar desert's ecosystem and its varied wildlife**.
- **Statement 3 is correct:** Various species of animals such as *black buck, chinkara and desert fox inhabit the Park*. The **highly endangered Great Indian Bustard, one of the world's heaviest flying birds, can also be seen here**.

17. Among the following Tiger Reserves, which one has the largest area under "Critical Tiger Habitat"?

- (a) Corbett  
(b) Ranthambore  
(c) Nagarjunsagar-Srisailem  
(d) Sunderbans

(2020)

Ans. (c)

- Critical 'tiger' habitats are also known as core areas of tiger reserves. They are identified under the Wildlife Protection Act (WPA), 1972 based on scientific evidence that "such areas are required to be kept as inviolate for the purpose of tiger conservation, without affecting the rights of the Scheduled Tribes or such other forest dwellers".
- **Nagarjunsagar- Srisailem Tiger reserve** spread over five districts of Andhra Pradesh (*Kurnool District, Prakasam District, Guntur District*) and Telangana (*Nalgonda, Mahabub Nagar*) has **got the largest area under "Critical Tiger Habitat"**. Out of the total area of 3296 km<sup>2</sup> **the critical tiger habitat spreads over 2595 km<sup>2</sup>**.
- **Other information about Nagarjunsagar- Srisailem Tiger reserve:**



- It is situated in the **deciduous Nallamala forests**.
- Krishna river flows through the tiger reserve.
- Two wildlife Sanctuaries, namely Rajiv Gandhi Wildlife Sanctuary and Gundla Brahmeswaram Wildlife Sanctuary (GBM) constitute the Tiger Reserve.
- Top faunal species include: Tiger, Leopard, Wolf, Wild Dog and Jackal.

#### ADDITIONAL INFORMATION

- A tiger reserve includes two parts: (a) Core or critical tiger habitat (National Park or Sanctuary status), and (b) Buffer or peripheral area.
- The term 'critical tiger habitat' is different from the 'critical wildlife habitat'. Since tigers are territorial big cats, hence considering their social land tenure dynamics, the 'critical tiger habitat' has been viewed separately from the 'critical wildlife habitat', which is applicable to other wild animal species.

| Critical tiger habitat  | Critical wildlife habitat   |
|---|---|
| Mentioned only in Wildlife (Protection) Act, 1972, as a sequel to amendment made in 2006              | Defined only in the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006                 |
| Notified by the State Government in consultation with an expert committee constituted for the purpose | Notified by Ministry of Environment, Forest and Climate Change in consultation with an expert committee constituted for the purpose |

18. If a particular plant species is placed under Schedule VI of The Wildlife Protection Act, 1972, what is the implication?
- A licence is required to cultivate that plant.
  - Such a plant cannot be cultivated under any circumstances.
  - It is a Genetically Modified crop plant.
  - Such a plant is invasive and harmful to the ecosystem.

(2020)

Ans. (a)

- Schedule VI of the Wildlife Protection Act 1972 provides for regulation of certain plants which can be cultivated only after acquiring a license. **Hence, option (a) is the correct answer.**
- Plants listed under Schedule VI.**
  - Beddome's cycad (Cycas beddomei)
  - Blue Vanda (Vanda soeruleni)
  - Kuth (Saussurea lappa)
  - Ladies slipper orchids (Paphiopedilum spg.)
  - Pitcher plant (Nepenthes khasiana)
  - Red Vanda (Ranthera imschottiana)

#### ADDITIONAL INFORMATION

- Recently, the WILD LIFE (PROTECTION) ACT, 1972 was amended in December, 2022. The amended Act has reduced the number of schedules to four.
  - Schedule I specifying the animal species with the highest level of protection.
  - Schedule II specifying the animal species with a lesser level of protection.
  - Schedule III specifies the protected plant species.
  - It is also proposed to add a Schedule IV specifying the species listed in the Appendices to the CITES Convention.

19. With reference to Indian elephants, consider the following statements:

- The leader of an elephant group is a female.
- The maximum gestation period can be 22 months.
- An elephant can normally go on calving till the age of 40 years only.
- Among the States in India, the highest elephant population is in Kerala.

Which of the statements given above is/are correct?

- 1 and 2 only
- 2 and 4 only
- 3 only
- 1, 3 and 4 only

(2020)

Ans. (a)

- Statement 1 is correct:** An elephant herd may have 10 to 12 female elephants and young ones and it is **led by the oldest female member**. Male

elephants live in the herd till they are 14–15 years old. Then they leave their herd and move around alone.

- **Statement 2 is correct:** Before giving birth to a calf, the **mother elephant carries the fetus for 22 months**, the longest gestation period of any mammal.
- **Statement 3 is not correct:** Most female elephants give birth for the first time between 14 and 15 years old in African elephants, and slightly later for Asian elephants. Fecundity is fairly constant between the ages of 16 and 40 and then declines slightly, **though females over 60 can still give birth.**
- **Statement 4 is not correct:** **Karnataka has the highest number of elephants** followed by Assam and Kerala.

#### ADDITIONAL INFORMATION

- Elephant is the largest terrestrial mammal of India.
- India has declared elephant as 'National Heritage Animal'.
- IUCN status: Endangered

**20. Which of the following Protected Areas are located in the Cauvery basin?**

1. Nagarhole National Park
2. Papikonda National Park
3. Sathyamangalam Tiger Reserve
4. Wayanad Wildlife Sanctuary

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

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

**(2020)**

**Ans. (c)**

- Among the given options, Nagarhole National Park, Sathyamangalam Tiger Reserve and Wayanad Wildlife Sanctuary are located in the Cauvery basin.

| Protected Area          | Location   |
|-------------------------|--|
| Nagarhole National Park | <ul style="list-style-type: none"> <li>• District- Kodagu, Mysore (Karnataka)</li> <li>• Foothills of the Western Ghats spreading down the Brahmagiri hills and south towards Kerala.</li> </ul> |

#### Sathyamangalam Tiger Reserve

- **District- Erode (TN)**
- It is a significant ecosystem and a wildlife corridor in the Nilgiri Biosphere Reserve between the Western Ghats and the rest of the Eastern Ghats.

#### Wayanad Wildlife Sanctuary

- **District-Wayanad(Kerala)**
- Bounded by the protected area network of **Nagarhole National Park and Bandipur National Park in Karnataka** in the northeast, and on the southeast by **Mudumalai National Park in Tamil Nadu.**

#### ADDITIONAL INFORMATION

The **Papikonda national park** is located in the West Godavari district in Andhra Pradesh. **River Godavari flows through Papikonda National Park.**

**21. With reference to India's biodiversity, Ceylon frogmouth, Coppersmith barbet, Gray-chinned minivet and White-throated redstart are:**

- (a) Birds      (b) Primates  
(c) Reptiles      (d) Amphibians

**(2020)**

**Ans. (a)**

- All four of them are **species of birds.**
- **Ceylon frogmouth:** The frogmouths are a group of nocturnal birds. They are named so because of their characteristic broad, frog-like gape. Ceylon frogmouth (Sri Lankan frogmouth) is a small frogmouth found in the Western Ghats of south India and Sri Lanka.
- **Coppersmith barbet:** These birds are widespread in the Indian subcontinent and Southeast Asia. They are known for their metronomic call that sounds similar to a coppersmith striking metal with a hammer. These birds are sexually monochromatic, where the males and females are similar in appearance.
- **Gray-chinned minivet:** The grey-chinned minivet is a species of bird in the family Campephagidae. It is found from the Himalayas to China, Taiwan and Southeast Asia. Its natural habitat is forests about 1,000–2,000 m (3,300–6,600 ft) in elevation

- **White-throated redstart:** The white-throated redstart is a species of bird in the family Muscicapidae. It is found in Nepal, Bhutan, central China and northern areas of Myanmar and Northeast India.

22. Which one of the following protected areas is well-known for the conservation of a sub-species of the Indian swamp deer (Barasingha) that thrives well on hard ground and is exclusively graminivorous?

- (a) Kanha National Park
- (b) Manas National Park
- (c) Mudumalai Wildlife Sanctuary
- (d) Tal Chhaper Wildlife Sanctuary

(2020)

Ans. (a)

- Swamp deer (Barasingha) is the state animal of Madhya Pradesh. The population of swamp deer has witnessed a revival in the Kanha National Park and Tiger Reserve (KNPTR) after having been perilously close to extinction for a long time. **Hence, option (a) is the correct answer.**
- **More about Swamp deer:**
  - ♦ There are three subspecies of swamp deer found in the Indian Subcontinent. The western swamp deer found in Nepal, southern swamp deer found in central and north India and eastern swamp deer found in the Kaziranga and Dudhwa National Parks.
  - ♦ The southern swamp deer has hard hooves and is adapted to hard ground. The other two subspecies are adapted to swampy areas.
  - ♦ **IUCN status:** Endangered

#### ADDITIONAL INFORMATION

- **Kanha National Park and Tiger Reserve:** It is on the Maikal range of the Satpura hills in Madhya Pradesh and best known for its evergreen Sal forests. It was the inspiration for Rudyard Kipling's "Jungle Book". (Some sources also claim Pench National Park to be the inspiration for the book).

23. Which of the following are the most likely places to find the musk deer in its natural habitat?

- 1. Askot Wildlife Sanctuary
- 2. Gangotri National Park
- 3. Kishanpur Wildlife Sanctuary
- 4. Manas National Park

Select the correct answer using the code given below:

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

(2020)

Ans. (a)

- The Himalayan musk deer is a small primitive cervid (*mammal of the deer family*). The unique feature of this deer is the **presence of the musk gland in the male** whose ingredients are valued for their **cosmetic and alleged pharmaceutical properties**.
- In the IUCN red list of threatened Species it is **listed under "endangered species"**. **Poaching of the musk pod and habitat destruction** are two major causes behind its vulnerability.
- Himalayan musk deer reside in the Himalayan mountain range, particularly within the countries of Bhutan, India, Nepal, and a small part of China.
- **Option (a) is the correct answer:** Among the given choices, it can be found in Askot wildlife sanctuary and Gangotri National Park only.
  - ♦ Askot Musk Deer Wildlife Sanctuary is **located near Askot in Uttarakhand**. It has been set up primarily with the object of conserving the musk deer and its habitat.
  - ♦ **Gangotri National Park** is located in the upper catchment of Bhagirathi river **in the Uttarkashi District (Uttarakhand)**.

24. Consider the following statements:

- 1. Asiatic lion is naturally found in India only.
- 2. Double-humped camel is naturally found in India only.
- 3. One-horned rhinoceros is naturally found in India only.

Which of the statements given above is/are correct?

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

(2019)

Ans. (a)

- **Statement 1 is correct:** Once ranged from Persia to Eastern India, Asiatic lions are now restricted to only Gir Forests of Gujarat, India.
- **Statement 2 is not correct:** Double humped camels (Bactrian camel) are native to the steppes

of Central Asia. India has a small population of the double-humped Bactrian, found mostly in the Nubra valley in Ladakh.

- **Statement 3 is not correct:** The greater one-horned rhino (or “Indian rhino”) is naturally found in Assam, India (Kaziranga National Park) and also in Chitwan National Park of Nepal. They are restricted to a few pockets in Southern Nepal, northern Bengal, and Brahmaputra Valley.

### ADDITIONAL INFORMATION

#### Asiatic Lions:



- **IUCN Status:** Endangered
- Asiatic lions are slightly smaller than African lions.
- Due to conservation efforts, their population in the Gir forest has increased over the years.
- **Project Lion:** It was launched in 2020 for the conservation of Asiatic Lion on the lines of Project Tiger and Project Elephant.

#### Double Hump Camels:



- **IUCN Status:** Critically Endangered
- Bactrian camels have two humps rather than the single hump of their Arabian relatives.
- The humps function the same way—storing fat which can be converted to water and energy when sustenance is not available.
- Found in cold-desert areas across Mongolia, India (Ladakh), China, Kazakhstan, Turkmenistan, Uzbekistan and parts of Afghanistan.
- Used by Indian army for patrolling in Ladakh.

#### One-horned Rhino:



- **IUCN Status:** Vulnerable
- Currently found in the foothills of the Himalayas in India and Nepal.
- Only specie of rhino that is found in India.

25. Which of the following are in Agasthyamala Biosphere Reserve?

- Neyyar, Peppara and Shendurney Wildlife Sanctuaries; and Kalakad Mundanthurai Tiger Reserve.
- Mudumalai, Sathyamangalam and Wayanad Wildlife Sanctuaries; and Silent Valley National Park.
- Kaundinya, Gundla Brahmeswaram and Papikonda Wildlife Sanctuaries; and Mukurthi National Park.
- Kawal and Sri Venkateswara Wildlife Sanctuaries; and Nagarjunasagar-Srisailem Tiger Reserve.

(2019)

Ans. (a)

- **Agasthyamala Biosphere Reserve** is located in the Western Ghats in the south of the country. It encompasses tropical forest ecosystems that fall within the Tirunelveli and Kanniyakumari districts of **Tamil Nadu** and the Thiruvananthapuram and Kollam districts of **Kerala**.
- Three wildlife sanctuaries, Shendurney, Peppara and Neyyar, are located in the site, as well as the Kalakad Mundanthurai Tiger reserve. **Hence, option (a) is the correct answer.**

### ADDITIONAL INFORMATION

- A part of World Network of Biosphere Reserves under MAB Programme of UNESCO.
- Agasthyamala Biosphere Reserve is home to Kani tribes from both Tamil Nadu and Kerala.
- Its prominence in the epic Ramayana has made it a famous site for Hindu pilgrimages.



26. Consider the following statements:

1. Some species of turtles are herbivores.
2. Some species of fish are herbivores.
3. Some species of marine mammals are herbivores.
4. Some species of snakes are viviparous.

Which of the statements given above are correct?

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

(2019)

Ans. (d)

- **Statement 1 is correct:** Most turtles are omnivores (eat both plant and animal), but some of them are strictly herbivores (e.g. Green sea turtles). What a turtle eats depends on its species, where it lives and what food sources are available to it.
- **Statement 2 is correct:** Surge wrasse and parrotfish are two familiar examples, often seen browsing and scraping on reef algae.
- **Statement 3 is correct:** Manatees, sometimes called sea cows feed on water grasses, weeds, and algae.
- **Statement 4 is correct:** Viviparous snakes are snakes that give birth to live young ones, while oviparous snakes lay eggs. Around 30% of snake species give live birth while 70% are oviparous. Examples of Viviparous snakes : Olive Sea Snakes and four species of Anacondas etc.

27. Consider the following pairs:

*Wildlife*                                      *Naturally found in:*

1. Blue-finned Mahseer : Cauvery River
2. Irrawaddy Dolphin : Chambal River
3. Rusty-spotted Cat : Eastern Ghats

Which of the pairs given correctly matched?

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

(2019)

Ans. (c)

- **Pair 1 is correctly matched:** Mahseer are freshwater fishes. Cauvery basin has two sub-species of Mahseer — orange-finned mahseer (hump-backed mahseer) and Blue-finned Mahseer. Orange-finned mahseer is endemic to

the Cauvery river basin. But blue-finned mahseer is a non-native, artificially bred fish which was introduced in Cauvery.

- **Pair 2 is not correctly matched:** Irrawaddy dolphins are found in coastal areas in South and Southeast Asia, and in three rivers: Ayeyarwady (Myanmar), Mahakam (Indonesian Borneo) and Mekong.
- **Pair 3 is correctly matched:** Rusty-spotted Cats are one of the few wild cats that inhabit the forests of Andhra Pradesh.

#### ADDITIONAL INFORMATION

**Irrawaddy river dolphins:**



- **IUCN Status:** Endangered
- Not a true freshwater dolphin, it can be found in brackish water as well.
- An euryhaline species (can tolerate a wide range of salinity).

**Rusty Cats:**



- **IUCN Status:** Near Threatened
- It is found mainly in moist and dry deciduous forests as well as scrub and grassland, but is likely absent in evergreen forest. It prefers dense vegetation and rocky areas.
- Endemic to India and Sri Lanka.
- Tracked by hunters for valuable fur.

28. Which one of the following National Parks lies completely in the temperate alpine zone?

- (a) Manas National Park  
(b) Nandapha National Park  
(c) Neora Valley National Park  
(d) Valley of Flowers National Park

(2019)

**Ans. (d)**

- **Valley of Flowers National Park** lies completely in the temperate alpine zone.
- Located in chamoli region, Uttarakhand.
- Valley of Flowers National Park is a **UNESCO World Heritage Site** and forms one of the two core zones (the other being the Nanda Devi National Park) of the Nanda Devi Biosphere Reserve.
- Sub-alpine forests birch and rhododendron cover parts of the park's area.
- Situated at an altitude of around 3,600 m above the sea level, the valley is also home to such rare and amazing wildlife species like the gray langur, the flying squirrel, the Himalayan weasel, and black bear, the red fox, the lime butterfly, the snow leopard and Himalayan monal, to name a few. **Hence, option (d) is the correct answer.**

**29. The term "sixth mass extinction/sixth extinction" is often mentioned in the news in the context of the discussion of:**

- Widespread monoculture practices in agriculture and large-scale commercial farming with indiscriminate use of chemicals in many parts of the world that may result in the loss of good native ecosystems.
- Fears of a possible collision of a meteorite with the Earth in the near future in the manner it happened 65 million years ago that caused the mass extinction of many species including those of dinosaurs.
- Large scale cultivation of genetically modified crops in many parts of the world and promoting their cultivation in other parts of the world which may cause the disappearance of good native crop plants and the loss of food biodiversity.
- Mankind's over-exploitation/misuse of natural resources, fragmentation/loss of natural habitats, destruction of ecosystems, pollution and global climate change.

**(2018)**

**Ans. (d)**

- Mass extinction refers to a substantial increase in the degree of extinction, or when the Earth loses more than three-quarters of its species in a geologically short period of time. So far, during

the entire history of the Earth, there have been five mass extinctions. **The sixth, which is ongoing, is referred to as the Anthropocene extinction.**

- The five mass extinctions that took place in the last 450 million years have led to the destruction of 70-95 % of the species of plants, animals and microorganisms that existed earlier. These extinctions were caused by "catastrophic alterations" to the environment, such as massive volcanic eruptions, depletion of oceanic oxygen or collision with an asteroid.
- But the sixth mass extinction is **driven by human activity**, primarily due to the unsustainable use of land, water, and energy. The ongoing sixth mass extinction may be one of the most serious environmental threats to the persistence of civilization.

**30. In which one of the following States is Pakhui Wildlife Sanctuary located?**

- Arunachal Pradesh
- Manipur
- Meghalaya
- Nagaland

**(2018)**

**Ans. (a)**

- **Pakhui Wildlife Sanctuary** is located in the Pakke Kessang district of Arunachal Pradesh.

**About Pakhui Wildlife Sanctuary:**

- It was declared a tiger reserve in 2002.
- It is also known as Pakke tiger reserve.
- Wildlife Found: Elephant, Tiger, Gaur, Barking Deer, Binturong, Leopard, Hornbill.
- The lower areas are covered with swampy rainforests.
- The higher altitudes between 1,000 to 3,000m have mainly deciduous and mixed deciduous forests.

**31. Consider the following statements:**

- The definition of "Critical Wildlife Habitat" is incorporated in the Forest Rights Act, 2006.
- For the first time in India, Baigas have been given Habitat Rights.
- Union Ministry of Environment, Forest and Climate Change officially decides and declares Habitat Rights for Primitive and Vulnerable Tribal Groups in any part of India.

Which of the statements given above is/are correct?

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

(2018)

Ans. (a)

- **Statement 1 is correct:**
  - ♦ The Critical Wildlife Habitats have been defined in **Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006**. The Act defines Critical Wildlife Habitats as areas "required to be kept inviolate for the purposes of wildlife conservation".
  - ♦ These areas are to be identified within national parks and sanctuaries on a case by case basis.
- **Statement 2 is correct:**
  - ♦ **Baiga is one of the Particularly Vulnerable Tribal Groups (PVTGs)** living in central India. In 2016, the government of Madhya Pradesh for the first time recognised the habitat rights of seven villages in Dindori district, which are mostly inhabited by the Baigas.
- **Statement 3 is not correct**
  - ♦ As per the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, the Ministry of Environment and Forests has been identified as the agency to determine and notify Critical Wildlife Habitats. The Ministry of Tribal Affairs is the nodal ministry for recognition and vesting of individual and community forest rights.

32. The term 'M-STRIPES' is sometimes seen in the news in the context of

- (a) Captive breeding of Wild Fauna  
(b) Maintenance of Tiger Reserves  
(c) Indigenous Satellite Navigation System  
(d) Security of National Highways

(2017)

Ans. (b)

- **MSTrIPES** stands for "**Monitoring System for Tigers: Intensive Protection and Ecological Status**".
- It is a platform where modern technology is used to assist effective patrolling, assess ecological

status and mitigate human-wildlife conflict in and around tiger reserves.

- MSTrIPES program uses **Global Positioning System (GPS)**, **General Packet Radio Services (GPRS)**, and remote sensing, to collect information from the field to provide inferences that allow tiger reserve managers to better manage their wildlife resources. **Hence, option (b) is the correct answer.**

33. In India, if a species of tortoise is declared protected under Schedule I of the Wildlife (Protection) Act, 1972, what does it imply?

- (a) It enjoys the same level of protection as the tiger.  
(b) It no longer exists in the wild, a few individuals are under captive protection; and now it is impossible to prevent its extinction.  
(c) It is endemic to a particular region of India.  
(d) Both (b) and (c) stated above are correct in this context.

(2017)

Ans. (a)

- **Wildlife (Protection) Act, 1972** provides for the protection of wild animals, birds, and plants. The Act provides for stringent punishment for violation of its provisions.
- It has six schedules which give varying degrees of protection. Schedule I and Schedule II provide the highest protection — offences under these are prescribed the highest penalties.
- **Option (a) is correct:** If a species of tortoise is declared protected under Schedule I, **it will enjoy the same level of protection as the tiger, as Tiger is also listed under Schedule I of the Act.**
- **Note:** After a recent amendment, the number of schedules have been decreased to four (details have been discussed earlier)

34. Recently there was a proposal to translocate some of the lions from their natural habitat in Gujarat to which one of the following sites?

- (a) Corbett National Park  
(b) Kuno Palpur Wildlife Sanctuary  
(c) Mudumalai Wildlife Sanctuary  
(d) Sariska National Park

(2017)

Ans. (b)

- The central expert committee in 2016 approved the translocation of **Asiatic Lions from Gir National**

**Park in Gujarat to Kuno Sanctuary in Madhya Pradesh.**

- Experts cited that Gir has become overcrowded with lions and there is need to spread them out to other locations to ensure their genetic stability and health. **Hence, option (b) is the correct answer.**

**ADDITIONAL INFORMATION**

**Kuno National Park:**

- Situated in Madhya Pradesh.
- The green vegetation is dominated by the “Kardhai”, “Khair” and “Salai” trees.
  - ♦ Kuno river (tributary of Chambal) flows through the park.
  - ♦ In September 2022, Eight African cheetahs were translocated from Namibia and released at the Kuno National Park as part of Project Cheetah. (Asiatic cheetah went extinct in India more than seventy years ago, mainly due to poaching).

**Asiatic Lions:**

- They are slightly smaller than African lions.
- There are only several hundred Asiatic lions in the wild, and they only live in the Gir Forest, India.
- **Conservation Status: Endangered in IUCN Red List and listed in Schedule I of Wildlife (Protection) Act 1972.**

**35. If you want to see gharials in their natural habitat, which one of the following is the best place to visit?**

- Bhitarkanika Mangroves
- Chambal River
- Pulicat Lake
- Deepor Beel

**(2017)**

**Ans. (b)**

- Gharials are a type of Asian crocodilian distinguished by their long, thin snouts. Gharials live in clear freshwater river systems.
- Chambal River is a shelter of rare crocodile species “Gharial” and the National Aquatic Animal Gangetic Dolphin.
- National Chambal Gharial Sanctuary is located at Palighat Village of Sawai Madhopur, which is adjacent to the banks of the Chambal River.

The National Chambal Sanctuary area is spread over three states, which include Madhya Pradesh, Rajasthan and Uttar Pradesh. The main attractions of the National Chambal Sanctuary are the Gharial and the Crocodile. **Hence, option (b) is the correct answer.**

**ADDITIONAL INFORMATION**



- Gharials are among the largest crocodilians.
- They live in clear freshwater river systems.
- Most aquatic of all crocodilians for it never moves far from the water.
- **Conservation status:** Critically endangered in IUCN list.
- Their population is now limited to India and Nepal only.
- The surviving population can be found within the tributaries of the Ganges river system: Girwa (Uttar Pradesh), Son (Madhya Pradesh), Ramganga (Uttarakhand), Gandak (Bihar), Chambal (Uttar Pradesh, Madhya Pradesh and Rajasthan) and Mahanadi (Orissa).
- The Gharial reserves of India are located in three States – Uttar Pradesh, Madhya Pradesh and Rajasthan.

**36. From the ecological point of view, which one of the following assumes importance in being a good link between the Eastern Ghats and the Western Ghats?**

- Sathyamangalam Tiger Reserve
- Nallamala Forest
- Nagarhole National Park
- Seshachalam Biosphere Reserve

**(2017)**

**Ans. (a)**

- **Sathyamangalam Tiger Reserve** is a significant ecosystem and a wildlife corridor in the **Nilgiri Biosphere Reserve** between the Western Ghats and the rest of the Eastern Ghats allowing gene flow between diverse fauna populations of the two eco-regions. It is located in the Erode District of Tamil Nadu.