

ENVIRONMENT

PYQs **2011-2025**

(Part-1)



BIODIVERSITY



Q. Regarding Peacock tarantula (Gooty tarantula), consider the following statements:



- I. It is an omnivorous crustacean.
- II. Its natural habitat in India is only limited to some forest areas.
- III. In its natural habitat, it is an arboreal species.

Which of the statements given above is/are correct?

- (a) I only
- (b) I and III
- (c) II only
- (d) II and III

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- (d) II and III**

- **Peacock tarantula** (also known as gooty tarantula is a spider and **not a crustacean**.
- Due to it's vibrant colours it is known as "peacock tarantula" thus **statement I is incorrect**.
- It is critically endangered and found only in some Forest areas primarily in Eastern ghats and Andhra Pradesh thus **statement II is correct**
- It is **arboreal (lives on trees)** as opposed to some spider species that lives by burrowing in ground.



Peacock Tarantula

(Poecilotheria metallica)

Location

Gooty, Andhra Pradesh
(And a few parts of TN!)

Diet

Primarily insects!

Conservation Status

Critically Endangered

Main Threats

Illegal pet trade and
collectors, habitat loss



*"You guys, I don't actually like metal
music that much..."*

Q. Among the following organisms, which one does not belong to the class of other three?



- a) Crab
- b) Mite
- c) Scorpion
- d) Spider



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c) Scorpion

d) Spider



- **Arachnids and crustaceans** are two groups of arthropods that are invertebrates.



- Arachnids are **terrestrial animals** whereas crustaceans are **aquatic animals**.

- Both arachnids and crustaceans have a **segmented body with jointed appendages**.

- The main difference between arachnids and crustaceans is the type of habitat they live.

- Mite, Scorpion and mite are Arachnids, while Crab is a Crustacean.

Arachnida

- Spiders, ticks, mites, scorpions



- Mollusca is a phylum of **protostomic invertebrate animals**, whose members are known as molluscs or mollusks.
- Around 76,000 extant species of molluscs are recognized, making it the **second-largest animal phylum after Arthropoda**.
- Molluscs are the **largest marine phylum**, comprising about 23% of all the named marine organisms.
- Includes snails, octopuses, squid, clams, scallops, oysters.



Phylum - Mollusca (Gastropods, Bivalves and Cephalopods)

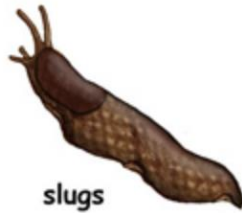
Class - Gastropoda (snails, slugs, conchs, periwinkles and sea slugs)



sea slugs

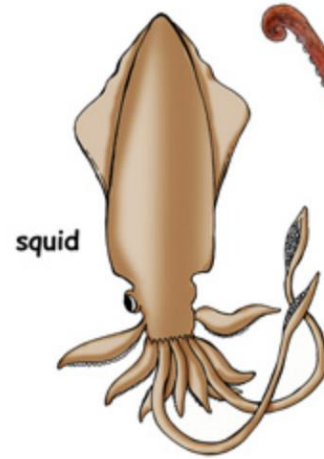


snails

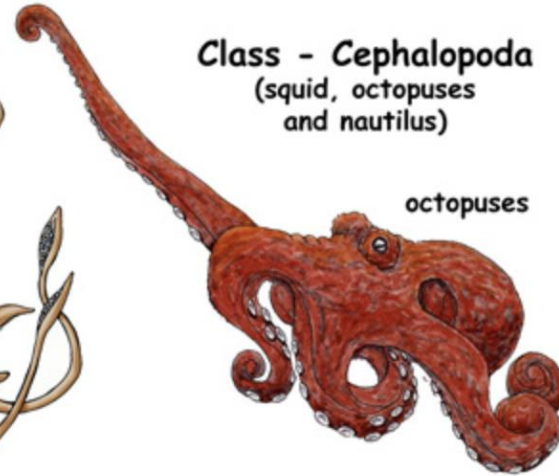


slugs

Class - Cephalopoda (squid, octopuses and nautilus)



squid

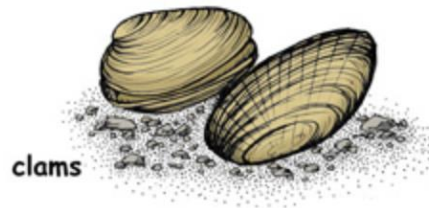


octopuses

Class - Bivalvia (clams, oysters, mussels and scallops)



scallops



clams



mussels

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Awakening Toppers



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Q. Consider the following statements:



Statement-I

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



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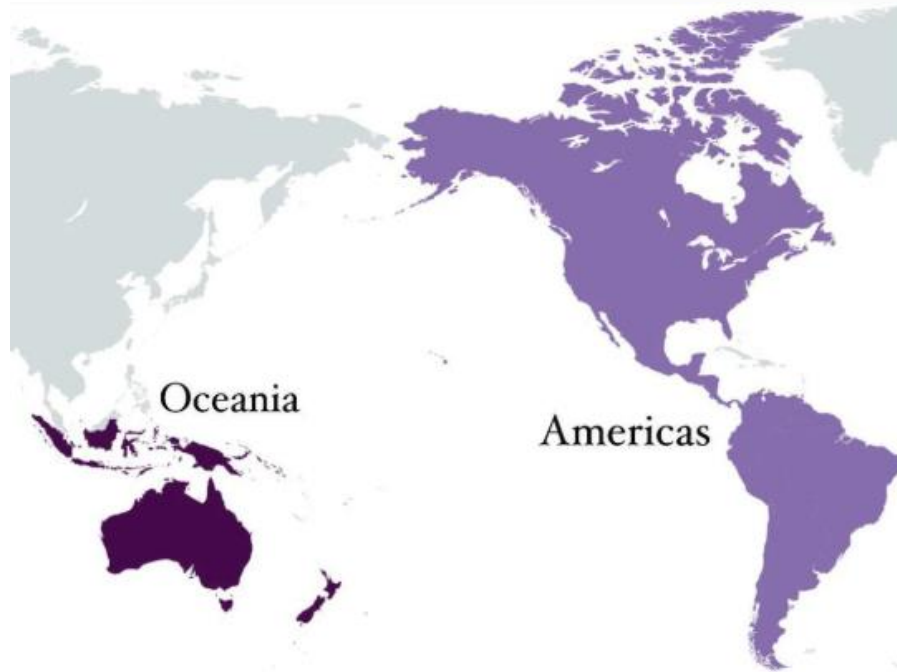
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- c) Statement I - is Correct but Statement-II is incorrect**
- d) Statement-I is incorrect but Statement-II is correct

Marsupials

- A marsupial is a mammal that belongs to the infraclass **Metatheria**, which is sometimes called **Marsupialia**.
- There are more than 250 marsupial species.
- Marsupials are characterized by **premature birth and continued development of the newborn** while attached to the nipples on the mother's lower belly. (pouched mammals)
- Examples - Kangaroos, koalas, etc.
- Marsupials are **native to Australia**.
- The Americas also have a presence of marsupials, with **opossums being the only marsupial family found in North and South America**.
- Marsupials are **not naturally** found in India.



Distribution of Marsupials



Percent of global marsupial species by continent

 70% of marsupials
(Around 250 species)

 30% of marsupials
(Around 120 species)

Marsupials



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Egg Laying Mammals

- Only two kinds of egg-laying mammals are left on the planet today—the **duck-billed platypus** and the **echidna, or spiny anteater**.



MONOTREMES

AnimalFact

ORDER: MONOTREMATA

Only group of egg-laying (oviparous) mammals indigenous to Australia and New Guinea with two extant families and their species

Ornithorhynchidae



Platypus

Ornithorhynchus anatinus

Tachyglossidae

Short-Beaked Echidna



Tachyglossus aculeatus
(Has 5 subspecies)

Sir David's Long-Beaked Echidna



Zaglossus attenboroughi

Eastern Long-Beaked Echidna



Zaglossus bartoni
(Has 4 subspecies)

Western Long-Beaked Echidna



Zaglossus bruijnii

 **Sleepy Classes**
Awakening Toppers



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Q. 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) All three
- d) None



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- **Sambar Deer:** The elusive sambar deer are crepuscular or nocturnal animals as they are most active at dusk and at night.
- They are found in a broad range of forest habitats like **dry deciduous forests, rainforests and mixed forests.**
- These deer play an important role in the ecosystem they live in by **dispersing seeds** throughout their native range.
- Indian Leopard, Bengal Tiger, and Dhole are the predators that prey on them.
- It has been listed as a **vulnerable species** on the IUCN Red List
- WPA 1972 – Schedule III



Deer Species	IUCN Status	State Animal of
Hangul / Kashmir Stag	Critically Endangered	Jammu & Kashmir
Sangai / Thamin / Brow-Antlered Deer	Endangered	Manipur
Swamp Deer / Barasingha	Vulnerable	Madhya Pradesh, Uttar Pradesh
Sambhar	Vulnerable	Odisha
Chital / Spotted Deer / Axis Deer	Least Concern	Telangana



Crepuscular Animals

- **Matutinal animals** are active only before sunrise, and **vespertine** only after sunset.



Crepuscular Animals

- Tigers
- Sambar Deer
- Red Panda



Malabar Civet

- It is **endemic to India** and was first reported from Travancore, Kerala.
- It is **nocturnal in nature** and found exclusively in the Western Ghats.



Habitat

- Wooded plains and hill slopes of evergreen rainforests.
- Western Ghats.

Malabar Civet



Threats

- Deforestation and commercial plantations are major threats.
- Civetone is extracted from the scent gland of this animal and used in medicine, and as an aromatic.
- Wildlife Protection Act Status - Schedule I
- CITES - Appendix III
- Haven't been sighted since 1991.
- It is among the 15 most threatened mammals in the world today.

Lion-tailed Macaque

- It is also called as **Lion-tailed Macaque, Wanderoo, or Liontail Macaque.**
- **It is diurnal**, meaning it is active exclusively in daylight hours.
- This animal is **endemic to the Western Ghats of Karnataka, Kerala and Tamil Nadu.**
- The Lion-tailed macaques prefer to stay in the **higher canopy of tropical evergreen forests.**
- The main threat to this species is **habitat disintegration due to human activities.**
- They are listed as **endangered species** under IUCN list.
- **Schedule I** of the Wildlife Protection Act, 1972.
- **Appendix I** of CITES



Q. Invasive Species Specialist Group' (that develop 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

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- 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)**.
- It **aims** to reduce threats to natural ecosystems and the native species they contain by increasing awareness of invasive alien species, and of ways to prevent, control or eradicate them.



Q. 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

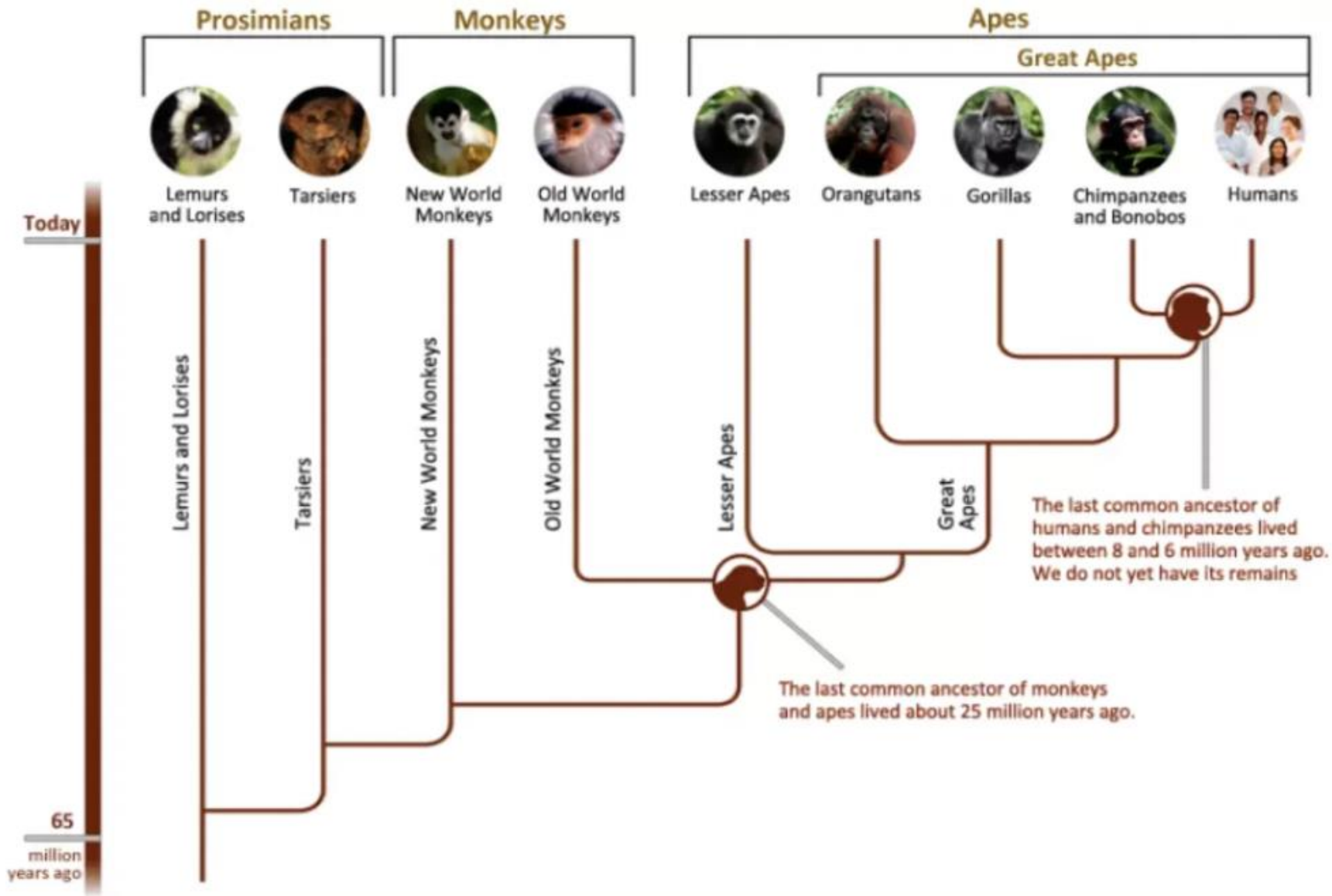


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Q. Consider the following statements regarding the Indian squirrels:



Sleepy Classes
Awakening Toppers

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?

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Q. 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?



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



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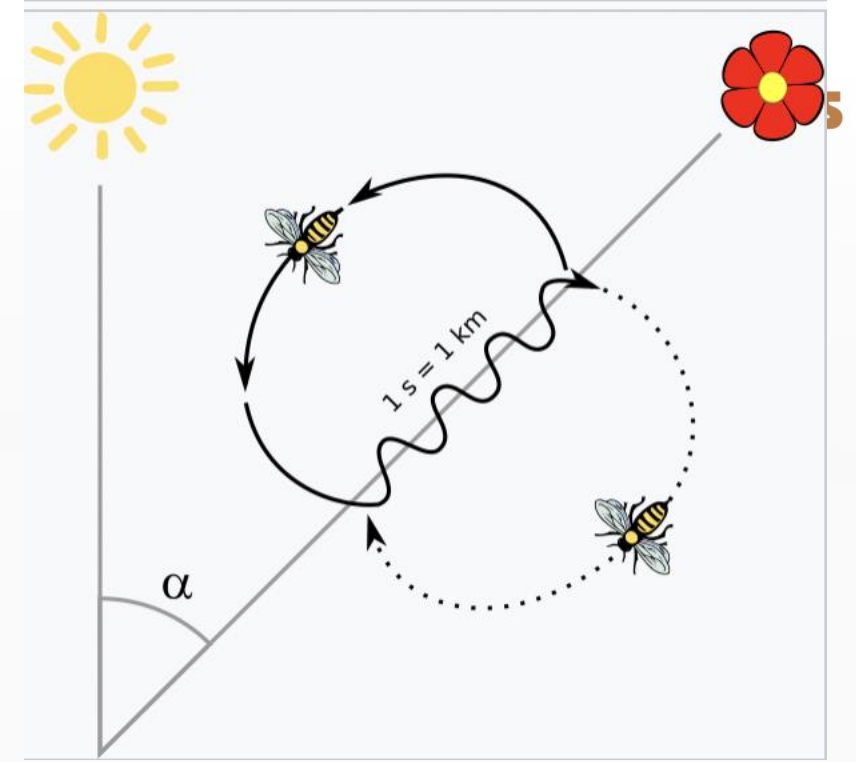


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- **Waggle dance** is a term used in beekeeping and ethology for a **particular figure-eight dance of the honey bee**.
- By performing this dance, successful foragers can share information about the direction and distance to patches of flowers yielding nectar and pollen, to water sources, or to new nest-site locations with other members of the colony.



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Q. Consider the following statements:



1. In India, the Biodiversity Management Committees are key to the realization of the objectives of the Nagoya Protocol.
2. 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
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- **Biodiversity Management Committees (BMC)**
- As per the **Biological Diversity Act 2002**, BMCs are created for “promoting conservation, sustainable use and documentation of biological diversity” by local bodies across the country.
- It shall consist of a chair person and not more than six persons nominated by the local body, of whom not less than one third should be women and not less than 18% should belong to the Scheduled Castes/ Scheduled Tribes.
- The main function of the BMC is **to prepare People’s Biodiversity Register in consultation with the local people.**
- The Registers entail a **complete documentation of biodiversity** in the area plants, food sources, wildlife, medicinal sources, etc.
- India’s Biological Diversity Act (BDA) 2002, is in close synergy with the **Nagoya Protocol** and aims to implement provisions of the Convention on Biological Diversity (CBD).
- The Nagoya Protocol sought to ensure commercial and research utilisation of genetic resources led to sharing its benefits with the government and the community that conserved such resources.
- CBD has two subsidiary protocols, namely the **Cartagena Protocol** on biosafety and the **Nagoya Protocol** on access to genetic resources and fair and equitable benefit-sharing.



Q. How does National Biodiversity Authority (NBA) help in protecting the Indian Agriculture?



1. NBA checks the biopiracy and protects the indigenous and traditional genetic resources.
2. NBA directly monitors and supervises the scientific research on genetic modification of crop plants.
3. Application for Intellectual Property Rights related to genetic/biological resources cannot be made without the approval of NBA.

Which of the statements given above is/are correct?

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



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- d) 1, 2 and 3



National Biodiversity Authority

- The National Biodiversity Authority (NBA) was established in 2003 **to implement India's Biological Diversity Act (2002).**
- The NBA is a **Statutory, Autonomous Body** and it performs the **facilitative, regulatory and advisory functions** for the Government of India on issues of conservation, sustainable use of biological resources and fair and equitable sharing of benefits arising out of the use of biological resources.
- Prior approval of NBA is necessary **before applying for any kind of IPRs in India** and outside based on any research or information on a biological resource obtained from India.



Bioprospecting and Biopiracy

- **Bioprospecting** is the **search** for and the **commercialisation of new products** that have been sourced from nature.
- Also known as **biodiversity prospecting**.
- While **biopiracy** is when **researchers and scientists use** sources from nature and traditional knowledge **without permission and exploit the indigenous cultures** they're getting their information from.
- **Various international treaties** have been negotiated to provide **countries legal recourse** in the event of biopiracy and to offer commercial actors **legal certainty for investment**.
- These include the **UN Convention on Biological Diversity** and the **Nagoya Protocol**.



Genetic Engineering Appraisal Committee

- The Genetic Engineering Appraisal Committee (GEAC) is a **statutory body** constituted under the 'Rules for the Manufacture, Use /Import /Export and Storage of Hazardous Microorganisms/Genetically Engineering Organisms or Cells, 1989' notified under the **Environment (Protection) Act, 1986**.
- It functions under the **Ministry of Environment, Forests & Climate Change**.
- The body **regulates** the use, manufacture, storage, import and export of **hazardous microorganisms or genetically-engineered organisms and cells in India**.



Q.The Genetic Engineering Appraisal Committee is constituted under the



- a) Food Safety and Standards Act, 2006
- b) Geographical Indications of Goods (Registration and Protection) Act, 1999
- c) Environment (Protection) Act, 1986
- d) Wildlife (Protection) Act, 1972



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Q. The “Red Data Books” published by the International Union for Conservation of Nature and Natural Resource (IUCN) contain lists of



1. Endemic plant and animal species present in the biodiversity hotspots.
2. Threatened plant and animal species.
3. Protected sites for conservation of nature and natural resources in various countries.

Select the correct answer using the codes given below:

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



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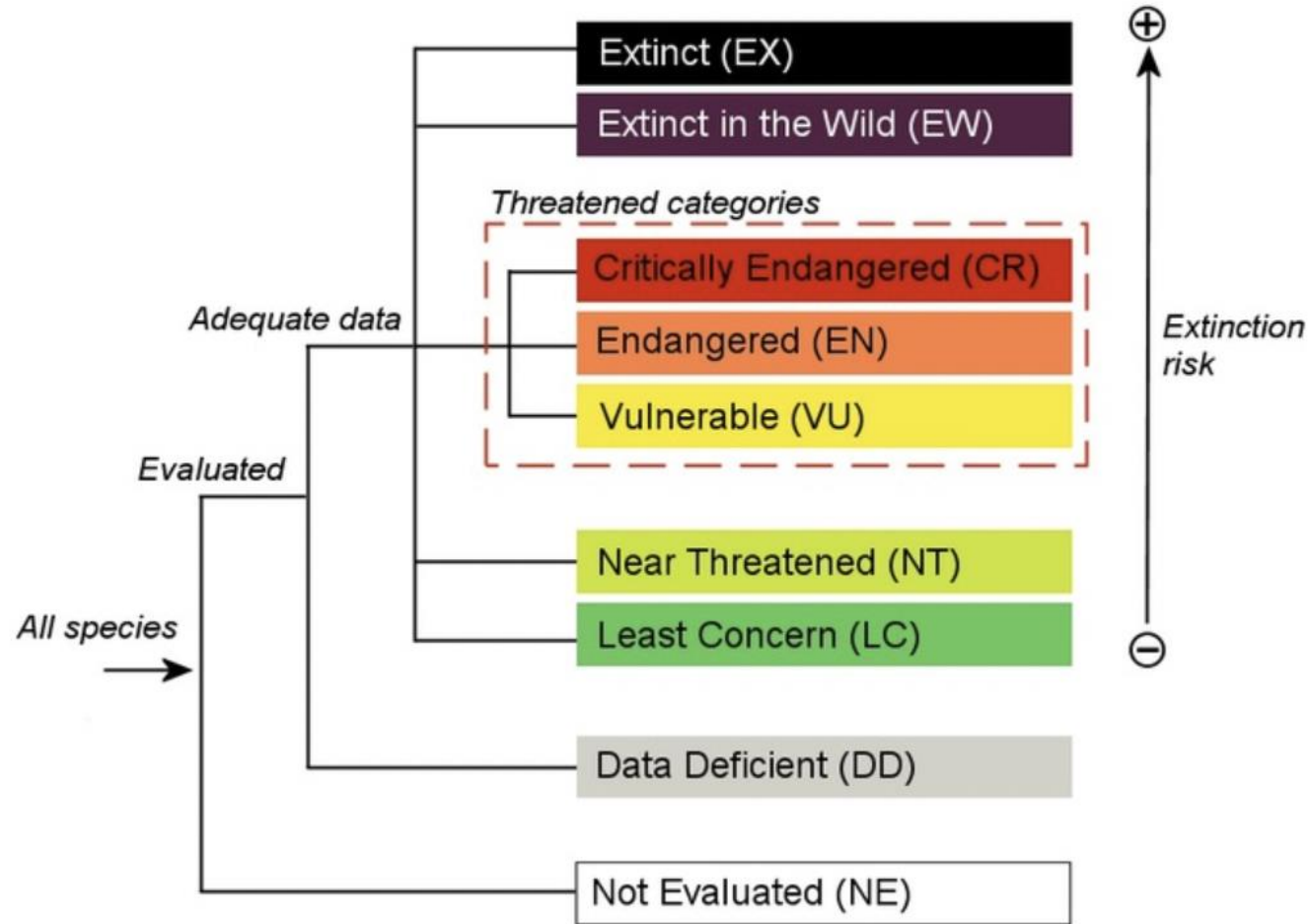


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Q.) With reference to the International Union for Conservation of Nature and Natural Resource (IUCN) and the Convention of International Trade in Endangered Species of Wild Fauna and Flora (CITES), which of the following statements is/are correct ?



1. IUCN is an organ of the United Nations and CITES is an international agreement between governments.
2. IUCN runs thousands of field projects around the world to better manage natural environments.
3. CITES is legally binding on the States that have joined it, but this Conventional does not take the place of national laws.

Select the correct answer using the codes given below:

- a) 1 only
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CITES/ Washington Convention



- The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is an international agreement to which States and regional economic integration organizations adhere voluntarily.
- CITES was drafted as a result of a resolution adopted in 1963 at a meeting of members of the International Union for Conservation of Nature (IUCN).
- The aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival.
- The CITES Secretariat is administered by UNEP (The United Nations Environment Programme) and is located at **Geneva**, Switzerland.
- Although CITES is legally binding on the Parties, it does not take the place of national laws.
- Rather, it provides a framework to be respected by each Party, which has to adopt its own domestic legislation to ensure that CITES is implemented at the national level.



Appendix I

Trade permitted only in exceptional circumstances - 3% of all species



(Example: African rhinoceros - threatened with extinction)

Appendix II

Trade strictly controlled - 97% of all species



(Example: Orchidaceae - at risk of becoming threatened)

Appendix III

Request for assistance in controlling trade of species protected in a specific country



(Example: Chilean toad)



CoP 3	New Delhi	 India	25 February – 8 March 1981
CoP 18	Geneva	 Switzerland	17–28 August 2019
CoP 19	Panama City	 Panama	14–25 November 2022

The 20th meeting of the Conference of the Parties (CoP20) to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) will be held in **Samarkand, Uzbekistan**, from November 24 to December 5, 2025.



IUCN

- The IUCN is a **membership Union** uniquely composed of both **government and civil society organisations**.
- Created in 1948, it is the global authority on the status of the natural world and the measures needed to safeguard it.
- It is headquartered in **Switzerland**.
- The IUCN Red List of Threatened Species, is the world's most comprehensive inventory of the global conservation status of plant and animal species.



Q. Consider the following statements:



1. Biodiversity is normally greater in the lower latitudes as compared to the higher latitudes.
2. Along the mountain gradients, biodiversity is normally greater in the lower altitudes as compared to the higher altitudes.

Which of the statements given above is/are correct?

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- Species density is higher in the tropics (low latitude) than in temperate regions (high latitude) resulting in a **latitudinal biodiversity gradient (LBG)**.
- **Elevational diversity gradient (EDG)** is an ecological pattern where biodiversity changes with elevation.
- The EDG states that species richness tends to increase as elevation increases, up to a certain point, creating a "**diversity bulge**" at middle elevations.
- **Humboldt's enigma** by Alexander von Humboldt's observations, it questions the conventional notion that tropical regions, fueled by ample sunlight, are the primary centres of biodiversity on Earth.
- It contends that despite receiving less sunlight and enduring colder temperatures, **mountain ecosystems defy this notion by showcasing exceptional biodiversity**, thereby challenging traditional ecological theories and prompting investigation into this anomaly.



Q. A sandy and saline area is the natural habitat of an Indian animal species. The animal has no predators in that area but its existence is threatened due to the destruction of its habitat. Which one of the following could be that animal?

- a) Indian wild buffalo
- b) Indian wild ass
- c) Indian wild boar
- d) Indian gazelle



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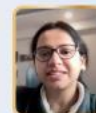
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Indian Wild Ass

- The Indian Wild Ass also called Ghor Khar or Ghud Khur is found predominantly in the **Little Rann of Kutch and its surrounding areas in Gujarat.**
- **Saline deserts (Rann),** arid grasslands and shrub lands are its preferred environment.



Indian Wild Ass

- Threats

- Threats to Wild Ass in the Little Rann of Kutch stem from **increasing human activities**.
- Land use patterns have changed since the Mega **Narmada Dam** Project which resulted in the **Sardar Sarovar canals** all around the protected area.
- The **International Boundary with Pakistan** has been fenced thus restricting any possibility of Wild Ass movement beyond borders.
- **Increased agricultural practices** have converted lands into irrigation fields, resulting in shrinking habitat for the existing Wild Ass population.
- **Prosopis juliflora** invasion is an additional threat to the habitat.



Indian Wild Ass

- **Conservation Status**

- In August 2015, the IUCN Red List has moved the Indian wild ass from the 'vulnerable' to 'endangered' category, indicating the need for heightened protection measures.
- It has been classified as a '**Vulnerable**' animal by IUCN in 2016.
- It is protected under **Schedule I** of the Wildlife Protection Act 1972.
- Included in **Appendix I** of the Convention on International Trade in Endangered Species (CITES), making international trade in this species illegal.



Indian Wild Ass

- **Indian Wild Ass Sanctuary** located in the Little Rann of Kutch is the **largest wildlife sanctuary** in India. (The Rann can be considered a large **ecotone**, a transitional area between **marine and terrestrial ecosystems**. During monsoon, the Rann gets inundated for a period of about one month. It is dotted with about 74 elevated plateaus or islands, locally called '**bets**'.)



Species	Habitat	IUCN Status
Indian wild buffalo	Wet grasslands, swamps, flood plains and densely vegetated river valleys	Endangered
Indian wild boar	Absent in extremely dry deserts and alpine zones.	Least Concern (Wild Boar)
Indian gazelle	Chinkara live in arid plains and hills, deserts, dry scrub and light forests.	Least Concern

Q. Which one of the following groups of animals belongs to the category of endangered species?



- a) Great Indian Bustard, Musk Deer, Red Panda and Asiatic Wild Ass
- b) Kashmir Stag, Cheetal, Blue Bull and Great Indian Bustard
- c) Snow Leopard, Swamp Deer, Rhesus Monkey and Saras (Crane)
- d) Lion-tailed Macaque, Blue Bull, Hanuman Langur and Cheetal



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Great Indian Bustard



Sleepy Classes

- The Great Indian Bustard is a **bustard** found in India and the adjoining regions of Pakistan.
- A large bird with a horizontal body and long bare legs, giving it an **ostrich like appearance**, this bird is among the **heaviest of the flying birds**.
- It is the **state bird of Rajasthan**.
- It is considered the **flagship grassland species**, representing the health of the grassland ecology.
- But with less than 200 GIBs remaining in the world, most of them found in **Rajasthan's 'Desert National Park'**, we are on the brink of forever losing a majestic bird species, which was once a **strong contender to be declared as India's National Bird**.



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Great Indian Bustard

- **IUCN Red List - Critically Endangered.**
- **CITES - Appendix I**
- **Wildlife (Protection) Act 1972 - Schedule I**
- **The Great Indian Bustard, Asian Elephant and Bengal Florican have been included in Appendix I of the UN Convention on Migratory Species at the 13th Convention on Migratory Species (CMS) in Gandhinagar (Gujarat) COP.**

Red Panda



- The Red panda is listed as **Endangered** under IUCN as its population has declined up to 50%.
- Also known as the **lesser panda**.
- **State animal of Sikkim**
- The red panda is found in particularly in along the Myanmar-Yunnan border, India, Nepal , Bhutan and China. (**Native to the eastern Himalayas and southwestern China**)
- In India the red panda is found in the foothills of the Himalayas, particularly in the **wetter eastern sections of Sikkim, West Bengal and Arunachal Pradesh**.
- These are closely connected with **montane forests with thick bamboo forest**.



Red Panda

- Scientists from the ZSI have concluded that India is home to both the (sub) species —
 - Himalayan red panda (*Ailurus fulgens*) and the
 - Chinese red panda (*Ailurus styani*) and
- the **Siang river in Arunachal Pradesh** splits the red panda into these two phylogenetic species.
- The red panda was considered a **monotypic species** till 2020 until the scientists studied its genetic make-up with respect to geographical distribution and described the occurrence of the two species.



Red Panda

Threats

- The main problems faced by these species are **destruction of habitat, poaching, and disintegration.**
- These species are used for different uses including medicine, wild meat etc.
- In India it is found in 19 protected or otherwise managed areas.
- **Wildlife Protection Act Status:** Schedule I
- **CITES** – Appendix I

Himalayan / White-Bellied Musk Deer

- Found in **Kashmir, Kumaon and Sikkim.**
- Only **males** produce the **musk.**
- **Threats include** poaching & illegal trade for its musk.
- State animal of **Uttarakhand.**
- **Endangered.**
- **Schedule I** of the Wild Life (Protection) Act, 1972.
- **Appendix I** of Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).



Kashmir Stag/Hangul



Sleepy Classes

- The Kashmir stag is the **state animal of Jammu and Kashmir**.
 - Ladakh administration declared black necked crane(NT) as its 'state bird' and snow leopard (VU) as its new 'state animal.'
- Today though, the viable population of hangul is limited to the **Dachigam Wildlife Sanctuary** near Srinagar, which is spread over 141 square kilometres.
- Very small fragmented groups have been seen in its adjoining protected areas which include **Overa-Aru Wildlife Sanctuary** in south Kashmir.
- It is placed under **Schedule I** of the Indian Wildlife (Protection) Act, 1972.
- IUCN Status – **Critically Endangered**



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Lion-tailed Macaque

- It is also called as **Lion-tailed Macaque, Wanderoo, or Liontail Macaque.**
- This animal is **endemic to the Western Ghats of Karnataka, Kerala and Tamil Nadu.**
- The Lion-tailed macaques prefer to stay in the **higher canopy of tropical evergreen forests.**
- The main threat to this species is **habitat disintegration due to human activities.**
- They are listed as **endangered species** under IUCN list.
- **Schedule I** of the Wildlife Protection Act, 1972.
- **Appendix I** of CITES



Q. In which of the following States is lion-tailed macaque found in its natural habitat?



Sleepy Classes
Awakening Toppers

1. Tamil Nadu
2. Kerala
3. Karnataka
4. Andhra Pradesh

Select the correct answer using the codes given below:

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



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- **Appendix I** of CITES



Q.) 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
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- c) 3 and 4 only
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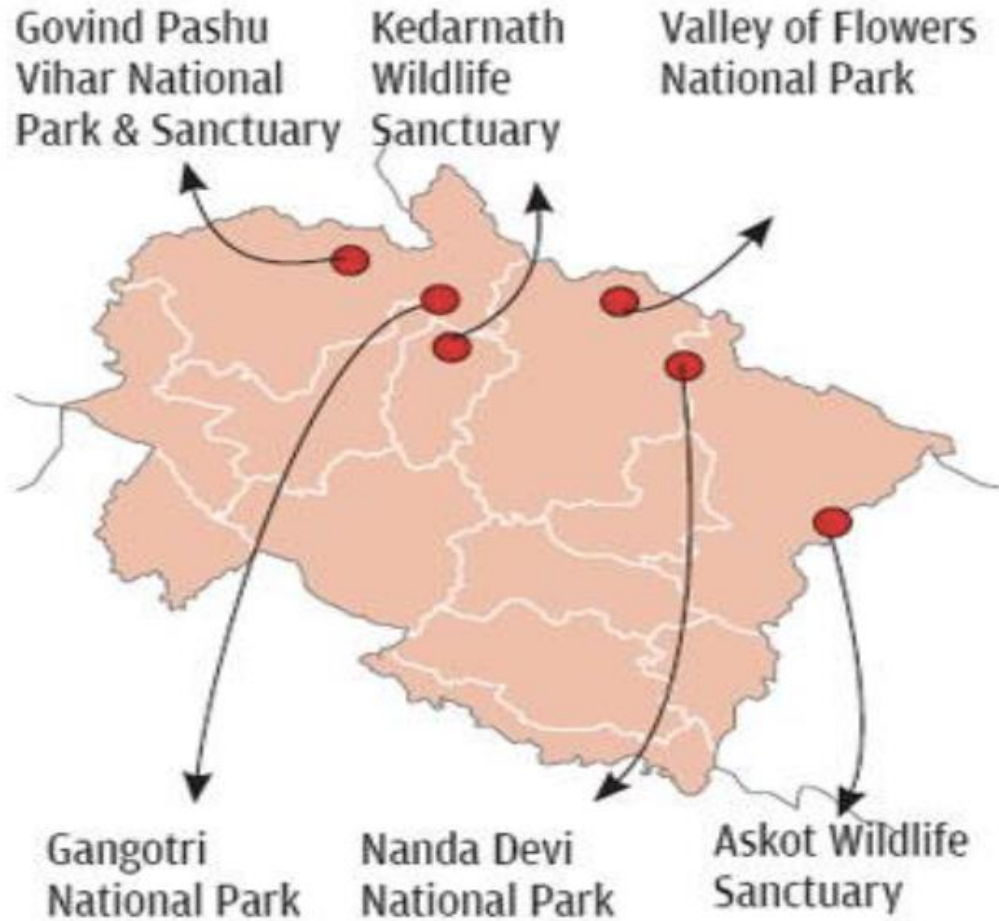
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- a) 1 and 2 only**
- b) 2 and 3 only
- c) 3 and 4 only
- d) 1 and 4 only

Fall from grace

Over 1,000 musk deer used to roam the areas a few decades ago

● Protected areas where musk deer are found



Q. Which one of the following is not a site for in-situ method of conservation of flora?



- a) Biosphere Reserve
- b) Botanical Garden
- c) National Park
- d) Wildlife Sanctuary



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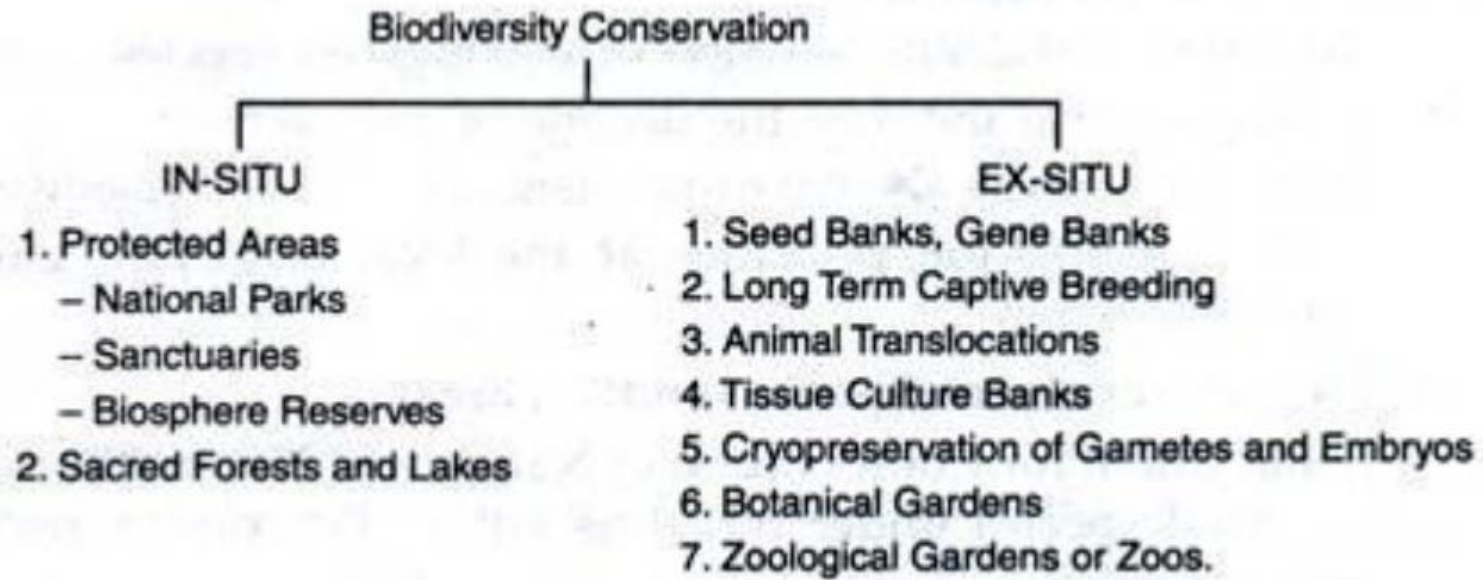
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Q. Three of the following criteria have contributed to the recognition of Western Ghats-Sri Lanka and Indo-Burma regions as hotspots of biodiversity:



1. Species richness
2. Vegetation density
3. Endemism
4. Ethno-botanical importance
5. Threat perception
6. Adaptation of flora and fauna to warm and humid conditions

Which three of the above are correct criteria in this context?

- | | |
|---------------|---------------|
| a) 1 2 and 6 | b) 2, 4 and 6 |
| c) 1, 3 and 5 | d) 3, 4 and 6 |



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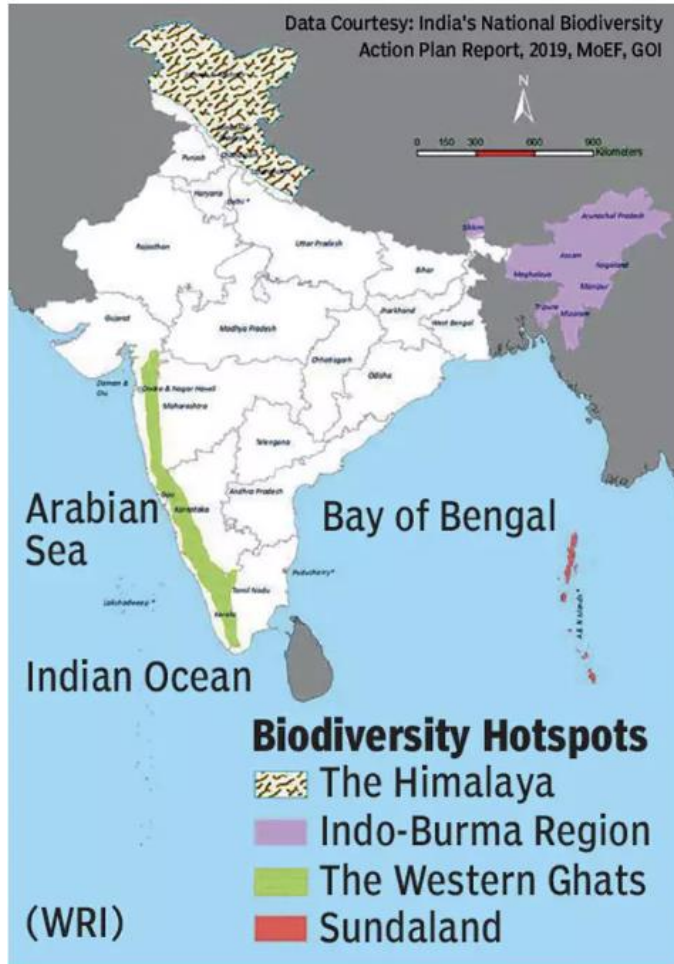


Biodiversity Hotspot

- To qualify as a biodiversity hotspot, a region **must meet two strict criteria:**
 - it must contain at least 1,500 species of vascular plants (more than 0.5% of the world's total) as endemics, and
 - it has to have lost at least 70% of its primary vegetation.
- Globally, 36 zones qualify under this definition



Biodiversity Hotspot - India



Biodiversity Hotspots - India

- 1. Himalaya:** Includes the entire Indian Himalayan region [Jammu and Kashmir, Himachal Pradesh, Uttarakhand, northern part of West Bengal (Darjeeling), Sikkim, northern part of Assam and Arunachal Pradesh] and that falling in Pakistan, Tibet, Nepal, Bhutan, China and Myanmar.
- 2. Indo-Burma:** Myanmar, Thailand, Vietnam, Laos, Cambodia and southern China; also included the entire northeastern India (Mizoram, Manipur, Nagaland, Meghalaya, and Tripura), and Andaman group of Islands, Bangladesh and Malaysia.
- 3. Sundaland:** Indonesia, Malaysia, Singapore, Brunei and Philippines; also included Nicobar group of Islands.
- 4. Western Ghats and Sri Lanka:** Includes the entire Western Ghats [Tamil Nadu, Kerala, Karnataka, Goa, Maharashtra and Gujarat] and Sri Lanka.



Q. Government of India encourages the cultivation of 'sea buckthorn'. What is the importance of this plant/



1. It helps in controlling soil erosion and in preventing desertification.
2. It is a rich source of biodiesel.
3. It has nutritional value and is well-adapted to live in cold areas of high altitudes.
4. Its timber is of great commercial value.

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Sea Buckthorn

- Produces an orange-yellow coloured edible berry.
- AKA Wonderberry, Lehberry, Ladakh gold.
- In India, it is found **above the tree line in the Himalayan region**, generally in dry areas such as the **cold deserts of Ladakh and Spiti**.
- In Himachal Pradesh, it is locally called chharma and grows in the wild in Lahaul and Spiti and parts of Kinnaur.
- A major part is covered by this plant in **Himachal Pradesh, Ladakh, Uttarakhand, Sikkim and Arunachal Pradesh**.



Sea Buckthorn

- Seabuckthorn is a **soil-binding plant** which prevents soil-erosion, checks siltation in rivers and helps preserve floral biodiversity.
- Its fruit and leaves are rich in **vitamins, carotenoids and omega fatty acids** and it can help troops in acclimatising to high-altitude.



Q. What is the difference between the antelopes Oryx and Chiru?



- a) Oryx is adapted to live in hot and arid areas whereas Chiru is adapted to live in steppes and semi-desert areas of cold high mountains.
- b) Oryx is poached for its antlers whereas Chiru is poached for its musk.
- c) Oryx exists in western India only whereas Chiru exists in north-east India only.
- d) None of the statements (a), (b) and (c) given above is correct.



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Oryx

- Oryx is a type of **antelope**.
- They are found in **Arabian Peninsula and North and East Africa**.
- The Arabian oryx was only saved from extinction through a **captive-breeding program and reintroduction to the wild**.
- North Africans are extinct in wild. East Africans are still present.
- All oryx species **prefer near-desert conditions and can survive without water for long periods**.



Arabian oryx



Male in [Dubai Desert Conservation Reserve](#)

Conservation status



Vulnerable (IUCN 3.1)^[1]

CITES Appendix I (CITES)^[1]



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Chiru

- Chiru (or chiru goat) is also referred to as **Tibetan antelope**.
- It is a sociable, tiny, graceful antelope-like animal that lives on the Tibetan Plateau's high alpine steppes.
- They are mainly seen in the **Ladakh region** in India.
- The underfur of the Tibetan antelope, or “**soft gold**” as it's called by poachers, is the warmest and softest wool in the animal kingdom.
- Predominantly, this underfur is woven into a traditional shawl known as a **shahtoosh**.
- ‘**Near Threatened**’ in IUCN Red List.
- It has been enlisted in **Schedule I** of Wildlife Protection Act, 1972.
- To enhance its protection, its prime habitats have been declared as Wildlife Sanctuaries viz. **Karakoram Wildlife Sanctuary and Changthang Cold Desert Wildlife Sanctuary**.





Q. Which of the following can be threats to the biodiversity of a geographical area?



1. Global warming
2. Fragmentation of habitat
3. Invasion of alien species
4. Promotion of vegetarianism

Select the correct answer using the codes given below:

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THE FIVE THREATS TO BIODIVERSITY



Land and Sea use Change

(Including habitat loss and degradation)

Example:
Agricultural land use which is responsible for **80%** of the global deforestation



Pollution

Make the environment unsuitable for survival directly and indirectly



Species overexploitation

Example:
Overfishing which may decimate global fish populations by 2050



Climate Change

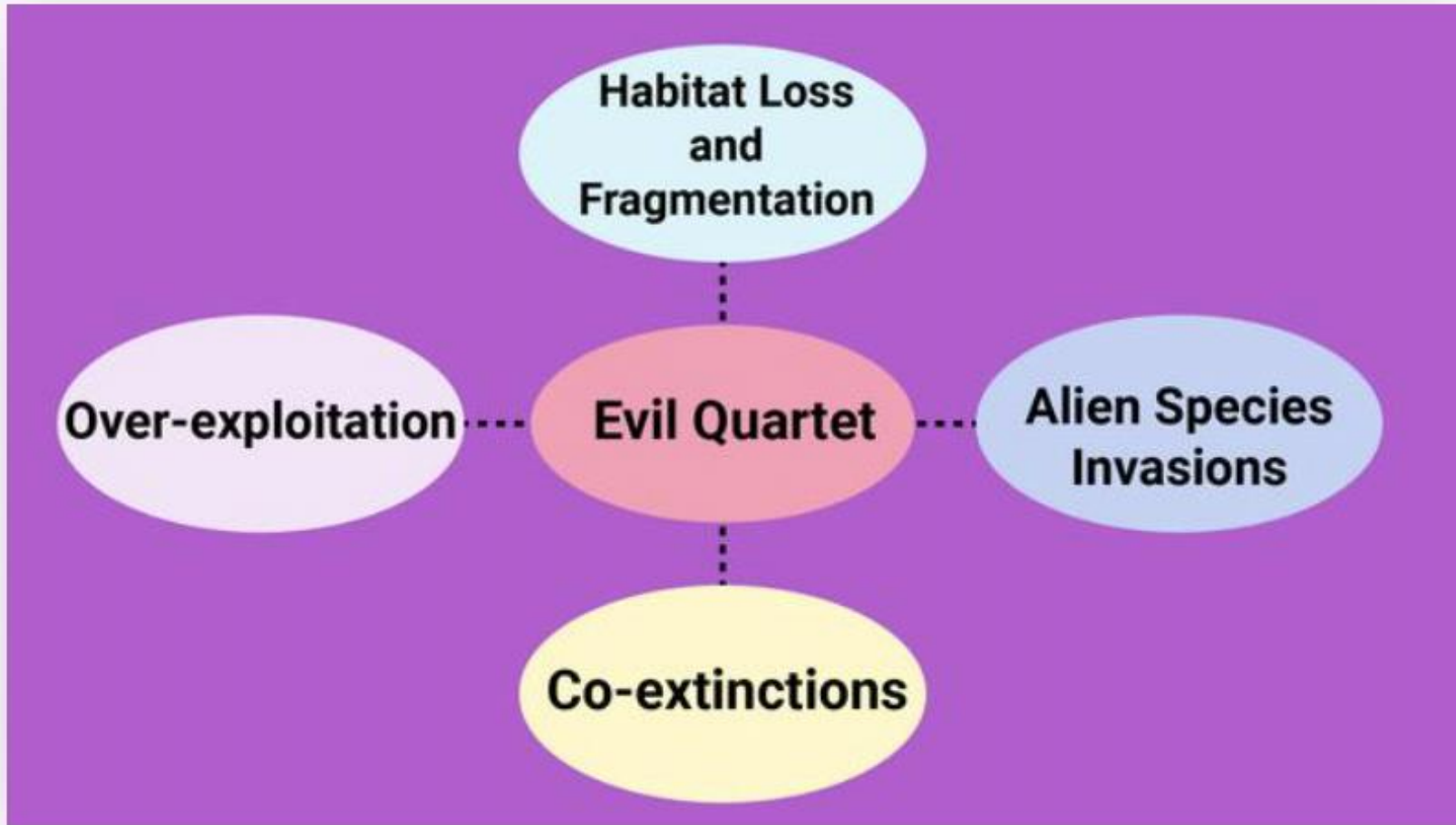
Forcing the animal to shift range or confounding the signals that trigger seasonal events and more



Invasive species and disease

Compete with native species for space, food and other resources; sometimes spread disease that native species have no immunity of





Q. Consider the following:

1. Black-necked crane
2. Cheetah
3. Flying squirrel
4. Snow leopard

Which of the above are naturally found in India?

- a) 1, 2 and 3 only
- b) 1, 3 and 4 only
- c) 2 and 4 only
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Black Necked Crane



Sleepy Classes

- The **black-necked crane** is a medium-sized crane in Asia that breeds on the **Tibetan Plateau** and **remote parts of India and Bhutan**.
- In India, **Eastern Ladakh** is the only known breeding ground of the Black-necked Crane outside of China.
- Owing to the special significance of the bird for the state, it has been declared as the **state bird of Ladakh**.



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Black Necked Crane

- It is locally known as **Dhung Karma**.
- Also, it is the only **high-altitude crane** amongst the 15 species found in the world.
- These birds build their nests in vast open environments, making them vulnerable to a host of predators.
- The major reason behind their depleting population are **feral dogs that disrupt their breeding process by harming eggs and chicks**.
- The other big reason is **loss of habitat altogether**, credited to increased grazing that puts tremendous pressure on wetlands and leads to their degradation

Black-necked crane



Black-necked Crane in Ladakh

Conservation status



Near Threatened (IUCN 3.1)^[1]

CITES Appendix I (CITES)^[2]



Namdapha Flying Squirrel

- It is a unique (the only one in its genus) flying squirrel that is restricted to a **single valley in the Namdapha in Arunachal Pradesh**. (Spotted in 1981)
- *Biswamoyopterus biswasi* (named after zoologist Shyamrup Biswas)
- Arboreal
- Nocturnal



Namdapha Flying Squirrel



Habitat

- Tropical forests.
- Mesua Ferrea jungles
- Found only in Namdapha Tiger Reserve in Arunachal Pradesh.

Threats

- Hunted for food
- Wildlife Protection Act Status - Schedule II
- It is among the 25 “most wanted lost” species that are the focus of Global Wildlife Conservation’s “Search for Lost Species” initiative.

Snow Leopard

- In India, their geographical range encompasses:
 - **Western Himalayas:** Jammu and Kashmir, Himachal Pradesh.
 - **Eastern Himalayas:** Uttarakhand and Sikkim and Arunachal Pradesh.
 - **J&K, Ladakh(State animal), HP (State animal), Uttarakhand, Sikkim, Arunachal Pradesh**



Snow Leopard

- IUCN Status – **Vulnerable**
- WPA, 1972 – **Schedule I**
- CITES – **Appendix I**
- CMS – **Appendix I**
- Hemis NP – **Snow leopard capital of the world**
- Kibber WS – **Hotspot for snow leopards**



Q. Consider the following fauna and India:

1. Gharial
2. Leatherback turtle
3. Swamp deer

Which of the above is/are endangered?

- a) 1 and 2 only
- b) 3 only
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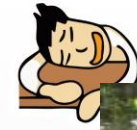
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Gharial



Sleepy Classes



- The **Gharial** is one of the **three species of crocodilians only found in Indian subcontinent** - Mugger, Saltwater crocodiles and the Gharial.
- Gharials are **endemic to the Indian subcontinent**.
- Once found abundantly in all the major river systems of South Asia, the Gharial is **now extinct in Pakistan, Bangladesh, Burma and Bhutan**.
- Gharial is listed as '**Critically Endangered**' in the IUCN Red List of Endangered Species.



Gharial

- Population of Gharials are a **good indicator of clean river water**.
- In India small populations are present and increasing in the rivers of the **National Chambal Sanctuary, Katarniaghat Wildlife Sanctuary in UP(Girwa river), Sone River Sanctuary in MP** and the rainforest biome of Mahanadi in **Satkosia Gorge Sanctuary, Orissa**, where they **apparently do not breed**.
- NCS is located at **tri-junction of Rajasthan, Madhya Pradesh and Uttar Pradesh**.
- It is known for **critically endangered gharials, the red-crowned roof turtle, and the endangered Ganges river dolphin**.
- **Satkosia gorge of Mahanadi** which is the southernmost limit of gharials home range in India.
- Ghaghra, Gandak river, Ramganga river, etc.



Gharial

- In 1976, the population of **Gharial** had **plummeted** to less than **200 individuals**.
- Getting alarmed, the Government of India subsequently accorded the highest level of protection to Gharial by bringing it under **Schedule I of the Wild Life Protection Act, 1972**.
- In 1976, **Project Crocodile** was initiated with support from the United Nations Development Programme and Food and Agriculture Organization.
- The project included an **intensive captive rearing and breeding programme intended** to restock depleted Gharial habitats.
- The **gharial reintroduction** in the **Beas Conservation Reserve** is an **ambitious programme of the Punjab government**.
- The reptiles were commonly sighted in the Beas River till the 1960s but later became extinct.



Giant Leatherback Turtle



- **Galathea Bay** is an **iconic nesting site** in India of the **enigmatic Giant Leatherback**, the **world's largest marine turtle** – borne out by surveys done over three decades.
- The largest of the seven species of sea turtles on the planet and also the most long-ranging, Leatherbacks are **found in all oceans except the Arctic and the Antarctic**.
- Within the **Indian Ocean**, they nest only in **Indonesia, Sri Lanka and the Andaman and Nicobar Islands** and are also listed in **Schedule I of India's Wildlife Protection Act, 1972**, according it the highest legal protection.
- IUCN status - **Vulnerable**
- **CITES - Appendix I**



Swamp Deer

- The **barasingha** (*Rucervus duvaucelii*), also known as the swamp deer, is a deer species distributed in the **Indian subcontinent**.
- Populations in **northern and central India** are **fragmented**, and two isolated populations occur in southwestern Nepal.



Barasingha



male



adult female and yearling

Conservation status



Vulnerable (IUCN 3.1)^[1]

CITES Appendix I (CITES)^[1]



Swamp Deer

- There are three subspecies of swamp deer found in the Indian Subcontinent.
 - The **western swamp deer** (*Rucervus duvaucelii*) found in Nepal.
 - **Southern swamp deer**/Hard Ground Barasingha (*Rucervus duvaucelii branderi*) found in central and north India.
 - **Eastern swamp deer** (*Rucervus duvaucelii ranjitsinhi*) found in the Kaziranga (Assam) and Dudhwa National Parks (Uttar Pradesh).



Q. Consider the following:

1. Star tortoise
2. Monitor lizard
3. Pygmy hog
4. Spider monkey

Which of the above are naturally found in India?

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Pygmy Hog

- Is the **world's smallest wild pig**.
- It is one of the **most useful indicators of the management status of grassland habitats**.
- The grasslands where the pygmy hog resides are crucial for the survival of other threatened species such as Indian Rhinoceros, Swamp Deer, Wild Buffalo, Hispid Hare, Bengal Florican and Swamp Francolin.

Habitat

- Relatively **undisturbed, tall 'terai' grasslands**.
- Assam is home to the **world's smallest and rarest wild suid (pigs)**, the Pygmy Hog (*Porcula salvania*).



Conservation status



Pygmy Hog

- Bullet-shaped, standing just 25 cm tall, they were once widely found in the wet grasslands of the Himalayan foothills stretching from **Uttar Pradesh to Assam, through Nepal terai and Bengal duars.**
- Today they are confined to a few pockets along **Assam's border with Bhutan and Arunachal Pradesh.**
- In fact, its only viable population exists in the **Manas Tiger Reserve.**
- **Wildlife Protection Act Status: Schedule I**
- **CITES Appendix I**



Sleepu Classes



Indian Star Tortoise

- Indian star tortoises are found across the Indian subcontinent, more specifically, in the Central and Southern parts of India, in West Pakistan and in Sri Lanka.
- It is typically found in **dry, open habitats** such as scrub forests, grasslands, and rocky outcroppings.
- IUCN Red List: **Vulnerable**
- Wild Life Protection Act 1972: **Schedule IV**
- Schedule IV: This list is for species that are not endangered. It includes protected species but the penalty for any violation is less compared to the Schedules I and II.
- Convention on International Trade in Species (CITES): **Appendix I**



- India is home to **four Monitor lizards** – the Bengal Monitor (*Varanus bengalensis*), the Asian Water monitor (*Varanus salvator*), the Yellow monitor (*Varanus flavescens*) and the Desert monitor (*Varanus griseus*).
- These reptiles are mostly solitary and spend their days on the go, often venturing into urban areas for food and water.
- They are even known **to help regulate rodent and insect populations**.

Bengal monitor



es

Bundala National Park

Conservation status



Near Threatened (IUCN 3.1)^[1]

CITES Appendix I (CITES)^[1]

- **Spider Monkeys** live in tropical climates, specifically the evergreen forests of **Central and South America**.

- They can also be found as far north as Mexico but not in India.



Q. With reference to “Gucchi” sometimes mentioned in the news, consider the following statements:

1. It is a fungus.
2. It grows in some Himalayan Forest areas.
3. It is commercially cultivated in the Himalayan foothills of north-eastern India.

Which of the statements given above is/are correct?

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Gucchi

- Found on the **foothills of the Himalayas**.
- One of the most sought-after edible mushrooms, guchhi is known for its **spongy, honeycombed head and savoury flavour** but all of that comes at a high price.
- It is known to be one of the **most expensive mushrooms**.
- The mushrooms **cannot be cultivated commercially** and grow in **conifer forests** across temperature regions, and the foothills **in Himachal Pradesh, Uttarakhand, and Jammu and Kashmir**.
- And it takes **months for villagers** to collect enough of these mushrooms, dry them and bring them to the market.



Q. Consider the following statements:

1. Some mushrooms have medicinal properties.
2. Some mushrooms have psychoactive properties
3. Some mushrooms have insecticidal properties
4. 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

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- Medicinal mushrooms such as shiitake, maitake, and reishi have been found to have **antitumor and immunostimulant properties**.
- **Psilocybin** is a hallucinogenic chemical in certain mushrooms known as **magic mushrooms**. Eating mushrooms that contain psilocybin can have a variety of effects, ranging from euphoria to hallucinations. Individuals use psilocybin as a recreational drug. It can provide feelings of euphoria and sensory distortion that are common to hallucinogenic drugs, such as LSD (lysergic acid diethylamide).
- Recently, an increasing number of mushrooms have been found to contain **insecticidal compounds**.



- Bioluminescence is the production and emission of light by living organisms. **Panellus stipticus** is one of the brightest-glowing bioluminescent mushrooms on Earth.
- A mushroom documentation project in the forests of Northeast India has revealed not only 600 varieties of fungi, but also led to a new discovery: a bioluminescent or light emitting variety of mushroom. The new species — named *Roridomyces phyllostachydis* — was first sighted on a wet August night near a stream in Meghalaya's Mawlynnong in East Khasi Hills district and later at Krang Shuri in West Jaintia Hills district



Q. Improper handling and storage of cereal grains and oilseeds result in the production of toxins known as aflatoxins which are not generally destroyed by normal cooking process. Aflatoxins are produced by

- a) Bacteria
- b) Protozoa
- c) Moulds
- d) Viruses



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- d) Viruses



- **Aflatoxins** are naturally occurring mycotoxins that are produced by many species of **Aspergillus**, a fungus.
- The term "mould" is a common name having no taxonomic significance.
- It is applied to a variety of fungi which grow as semi-microscopic organisms, and whose mycelium tends to form a loose meshwork rather than a dense tissue.
- **Aspergillus releases Cyclopiazonic acid (CPA) – kodo millet poisoning – Elephant deaths in Bandhavgarh.**
- Investigations confirmed CPA levels exceeded 100 ppb in tissue samples, causing acute neurotoxic damage.



Q. Consider the following organisms:

1. Agaricus
2. Nostoc
3. Spirogyra

Which of the above is/are used as biofertilizers/biofertilizers?

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



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Agaricus

- **Agaricus is a genus of mushrooms** containing both edible and poisonous species, with possibly over 300 members worldwide.

Nostoc

- **Bioinoculants** are microbial preparations that enhance the uptake of nutrients by plants from the soil, increase the availability of the nutrients and stimulate plant growth. There are two types of organisms which are used as inoculants: symbiotic organisms (such as *Rhizobium*, *Synorhizobium*, *Bradyrhizobium*, *Nostoc*, *Anabaena*, etc.) and non-symbiotic organisms (such as *Azotobacter*, *Azospirillum*, *Beijerinckia*, etc.)

Spirogyra

- **Spirogyra is a genus of filamentous green algae** of the order Zygnematales, named for the helical or spiral arrangement of the chloroplasts that is diagnostic of the genus.
- Spirogyra chiefly occurs in ponds, pools, ditches and similar other places.



Q. Consider the following statements :



1. Animal Welfare Board of India is established under the Environment (Protection) Act, 1986.
2. National Tiger Conservation Authority is a statutory body.
3. National Ganga River Basin Authority is chaired by the Prime Minister.

Which of the statements given above is/are correct ?

- a) 1 only
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- **Animal Welfare Board** has been established under **Prevention of Cruelty to Animals Acts 1960**.
- **National Tiger Conservation Authority (NTCA)** is a **statutory body** under the **Ministry of Environment, Forests and Climate Change**.
- It was established in 2005 following the recommendations of the Tiger Task Force.
- It was constituted under enabling provisions of the **Wildlife (Protection) Act, 1972, as amended in 2006**, for strengthening tiger conservation, as per powers and functions assigned to it.
- Headed by Minister of Environment.



National Ganga Council

- Also known as 'National Council for Rejuvenation, Protection and Management of River Ganga'.
- It was formed under the **River Ganga (Rejuvenation, Protection and Management) Authorities Order, 2016**.
- This Order dissolved the **National Ganga River Basin Authority** and replaced it with the National Ganga Council.
- This Council has the overall responsibility of preventing pollution and rejuvenating the Ganga River Basin, including the River Ganga and its tributaries.
- Headed by PM.





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LMRs (Last minute revision sheets)

Q. Which of the following are the key features of 'National Ganga River Basin Authority (NGRBA)'?

1. River basin is the unit of planning and management.
2. It spearheads the river conservation efforts at the national level.
3. One of the Chief Ministers of the States through which the Ganga flows becomes the Chairman of NGRBA on rotation basis.

Select the correct answer using the code given Below.

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Q. With reference to Bombay Natural History Society (BNHS), consider the following statements :

1. It is an autonomous organization under the Ministry of Environment and Forests.
2. It strives to conserve nature through action-based research, education and public awareness.
3. It organizes and conducts nature trails and camps for the general public.

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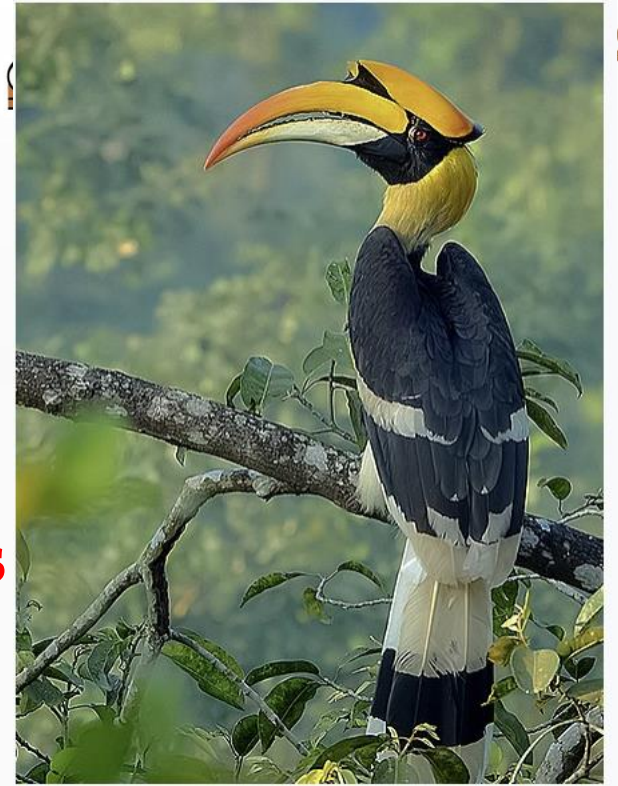
Bombay Natural History Society

- The Bombay Natural History Society (BNHS), founded on 15 September 1883, is one of the **largest non-governmental organisations in India** engaged in conservation and biodiversity research.
- The BNHS logo is the **great hornbill**.



- The **great hornbill** (*Buceros bicornis*), also known as the concave-casqued hornbill, great Indian hornbill or great pied hornbill, is one of the larger members of the hornbill family.
- It is found in the **Indian subcontinent and Southeast Asia**.
- Its distribution is fragmented in the **Western Ghats and in the foothills of the Himalayas**.
- The great hornbill is the **state bird of Arunachal Pradesh and Kerala**.
- The **Hornbill festival** celebrated in **Nagaland** is named after the bird – Hornbill which is the most revered and admired bird for the Nagas.

Great hornbill



S



- Referred to as **'forest engineers'** or **'farmers of the forest'** for playing a key role in dispersing seeds of tropical trees, hornbills indicate the prosperity and balance of the forest they build nests in.
- Hornbills are hunted for their casques – upper beak – and feathers for adorning **headgear**.
- They are also poached for their meat and medicinal value of their body part
- **Schedule I** - Wildlife Protection Act, 1972.
- **Appendix I** – CITES
- **Vulnerable** - IUCN



Conservation status



Vulnerable (IUCN 3.1)^[1]

CITES Appendix I (CITES)^[1]



Initiatives

- **Asian Waterbird census**
- The Asian waterbird census is an **annual exercise** undertaken in India by **Bombay Natural History Society in association with Wetlands International**, in which enthusiastic birdwatchers count the birds by observing them near their respective breeding grounds.
- The exercise is a part of '**International waterbird census**', an international exercise.
- It also aims to **create awareness regarding bird species as well as health of the wetlands**, which are facing severe threat amidst anthropogenic disturbance.
- It is conducted in the month of **January every year**.



Initiatives

- **National Dragonfly festival**
- The festival was started in 2018 in order to inform the public about integral **role played by dragonflies** in our environment.
- The Bombay Natural History Society has been organising the festival since then in association with **WWF India, United Nations Development Programme, United Nations Environment Programme and National Biodiversity Board of India.**
- The local events which are the part of this nationwide festival are also organised by **WWF India in association with various state agencies.**
- The "**Thumbimahotsavam**" is a state butterfly festival of **Kerala** which is organised as a part of National Dragonfly festival.





Initiatives

- On August 18 every year, the World-Wide Fund for Nature (WWF-India) and the Bombay Natural History Society (BNHS) commemorates Dragonfly Day in New Delhi and its surrounding areas.
- **Dragonflies**
- It is an aerial predator insect most commonly found near freshwater habitats throughout most of the world.
- Their distinctive colors make them look beautiful. This makes Most species of dragonflies live in the tropics and particularly in the rainforests.



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Q.) In which of the following regions of India are you most likely to come across the 'Great Indian Hornbill' in its natural habitat?



- a) Sand deserts of northwest India
- b) Higher Himalayas of Jammu and Kashmir
- c) Salt marshes of western Gujarat
- d) Western Ghats



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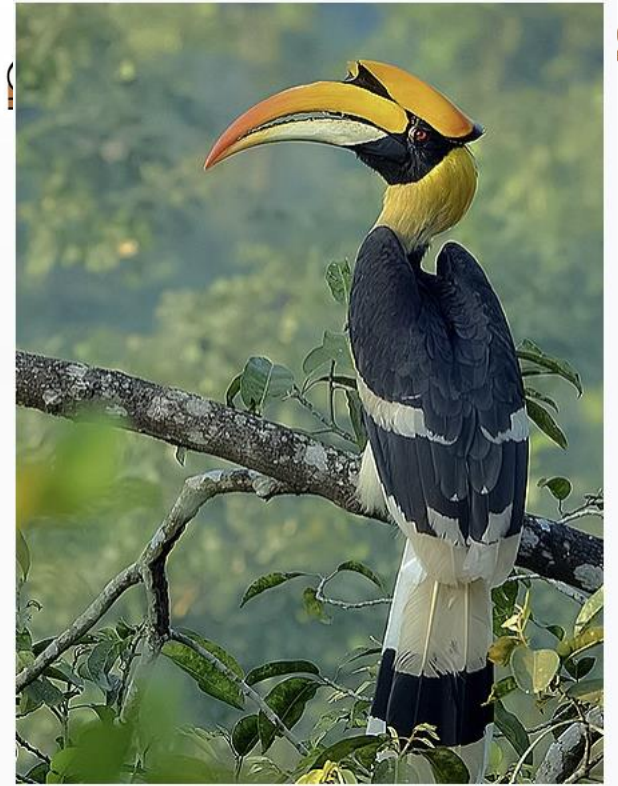


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- **Appendix I – CITES**
- **Vulnerable - IUCN**



Conservation status



Q. Other than poaching, what are the possible reasons for the decline in the population of Gangas River Dolphins ?

1. Construction of dams and barrages on rivers
2. Increase in the population of crocodiles in rivers.
3. Getting trapped in fishing nets accidentally
4. Use of synthetic fertilizers and other agricultural chemicals in crop-fields in the vicinity of rivers

Select the correct answer using the code given below.

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



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Gangetic Dolphin (Susu)

- The Ganges river dolphin can only live in **freshwater** and is **essentially blind**. (Ultrasonic waves – echolocation - emitting sounds and listening for the reflected echoes when it bounces off objects)
- Also known as **Susu** due to the noise the dolphin is said to make when it breathes.
- Tiger of the Ganges.
- It is a **reliable indicator** of the health of the entire river ecosystem.
- It was recognised as the **National Aquatic Animal** in 2009, by the Government of India.
- **Official animal** of the **Indian city of Guwahati**.
- **Habitat** - Ganges and Brahmaputra rivers and their tributaries in Bangladesh, India and Nepal.



Gangetic Dolphin (Susu)

- It is among the **four freshwater dolphins** in the world- the other three are:
 - The 'Baiji' now likely extinct from the Yangtze River in China,
 - The 'Bhulan' of the Indus in Pakistan, and
 - The 'Boto' of the Amazon River in Latin America.
- These four species live only in rivers and lakes.



Gangetic Dolphin (Susu)

- A stretch of the **Ganges River between Sultanganj and Kahlgaon in Bihar** has been declared a dolphin sanctuary and named **Vikramshila Gangetic Dolphin Sanctuary**, the first such protected area.
- On the occasion of the 74th Independence Day, 15 August 2020, the Indian Ministry of Environment, Forest and Climate Change announced '**Project Dolphin**' to boost conservation of both river and oceanic dolphins.
- Wildlife (Protection), Act 1972: **Schedule I.**
- IUCN: **Endangered.**
- CITES: **Appendix I**
- CMS: **Appendix I & II**
- **National Mission for Clean Ganga** celebrates 5th October as National Ganga River Dolphin Day.



Q. The most important strategy for the conservation of biodiversity together with traditional human life is the establishment of

- a) Biosphere reserves
- b) Botanical gardens
- c) National parks
- d) Wildlife sanctuaries



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Biosphere Reserves

- There are 18 Biosphere Reserves in India. (categories roughly correspondingly to **IUCN Category V Protected areas**) to **protect larger areas of natural habitat than a typical national park or animal sanctuary**, and that often include one or more national parks or reserves, along with buffer zones that are open to some economic uses.
- Protection is granted not only to the **flora and fauna** of the protected region, but also to the **human communities** who inhabit these regions, and their ways of life.
- Biosphere Reserves are thus special environments for both people and nature and are living examples of **how human beings and nature can co-exist while respecting each other's needs**.



Q.) 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 above are correctly matched?

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



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- **Blue-finned Mahseer** is found naturally in the **Cauvery river. (LC)**
- **Irrawaddy Dolphin** is found in coastal areas in South and Southeast Asia, and in three rivers: the Irrawaddy (Myanmar), the Mahakam (Indonesian Borneo) and the Mekong (China).
- Around 6000 have been reported from Bangladesh.
- Their distribution in **Chilika is considered to be the highest single lagoon population.**
 - Gangetic dolphin - Endangered
 - Indus River Dolphin - Endangered
 - Irrawaddy Dolphin – Endangered
- **Rusty Spotted Cat** is one of the world's smallest feline. The rusty spotted cat, one of the few wild cats that inhabit the forests of **Andhra Pradesh, is among the animals in the Eastern Ghats.**

Rusty-spotted cat



Conservation status



Near Threatened (IUCN 3.1)^[2]

CITES Appendix I (CITES)^[2]

Q. Which of the following is not a bird?

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



Q. Which of the following is not a bird?

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



Q. 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
- b) 2 only
- c) 1 and 3
- d) 3 only



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Which of the statements given above is/are correct?

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- b) 2 only**
- c) 1 and 3
- d) 3 only

- Under the Wildlife (Protection) Act, 1972, wild animals are not considered the sole property of the government. However, the government **holds regulatory authority** over their protection, hunting, and conservation.
- Wild animals in protected areas are under government protection, but **ownership is not explicitly defined** as solely belonging to the government.
- The law governing the subject of wildlife, the Wildlife (Protection) Act, 1972, **does not discriminate between animals found in protected areas and outside.**
- **Statement 3 is not correct:** Only if the **wild animal becomes a danger to human life or is diseased or disabled** beyond recovery can it be allowed to be captured or killed by the competent authority, the Chief Wildlife Warden of the State.
- **Mere apprehension or fear** that a wild animal could endanger human life is not a ground for capture or killing.



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

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



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b) Cockroach

c) Crab

d) Spider



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- The **ant-fungus mutualism** is a symbiosis seen between certain ant and fungal species, in which **ants actively cultivate fungus** much like humans farm crops as a food source.
- Leafcutter ants use leaves as their fertilizer to grow their crop: fungus.
- They cultivate their fungal gardens by providing them with freshly cut leaves, protecting them from pests and molds, and clearing them of decayed material and garbage.
- In return, the **fungus acts as a food source for the ants' larvae.**

Q. Consider the following pairs:

1. Nokrek Bio-sphere Reserve : Garo Hills
2. Logtak (Loktak) Lake : Barail Range
3. Namdapha National Park : Dafla Hills

Which of the above pairs is/are correctly matched?

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



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- **Nokrek** is the highest peak in **Garo Hills**.
- The **Barail Range** is a tertiary mountain range in Northeast India with an area of approximately 80,000 ha between Brahmaputra and Barak basins stretching from Nagaland & Manipur to the east and Assam & Meghalaya to the west.
- **Daphla (or Dafla) Hills** is a tract of hilly country on the border of western Arunachal and Assam occupied by an independent tribe called Daphla.
- **Namdapha National Park** is located between the **Dapha bum** range of the **Mishmi Hills and the Patkai range** with a wide elevation range between 200 and 4,571 m. It is crossed from east to west by the **Noa Dihing** River that originates at the Chaukan Pass on the Indo-Myanmar border.



Q. Consider the following pairs

1. Dampa Tiger Reserve : Mizoram
2. Gumti Wildlife Sanctuary : Sikkim
3. Saramati Peak : Nagaland

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Gumti Wildlife Sanctuary is in **Tripura**.



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Q) Which of the following National Parks is unique in being a swamp with floating vegetation that supports a rich biodiversity?



- a) Bhitarkanika National Park
- b) Keibul Lamjao National Park
- c) Keoladeo Ghana National Park
- d) Sultanpur National Park



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- The **Keibul Lamjao National Park** is a national park in the state of Manipur in India.
- The park is situated on the southern shore of the Loktak Lake – the largest fresh water lake in Eastern India, which has been declared a Ramsar site.(Rudrasagar lake - Tripura)
- It is **only floating park** in the world.
- It is characterized by floating decomposed plant material locally called **phumdi** (floating mass of entangled vegetation formed by the accumulation of organic debris and biomass with soil)
- Forest Type - Moist semi evergreen forests
- Threats from dwindling water quality of Loktak Lake and changes in the water regime due to the National Hydro-Electric Project Corporation (NHPC)'s Ithai barrage.

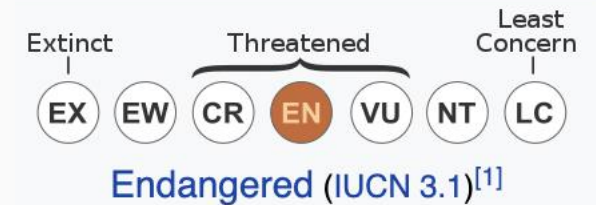


- The sangai is an endemic and endangered subspecies of Eld's deer found only in Manipur.
- It is also the state animal of Manipur.
- It is also fondly called Manipur's dancing deer because of its delicate gait as it negotiates its way along the floating wetlands
- Sangai is listed as 'Endangered' in the IUCN Red List of Threatened Species and Schedule I of the Indian Wild Life (Protection) Act, 1972.
- Sangai is also included in Appendix 1 of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).
- Threats from low genetic variability (inbreeding depression - reduced survival and fertility of offspring of related individuals), disease susceptibility (immune system is compromised), etc.
- Relocation to Pumlen Pat??, a fresh-water lake second largest in the state after Loktak Lake

Sangai



Conservation status



Q. In a particular region in India, the local people train the roots of living tree into robust bridges across the streams. As the time passes these bridges become stronger. These unique 'Living Root Bridges' are found in

- a) Meghalaya
- b) Himachal Pradesh
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- d) Tamil Nadu



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- The living root bridges of **Cherrapunji, Laitkynsew, and Nongriat in Meghalaya** is a form of tree shaping, which creates these **suspension bridges**.
- The useful lifespan of the bridges, once complete, is thought to be 500–600 years.
- They are **naturally self-renewing and self-strengthening** as the component roots grow thicker.



Q.) Which one of the following is the national aquatic animal of India?



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- b) Olive ridley turtle
- c) Gangetic dolphin
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Q.) With reference to an organization known as 'BirdLife International', which of the following statements is/are correct?



1. It is a Global Partnership of Conservation Organizations.
2. The concept of 'biodiversity hotspots' originated from this organization.
3. It identifies the sites known/referred to as 'Important Bird and Biodiversity Areas'.

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- BirdLife International is a **global partnership of non-governmental organizations** that strives to conserve birds and their habitats.
- BirdLife International has identified 13,000 Important Bird and Biodiversity Areas and is the official International Union for Conservation of Nature's Red List authority for birds.
- BirdLife International publishes a quarterly magazine, *BirdLife: The Magazine*, which contains recent news and authoritative articles about birds and their conservation.
- The Bombay Natural History Society (BNHS - one of the largest non-governmental organisations in India engaged in conservation and biodiversity research) and Birdlife International have identified 467 IBAs in India.
- **Forty percent of these IBAs fall outside the PA network** and thus form an important tool for landscape-level conservation planning.
- BNHS has also prepared a list of 96 new/potential sites which can be designated as IBAs in the future.
- The British biologist **Norman Myers** coined the term "biodiversity hotspot" in 1988 .



Q).What is/are unique about 'Kharai camel', a breed found in India?



1. It is capable of swimming up to three kilometers in seawater.
2. It survives by grazing on mangroves.
3. It lives in the wild and cannot be domesticated.

Select the correct answer using the code given below

a) 1 and 2 only

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- Kharai camels' name is derived from the local word *khara*, meaning saline.
- Location - **Kutch, a coastal region of Gujarat**, which is also a large desert land, has two camel breeds. One is the popular Kutchi breed and the other, the Kharai breed, native to the region.
- The Kharai breed has the special ability to survive on both dry land and in the sea, making it an ecotonal breed.
- Recognised as a separate breed a few years ago by the National Bureau of Animal Genetic Resources (NBAGR), the Kharai camel is probably the only domesticated breed of camel that lives in dual ecosystems.
- Feeding - Kharai camels are known to feed on mangroves on the island offshore. And to eat this salty marine food, they sometimes swim for hours.



Q).With reference to 'Red Sanders', sometimes seen in the news, consider the following statements:



1. It is a tree species found in a part of South India.
2. It is one of the most important trees in the tropical rain forest areas of South India.

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



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- Red Sanders is an **endemic** tree of South India.
- They are found in **Tropical Dry Deciduous forest of the Palakonda and Seshachalam hill ranges of Andhra Pradesh** and also found in Tamil Nadu and Karnataka.
- The International Union for Conservation of Nature (IUCN), an international organisation for nature conservation, has now reclassified red sanders (*Pterocarpus santalinus*) as '**ENDANGERED**' from the earlier 'near threatened'.



- IUCN Red List: Endangered.
- CITES: Appendix II
- Wildlife (Protection) Act 1972: Schedule IV
- Santalin (vs Santalol)
- Strontium cadmium, zinc, and copper
- **Sandalwood Spike Disease** is an infectious disease which is caused by phytoplasma.
- **Phytoplasmas are bacterial parasites** of plant tissues which are transmitted by insect vectors and involved in plant-to-plant transmission.
- There is no cure as of now for the infection.



Q. Consider the following:

1. Cashew
2. Papaya
3. Red sanders

How many of the above trees are actually native to India?

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

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How many of the above trees are actually native to India?

(a) Only one

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(d) None

- **Cashew**

- Not native to India
- Native to **Brazil (South America)**
- Brought to India by the **Portuguese** in the 16th century

- **Papaya**

- Not native to India
- Native to **Central America / Southern Mexico**
- Introduced to India post-Columbian exchange.



Q.) 'Gadgil Committee Report' and 'Kasturirangan Committee Report', sometimes seen in the news, are related to



- a) constitutional reforms
- b) Ganga Action Plan
- c) linking of rivers
- d) protection of Western Ghats



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- a) constitutional reforms
- b) Ganga Action Plan
- c) linking of rivers
- d) protection of Western Ghats**



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- To conserve and protect the bio diversity of Western Ghats while allowing for sustainable and inclusive development of the region, Government of India had constituted a High Level Working Group under the Chairmanship of Dr. Kasturirangan.
- The Committee had recommended that identified geographical areas falling in the six States of Kerala, Karnataka, Goa, Maharashtra, Gujarat and Tamil Nadu may be declared as Ecologically Sensitive Areas.
- The Committee recommended bringing just 37% of the Western Ghats under the Ecologically Sensitive Area (ESA) zones — downing from the 64% suggested by the Gadgil Committee report.

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



- a) Bhitarkanika Mangroves
- b) Chambal River
- c) Pullicat Lake
- d) Deepor Beel



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- a) Bhitarkanika Mangroves
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- d) Deepor Beel



Gharial

- Population of Gharials are a good indicator of clean river water.
- Mainly found in Chambal river and also in Ghaghra and Gandak river, Girwa river (Katarniaghat Wildlife Sanctuary in Uttar Pradesh), the Ramganga river in Jim Corbett National Park and the Sone river(Bihar).
- The **National Chambal Sanctuary** is located along river Chambal on the tri-junction of Rajasthan, Madhya Pradesh and Uttar Pradesh.
- It is known for critically endangered gharials, the red-crowned roof turtle, and the endangered Ganges river dolphin.
- **Critically endangered.**
- **Schedule I** of the Wild Life (Protection) Act, 1972.
- Appendix I of Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).



Q).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



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- **M-STrIPES**, short for **Monitoring System for Tigers - Intensive Protection and Ecological Status** is a **software-based monitoring system** launched across Indian tiger reserves by the Indian government's National Tiger Conservation Authority in 2010. .
- 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.
- It uses Global Positioning System (GPS), General Packet Radio Services (GPRS), and remote sensing, to collect information from the field, create a database using modern Information Technology (IT) based tools, analyses the information using GIS and statistical tools to provide inferences that allow tiger reserve managers to better manage their wildlife resources.



Q).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 not 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.



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WPA 1972



- This Act provides for the protection of the country's wild animals, birds, and plant species, in order to ensure environmental and ecological security.
- Among other things, the Act lays down restrictions on hunting many animal species.
- WPA has six schedules which give varying degrees of protection. Schedule I and part II of Schedule II provide absolute protection - offences under these are prescribed the highest penalties.
- Species listed in Schedule III and Schedule IV are also protected, but the penalties are much lower.
- Schedule V includes the animals which may be hunted.
- The specified endemic plants in Schedule VI are prohibited from cultivation and planting



Vermin



- As per Section 62 of the Wildlife Protection Act, 1972, States can send a list of wild animals to the Centre requesting it to declare them vermin for selective slaughter.
- The Central Government may by notification, declare any wild animal other than those specified in Schedule I and part 11 of Schedule II of the law to be vermin for any area for a given period of time.
- As long as the notification is in force such wild animal shall be included in Schedule V of the law, depriving them of any protection under that law.



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Q.) If a particular plant species is placed under Schedule VI of The Wildlife Protection Act, 1972,



what is the implication?

- a) a license is required to cultivate that plant.
- b) Such a plant cannot be cultivated under any circumstances.
- c) It is a Genetically Modified crop plant.
- d) Such a plant is invasive and harmful to the ecosystem.



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- There are six schedules under the Wildlife Protection Act, 1972.
- The specified endemic plants in Schedule VI are prohibited from cultivation and planting.
- It further states that "Cultivation of specified plants without license prohibited. –
 - (1) no person shall cultivate a specified plant except under, and in accordance with a license granted by the Chief Wildlife Warden or any other officer authorized by the State Government in this behalf;
 - 2) Every license granted under this section shall specify the area in which and the conditions, if any, subject to which the licensee shall cultivate a specified plant."
- Placement in Schedule VI provides for regulation in cultivation of a specified plant and restricts its possession, sale and transportation.
- Both cultivation and trade of specified plants can only be carried out with prior permission of competent authority.



Q).According to the Wildlife (Protection) Act, 1972, which of the following animals cannot be hunted by any person except under some provisions provided by law?



1. Gharial
2. Indian wild ass
3. Wild buffalo

Select the correct answer using the code given below:

- a) 1 only
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- d) 1, 2 and 3

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- Critically endangered.
- Schedule I of the Wild Life (Protection) Act, 1972.
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- India has three species of Crocodiles –
 - Gharial: Critically Endangered.
 - Mugger crocodile: Vulnerable
 - Saltwater crocodile: Least Concern (Found in coastal areas of Odisha, WB and TN)
- Schedule I of the Wild Life (Protection) Act, 1972.
- Appendix I of Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).



Indian Wild Ass

- In August 2015, the IUCN Red List has moved the Indian wild ass from the 'vulnerable' to 'endangered' category, indicating the need for heightened protection measures.
- It has been classified as 'nearly threatened' animal by IUCN in 2016.
- It is protected under Schedule 1 of the Wildlife Protection Act 1972.
- Included on Appendix I of the Convention on International Trade in Endangered Species (CITES), making international trade in this species illegal.
- Indian Wild Ass Sanctuary located in the Little Rann of Kutch is the largest wildlife sanctuary in India.
- A few years back, the Gujarat Ecological Education and Research Foundation (GEER) report had recommended that the Thar desert in Rajasthan should be developed as an alternative site for re-establishing the Indian wild ass by reintroduction a few of them.



Wild Water Buffalo

- Found in the alluvial grasslands, marshes, swamps and river valleys.
- Endangered
- Schedule I of the Wild Life (Protection) Act, 1972.
- Appendix I of Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).
- Five female wild buffaloes have been translocated from Manas National Park in Assam to Udanti Wildlife Sanctuary in Raipur district, Chhattisgarh which is longest translocation in the country ever, that seeks to revive the waning population of Chhattisgarh's State animal.
- **Big five** of Kaziranga NP - Tiger, rhino, elephant, swamp deer, and wild water buffalo



Q).Consider the following statements in respect of Trade Related Analysis of Fauna and Flora in Commerce (TRAFFIC)



1. TRAFFIC is a bureau under United Nations Environment Programmed (UNEP).
2. The mission of TRAFFIC is to ensure that trade in wild plants and animals is not a threat to the conservation of nature.

Which of the above statements is/are correct?

- a) 1 only
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- c) Both 1 and 2
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- **TRAFFIC, the Wildlife Trade Monitoring Network**, is a **non-governmental organisation** working globally on the trade in wild animals and plants, interested in both biodiversity and sustainable development.
- TRAFFIC (Trade Records Analysis of Flora and Fauna in Commerce) was originally created in 1976, as a specialist group of the **Species Survival Commission of the International Union for Conservation of Nature (IUCN)**.
- It evolved into a strategic alliance of the **World Wide Fund for Nature (WWF)** and the **International Union for Conservation of Nature (IUCN)**.
- The organisation's aim is to "ensure that trade in wild plants and animals is not a threat to the conservation of nature"



- The TRAFFIC is governed by the TRAFFIC Committee, a steering group composed of members of TRAFFIC's partner organizations, WWF and IUCN.
- TRAFFIC also works in close co-operation with the Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).



Q. Consider the following kinds of organisms:

1. Bat
2. Bee
3. Bird

Which of the above is/are pollinating agent/agents?

- a) 1 and 2 only
- b) 2 only
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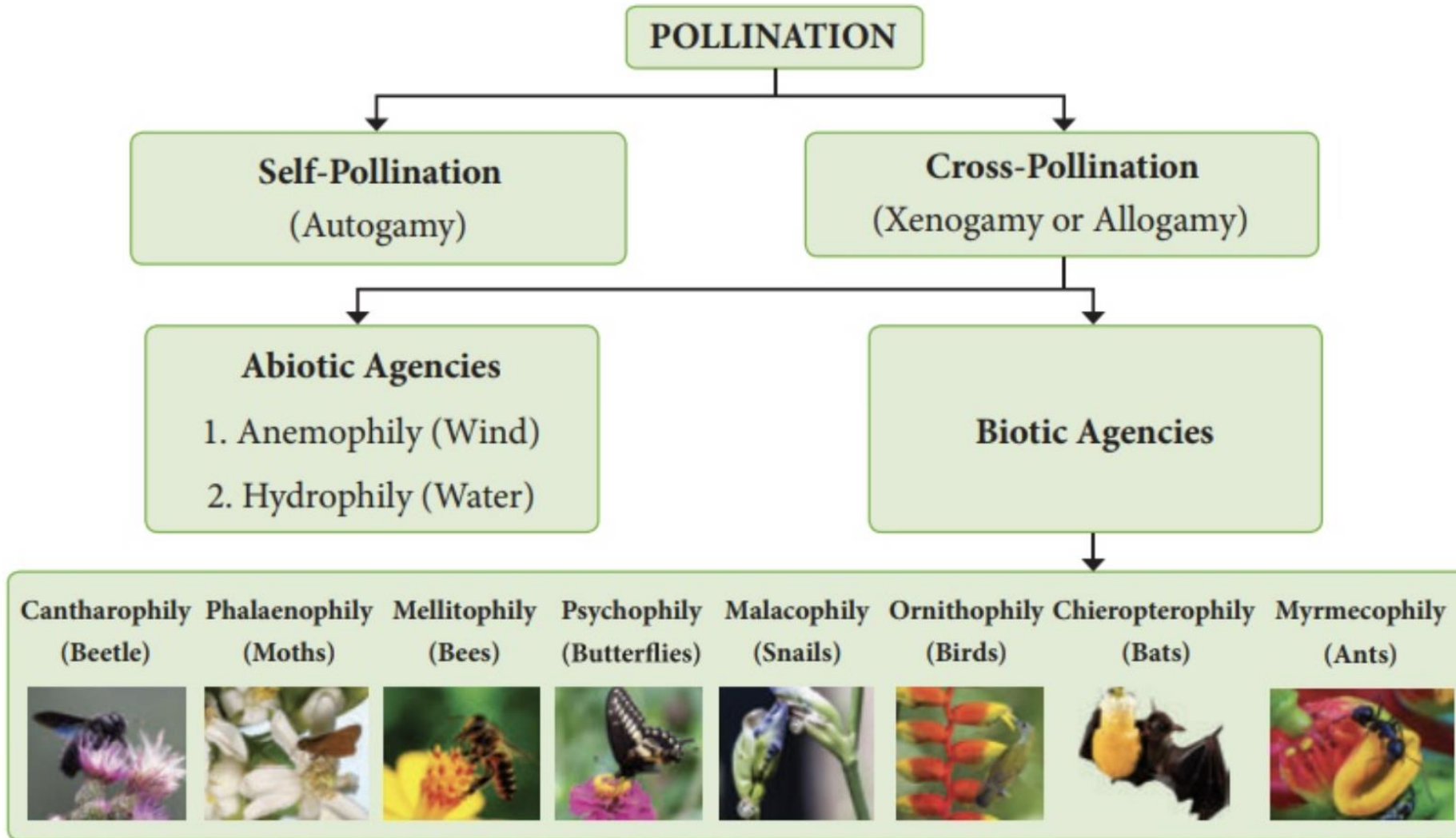
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Pollination

- Pollination is the **process of reproduction** in plants.
- It is the **transfer of pollen** from a male part of a plant to a female part of a plant.





Q).Due to some reasons, if there is a huge fall in the population of species of butterflies, what could be its likely consequence/consequences?



1. Pollination of some plants could be adversely affected.
2. There could be a drastic increase in the fungal infections of some cultivated plants.
3. It could lead to a fall in the population of some species of wasps, spiders and birds.

Select the correct using the code given below:

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Statement 1 and 3 are correct

- Butterflies are pollinating insects. They help in pollination of many flowering plants.
- Butterflies also act as a lower member of the food chain. A number of animals, including birds and mice feed on butterfly. As populations of butterfly diminish, so will populations of birds and other animals that rely on them as a food source. This loss of the butterfly is the beginning of the “butterfly effect.”

Statement 2 is *not correct*



Q. Biodiversity forms the basis for human existence in the following ways:



1. Soil formation
2. Prevention of soil erosion
3. Recycling of waste
4. Pollination of crops

Select the correct answer using the codes given below:

- a) 1, 2 and 3 only
- b) 2, 3 and 4 only
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Q).Why is a plant called Prosopis juliflora often mentioned in news?



- a) Its extract is widely used in cosmetics.
- b) It tends to reduce the biodiversity in the area in which it grows.
- c) Its extract is used in the synthesis of pesticides.
- d) None of these



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- *Prosopis juliflora* (Vilaiti Keekar), a non-native and invasive tree species, belongs to South and Central America.
- It is a shrub or small tree, commonly known as **Seemai Karuvelam**.
- It has superior ability to adapt and establish itself in the given environment as it is capable of growing in a wide variety of soils and climatic conditions
- Prosopis was introduced into India's arid landscapes in the late 19th century owing to misplaced beliefs that deserts and grasslands were wastelands and hence needed trees.
- It has **encroached over half Banni**, one of Asia's largest grasslands in Gujarat.
- Fuelwood was another reason for its introduction.
- Prosopis was introduced in Banni to keep the salt flats of the Rann of Kachchh in check.



- A recent study has shown that apart from threatening local plants, with whom it competes for resources, this tree is also affecting the nesting success of birds as it produces less oxygen and more carbon dioxide.
- It causes drying up of water bodies and ground water as it absorbs more than 4 litres of water to obtain one kg of biomass.
- It causes stomach poisoning in livestock by inducing a permanent impairment of its ability to digest cellulose.



Q).In which one of the following States is Pakhui Wildlife Sanctuary located?



- a) Arunachal Pradesh
- b) Manipur
- c) Meghalaya
- d) Nagaland



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- Pakhui is a Wildlife Sanctuary and a dedicated Tiger Reserve (also known as the Pakke Tiger Reserve) in the district of East Kameng in **Arunachal Pradesh, India**.
- It falls within the **Eastern Himalaya Biodiversity Hotspot**.
- It is bordered by the **Kameng River and Pakke River**, which are important sources of water for the animals and the irrigation of the vegetation.
- It is also known for its amazing sightings of four resident hornbill species.
- The Government of Arunachal Pradesh is planning to build a 692.7 km highway through the 862 sq km Pakke Tiger Reserve (PTR) in East Kameng district, Arunachal Pradesh. Named the East-West Industrial Corridor, the **highway aims to connect Arunachal Pradesh with Assam**. It has been argued that corridor will also be a threat to the adjoining Nameri Tiger Reserve in Assam.





- The government of Arunachal Pradesh on January 20 declared the **Pakke Paga Hornbill Festival (PPHF)**—the state's only conservation festival, as a —state festival.
- The first-ever PPHF was held on January 16–18, 2015.
- The organizers had a number of objectives in mind—to recognise the role played by the **resident Nyishi tribe** in conserving hornbills in the Pakke Tiger Reserve (PTR), to devise alternative sources of income for a region that relies on hunting and logging, and to tell the rest of the country about the wonders of the PTR and its surrounding areas.



Q.) Consider the following statements: The Environment Protection Act, 1986 empowers the Government of India to



1. state the requirement of public participation in the process of environmental protection, and the procedure and manner in which it is sought
2. lay down the standards for emission or discharge of environmental pollutants from various sources

Which of the statements given above is/are correct?

- a) 1 only
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- EPA 1986 was enacted in the wake of Bhopal gas tragedy under article 253 of constitution.
- It implements agenda of UN conference on human environment.
- It regulates environmental pollution, laying down procedures and standards for industrial waste, emissions, hazardous waste.
- As per Section 3 of the Environment Protection Act, the Government of India is empowered to make rules in the laying down standards for emission or discharge of environmental pollutants from various sources.
- No mention of public participation in the act.
- Eco sensitive zones are included under this act.



Q.) 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
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- Gir National Park and Wildlife Sanctuary, also known as Sasan Gir, is a forest and wildlife sanctuary in Gujarat, India, is the only natural habitat of Asiatic lions.
- People mostly link Gir with "Maldharis" who have survived through the ages by having symbiotic relationship with the lion.
- They are religious pastoral communities living in Gir.
- Their settlements are called "nesses".
- Endangered
- Schedule I of the Wild Life (Protection) Act, 1972.
- Appendix I of Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).
- The "Asiatic Lion Conservation Project" has been launched by the Union Ministry of Environment, Forests and Climate Change (MoEFCC).
- Under Project Lion, six new sites apart from the Kuno-Palpur Wildlife Sanctuary (Madhya Pradesh) have been identified under Project Lion that was announced in August 2020.



- There are three species of rhino in Asia—Greater one-horned (*Rhinoceros unicornis*), Javan and Sumatran.
- Only the Great One-Horned Rhino is found in India.
- It is the largest of the rhino species. (Habitat- India and Nepal)
- The Indian rhinoceros is regionally extinct in Pakistan.
- The five rhino range nations (India, Bhutan, Nepal, Indonesia and Malaysia) have signed a declaration 'The New Delhi Declaration on Asian Rhinos 2019' for the conservation and protection of the species.
- Indian Rhino Vision 2020 - Launched in 2005, it is an ambitious effort to attain a wild population of at least 3,000 greater one-horned rhinos spread over seven protected areas in the Indian state of Assam by the year 2020.



- Great One-Horned Rhino/Indian Rhino: Vulnerable.
- Black Rhino: Smaller of the two African species.
- White Rhino: Recently, researchers have created an embryo of the northern white rhino by using In vitro Fertilization (IVF) process.
- Javan Rhino: Critically endangered in IUCN Red List.
- Sumatran Rhino: Recently gone extinct in Malaysia.



- The **Bactrian camel** also known as the **Mongolian camel** or **domestic Bactrian camel**, is a large ungulate native to the steppes of Central Asia.
- It has two humps on its back, in contrast to the single-humped dromedary camel.
- Its population of 2 million exists mainly in the domesticated form.
- A small population of bactrian camel exists in the **Nubra valley of Ladakh (J&K)**.



Q. Consider the following statements:



1. Lions do not have a particular breeding season.
2. Unlike most other big cats, cheetahs do not roar.
3. Unlike male lions, male leopards do not proclaim their territory by scent marking.

Which of the statements given above are correct?

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Q. Consider the following pairs:

	Country	Animal found in its natural habitat
1.	Brazil	Indri
2.	Indonesia	Elk
3.	Madagascar	Bonobo

How many of the pairs given above are correctly matched?

- a) Only one
- b) Only two
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- The Indri (*Indri indri*) is a species of lemur found only in Madagascar, not in Brazil.
- Elk (*Cervus canadensis*) are found in North America and parts of East Asia, not Indonesia.
- Bonobos (*Pan paniscus*) are native to the Democratic Republic of Congo in Central Africa, not Madagascar.



Q. Consider the following statements:

Statement-I: The Indian Flying Fox is placed under the "vermin" category in the Wild Life (Protection) Act, 1972.

Statement-II: The Indian Flying Fox feeds on the blood of other animals.

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 explains Statement-I
- (b) Both Statement-I and Statement-II are correct, but Statement-II does not explain Statement-I
- (c) Statement-I is correct, but Statement-II is incorrect
- (d) Statement-I is incorrect, but Statement-II is correct



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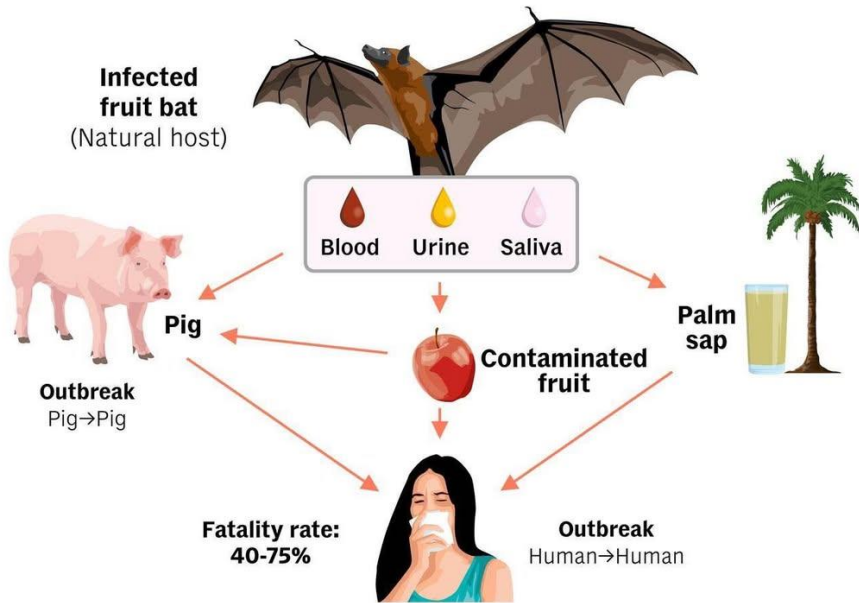
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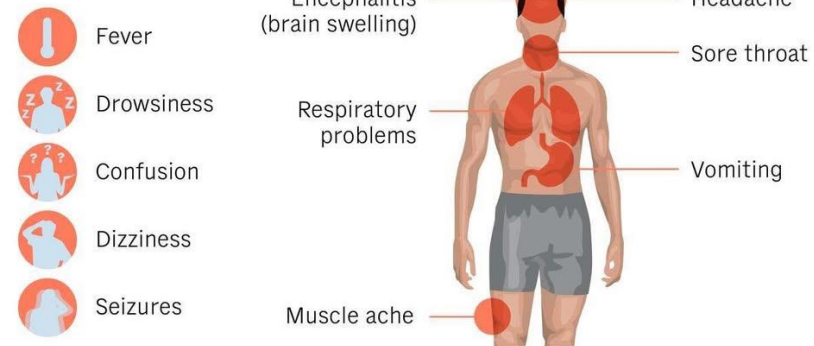


Nipah virus: What it is and how it spreads

There are currently no drugs or vaccines for the infection, and treatment is mainly supportive care like rest and hydration.



Symptoms



Source: Centers for Disease Control and Prevention
CNA GRAPHICS



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Q. 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



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Q.) Which of the following are in Agasthyamala Biosphere Reserve?



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



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- d) Kawal and Sri Venkateswara Wildlife Sanctuaries; and Nagarjunasagar -Srisailem Tiger Reserve.



- Located in the Western Ghats in the south of the country, the Agasthyamala Biosphere Reserve is a unique genetic reservoir of cultivated plants.
- Three wildlife sanctuaries, **Shendurney, Peppara and Neyyar**, are located in the site, as well as the Kalakad Mundanthurai Tiger reserve.



Q.) With reference to 'dugong', a mammal found in India, which of the following statements is/are correct ?



1. It is a herbivorous marine animal.
2. It is found along the entire coast of India.
3. It is given legal protection under Schedule I of the Wildlife (Protection) Act, 1972.

Select the correct answer using the codes given below:

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



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DUGONG

- The dugong (*Dugong dugon*), also called the sea cow, is a herbivorous mammal.
- They can grow upto three meters long, weigh about 300 kilograms, and live for about 65 to 70 years, grazing on seagrass and coming to the surface to breathe.
- They are found in over 30 countries and in India are seen in the Gulf of Mannar, Gulf of Kutch, Palk Bay, and the Andaman and Nicobar Islands.
- The dugongs that inhabited waters off the Odisha, West Bengal and Andhra Pradesh coasts two centuries back became extinct now.
- IUCN Red List status: Vulnerable
- Wild (Life) Protection Act, 1972: Schedule I
- CITES: Appendix I
- Government of Tamil Nadu will set up India's first Dugong Conservation Reserve in the Palk Bay.
- The conserve will cover an area of 500 Kms.



Q. Consider the following animals:

1. Sea cow
2. Sea horse
3. Sea lion

Which of the above is/are mammal/mammals?

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



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Sea Cow

- Sea Cow (*Hydrodamalis gigas*), also called Steller's sea cow, very large **aquatic mammal**.

Sea Horse

- Sea horse is a **vertebrate fish**

Sea Lion

- It is warm blooded, gives birth to live young, has hair, and the female produces milk.
- All these are characteristics of **mammals**.



Q. Consider the following:

1. Bats
2. Bears
3. Rodents

The phenomenon of hibernation can be observed in which of the above kinds of animals?

- a) 1 and 2 only
- b) 2 only
- c) 1, 2 and 3
- d) Hibernation cannot be observed in any of the above



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Q.) 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



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- Green sea turtles eat seagrasses and algae, though juveniles snack on crabs, sponges, and jellyfish. In the wild, they can live up to 80 years and grow up to five feet long. Once mature, it is the only sea turtle that is strictly herbivorous.
- Parrotfish are algae eaters. They obtain the algae by ripping small chunks of coral from a reef. Many other herbivores thrive among the fish population.
- Sea cows, marine mammal, live in shallow coastal areas and feed on sea vegetation.
- Snakes that are viviparous nourish their developing young through a placenta and yolk sac, something that is highly unusual among reptiles.
- **Ovoviviparous** is a type of reproduction seen in the snakes. Ovoviviparity means the eggs are developed internally in the body of female snake and then she gives the birth to young ones. Around 25% of Indian snakes are ovoviviparous. Sand boas, sea snakes, vine snakes, vipers etc. are some of the examples ovoviviparous snakes from India



Q.) Which one of the following National Parks has a climate that varies from tropical to subtropical, temperate and arctic?



- a) Khangchendzonga National Park
- b) Nandadevi National Park
- c) Neora Valley National Park
- d) Namdapha National Park



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- Namdapha NP has the elevation range from 300 to 4,500 m and vegetation zones from evergreen, moist deciduous to temperate broadleaved and coniferous forest types to alpine vegetation.

- **Khangchendzonga National Park** also **Kanchenjunga Biosphere Reserve** is named after the mountain **Kangchenjunga** (alternative spelling *Khangchendzonga*), which is the third-highest peak in the world at 8,586 metres. It is one of the few high-altitude National parks of India and was recently included as a mixed-criteria UNESCO World Heritage site.



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- The **Nanda Devi National Park or Nanda Devi Biosphere Reserve**, established in 1982 is a **national park** situated **around the peak of Nanda Devi (7816 m) in Chamoli Garhwal district of Uttarakhand, in northern India**. The entire park lies at an elevation of more than 3,500 m (11,500 ft) above mean sea level.
- **Neora NP in WB** sustains a unique ecosystem where tropical, sub-tropical, sub-temperate, and temperate vegetative system still harbours a wealth of flora and fauna.



Q.) Which one of the following National Parks lies completely in the temperate alpine?



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



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- Valley of Flowers National Park is an Indian national park which was established in 1982.
- It is located in Chamoli in the state of Uttarakhand and is known for its meadows of endemic alpine flowers and the variety of flora.
- The valley is situated at a very remarkable area, which is the confluence point of Himalayan ranges, Zaskar and Western and Eastern Himalayas.



Q. 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?

- a) Sathyamangalam Tiger Reserve
- b) Nallamala Forest
- c) Nagarhole National Park
- d) Seshachalam Biosphere Reserve

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Q.) 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 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
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- Desert National Park is a national park situated in the Indian state of Rajasthan, near the towns of **Jaisalmer and Barmer**.



- This is one of the largest national parks, covering an area of 3162 km².
- The Desert National Park is an excellent example of the ecosystem of the Thar Desert.
- The Thar desert is the most thickly populated desert in the world with an average density of 83 persons/km²
- However, the human population within the DNP is low (4-5 persons per km²).
- There are 73 villages and also settlements or Dhanis existing within the Park.



- The DNP is the most important site for the long-term survival of the Globally Threatened Great Indian Bustard and other endemic fauna and flora.
- It is one of the heaviest flying birds in the world.
- It is the State bird of Rajasthan. (mostly to Rajasthan and Gujarat)
- It is considered the flagship grassland species, representing the health of the grassland ecology.
- But with less than 200 GIBs remaining in the world, most of them found in Rajasthan's Desert National Park.
- Critically endangered and Schedule I of the Wildlife (Protection) Act, 1972.
- Appendix I of Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).
- The Great Indian Bustard, Asian Elephant and Bengal Florican have been included in Appendix I of the UN Convention on Migratory Species at the 13th Convention on Migratory Species (CMS) in Gandhinagar (Gujarat).



Q. Consider the following pairs about parks and rivers passing through them:



1. Corbett National Park: Ganga
2. Kaziranga National Park: Manas
3. Silent Valley National Park: Kaveri

Which of the above pairs is/are correctly matched?

- a) 1 and 2
- b) 3 only
- c) 1 and 3
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1. Corbett National Park : Ganga	River Ramganga (West) and River Kosi
2. Kaziranga National Park : Manas	Brahmaputra, Diphlu, Mora Diphlu and Mora Dhansiri
3. Silent Valley National Park : Kaveri	Bharathapuzha , River Kunthi



Q.) Among the following Tiger Reserves:

which one has the largest area under "Critical Tiger Habitat"?

- a) Corbett
- b) Ranthambore
- c) Nagarjunsagar-Srisaïlam
- d) Sunderbans



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- Critical 'tiger' habitats (CTHs), also known as **core areas of tiger reserve**.
- They are identified under the Wild Life Protection Act, 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".
- The notification of CTH is done by the state government in consultation with the expert committee constituted for the purpose.
- **Nagarjunsagar -Srisaillam Tiger Reserve** is the largest tiger reserve in India.
- The total area of the tiger reserve is 3,728 km² (1,439 sq mi).



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



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

Which of the statements given above is/are correct?

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- The Indian elephant is one of three extant recognised subspecies of the Asian elephant and native to mainland Asia.
- The oldest female in an elephant herd is always the leader.
- Elephants have the longest gestation period of all mammals. The average gestation period of an elephant is about 640 to 660 days, or roughly 95 weeks.
- Female elephants live for 60 to 70 years, but only have about four offspring throughout their lifetime.
- Fertility decreases after age 50 in elephants, but the pattern differed from a total loss of fertility in menopausal women with many elephants continuing to reproduce at least until the age of 65 years.
- Therefore it is not till the age of 40 years only.
- Karnataka leads the table with 6,049 elephants followed by Kerala.



- ‘Status of Elephants in India: DNA-based Synchronous All-India Population Estimation of Elephants (SAIEE 2021–25)’ estimated **22,446 elephants, compared to 29,964 in 2017.**
- The 2025 elephant census combined **ground-based surveys, satellite mapping, and DNA fingerprinting.**
- The exercise was conducted by the **Wildlife Institute of India (WII)** under Project Elephant (1992).
 - Karnataka – 6,013
 - Assam – 4,159
 - Tamil Nadu – 3,136
- **33 Elephant Reserves** have been established in 14 major elephant States.
- Assam and TN have 5 each.



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



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



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- The Sri Lanka frogmouth, Sri Lankan frogmouth or Ceylon frogmouth is a small frogmouth (The frogmouths are a group of nocturnal birds) found in the Western Ghats of south India and Sri Lanka.
- The coppersmith barbet, also called crimson -breasted barbet and coppersmith, is an Asian barbet with crimson forehead and throat, known for its metronomic call that sounds similar to a coppersmith striking metal with a hammer. It is a resident bird in the Indian subcontinent and parts of Southeast Asia.
- 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.
- The white -throated redstart is a species of bird in the family Muscicapidae. It is found in Nepal, Bhutan, central China and far northern areas of Myanmar and Northeast India. Its natural habitat is temperate forests. Hence option (a) is the correct answer.

Q.) 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 Chhapar Wildlife Sanctuary



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- Three subspecies are currently recognized –
 - Western swamp deer - Indogangetic plains.
 - Southern swamp deer - Kanha National Park.
- **Southern Swamp Deer** - The State animal of Madhya Pradesh - Hard Ground Barasingha is found exclusively in Kanha Tiger Reserve.
- It is the **first tiger reserve** in India to **officially introduce a mascot, “Bhoorsingh the Barasingha”**.
- It was reintroduced into Satpura Tiger Reserve.
- **Eastern swamp deer** - Kaziranga and Dudhwa National Parks).
- It is the state animal of the Indian states of Madhya Pradesh and Uttar Pradesh.
- **Vulnerable**
- **Schedule I** of the Wild Life (Protection) Act, 1972.
- **Appendix I** of Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).



Q.) Which one of the following is used in preparing a natural mosquito repellent?



- a) Congress grass
- b) Elephant grass
- c) Lemongrass
- d) Nut grass



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- a) Congress grass
- b) Elephant grass
- c) Lemongrass**
- d) Nut grass



- Lemongrass is a tall herb that is abundantly found in tropical and sub-tropical areas of Asia, Africa, and Australia.
- China and India accounts for the maximum production of Lemongrass.
- The Lemongrass plant is known to be **an excellent mosquito repellent**.
- It contains a compound citronella that helps to mask the scents that mosquitoes rely on to target hosts.

Q.) 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
- b) 2 only
- c) 3 only
- d) 1 and 3



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- **Volvation**

- Hedgehogs are a small mammal with short limbs and a body low to the ground.
- When they are frightened, or annoyed, hedgehogs will roll into a ball so that an predator will feel the full brunt of its sharp spines and will then leave the hedgehog alone. Marmots are relatively large ground squirrels.
- These herbivores are active during the summer when often found in groups, but are not seen during the winter when they hibernate underground.
- They are the heaviest members of the squirrel family. They do not roll up when threatened.
- Pangolins are uniquely covered in tough, overlapping scales.
- These mammals eat ants and termites using an extraordinarily long, sticky tongue, and are able to quickly roll themselves up into a tight ball when they feel threatened.



Q.) Which one of the following is a filter feeder?

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



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- d) Pelican



- **Filter Feeder** is an animal (such as a clam or baleen whale) that obtains its food by filtering organic matter or minute organisms from a current of water that passes through some part of its system.
- This means they feed by pumping water through their gills, trapping particles of food as well as nutrients, suspended sediments and chemical contaminants.
- **Oysters** are natural filter feeders.
- Some animals that use this method of feeding are **clams, krill, sponges, baleen whales, and many fish (including some sharks).**
- Some birds, such as **flamingos and certain species of duck,** are also filter feeders



Q.) With reference to 'palm oil', consider the following statements:



1. The palm oil tree is native to Southeast Asia.
2. The palm oil is a raw material for some industries producing lipstick and perfumes.
3. The palm oil can be used to produce biodiesel.

Which of the statements given above are correct?

- a) 1 and 2 only
- b) 2 and 3 only
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- Palm oil is an edible vegetable oil derived from the mesocarp (reddish pulp) of the fruit of the oil palms.
- Palm oil tree is **native to Africa**.
- Our palm oil trees are grown in **Malaysia and Indonesia**, which represents 85% of the world's palm oil supply.
- Palm oil is a vegetable oil used in cosmetics for its moisturising and texturising properties
- Palm oil is used in lipstick as it **holds color well**, doesn't melt at high temperatures, and has a smooth application and virtually no taste.
- Also, palm oil makes perfumed and deodorants more effective and helps the fragrance to last longer
- Palm oil is considered as an alternative and promising feedstock to further diversified the **biodiesel production** in the global market.



Q.) Consider the following statements:



1. Moringa (drumstick tree) is a leguminous evergreen tree.
2. Tamarind tree is endemic to South Asia.
3. In India, most of the tamarind is collected as minor forest produce.
4. India exports tamarind and seeds of moringa.
5. Seeds of moringa and tamarind can be used in the production of biofuels.

Which of the statements given above are correct?

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



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- d) 1, 2, 3 and 5



- Moringa oleifera is a plant that is often called the drumstick tree, the miracle tree, the ben oil tree, or the horseradish tree.
- Moringa has been used for centuries due to its **medicinal properties and health benefits**.
- It also has **antifungal, antiviral, antidepressant, and anti-inflammatory properties**.
- It can be evergreen or semi-deciduous.
- Because of which is extensively being grown in semiarid regions in India.
- **Tamarind Tree** is a leguminous tree bearing edible fruit that is indigenous to tropical Africa. It is native to Africa or Indian-sub continent and grown in Southeast Asia and Africa as well. Hence, statement 2 is not correct. Most of the tamarind is collected as minor forest produce. Hence, statement 3 is correct. India is one of the largest exporters of **both Tamarind and Seed of Moringa**.



- Tamarind (*Tamarindus indica*) is a leguminous tree bearing edible fruit that is indigenous to tropical Africa.
- It is native to Africa or Indian-sub continent and grown in Southeast Asia and Africa as well.
- Most of the tamarind is collected as minor forest produce.
- The country is also the largest moringa exporter and meets 80 per cent of its world demand.
- Tamarind is exported from India to about 60 countries. Karnataka is the largest producer of tamarind in the country.



Q. Consider the following statements:



1. The Government of India provides Minimum Support Price for niger (*Guizotia abyssinica*) seeds.
2. Niger is cultivated as a Kharif crop.
3. Some tribal people in India use niger seed oil for cooking.

How many of the above statements are correct?

- A. Only one
- B. Only two
- C. All three
- D. None

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- Niger, a **minor oilseed crop**, is primarily cultivated in rainfed areas.
- The seeds of Niger are utilized as a food source for humans.
- With an oil content ranging from 37% to 47%, the oil extracted from the seeds has a pale yellow color, a nutty flavor, and a pleasant aroma.
- Niger is primarily cultivated as a **Kharif crop** in India.



Q. 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?

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- The Chief Wildlife Warden of the State **does not govern** a Community Reserve. It is managed by the local community through a management committee.
- After a forest has been made into a community reserve, people are not allowed to hunt there, or use it for agricultural practices such as Shifting (jhum) cultivation.
- People of such area are **allowed to collect non-timber forest produce.**



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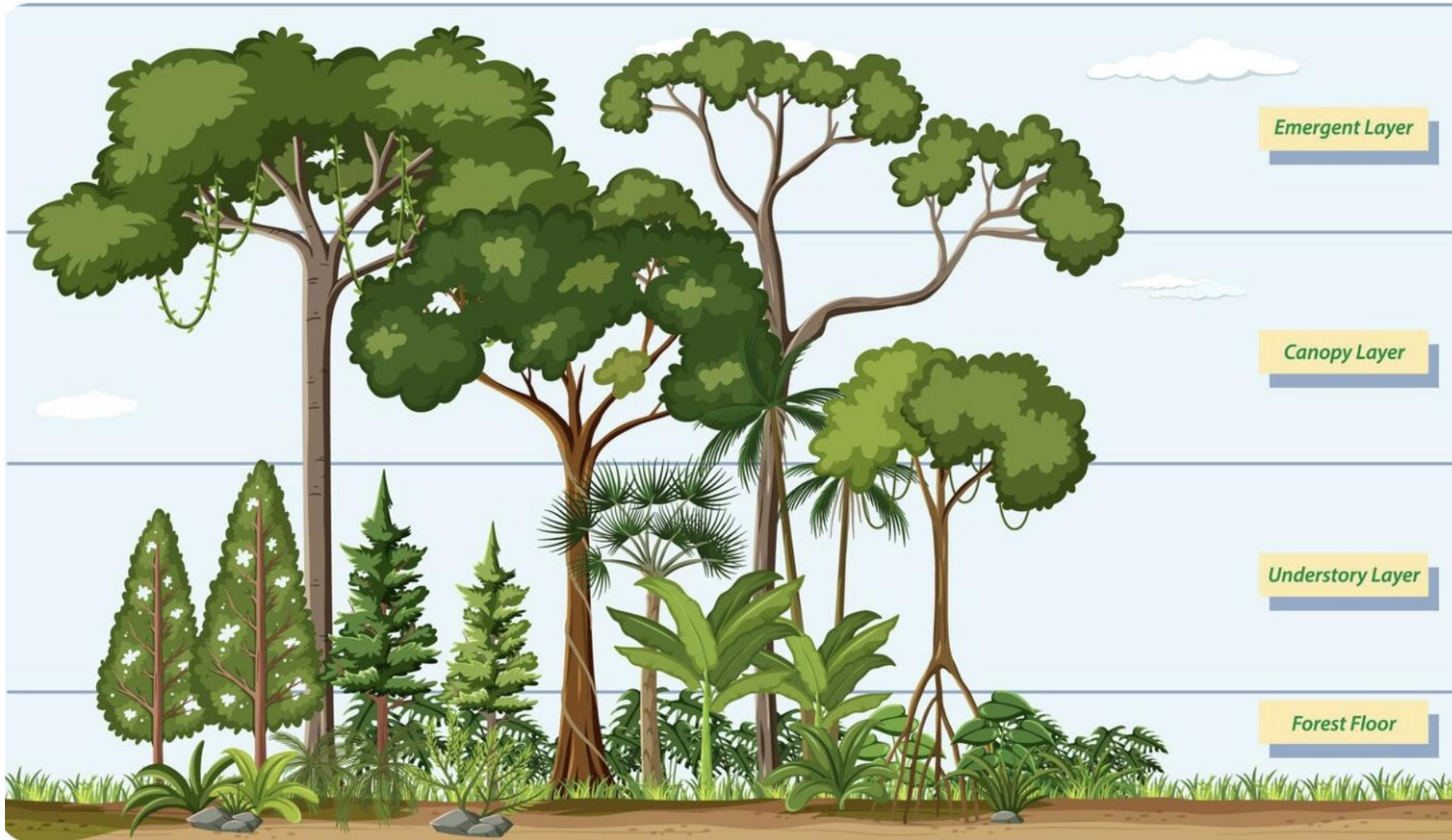
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ECOSYSTEMS



Q. Consider the following statements:

Statement-I:

The soil in tropical rainforests is rich in nutrients.

Statement-II:

The high temperature and moisture of tropical rain forests cause dead organic matter in the soil to decompose quickly.

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
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TROPICAL RAIN FORESTS -

- Tropical rainforest soils are **often deep but not particularly fertile.**
- This is partly due to the fact that **huge amounts of some mineral nutrients are tied up inside the vegetation** rather than being free in the soil at any given time.
- Over two-thirds of the world's rainforests, and three-fourths of the Amazonian rainforest can be considered "**wet-deserts**" in that they grow on **red and yellow clay-like laterite soils which are acidic and low in nutrients.** - largely devoid of minerals like phosphorus, potassium, calcium, and magnesium, which come from "rock" sources, but are rich with aluminium oxide and iron oxide.



Q. Which of the following is/are unique characteristic/characteristics of equatorial forests?



1. Presence of tall, closely set trees with crowns forming a continuous canopy
2. Coexistence of a large number of species
3. Presence of numerous varieties of epiphytes

Select the correct answer using the code given below:

- a) 1 only
- b) 2 and 3 only
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Q.) Which one of the following regions of India has a combination of mangrove forest, evergreen forest and deciduous forest?



- a) North Coastal Andhra Pradesh
- b) South-West Bengal
- c) Southern Saurashtra
- d) Andaman and Nicobar Islands



Q.) Which one of the following regions of India has a combination of mangrove forest, evergreen forest and deciduous forest?



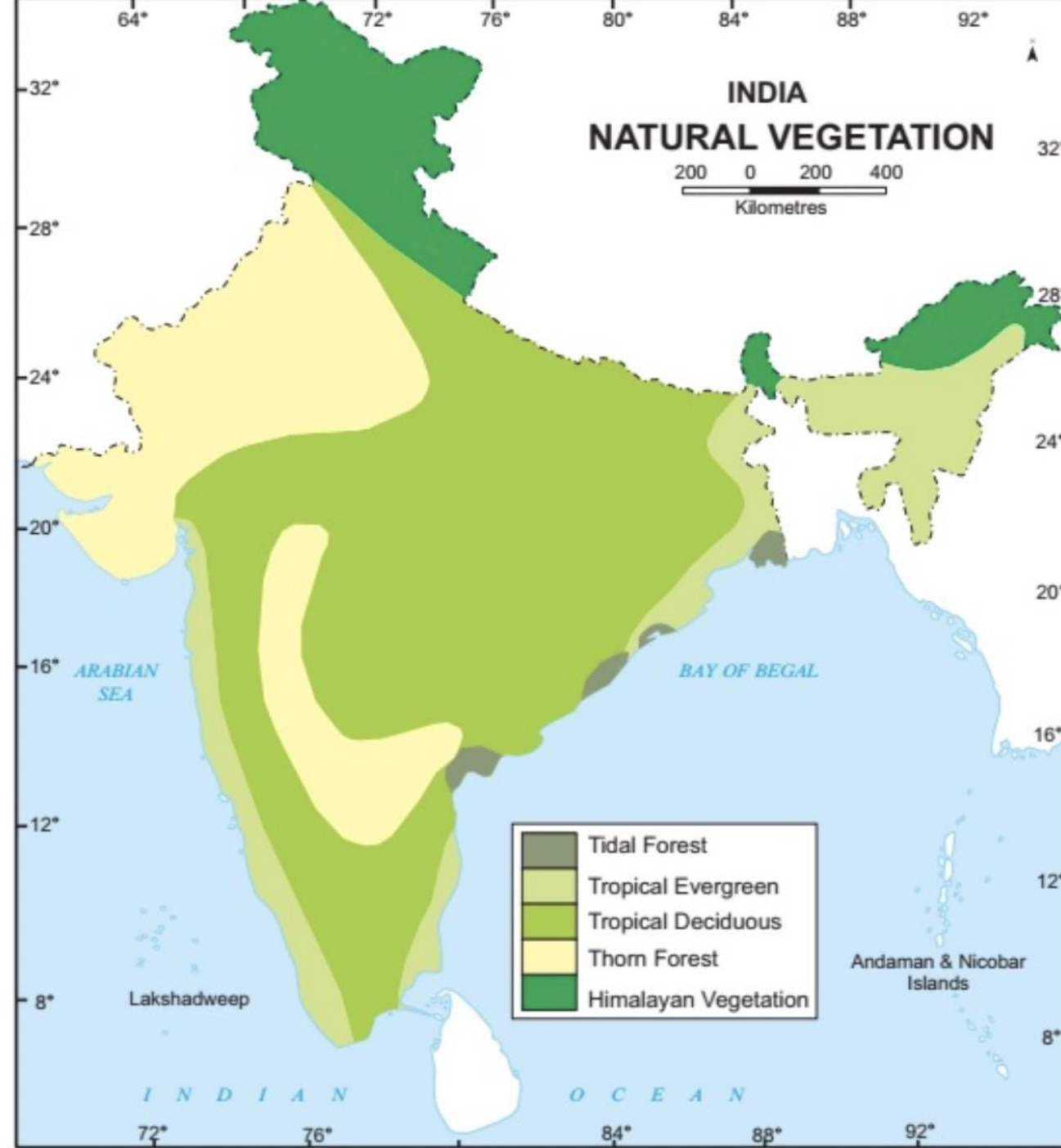
- a) North Coastal Andhra Pradesh
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- c) Southern Saurashtra
- d) Andaman and Nicobar Islands**



Tropical evergreen forests of India are found in the Andaman and Nicobar Islands, the Western Ghats, which fringe the Arabian Sea, the coastline of peninsular India, and the greater Assam region in the north-east.

The states where these forests are predominantly identified are :

1. Tamil Nadu
2. Kerala
3. Karnataka
4. Maharashtra
5. Assam
6. Arunachal Pradesh
7. Nagaland
8. Tripura
9. Meghalaya
10. West Bengal
11. Andaman and Nicobar Islands.



- The mangrove cover in India is 4,992 sq km, which is 0.15% of the country's total geographical area.
- West Bengal has the highest percentage of area under total Mangrove cover followed by Gujarat and Andaman Nicobar Islands.

Mangrove Cover Assessment 2021						(in sq km)
Sl. No.	State/UT	Very Dense Mangrove	Moderately Dense Mangrove	Open Mangrove	Total	Change with respect to ISFR 2019
1.	Andhra Pradesh	0	213	192	405	1
2.	Goa	0	21	6	27	1
3.	Gujarat	0	169	1,006	1,175	-2
4.	Karnataka	0	2	11	13	3
5.	Kerala	0	5	4	9	0
6.	Maharashtra	0	90	234	324	4
7.	Odisha	81	94	84	259	8
8.	Tamil Nadu	1	27	17	45	0
9.	West Bengal	994	692	428	2,114	2
10.	A&N Islands	399	168	49	616	0
11.	D&NH and Daman & Diu	0	0	3	3	0
12.	Puducherry	0	0	2	2	0
Total		1,475	1,481	2,036	4,992	17



Q. With reference to 'Forest Carbon Partnership Facility', which of the following statements is/are correct?

1. It is global partnership of governments, businesses, civil society and indigenous peoples
2. It provides financial aid to universities, individual scientists and institutions involved in scientific forestry research to develop eco-friendly and climate adaptation technologies for sustainable forest management
3. It assists the countries in their 'REDD+ (Reducing Emission from Deforestation and Forest Degradation+)' efforts by providing them with financial and technical assistance.

Select the correct answer using the code given below

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- The Forest Carbon Partnership Facility (FCPF) is a **global partnership** of governments, businesses, civil society, and indigenous peoples.
- It was launched in **2008 by the World Bank** to support developing countries in their **efforts to reduce emissions from deforestation and forest degradation (REDD+)**.
- The FCPF **does not provide financial aid** to universities, individual scientists, or institutions for research.
- Its primary goal is to assist countries with **policy development, capacity building, and pilot programs for REDD+**, not direct scientific research funding.



Q. The "Miyawaki method" is well known for the:



- a) Promotion of commercial farming in arid and semi-arid areas
- b) Development of gardens genetically modified flora using genetically modified flora
- c) Creation of mini forests in urban areas
- d) Harvesting wind energy on coastal areas and on sea surfaces



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Miyawaki Method

- A technique pioneered by Japanese botanist Akira Miyawaki, that helps build **dense, native forests in a short time.**
- **Method:** This method includes planting trees (**only native species**) as close as possible in the same area which not only saves space, but the planted saplings also **support each other in growth and block sunlight reaching the ground**, thereby preventing the growth of weed.



Q.) Consider the following statements:



1. Agricultural soils release nitrogen oxides into environment.
2. Cattle release ammonia into environment.
3. Poultry industry releases reactive nitrogen compounds into environment.

Which of the statements given above is/are correct?

- a) 1 and 3 only
- b) 2 and 3 only
- c) 2 only
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- A **major direct source of nitrous oxide** from agricultural soils is that of **synthetic fertilizer use**.
- Where large applications of fertilizer are combined with soil conditions favorable to denitrification, large amounts of nitrous oxide can be produced and emitted to the atmosphere.
- **Ammonia is a common by - product of animal waste** due to the often inefficient conversion of feed nitrogen into animal product.
- Emissions of ammonia from livestock farming are responsible for the acidification and eutrophication of deposited ammonia in the environment.
- Reactive nitrogen includes – ammonia, nitrate, nitric oxide (NO), nitrous oxide (N₂O).
- Livestock and Poultry are both responsible for emissions of these.



Q.) What can be the impact of excessive/inappropriate use of nitrogenous fertilizers in agriculture ?



1. Proliferation of nitrogen fixing microorganisms in soil can occur.
2. Increase in the acidity of soil can take place.
3. Leaching of nitrate to the ground water can occur.

Select the correct answer using the codes given below:

- a) 1 and 3 only
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- More nitrogen in the soil leads to **less need for nitrogen-fixing bacteria.**
- Excessive/ inappropriate use of nitrogenous fertilizers increases the acidity of soil (due to the release of H ions) and leaching of nitrate to the groundwater.
- As the ammonium-N in fertilizers undergoes nitrification (conversion of ammonium to nitrate in soils by bacteria), **hydrogen (H^+) is released**, which can increase acidity.
- As the percentage of ammonium increases in a given fertilizer the **acidifying potential will also be increased**, thus reducing pH.
- Excessive fertilizer applications can lead to high concentrations of nutrients in the soil and the **nutrients not taken up by plants are prone to leaching.**



Q. Which of the following adds / add nitrogen to the soil?

1. Excretion of urea by animals
2. Burning of coal by man
3. Death of vegetation

Select the correct answer using the codes given below.

- a) 1 only
- b) 2 and 3 only
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Q. Consider the following plants:

1. Groundnut
2. Horse-gram
3. Soybean

How many of the above belong to the pea family?

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

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- All the three plants listed – Groundnut, Horsegram, and Soybean – belong to the pea family (**Fabaceae or Leguminosae**).



Q. Which of the following are nitrogen-fixing plants?



1. Alfalfa
2. Amarnath
3. Chickpea
4. Clover
5. Purslane (Kulfa)
6. Spinach

Select the correct answer using the code given below:

- a) 1, 3 and 4 only
- b) 1, 3, 5 and 6 only
- c) 2, 4, 5 and 6 only
- d) 1, 2, 4, 5 and 6



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- b) 1, 3, 5 and 6 only
- c) 2, 4, 5 and 6 only
- d) 1, 2, 4, 5 and 6

- **Alfalfa**, also called lucerne, is a perennial flowering plant in the legume family Fabaceae. It is cultivated as an important forage crop in many countries around the world. Symbiotic N₂ fixation by alfalfa provides substantial amounts of nitrogen (N) to livestock operations, subsequent crops, and soil organic matter. Hence option 1 is correct.
- **Chickpea**: The chickpea or chick pea is an annual legume of the family Fabaceae. **Hence option 3 is correct.**
- Amaranthus is a cosmopolitan genus of annual or short-lived perennial plants collectively known as amaranths. **Hence option 2 is not correct.**



- **Clover:** Nitrogen is "fixed" in clovers through a symbiotic relationship with Rhizobium bacteria that infects the plant's roots. **Hence option 4 is correct.**
- **Purslane:** Purslane is a green, leafy vegetable that can be eaten raw or cooked. It is known scientifically as *Portulaca oleracea*, and is also called pigweed, little hogweed, fat weed and pusley. This succulent plant contains about 93% water. It has red stems and small, green leaves. **Hence option 5 is not correct.**
- **Spinach:** Spinach is a leafy green flowering plant native to central and western Asia. It is of the order Caryophyllales, family Amaranthaceae. **Hence option 6 is not correct.**



Q. Mycorrhizal biotechnology has been used in rehabilitating degraded sites because mycorrhiza enables the plants to



1. resist drought and increase absorptive area
2. tolerate extremes of PH
3. Resist disease infestation

Select the correct answer using the codes given below:

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- Mycorrhizal plants have tolerance to adverse soil, PH, high temp., drought and toxic heavy metals.
- The most important role of Mycorrhizal fungi is to absorb nutrients and water from soil and transfer them to their hosts.
- Mycorrhizae helps plants withstand root diseases, the oxalic acid production by mycorrhizal fungi contributes to disease suppression.



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



The Sleepy Classes

Awakening Toppers

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- a) 1 only
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- c) 1 and 3 only
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- When plants drop leaves or die, they contribute to detritus.
- Detritus consists of **dead leaves and other plant remains** that accumulate on the ground or at the bottom of a body of water.
- Detritus may also include **animal feces** and other organic debris.
- Heterotrophic organisms called **detritivores** feed on detritus.
- **Earthworms, millipedes, and woodlice** are detritivores that consume rotting leaves and other dead plant materials in or on soil.
- **Dung beetles** consume feces.
- In aquatic ecosystems, detritivores include “**bottom feeders**” such as sea cucumbers and catfish.



- **Saprotrophs** (Gr: sapos - rotten; trophos - feeder) are also called **decomposers or reducers**.
- They break down the complex organic compounds of dead matter (of plants and animals).
- They mainly consist of **bacteria and Fungi**.
- Decomposers **do not ingest** their food.
- Instead they **secrete digestive enzymes** into the dead and decaying plant and animal remains to digest the organic material.
- **Enzymes** act upon the complex organic compounds of the dead matter.
- Decomposers absorb a part of the decomposition products for their own nourishment.
- The remaining substances are added as minerals to the substratum (mineralisation).
- Released minerals are reused (utilised) as nutrients by the plants (producers).



Q.) 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



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- Detritivores are heterotrophs that obtain nutrients by consuming detritus (**dead or decaying plants or animals as food**)
- By doing so, all these detritivores contribute to decomposition and the nutrient cycles.
- Detritivores include microorganisms such as bacteria and larger organisms such as fungi, insects, worms, and some crustaceans.
- Examples of detritivores are **earthworms, blowflies, millipedes, maggots, and woodlice.**



Q. The organisms "Cicada, Froghopper and Pond skater" are:



- (a) Birds
- (b) Fish
- (c) Insects
- (d) Reptiles



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Q. 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



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- **Ecological succession** typically begins when the existing biological community has been cleared away by human activity or natural disturbance such as a fire or severe storm.
- The population of trees that once lived in this area can't grow back because the fire has changed the ground composition. Without tree roots to act as anchors, rain washes away the soil and the ground becomes rocky and barren. This rocky ground, however, proves ideal to lichens, the pioneer population.
- Mosses and herbs are well suited to living in the shallow soil environment created by the lichen, and they replace the lichen as the dominant population.
- Grasses intercept most of the rainwater before it reaches the roots of the shrubs. Because the grasses limit the supply of water to the shrub seedlings, they maintain the integrity of the ecosystem as a grass ecosystem.



Q.) The vegetation of savannah consists of grassland with scattered small trees, but extensive areas have no trees. The forest development in such areas is generally kept in check by one or more or a combination of some conditions.



Which of the following are such conditions?

1. Burrowing animals and termites
2. Fire
3. Grazing herbivores
4. Seasonal rainfall
5. Soil properties

Select the correct answer using the code given below:

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



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- Savanna ecosystems are heterogeneous environments characterized by the presence of trees, bushes, and grasses.
- Nutrient and soil moisture availability are usually the limiting factors affecting the biomass growth in savannas, and overall biomass is impacted by competition, fire, grazing, and harvesting.



Q. 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



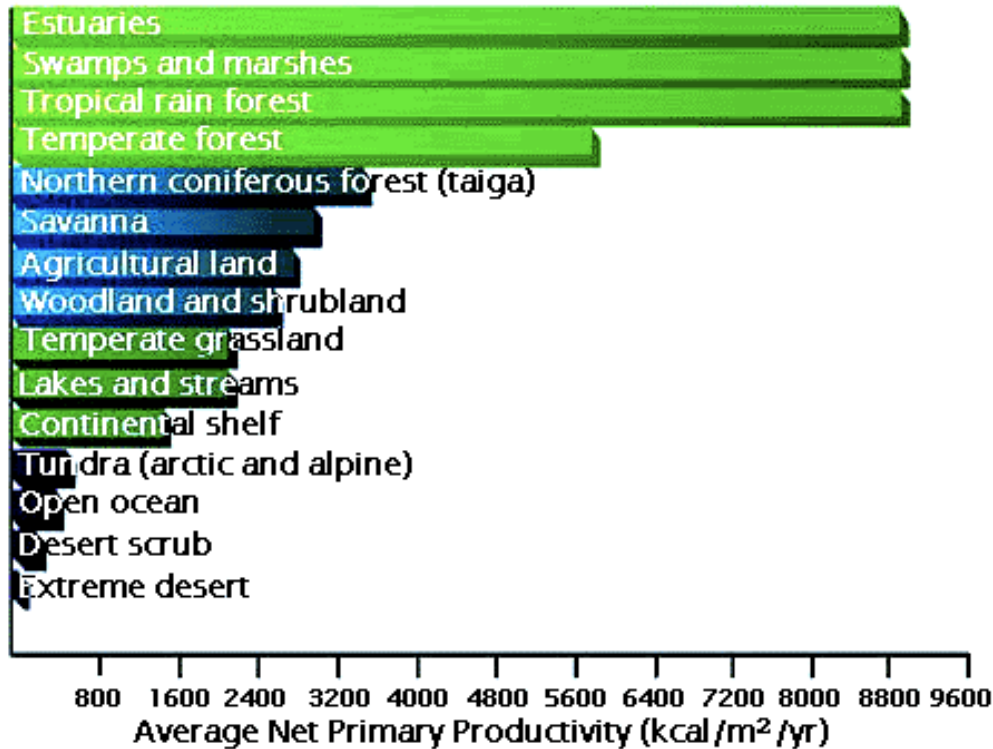
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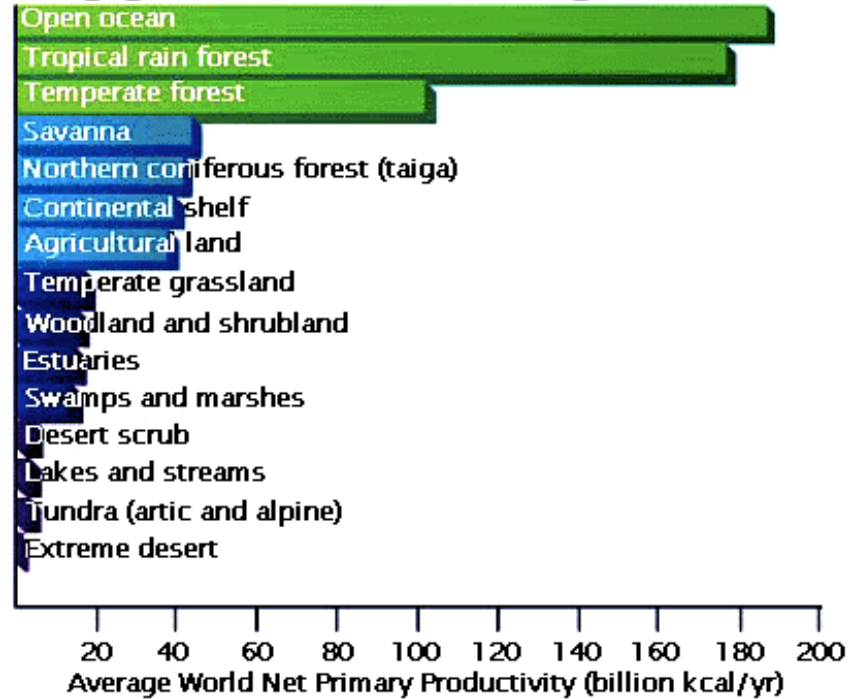


PRODUCTIVITY IN DIFFERENT ECOSYSTEMS

Type of Ecosystem



Type of Ecosystem



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



1. A food chains 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
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- d) None



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- A food chain is the sequence of who eats whom in a biological community (an ecosystem) to obtain nutrition.



TYPES OF FOOD CHAIN

Grazing food chain

- In a grazing food-chain, the first level starts with **plants as producers** and ends with **carnivores as consumers** at last level, with the herbivores being at the intermediate level.
- In a **terrestrial ecosystem**, the grass is eaten by a caterpillar, which is eaten by lizard and lizard is eaten by a snake.
- In **Aquatic ecosystem**, phytoplankton (primary producers) are eaten by zooplanktons which are eaten by fishes and fishes are eaten by pelicans.
- In an **aquatic ecosystem**, the grazing food chain is the major conduit for energy flow.
- As against this, in a **terrestrial ecosystem**, a much larger fraction of energy flows through the detritus food chain than through the grazing food chain.



TYPES OF FOOD CHAIN

Detritus food chain

- This type of food chain goes from **dead organic matter to organisms** feeding on detritus (detritivores) and their predators.
- Such ecosystems are thus less dependent on direct solar energy.
- These depend chiefly on the influx of organic matter produced in another system.





Q. 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



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- The **ecological niche** is the ecological role and space that an organism fills in an ecosystem.
- The ecological niche involves both the place where an organism lives and the roles that an organism does in its habitat.
- For example, the ecological niche of a sunflower growing in the backyard includes absorbing light, water and nutrients (for photosynthesis), providing shelter and food for other organisms (e.g. bees, ants, etc.), and giving off oxygen into the atmosphere.



Q. With reference to 'Eco-Sensitive Zones', which of the following statements is/are correct ?



1. Eco-Sensitive Zones are the areas that are declared under the Wildlife (Protection) Act, 1972.
2. The purpose of the declaration of Eco-Sensitive Zones is to prohibit all kinds of human activities in those zones except agriculture.

Select the correct answer using the code given below.

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



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Sleepy Classes
Awakening Toppers

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- Declared under Environment (Protection) Act, 1986.
- Activities prohibited are generally specific to each zone and notified separately.



Q. With reference to Neem tree, consider the following statements :



1. Neem oil can be used as a pesticide to control the proliferation of some species of insects and mites.
2. Neem seeds are used in the manufacture of biofuels and hospital detergents.
3. Neem oil has applications in pharmaceutical industry.

Which of the statements given above is/are correct ?

- a) 1 and 2 only
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- Neem oil is widely used as a **natural pesticide and insect repellent**.
- Its active compound, **azadirachtin**, disrupts the life cycle of insects, making it effective in controlling pests like mites, aphids, and whiteflies.
- Neem oil is used in traditional medicine for its **antifungal, antibacterial, and anti-inflammatory properties**.
- It is also used in skincare products and therapeutic oils.



Q. With reference to a conservation organization called 'Wetlands International', which of the following statements is/are correct?

1. It is an intergovernmental organization formed by the countries which are signatories to Ramsar Convention.
2. It works at the field level to develop and mobilize knowledge, and use practical experience to advocate for better policies.

Select the correct answer using the code given below

- a) 1 only
- b) 2 only
- c) Both 1 and 2
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- Wetlands International is the **only global non-governmental organisation (NGO)** dedicated to wetlands.



Q. Consider the following pairs:

Wetlands Confluence of rivers

1. Harike Wetlands : Confluence of Beas and Satluj/Sutlej
2. Keoladeo Ghana National Park : Confluence of Banas and Chambal
3. Kolleru Lake : Confluence of Musi and Krishna

Which of the above pairs is/are correctly matched?

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- b) 2 and 3 only
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Keoladeo Ghana National Park is formed by inundation of Gambira and Banganga rivers.



Kolleru Lake is confluence of Godavari and Krishna.



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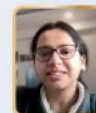
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Q. Consider the following pairs:

<u>Wetland/Lake:</u>	<u>Location</u>
-----------------------------	------------------------

- | | |
|--------------------|------------------|
| 1. Hokera Wetland | Punjab |
| 2. Renuka Wetland | Himachal Pradesh |
| 3. Rudrasagar Lake | Tripura |
| 4. Sasthamkotta | Tamil Nadu |

How many pairs given above are correctly matched?

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- **Hokera Wetland** is located in Jammu and Kashmir, not Punjab. Hokera wetland is about 10 km from Srinagar. It is a natural perennial wetland contiguous to the Jhelum basin.
- **Renuka Wetland** is the largest natural lake in Himachal Pradesh.
- It is a natural wetland with freshwater springs and inland subterranean karst formations, fed by a small stream flowing from the lower Himalayan out to the Giri river.
- **Rudrasagar Lake**, also known as Rudijala, is a lake located in Melaghar, Tripura.
- The lake is designated as a Ramsar site. A lowland sedimentation reservoir in the northeast hills, fed by three perennial streams discharging to the River Gomti.
- **Sasthamkotta** is located in the Kollam district of Kerala, not Tamil Nadu. It is the largest freshwater lake in Kerala and has always been a centre of tourist activity.



Q.) Consider the following statements:



1. Under Ramsar Convention, it is mandatory on the part of the Government of India to protect and conserve all the wetlands in the territory of India.
2. The Wetlands (Conservation and Management) Rules, 2010 were framed by the Government of India based on the recommendation of Ramsar Convention.
3. The Wetlands (Conservation and Management) Rules, 2010 also encompass the drainage area or catchment regions of the wetlands as determined by the authority.

Which of the statements given above is/are correct?

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- Article 4 of the Ramsar Convention states that "Each Contracting Party shall promote the conservation of wetlands and waterfowl by establishing nature reserves on wetlands, whether they are included in the List or not, and provide adequately for their wandering." It is not mandatory on the part of the Government of India to protect and conserve all the wetlands in the territory of India.
- Article 3 of the Ramsar Convention states that "The Contracting Parties shall formulate and implement their planning so as to promote the conservation of the wetlands included in the List, and as far as possible the wise use of wetlands in their territory."
- As per Wetlands (Conservation and Management) Rules, 2010, a "wetland" means an area or of marsh, fen, peatland or water; natural or artificial, permanent or temporary, with water that is static or



flowing, fresh, brackish or salt, including areas of marine water, **the depth of which at low tide does not exceed six metres** and includes all inland waters such as lakes, reservoir, tanks, backwaters, lagoon, creeks, estuaries and manmade wetland and the zone of direct influence on wetlands that is to say the drainage area or catchment region of the wetlands as determined by the authority.



Q. "If rainforests and tropical forests are the lungs of the Earth, then surely wetlands function as its kidneys." Which one of the following functions of wetlands best reflects the above statement?

- a) The water cycle in wetlands involves surface runoff, subsoil percolation and evaporation.
- b) Algae form the nutrient base upon which fish, crustaceans, molluscs, birds, reptiles and mammals thrive.
- c) Wetlands play a vital role in maintaining sedimentation balance and soil stabilization.
- d) Aquatic plants absorb heavy metals and excess nutrients.





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- Tropical rainforests are often called the “lungs of the planet” because they generally draw in carbon dioxide and breathe out oxygen. Natural wetlands have often been referred to as "earth's kidneys" because of their high and long-term capacity to filter pollutants from the water that flows through them.
- Aquatic plants can uptake large amounts of metals from water and/or sediment through active and passive absorption, with this absorption capacity of metals through different organs such as roots, stems, and leaves, making these plants suitable for heavy metal alterations in the aquatic environment.



Q. In the context of ecosystem productivity, marine upwelling zones are important as they increase the marine productivity by bringing the



1. Decomposer microorganism to the surface.
2. Nutrients to the surface.
3. Bottom-dwelling organisms to the surface.

Which of the statements given above is/are correct?

- a) 1 and 2
- b) 2 only
- c) 2 and 3
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Q).Biological Oxygen Demand (BOD) is a standard criterion for



- a) Measuring oxygen levels in blood
- b) Computing oxygen levels in forest ecosystems
- c) Pollution assay in aquatic ecosystems
- d) Assessing oxygen levels in high altitude regions



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- BOD is the biological method used for the measurement of the total amount of dissolved oxygen (DO) used by microbes in the biological process of metabolizing organic molecules present in water.
- It symbolizes the amount of organic pollution present in an aquatic ecosystem.
- A highly polluted water will have a high levels of biological oxygen demand (BOD).

Q).Which of the following leaf modifications occur(s) in the desert areas to inhibit water loss?



1. Hard and waxy leaves
2. Tiny leaves
3. Thorns instead of leaves

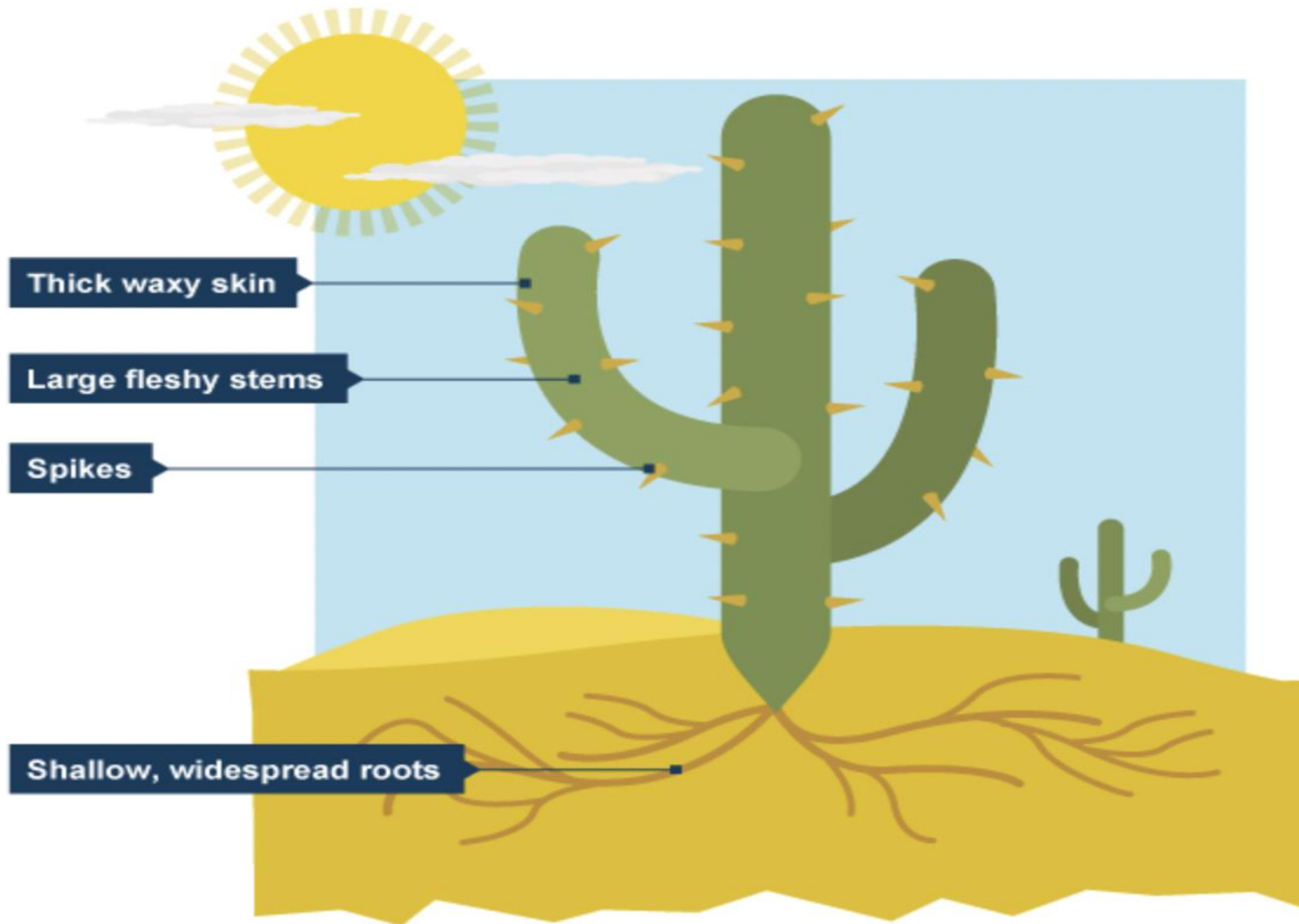
Select the correct answer using the code given below:

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



- Adaptation is any attribute of the organism (morphological, physiological, behavioural) that enables the organism to survive and reproduce in its habitat.
- In the desert, plants and animals have to cope with very little water.
- There is also a big variation in temperature between day and night - the **diurnal range**.





- thick, waxy skin to reduce loss of water and to reflect heat
- their stomata arranged in deep pits to minimise water loss through transpiration.
- large, fleshy stems to store water
- thorns and thin, spiky or glossy leaves to reduce water loss and the photosynthetic function is taken over by the flattened stems.
- 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
- They also have a special photosynthetic pathway (CAM) that enables their stomata to remain closed during day time.



Q.) Consider the following statements:



1. As per law, the Compensatory Afforestation Fund Management and Planning Authority exists at both National and State levels.
2. People's participation is mandatory in the compensatory afforestation programmes carried out under the Compensatory Afforestation Fund Act, 2016.

Which of the statements given above is/are correct?

- a) 1 only
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- **Compensatory afforestation** means that every time forest land is diverted for non-forest purposes such as mining or industry, the user agency pays for planting forests over an equal area of non-forest land, or when such land is not available, twice the area of degraded forest land.
- As per law, the Compensatory Afforestation Fund Management and Planning Authority exists at both National and State levels.
- It does not provide for mandatory people participation in the compensatory afforestation programmes carried out under the Compensatory Afforestation Fund Act, 2016.



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Q.) Consider the following statements:



1. As per recent amendment to the Indian Forest Act, 1927, forest dwellers have the right to fell the bamboos grown on forest areas.
2. As per the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, bamboo is a minor forest produce.
3. The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forests Rights) Act, 2006 allows ownership of minor forest produce to forest dwellers.

Which of the statements given above is/are correct?

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- b) 2 and 3 only
- c) 3 only
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- The Indian Forest (Amendment) Ordinance, 2017 exempts bamboo grown in non-forest areas from definition of tree, thereby dispensing with the requirement of felling/transit permit for its economic use.
- Minor Forest Produce (MFP) is defined under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, as all non-timber forest produce of plant origin, and includes bamboo, brushwood, stumps, canes, Tusser, cocoon, honey, waxes, Lac, tendu/kendu leaves, medicinal plants and herbs, roots, tuber and the like.
- The Forest Rights Act 2006 defines forest rights as inclusive of 'Right of ownership, access to collect, use and dispose of minor forest produce which have traditionally been collected within or outside village boundaries'.
- Individuals, communities and gram sabhas having rights under this particular section of the Act will not only have the rights to use but also rights of ownership over MFPs.



Q.) Consider the following states:

1. Chhattisgarh
2. Madhya Pradesh
3. Maharashtra
4. Odisha

With reference to the States mentioned above, in terms of percentage of forest cover to the total area of State

Which one of the following is the correct ascending order?

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

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- c) 3-2-4-1**
- d) 3-2-1-4

The percentage of forested area in 2021 by state as published by the Forest Survey of India in ascending order is:

- Maharashtra (16.51%), Madhya Pradesh (25.14%), Odisha (32.98%), Chhattisgarh (41.21%).



Q.) 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
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- A fern is a member of a group of vascular plants that reproduce via spores and have neither seeds nor flowers. Ferns require indirect sunlight, moist soil, and a humid atmosphere. Ferns prefer potting soil with good drainage and high organic content.
- Lichens are a complex life form that is a symbiotic partnership of two separate organisms, a fungus and an alga. only require an undisturbed surface, time, and clean air. Lichens grow on any undisturbed surface--bark, wood, mosses, rock, soil, peat, glass, metal, plastic, and even cloth.
- Mosses are non-flowering plants which produce spores and have stems and leaves, but don't have true roots. Moss is very low maintenance and needs virtually nothing except shade and moisture to thrive. Hence option 3 is correct.

- A mushroom or toadstool is the fleshy, spore-bearing fruiting body of a fungus, typically produced above ground, on soil, or on its food source. Mushrooms can be cultivated hydroponically as fungi.



Q. Lichens, which are capable of initiating ecological succession even on a bare rock, are actually a symbiotic association of

- a) algae and bacteria
- b) algae and fungi
- c) bacteria and fungi
- d) fungi and mosses



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- Lichens are **mutualistic associations** of a fungus and an alga or cyanobacterium.
- They are **sensitive to sulphur dioxide in the air** which rapidly accumulates in their tissues.
- Lichens are commonly used as **air quality indicators** since some species are more pollution tolerant than others.
- The most sensitive lichens are shrubby and leafy whereas the most tolerant lichens are crustose.



Q. If you walk through countryside, you are likely to see some birds stalking alongside the cattle to seize the insects, disturbed by their movement through grasses, Which of the following is/are such bird/birds?



1. Painted Stork
2. Common Myna
3. Black-necked Crane

Select the correct answer using the code given below.

- a) 1 and 2
- b) 2 only
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- The common myna (*Acridotheres tristis*), also called the Indian myna, is a highly **commensal passerine** that lives in close association with humans, being most successful in disturbed habitats.
- It is an **opportunistic feeder** on insects, disturbed by grazing cattle.



Q.) 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



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- Copepods are a group of small crustaceans found in nearly every freshwater and saltwater habitat.
- Copepods are major secondary producers in the World Ocean.
- They are an important source of food for many fish species but also a significant producer of detritus.
- Cyanobacteria, also called bluegreen algae, are microscopic organisms found naturally in all types of water.
- Cyanobacteria are important primary producers and form a part of the phytoplankton.



- Diatoms are photosynthesising algae, they have a siliceous skeleton (frustule) and are found in almost every aquatic environment including fresh and marine waters.
- Foraminifera are single-celled organisms, members of a phylum or class of amoeboid protists characterized by streaming granular ectoplasm for catching food and other uses.



Q. 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



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



Q. Which one of the following is the process involved in photosynthesis?

- a) Potential energy is released to form free energy
- b) Free energy is converted into potential energy and stored
- c) Food is oxidized to release carbon dioxide and water
- d) Oxygen is taken, and carbon dioxide and water vapour are given out



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Q.) 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?



- a) Carbon cycle
- b) Nitrogen cycle
- c) Phosphorus cycle
- d) Sulphur cycle



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- Gaseous cycles include those of nitrogen, oxygen, carbon, and water;
- sedimentary cycles include those of iron, calcium, phosphorus, and other more earthbound elements.
- Much of the phosphorus on Earth is tied up in rock and sedimentary deposits, from which it is released by weathering, leaching, and mining.
- Phosphorus moves in a cycle through rocks, water, soil and sediments and organisms.
- Over time, rain and weathering cause rocks to release phosphate ions and other minerals.
- This inorganic phosphate is then distributed in soils and water.



Q. Which of the following adds/add carbon dioxide to the carbon cycle on the planet Earth?



1. Volcanic action
2. Respiration
3. Photosynthesis
4. Decay of organic matter

Select the correct answer using the code given below.

- a) 1 and 3 only
- b) 2 only
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Q.) 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 code given below:

- a) 1 and 2 only
- b) 2 and 3 only
- c) 1 and 3 only
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- Cnidarian, also called coelenterate are mostly marine animals. They include the corals, hydras, jellyfish, etc.
- The relationship between cnidarians and dinoflagellate algae is termed as "symbiotic", because both the animal host and the algae are benefiting from the association.
- It is a mutualistic interaction.
- Fungi have several mutualistic relationships with other organisms. In mutualism, both organisms benefit from the relationship.
- Two common mutualistic relationships involving fungi are mycorrhiza and lichen.



Q. Which of the following have coral reefs?



1. Andaman and Nicobar Islands
2. Gulf of Kutch
3. Gulf of Mannar
4. Sunderbans

Select the correct answer using the code given below.

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- Major reef formations in Indian seas occur in the **Gulf of Mannar, Palk Bay , Gulf of Kutch, the Andaman and Nicobar Islands and the Lakshadweep.**



Q."Biorock technology" is talked about in which one of the following situations?



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- a) Restoration of damaged coral reefs
- b) Development of building materials using plant residues
- c) Identification of areas for exploration/extraction of shale gas
- d) Providing salt licks for wild animals in forests/protected areas



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BIOROCK TECHNOLOGY

- The Zoological Survey of India (ZSI), with help from Gujarat's forest department, is attempting for the first time a process to restore coral reefs using biorock or mineral accretion technology.
- It is a method that applies safe, low voltage electrical currents through seawater, causing dissolved minerals to crystallize on structures, growing into a white limestone (CaCO_3) similar to that which naturally makes up coral reefs and tropical white sand beaches.
- Biorock, also known as Seacrete or Seament, refers to the substance formed by electro-accumulation of minerals dissolved in seawater.
- A biorock structure was installed one nautical mile off the Mithapur coast in the Gulf of Kachchh on 19th January, 2020.
- The scientists have used solar panels for power in this case.



Q. Consider the following:



1. Carabid beetles
2. Centipedes
3. Flies
4. Termites
5. Wasps

Parasitoid species are found in how many of the above kind of organisms?

- (a) Only two
- (b) Only three
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Q. Which one of the following shows a unique relationship with an insect that has coevolved with it and that is the only insect that can pollinate this tree?

- (a) Fig
- (b) Mahua
- (c) Sandalwood
- (d) Silk cotton

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2. Fish
3. Frogs

How many of the above have poisonous species among them?

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Q. One of the following regions has the world's largest tropical peatland, which holds about three years worth of global carbon emissions from fossil fuels; and the possible destruction of which can exert detrimental effect on the global climate. Which one of the following denotes that region?

- (a) Amazon Basin
- (b) Congo Basin
- (c) Kikori Basin
- (d) Rio de la Plata Basin



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(a) Amazon Basin

(b) Congo Basin

(c) Kikori Basin

(d) Rio de la Plata Basin



Q. Consider the following international agreements:



1. The International Treaty on Plant Genetic Resources for Food and Agriculture
2. The United Nations Convention to Combat Desertification
3. The World Heritage Convention

Which of the above has/have a bearing on biodiversity?

- a) 1 and 2 only
- b) 3 only
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Q. On the planet earth, most of the freshwater exists as ice caps and glaciers. Out of the remaining freshwater, the largest proportion

- a) is bound in atmosphere as moisture and clouds
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Percentage of fresh water resources

- Ice Caps and Glaciers- 2.05%,
- Groundwater- 0.68%,
- Lakes- 0.01,
- Soil Moisture- 0.005,
- Atmosphere- 0.001%,
- Streams and rivers 0.0001%,
- Biosphere - 0.00004%





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LMRs (Last minute revision sheets)

Q.) Consider the following statements:



1. 36% of India's districts are classified as "overexploited" or "critical" by the Central Ground Water Authority (CGWA).
2. CGWA was formed under the Environment (Protection) Act.
3. India has the largest area under groundwater irrigation in the world.

Which of the statements given above is/are correct?

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- b) 2 and 3 only
- c) 2 only
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- Central Ground Water Authority (CGWA) was constituted under sub-section (3) of Section 3 of the Environment (Protection) Act, 1986 for the purposes of regulation and control of ground water development and management in the country.
- The Authority is engaged in various activities related to regulation of ground water development to ensure its long-term sustainability.
- **Stage of Groundwater Extraction:**
 - **Safe** → Extraction < 70%
 - **Semi-critical** → 70–90%
 - **Critical** → 90–100%
 - **Over-exploited** → >100% (more water extracted than recharged)



- At 39 million hectares (67% of its total irrigation), India has the world's largest groundwater well equipped irrigation system (China with 19 mha is second, USA with 17 mha is third).
- India, Pakistan, and Bangladesh are, respectively, the first, fourth and sixth largest users of groundwater globally.
- India pumps more than the US and China combined - the second and third-largest users, respectively.



Q. Which one of the following has been constituted under the Environment (Protection) Act, of 1986?



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- a) Central Water Commission
- b) Central Ground Water Board
- c) Central Ground Water Authority
- d) National Water Development Agency



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Q.) What is/are the importance/ importances of the 'United Convention to Combat Desertification'?



1. It aims to promote effective action through innovative national programmes and supportive international partnerships.
2. It has a special/particular focus on South Asia and North Africa regions, and its Secretariat facilitates the allocation of major portion of financial resources to these regions.
3. It is committed to bottom up approach, encouraging the participation of local people in combating the desertification.

Select the correct answer using the code given below:

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- The **United Nations Convention to Combat Desertification** is a Convention to combat desertification and mitigate the effects of drought through national action programs that incorporate long-term strategies supported by international cooperation and partnership arrangements.



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- The Convention, the only convention stemming from a direct recommendation of the Rio Conference's Agenda 21, was adopted in Paris, France, on 17 June 1994 and entered into force in December 1996.
- It is the only internationally legally binding framework set up to address the problem of desertification.
- The Convention is based on the principles of participation, partnership and decentralization—the backbone of good governance and sustainable development.
- It has 197 parties, making it near universal in reach.
- The implementation of the UNCCD is organized around these five regional implementation annexes.
- Five world regions – Africa, Asia, Latin America and the Caribbean (LAC), Northern Mediterranean, Central and Eastern Europe - have the important job of deciding how to implement the United Nations Convention to Combat Desertification (UNCCD).



Q.) Which of the following statements is/are correct? Proper design and effective implementation of UNREDD+ Programme can significantly contribute to



1. protection of biodiversity
2. resilience of forest ecosystems
3. poverty reduction

Select the correct answer using the code given below:

- a) 1 and 2 only
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- REDD+ is a framework created by the UNFCCC Conference of the Parties to guide activities in the forest sector that reduces emissions from deforestation and forest degradation, as well as the sustainable management of forests and the conservation and enhancement of forest carbon stocks in developing countries.
- It is estimated that globally, deforestation and forest degradation account for around 11 percent of CO₂ emissions. Halting deforestation is a cost-effective action that has a clear impact in reducing global GHG emissions.
- It aims at the implementation of activities by national governments to reduce human pressure on forests that result in greenhouse gas emissions at the national level, but as an interim measure also recognizes subnational implementation.
- The implementation of REDD+ activities is voluntary and depends on the national circumstances, capacities and capabilities of each developing country and the level of support received.



Q).With reference to an initiative called ‘The Economics of Ecosystems and Biodiversity (TEEB)’, which of the following statements is/are correct?



1. It is an initiative hosted by UNEP, IMF and World Economic Forum.
2. It is a global initiative that focuses on drawing attention to the economic benefits of biodiversity.
3. It presents an approach that can help decisionmakers recognize, demonstrate and capture the value of ecosystems and biodiversity.

Select the correct answer using the code given below

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- The Economics of Ecosystems and Biodiversity (TEEB) is a global initiative focused on “making nature’s values visible”.
- Its principal objective is to mainstream the values of biodiversity and ecosystem services into decision-making at all levels.
- It aims to achieve this goal by following a structured approach to valuation that helps decision-makers recognize the wide range of benefits provided by ecosystems and biodiversity, demonstrate their values in economic terms and, where appropriate, capture those values in decision-making.





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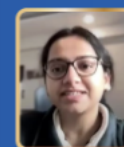
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