
Geno IAS
"Illuminating Path to Success"
UPSC CSE PRELIMS PYQs
2011 & 2012

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"Illuminating Path to Success"

UPSC PRELIMS

ENVIRONMENT & ECOLOGY

14 Years PYQs

(2011 to 2024)

with

DETAILED EXPLANATION

2011 & 2012

Ajit Tiwari Sir (Experience more than 18 years)

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ABOUT ME

Geno IAS

HAVE MENTORED MORE THAN 10 LAKH STUDENTS (OFFLINE & ONLINE CLASSES) FOR UPSC CIVIL SERVICES EXAMINATION & OTHER UPSC EXAMS FOR MORE THAN 18 YEARS.

AJIT TIWARI

- ✓ Have worked as Senior Faculty in various prestigious institutes in India.
- ✓ Lectures are fused with memory tricks for long term retention.
- ✓ Interactive teaching based on question answer approach
- ✓ Well known faculty for General studies- Environment & Ecology, Complete Geography (Physical, Indian, World, & Economic Geography), Disaster Management & Complete Geography Optional.

PERSONAL MENTORSHIP

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WAV -Approach

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LET'S REVISE


UPSC CSE PRELIMS
PYQs 2011

Q11. There is a concern over the increase in harmful algal blooms in the seawaters of India. What could be the causative factors for this phenomenon?

Habs

Algal bloom

boom

Green Scum

1. Discharge of nutrients from the estuaries.
2. Run-off from the land during the monsoon.
3. Upwelling in the seas.

Select the correct answer from the codes given below:

a) 1 only

b) 1 and 2 only

c) 2 and 3 only

d) 1, 2 and 3

11. Solution (d)

Knowledge Base:

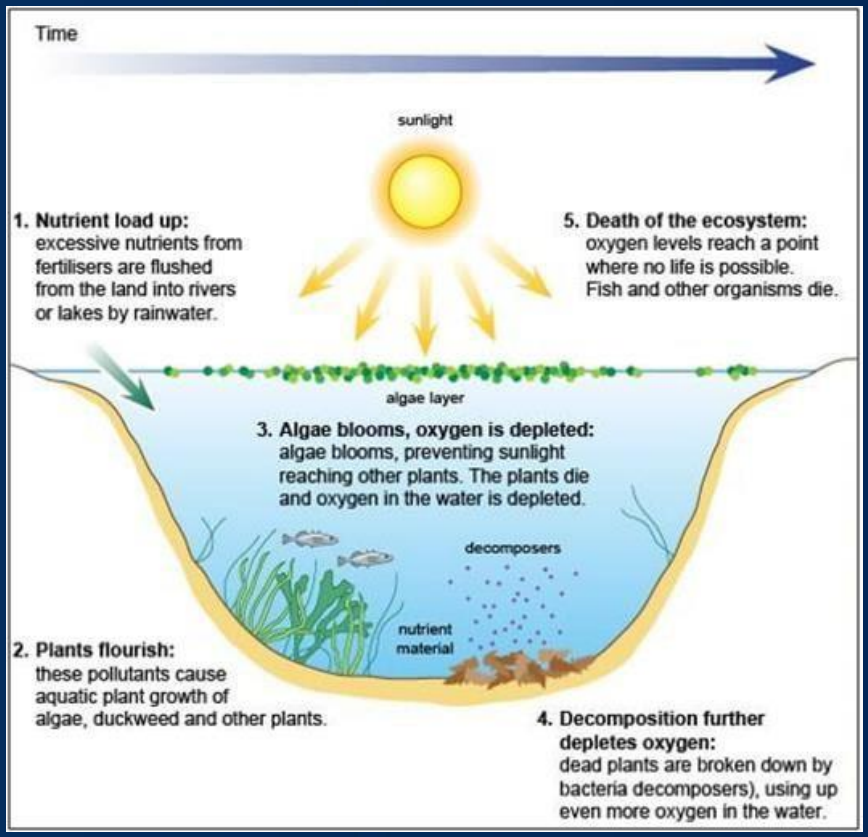
- An algal bloom or marine bloom or water bloom is a rapid increase in the population of algae in an aquatic system.
- Algal blooms may occur in freshwater as well as marine environments.
- Blooms which can injure animals or the ecology are called "harmful algal blooms(HAB)" Harmful Algal Bloom can lead to fish die-offs, cities cutting off water to residents, or states having to close fisheries.

CAUSES OF ALGAL BLOOM

Eutrophication
Nitrate, phosphate

- **Nutrients:** Nutrients promote and support the growth of algae and Cyanobacteria.
- The Eutrophication (nutrient enrichment) of waterways is considered as a major factor.
- The main nutrients contributing to Eutrophication are phosphorus and nitrogen.

- External sources include runoff and soil erosion from fertilized agricultural areas, erosion from river banks, river beds, land clearing (deforestation), and sewage effluent.
- Internal origin of nutrients comes from the lake/reservoir sediments.
- When dissolved oxygen concentration is low in the water, sediments release phosphate into the water column.
- This phenomenon encourages the growth of algae.



TEMPERATURE

- Early blue-green algal blooms usually develop during the spring when water temperature is higher and there is increased light.
- Water temperatures above 25°C are optimal for the growth of Cyanobacteria.
- In temperate regions, blue-green algal blooms generally do not persist through the winter months due to low water temperatures.
- Higher water temperatures in tropical regions may cause blue-green algal blooms to persist throughout the year.

- **Light:** Blue-green algae populations are diminished when they are exposed to long periods of high light intensity but have optimal growth when intermittently exposed to high light intensities.
- These conditions are met under the water surface where the light environment is fluctuating.
- Even under low light conditions, blue-green algae have higher growth rates than any other group of algae.
- **Stable Conditions:** Most blue-green algae prefer stable water conditions with low flows, long retention times, light winds and minimal turbulence.

- Thermal stratification occurs when the top layer of the water column becomes warmer and the lower layer remains cooler.
- When the two layers stop mixing, the upper layer becomes more stable and summer blooms of blue-green algae are supported.
- Turbidity: Turbidity is caused by the presence of suspended particles and organic matter in the water column.
- When turbidity is low, more light can penetrate through the water column.

- This creates optimal conditions for algal growth. increased aquaculture operations leading to enrichment of coastal waters, dispersal of toxic species through currents, storms, ship ballast waters and shellfish seeding activities are some of the factors triggering the blooms.
- **Upwelling:** formation of mud banks, nutrient discharges from estuaries and run-off from the land during monsoons or rainfall cause some algae blooms in coastal waters.

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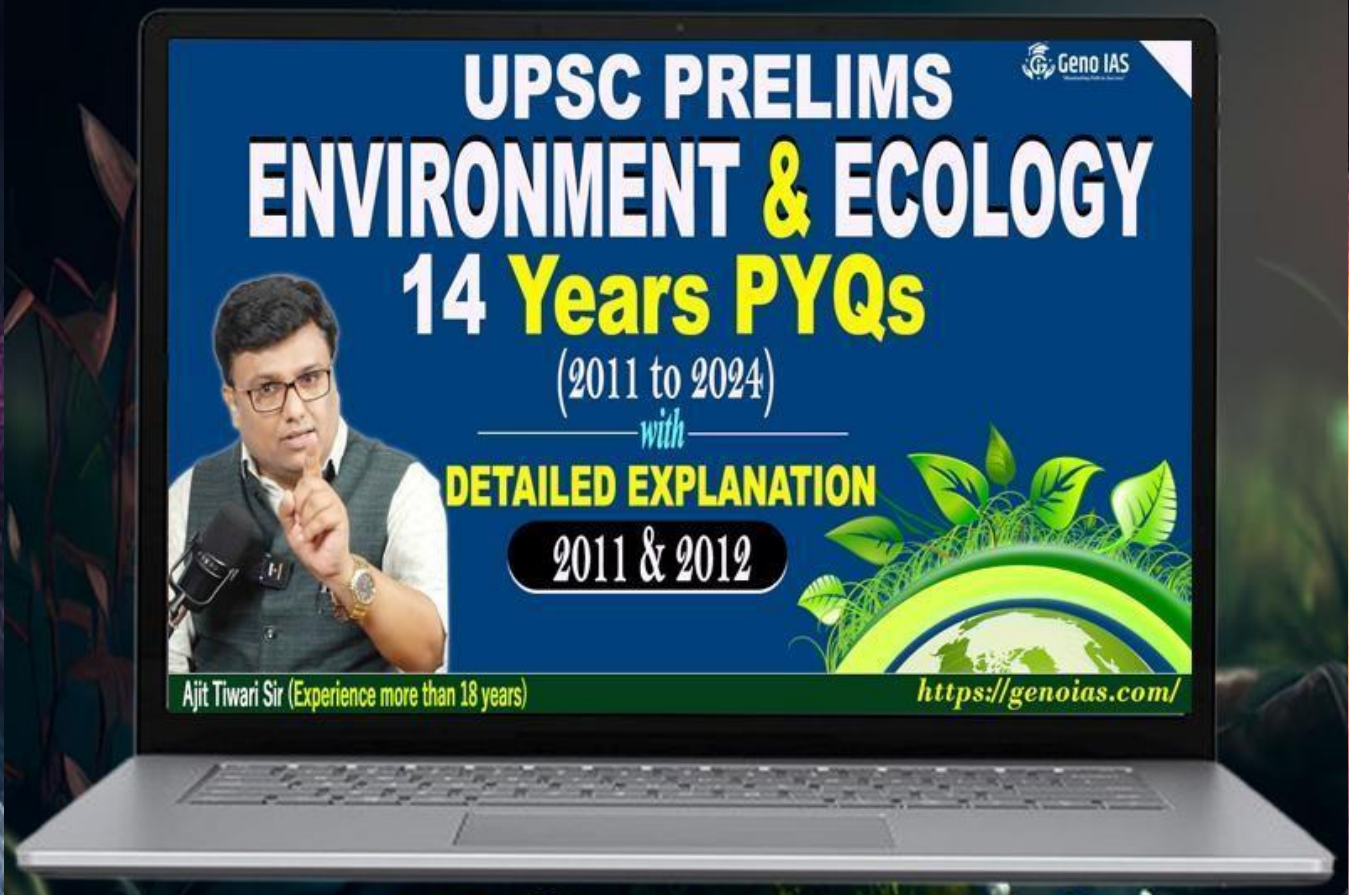

Monday To Frinday

LIVE 4th Feb @ 11:00 AM

DON'T FORGET TO WATCH

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Q12. The "Red Data Books" published by the International Union for Conservation of Nature and Natural Resources (IUCN) contain lists of:

1. Endemic plant and animal species present in the biodiversity hotspots, X
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

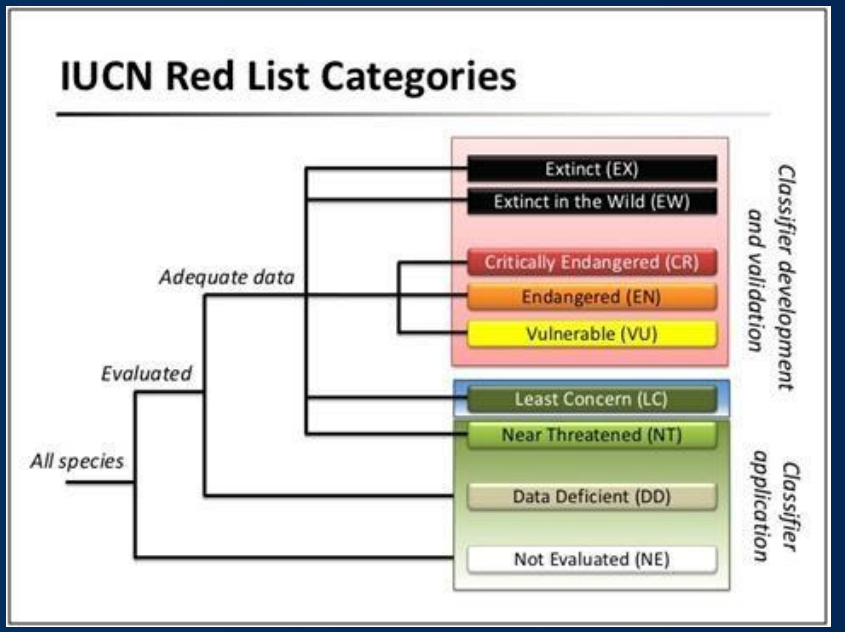
b) 2 only

c) 2 and 3

d) 3 only

12. Solution (b)

- The IUCN (International Union for Conservation of Nature) Red Lists are the bearers of genetic diversity and the building blocks of ecosystems, and information on their conservation status and distribution provides the foundation for making decisions about conserving biodiversity from local to global levels.



- The IUCN Global Species Programme working with the IUCN Species Survival Commission (SSC) has been assessing the conservation status of species, subspecies, varieties, and even selected subpopulations on a global scale for the past 50 years in order to highlight taxa threatened with extinction, and thereby promote their conservation.

Q13. Human activities in the recent past have caused the increased concentration of carbon dioxide in the atmosphere, but a lot of it does not remain in the lower atmosphere because of:

Blue Carbon Green Carbon Carbon Sink

1. Its escape into the outer stratosphere.
2. The photosynthesis by phytoplankton in the oceans.
3. The trapping of air in the polar ice caps. 0.03% CO_2

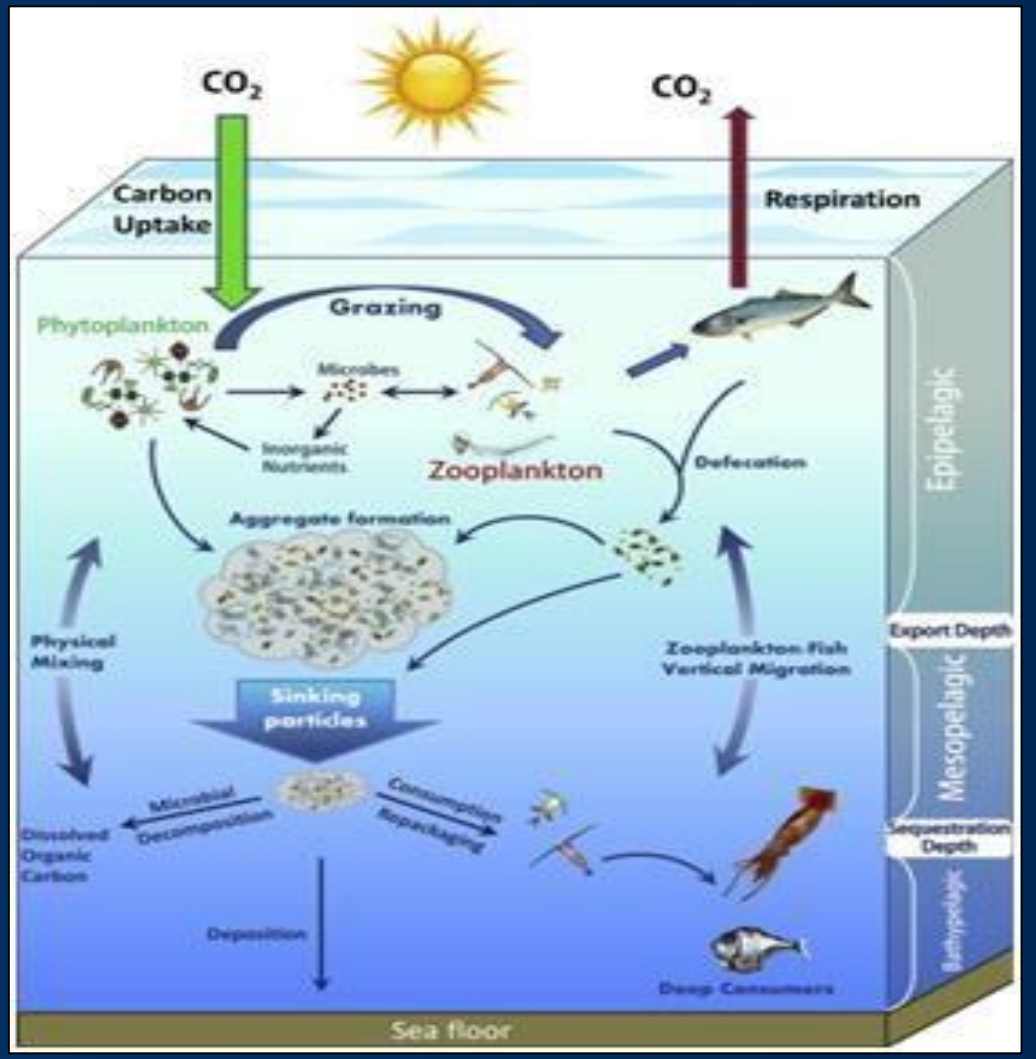
Which of the statements given above is/are correct?

a) 1 and 2 **b) 2 only**

c) 2 and 3 **d) 3 only**

13. Solution (b)

- Phytoplankton are a very important part of the ocean food chain.
- They make their own food by photosynthesis for which they utilize atmospheric carbon dioxide.
- Trapping of carbon dioxide on polar ice caps is not known. Also, carbon dioxide does not escape into the stratosphere.



Q14. In the context of ecosystem productivity, marine upwelling zones are important as they increase the marine productivity by bringing the:

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

Rate of Photosynthesis / Vol^{m} / time

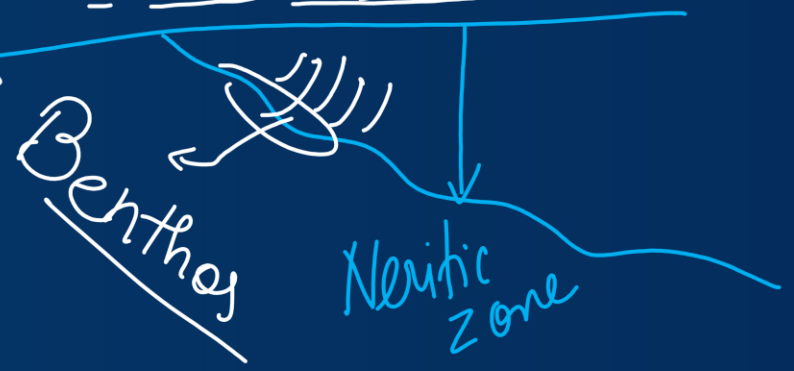
Which of the statements given above is/are correct?

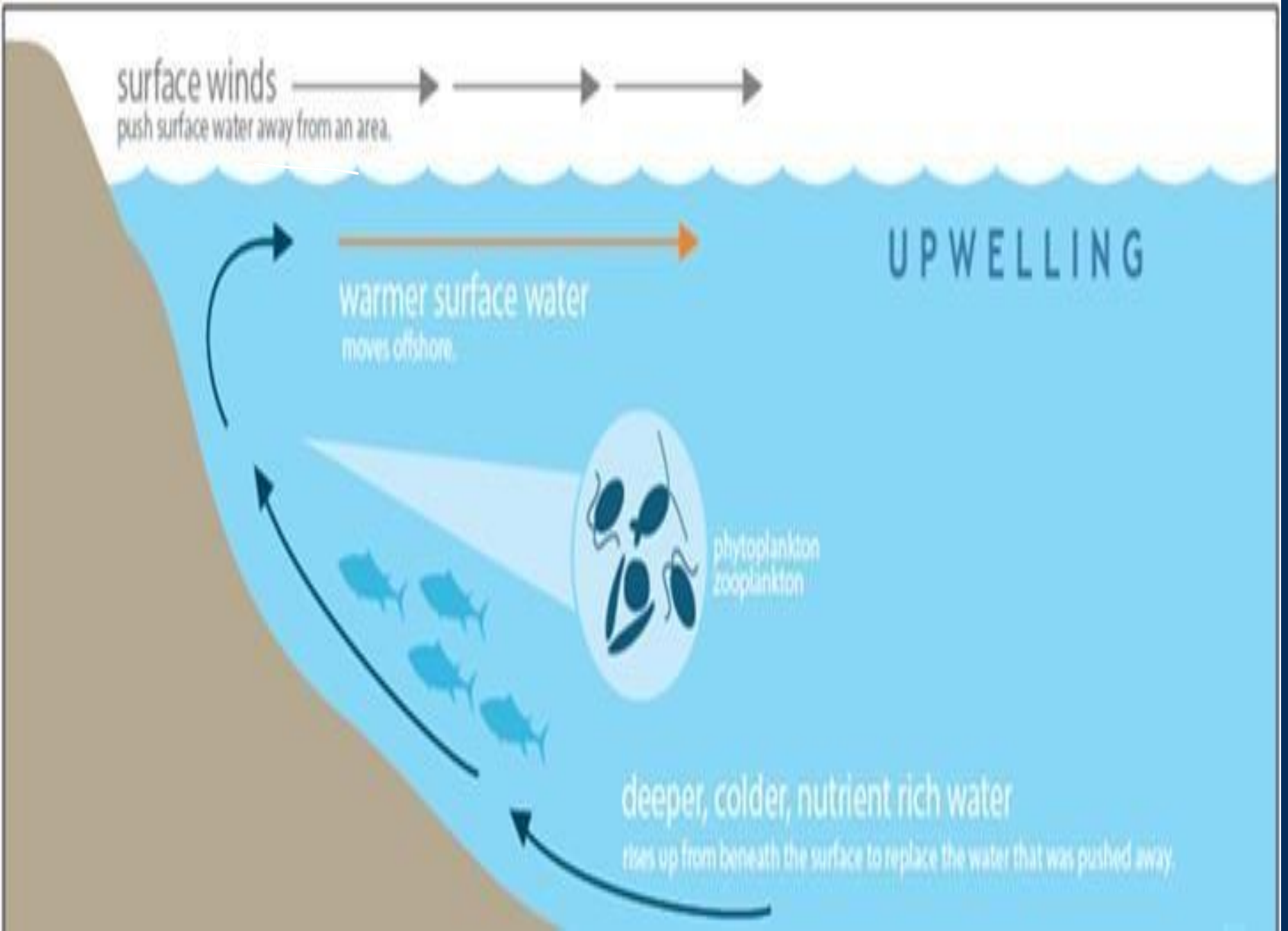
a) 1 and 2

b) 2 only

c) 2 and 3

d) 3 only




surface winds
push surface water away from an area.
UPWELLING
warmer surface water
moves offshore.
phytoplankton
zooplankton
deeper, colder, nutrient rich water
rises up from beneath the surface to replace the water that was pushed away.

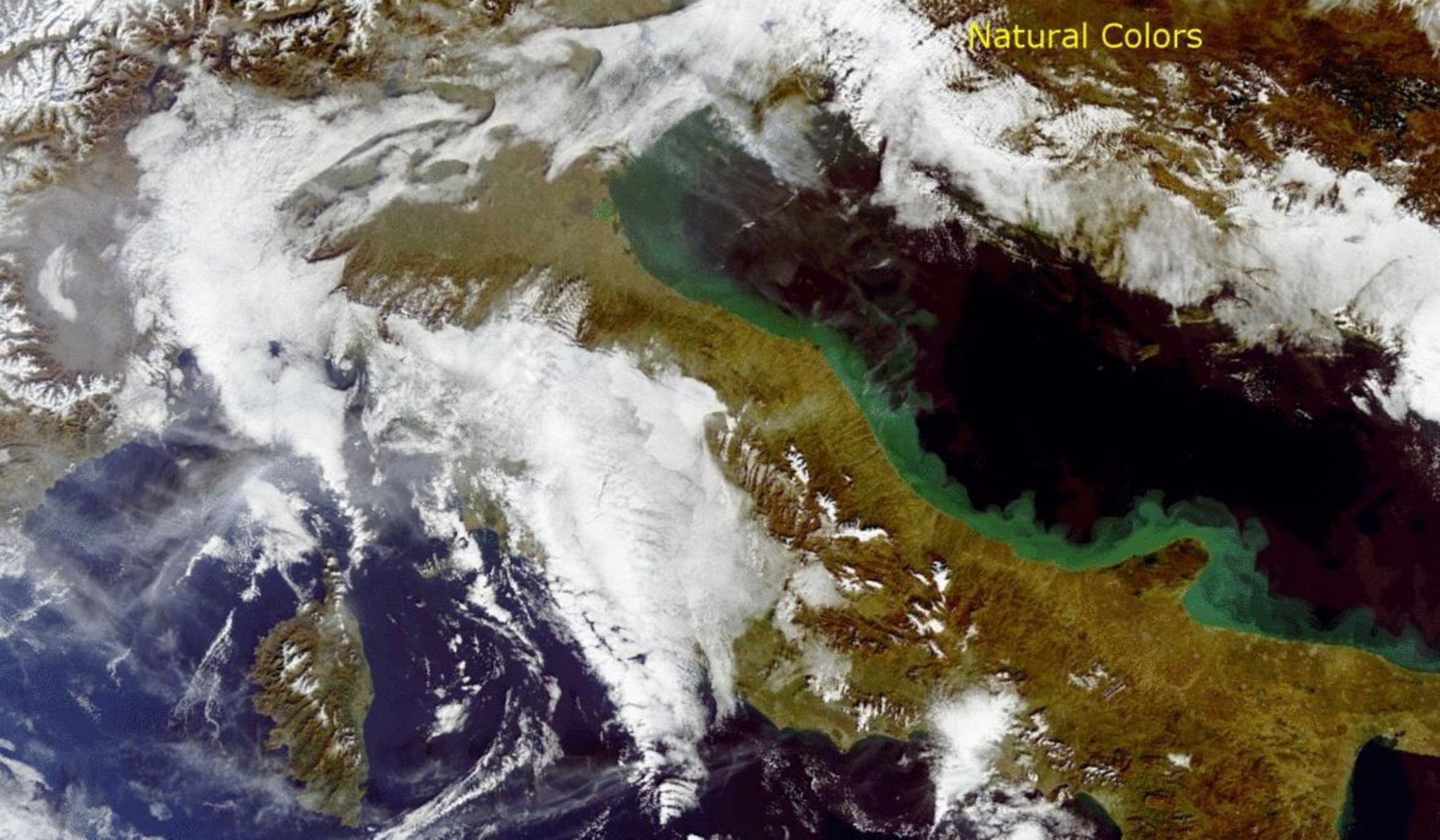
14. Solution (b)

- Upwelling brings nutrient-rich water towards the ocean surface, replacing the warmer, usually nutrient depleted surface water.
- This is to do with the Phytoplankton and nothing to do with the decomposer microorganisms.

Upwelling:

- Winds blowing across the ocean surface push water away. Water then rises up from beneath the surface to replace the water that was pushed away. This process is known as “upwelling.”

- Upwelling occurs in the open ocean and along coastlines.
- The reverse process, called “downwelling,” also occurs when wind causes surface water to build up along a coastline and the surface water eventually sinks toward the bottom.
- Water that rises to the surface as a result of upwelling is typically colder and is rich in nutrients.
- These nutrients “fertilize” surface waters, meaning that these surface waters often have high biological productivity.
- Therefore, good fishing grounds typically are found where upwelling is common.


Natural Colors

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Q15. With reference to India, consider the following Central Acts:

1. Import and Export (Control) Act, 1947
2. Mining and Mineral Development (Regulation) Act, 1957
3. Customs Act, 1962
4. Indian Forest Act, 1927

Which of the above Acts have relevance to/bearing on the biodiversity conservation in the country?

a) 1 and 3 only

b) 2, 3 and 4 only

c) 1, 2, 3 and 4

d) None of the above Acts

15. Solution: (c)

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Biodiversity related Acts and Rules

Sl. No.	Acts & Rules
1	The Fisheries Act, 1897
2	The Destructive Insects and Pests Act, 1914
3	The Indian Forest Act, 1927
4	The Agricultural Produce (Grading and Marketing) Act, 1937
5	The Indian Coffee Act, 1942
6	Import and Export (Control) Act, 1947
7	The Rubber (Production and Marketing) Act, 1947
8	The Tea Act, 1953
9	Mining and Mineral Development (Regulation) Act 1957
10	Prevention of Cruelty to Animal Act, 1960

Sl. No.	Acts & Rules
11	The Customs Act, 1962
12	The Spices Board Act, 1986
13	The Seeds Act, 1966
14	The Patents Act, 1970
15	The Wildlife (Protection) Act, 1972
16	Marine Products Export Development Authority Act 1972
17	The Water (Prevention and Control of Pollution) Act, 1974
18	Tobacco Board Act, 1975
19	Territorial Water, Continental Shelf, Exclusive Economic Zone and other Maritime Zones Act, 1976
20	Water (Prevention and Control of Pollution) Cess Act, 1977
21	Maritime zones of India (Regulation and fishing by Foreign Vessels) Act 1980
22	Forest (Conservation) Act, 1980

Sl. No.	Acts & Rules
23	Air (Prevention and control of Pollution) Act 1981
24	Agricultural and Processed Food Products Export Development Authority Act 1985/1986
25	Environment (Protection) Act, 1986
26	The Spices Act, 1986
27	National Diary Development Board, 1987
28	Rules for the manufacture, use/import/export and storage of hazardous microorganism/genetically engineered organisms or cells, 1989
29	Foreign Trade (Development and Regulation) Act, 1992

Sl. No.	Acts & Rules
30	Protection of Plant varieties and Farmers Rights (PPVFR) Act, 2001
31	The Biological Diversity Act, 2002
32	Plant Quarantine (Regulation of Import into India) order 2003
33	The Biological Diversity Rules, 2004
34	The Food Safety and Standards Act, 2006
35	Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006
36	The National Green Tribunal Act 2010

Q16. Consider the following statements about National Biodiversity Authority:

1. It is a statutory autonomous body under the Ministry of Environment and Forests.
2. It performs facilitative, regulatory and advisory functions for the Government of India on issues of conservation, sustainable use of biological resources.
3. It was established by the Central Government in 2003 to implement India's Environment protection act 1986.

Biological Diversity Act 2002

Select the correct answer using the codes below.

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 only

(d) 1, 2 and 3

16. Solution (A)

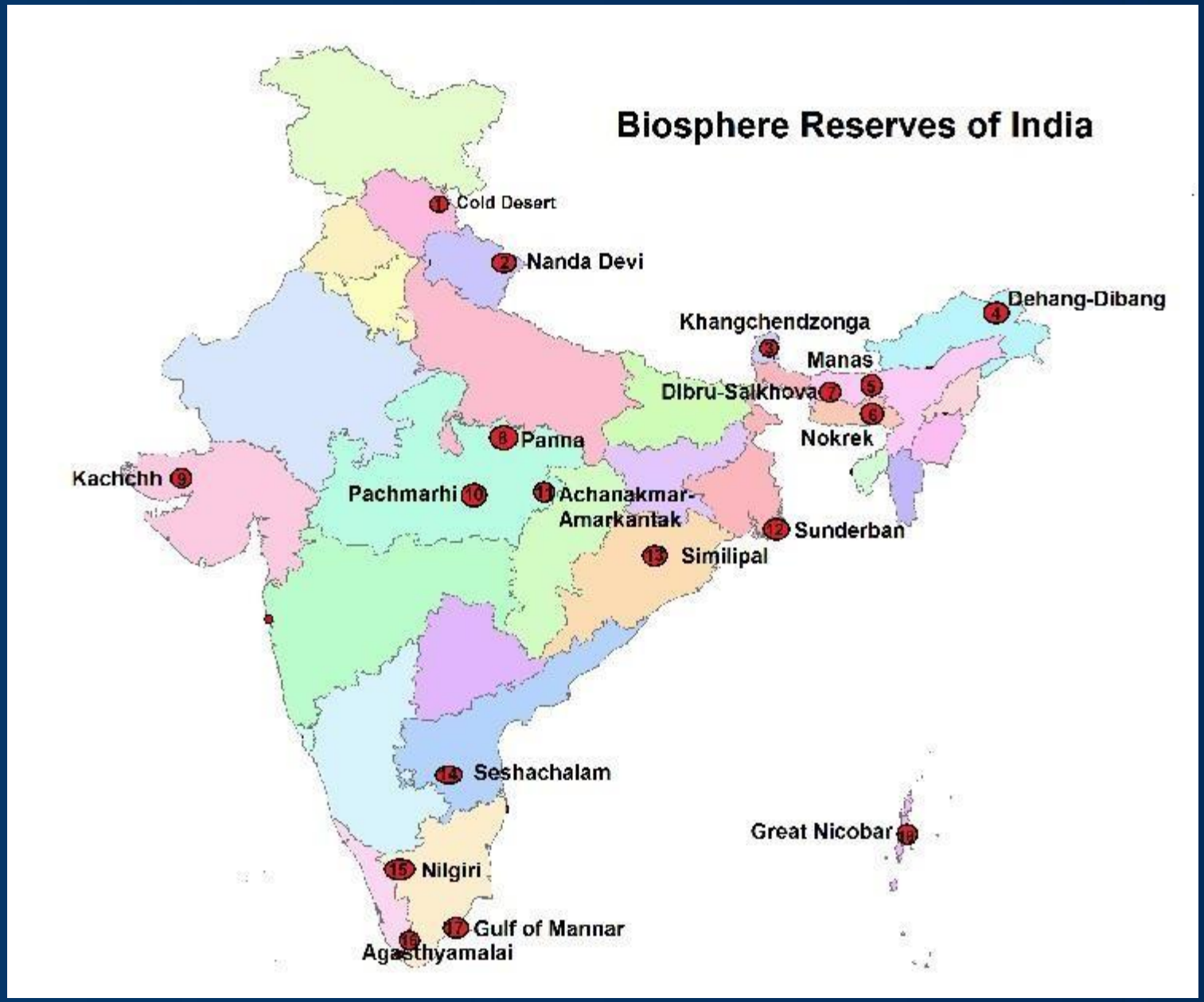
- **Statement 1 is correct:** The National Biodiversity Authority (NBA) is a statutory autonomous body under the Ministry of Environment and Forests, Government of India established in 2003 to implement the provisions under the Biological Diversity Act, 2002 after India signed the Convention on Biological Diversity (CBD) in 1992.

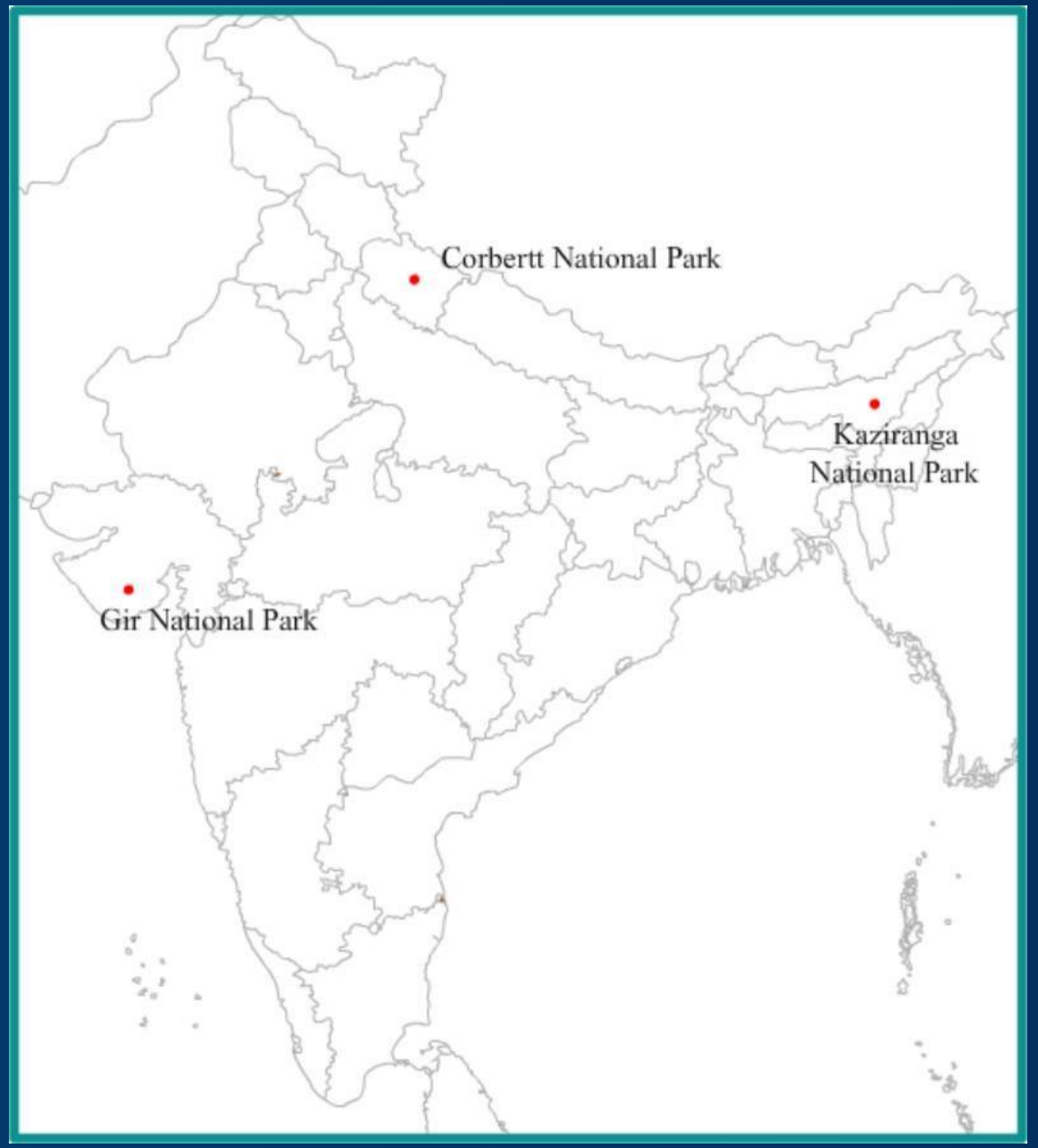
- **Statement 2 is correct:** The NBA performs facilitative, regulatory and advisory functions for the Government of India on issues of conservation, sustainable use of biological resources and fair and equitable sharing of benefits arising out of the use of biological resources.
- **Statement 3 is not correct:** The National Biodiversity Authority (NBA) was established by the Central Government in 2003 to implement India's Biological Diversity Act (2002).

Expected Questions

- The Biological Diversity Act (2002) mandates the implementation of the provisions of the Act through the decentralized system with the NBA focusing on advising the Central Government on matters relating to the conservation of biodiversity, sustainable use of its components and equitable sharing of benefits arising out of the utilization of biological resources; and advising the State Governments in the selection of areas of biodiversity importance to be notified under Sub-Section (1) of Section 37 as heritage sites and measures for the management of such heritage sites.


INDIA
BIOSPHERE RESERVES
N
AFGHANISTAN
Cold Desert
CHINA
PAKISTAN
Nanda Devi National Park & Biosphere Reserve
NEPAL
Khangchendzonga
BHUTAN
Manas National Park
Nokrek National Park
BANGLADESH
Panna
Great Rann of Kutch
MYANMAR
Achanakmar-Amarkantak Biosphere Reserve
Pachmarhi Biosphere Reserve
Similipal National Park
Sundarban National Park
Bay of Bengal
Arabian Sea
Seshachalam Hills
Nilgiri Biosphere Reserve
Gulf of Mannar
Agasthyamalai Biosphere Reserve
SRI LANKA
Great Nicobar Biosphere Reserve
Biosphere Reserves
International Boundary
State/UT Boundary
INDIAN OCEAN


Biosphere Reserves of India
1 Cold Desert
2 Nanda Devi
4 Dehang-Dibang
Khangchendzonga
3
Manas
5
Dibru-Saikhowa
7
6
Nokrek
8 Panna
Kachchh 9
Pachmarhi 10
11 Achanakmar-Amarkantak
12 Sunderban
13 Similipal
14 Seshachalam
Great Nicobar
15 Nilgiri
17 Gulf of Mannar
16
Agasthyamalai


Corbertt National Park
Kaziranga
National Park
Gir National Park

State/UT	National Park	Year of Establishment	Area (km2)
1. Ladakh	Hemis NP	1981	3,350.00
2. Rajasthan	Desert NP	1992	3,162.00
3. Uttarakhand	Gangotri NP	1989	2,390.02
4. Arunachal Pradesh	Namdapha NP	1983	1,807.82
5. Sikkim	Khangchendzonga NP	1977	1,784.00
6. Chhattisgarh	Guru Ghasidas (Sanjay) NP	1981	1,440.71
7. West Bengal	Sunderban NP	1984	1,330.10
8. Chhattisgarh	Indravati (Kutru) NP	1982	1,258.37
9. Andhra Pradesh	Papikonda NP	2008	1,012.86
10.Madhya Pradesh	Kanha NP	1955	940.00

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Great Himalayan
Rajaji
Valley of Flowers
Corbett
Sariska
Keoladeo
Dudhwa Tiger Reserve
Ranthambhore
Manas
Kaziranga
Keibul Lamjao
Bandhavgarh
Kanha National Park
Gir
Pench
Sunderbans
Chilka Lake National Park
Nagarhole
Bandipur
Parambikulam Sanctuary
Wayanad
Periyar

What are the top 10 largest National Parks in India?

State/UT	National Park	Year of Establishment	Area (km2)
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3. Uttarakhand	Gangotri NP	1989	2,390.02
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1 Cold Desert
2 Nanda Devi
Khangchendzonga
3
4 Dehang-Dibang
Manas
5
6
7 Dibru-Saikhowa
Nokrek
8 Panna
Kachchh 9
Pachmarhi 10
11 Achanakmar-
Amarkantak
12 Sunderban
13 Similipal


National Parks of India
Locations Marked by
Last Updated: 12-02-2020
Dachigam NP
Hemis NP
City Forest (Salim Ali) NP
Kishtwar NP
Pin Valley NP
Inderkilla NP
Great Himalayan NP
Govind NP
Gangotri NP
Khirganga NP
Valley of Flowers NP
Simbalbara NP
Nanda Devi NP
Rajaji NP
Kalesar NP
Jim Corbett NP
Neora Valley NP
Khangchendzonga NP
Mouling NP
Gorumara NP
Dibru-Saikhowa NP
Sultanpur NP
Dudhwa NP
Valmiki NP
Jaldapara NP
Desert NP
Sariska NP
Singalila NP
Buxa NP
Nameri NP
Namdapha NP
Keoladeo Ghana NP
Manas NP
Kaziranga NP
Ranthambhore NP
Orang NP
Madhav NP
Nokrek Ridge NP
Intanki (Ntanki) NP
Mukundra Hills NP
Balphakram NP
Panna NP
Keibul-Lamjao NP
Sanjay NP
Betla NP
Clouded Leopard NP
Bandhavgarh NP
Murlen NP
Van Vihar NP
Guru Ghasidas NP
Fossil NP
Bison (Rajbari) NP
Dinosaur Fossils NP
Marine NP
Satpura NP
Kanha NP
Phawngpui Blue Mountain NP
Blackbuck NP
Pench NP
Sunderban NP
Gugamal NP
Similipal NP
Gir NP
Nawegaon NP
Vansda NP
Tadoba NP
Bhitarkanika NP
Indravati (Kutru) NP
Sanjay Gandhi NP
Kanger Valley NP
Kasu Brahmananda Reddy NP
Papikonda NP
Mrugavani NP
Chandoli NP
Mahaveer Harina Vanasthali NP
Mollem NP
Anshi NP
Rajiv Gandhi (Rameswaram) NP
Sri Venkateswara NP
Kudremukh NP
Guindy NP
Saddle Peak NP
North Button Island NP
Bannerghatta NP
Middle Button Island NP
Rani Jhansi Marine NP
Nagarahole NP
Bandipur NP
South Button Island NP
Mudumalai NP
Mahatama Gandhi Marine (Wandoor) NP
Silent Valley NP
Mukurthi NP
Mount Harriett NP
Anamudi Shola NP
Annamalai NP
Eravikulam NP
Mathikettan Shola NP
Pambadum Shola NP
Periyar NP
Gulf of Mannar Marine NP
Campbell Bay NP
Galathea Bay NP


INDIA
TIGER RESERVES
N
LADAKH
JAMMU & KASHMIR
HIMACHAL PRADESH
PUNJAB
UTTARAKHAND
HARYANA
DELHI
RAJASTHAN
UTTAR PRADESH
BIHAR
SIKKIM
ARUNACHAL PRADESH
NAGALAND
MANIPUR
TRIPURA
MEGHALAYA
ASAM
WEST BENGAL
JHARKHAND
ODISHA
CHHATTISGARH
MADHYAPRADESH
GUJARAT
MAHARASHTRA
TELANGANA
ANDHRA PRADESH
KARNATAK
TAMILNADU
KERALA
RAJAJI
JIM CORBETT
PILIBHIT
DUDHWA
SARISKA
RANTHAMBHORE
MUKUNDRA HILLS
PANNA
SANJAY DUBRI
PALAMU
BANDHAVGARH
SATPURA
PENCH
KANHA
ACHANKAMAR
MELGHAT
BOR
NAWEGAO-NAGZIRA
TADOBA-ANDHERI
SATKOSIA
KAWAL
UDANTI-SITANADI
INDRAWATI
SAHYADRI
AMRABAD
NAGARJUN SAGAR
SRISAILAM
DANDELI ANSHI
BHADRA
NAGARHLOLE
BILIGIRI RANGNATH
MUDUMALAI
BANDIPUR
SATHYAMANGALAM
ANNAMLAI
PARAMBIKULAM
PERIYAR
KALAKAD
MUNDANTHURAI
VALMIKI
BUXA
KAMLANG
PAKHUI
NAMDAPHA
MANAS
NAMERI
KAZIRANGA
ORANG
DAMPHA
SIMLIPAL
SUNDARBANS
TIGER RESERVES


INDIA
Tiger Reser Forest
N
TAJIKISTAN
AFGHANISTAN
PAKISTAN
CHINA (TIBET)
NEPAL
BHUTAN
BANGLADESH
MYANMAR
SRI LANKA
INDIAN OCEAN
Arabian Sea
Bay of Bengal
LADAKH
JAMMU & KASHMIR
HIMACHAL PRADESH
CHANDIGARH
UTTARAKHAND
PUNJAB
HARYANA
DELHI
RAJASTHAN
UTTAR PRADESH
BIHAR
SIKKIM
ARUNACHAL PRADESH
NAGALAND
MANIPUR
TRIPURA
MEGHALAYA
ASSAM
WEST BENGAL
JHARKHAND
ODISHA
CHHATTISGARH
MADHYA PRADESH
GUJARAT
MAHARASHTRA
TELANGANA
ANDHRA PRADESH
GOA
KARNATAKA
TAMIL NADU
KERALA
PUDUCHERRY
LAKSHADWEEP (INDIA)
ANDAMAN & NICOBAR (INDIA)
DADRA & NAGAR HAVELI AND DAMAN & DIU
Rajaji
Jim Corbett
Pilibhit
Dudhwa
Sariska
Ranthambore
Mukundra Hills
Panna
Sanjay Dubri
Bandhavgarh
Palamau
Satpura
Kanha
Pench
Melghat
Nawegaon-Nagzira
Nagarjunsagar-Srisailam
Satkosia
Tadoba
Udanti-Sitanadi
Indravati
Kawal
Similipal
Sunderbans
Amrabad
Kali
Bhadra
Nagarahole
Bandipur
Sathyamangalam
Mudumalai
Parambikulam
Anamalai
Periyar
Kalakkad-Mundanthurai
Valmiki
Buxa
Orang
Pakhui
Namdapha
Kaziranga
Manas
Nameri
International Boundary
State Boundary
Tiger Reserve Forest

KENDRIYA VIDYALAYA ISLAND GROUNDS CHENNAI -02

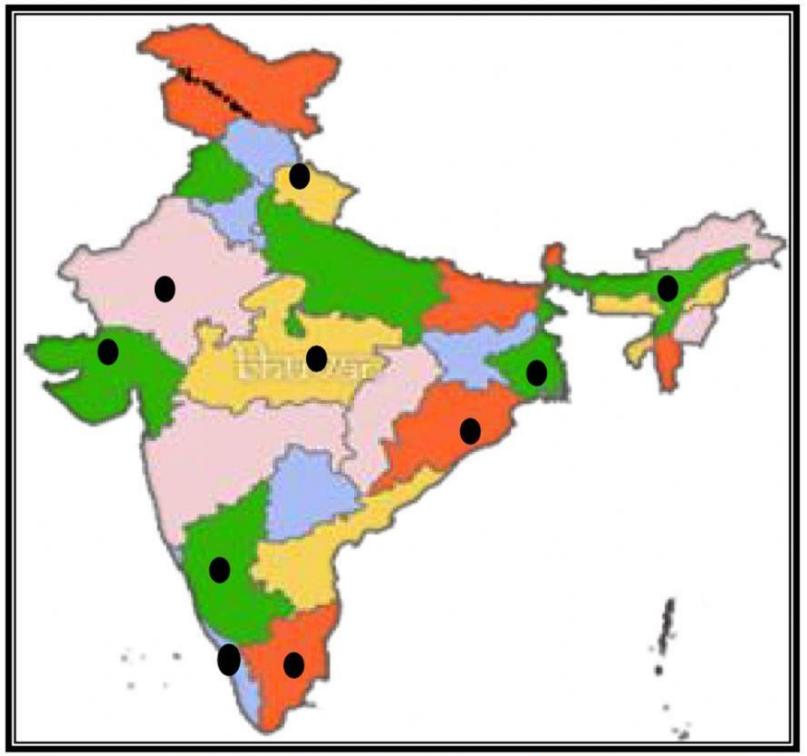
CLASS : 5 SUB:EVS MAPPING SKILL NATIONAL PARKS AND SANCTUARIES

GIR

KANHA

KAZIRANGA

PERIYAR



ANAMALAI

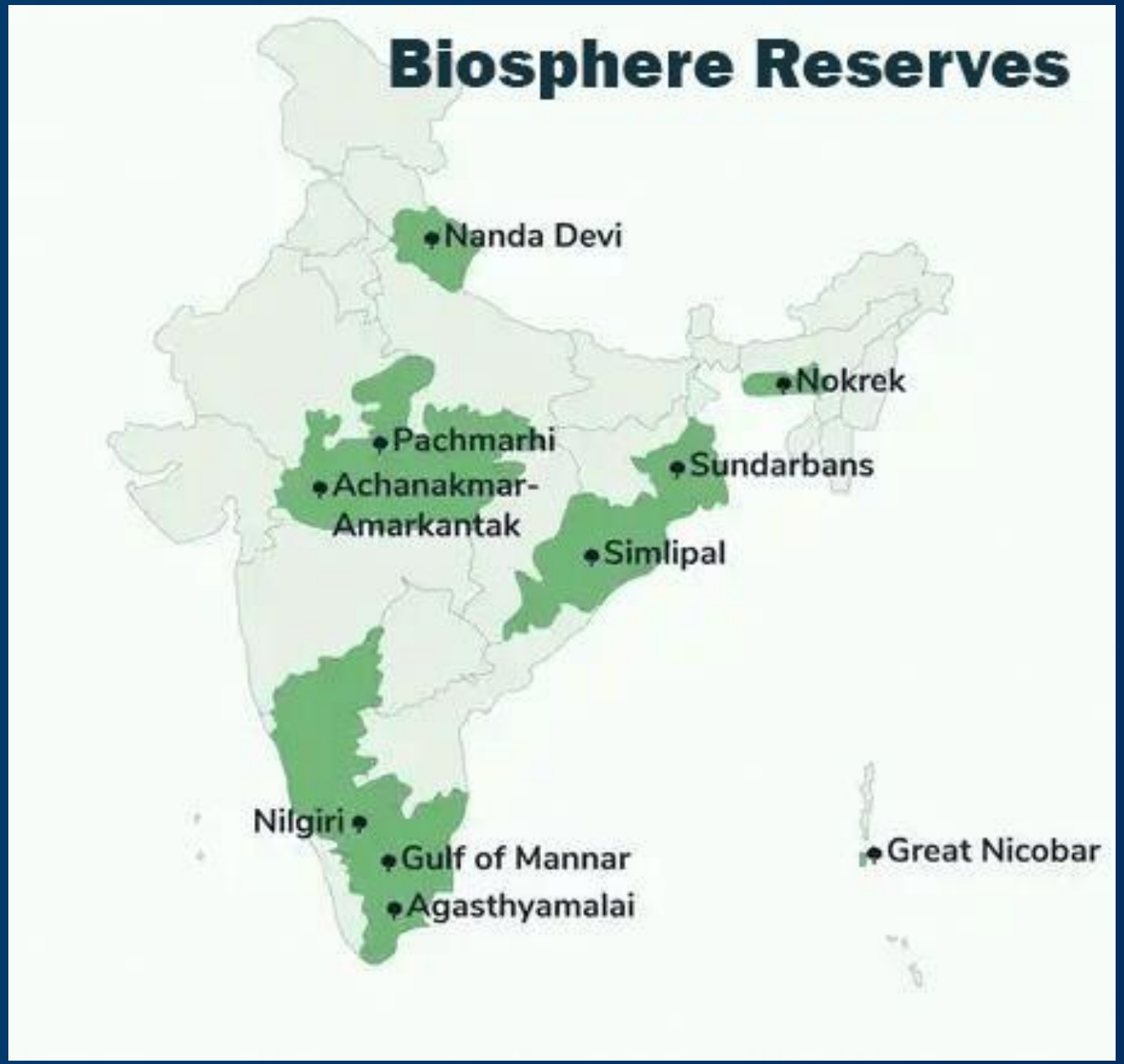
BANDIPUR

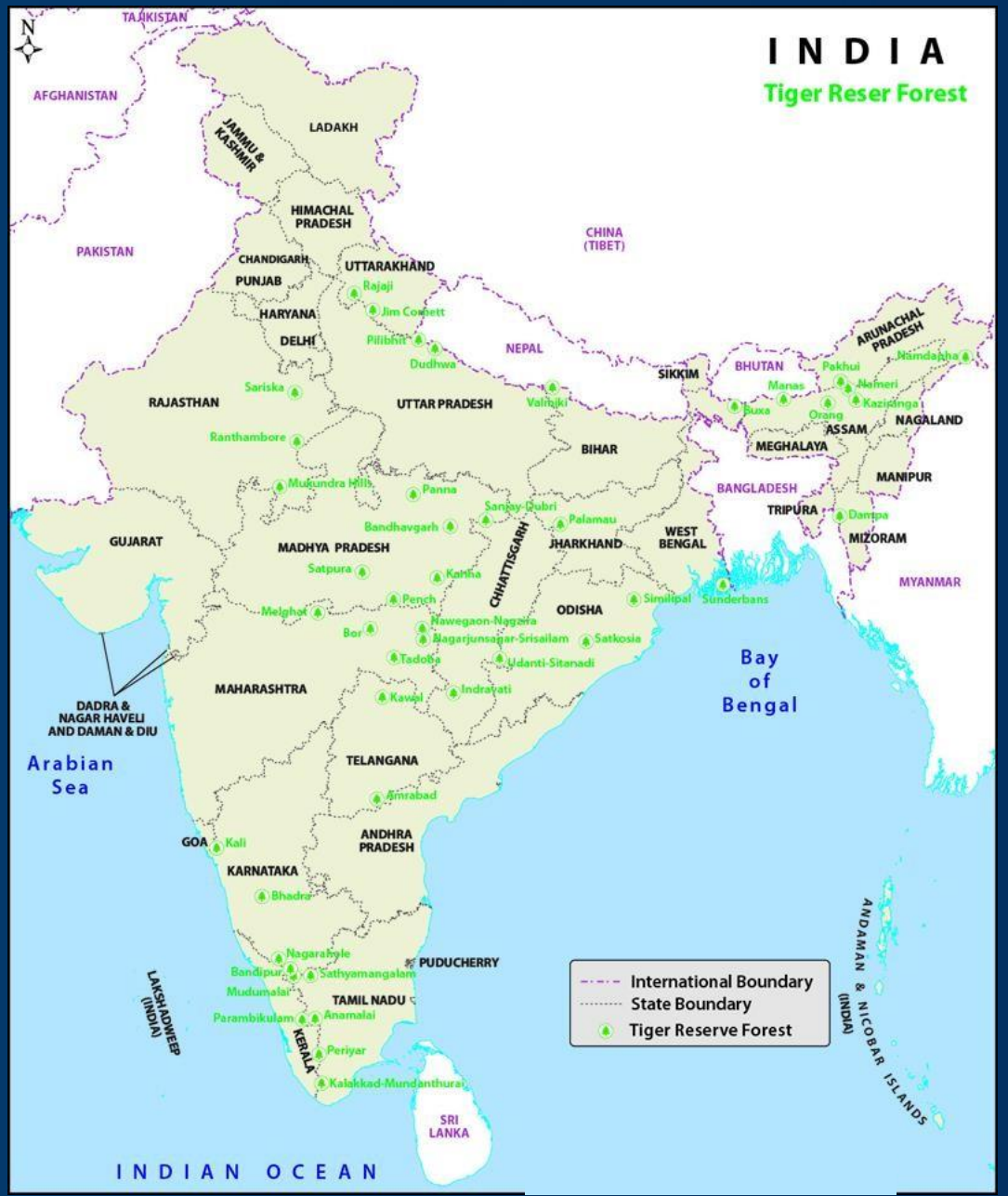
SIMLIPAL

RANTHAMBORE

CORBETT

SUNDARBAN


Biosphere Reserves
Nanda Devi
Nokrek
Pachmarhi
Sundarbans
Achanakmar-
Amarkantak
Simlipal
Nilgiri
Gulf of Mannar
Agasthyamalai
Great Nicobar


INDIA
Tiger Reser Forest
TAJIKISTAN
AFGHANISTAN
PAKISTAN
CHINA (TIBET)
NEPAL
BHUTAN
BANGLADESH
MYANMAR
SRI LANKA
JAMMU & KASHMIR
LADAKH
HIMACHAL PRADESH
CHANDIGARH
UTTARAKHAND
PUNJAB
HARYANA
DELHI
RAJASTHAN
UTTAR PRADESH
BIHAR
SIKKIM
ARUNACHAL PRADESH
ASSAM
NAGALAND
MEGHALAYA
MANIPUR
TRIPURA
MIZORAM
WEST BENGAL
JHARKHAND
ODISHA
CHHATTISGARH
GUJARAT
MADHYA PRADESH
MAHARASHTRA
DADRA & NAGAR HAVELI AND DAMAN & DIU
TELANGANA
ANDHRA PRADESH
GOA
KARNATAKA
TAMIL NADU
KERALA
PUDUCHERRY
LAKSHADWEEP (INDIA)
ANDAMAN & NICOBAR ISLANDS (INDIA)
Rajaji
Jim Corbett
Pilibhit
Dudhwa
Sariska
Valmiki
Ranthambore
Mukundra Hills
Panna
Sanjay-Dubri
Palamau
Bandhavgarh
Satpura
Kanha
Pench
Melghat
Nawegaon-Nagzira
Bor
Nagarjunsagar-Srisailam
Satkosia
Tadoba
Udanti-Sitanadi
Kawal
Indravati
Simlipal
Sunderbans
Amrabad
Kali
Bhadra
Nagarahole
Bandipur
Sathyamangalam
Mudumalai
Parambikulam
Anamalai
Periyar
Kalakkad-Mundanthurai
Manas
Pakhui
Nameri
Kaziranga
Buxa
Orang
Namdapha
Dampa
Bay of Bengal
Arabian Sea
INDIAN OCEAN
International Boundary
State Boundary
Tiger Reserve Forest

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UPSC CSE PRELIMS 2012

Q17. Consider the following kinds of organisms:

1. Bacteria
2. Fungi
3. Flowering plants

Some species of which of the above kinds of organisms are employed as biopesticides?

a) 1 only

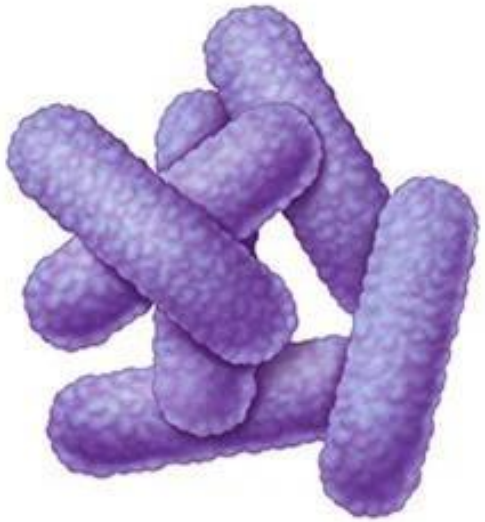
b) 2 and 3 only

c) 1 and 3 only

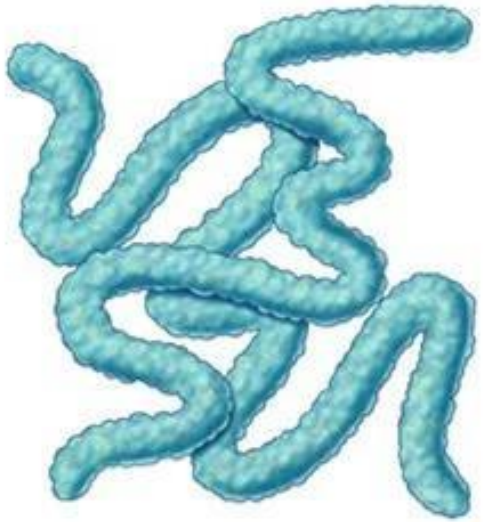
d) 1, 2 and 3

Bacteria

Sphere-shaped
(cocci)



Rod-shaped
(bacilli)



Spiral-shaped
(spirochetes)

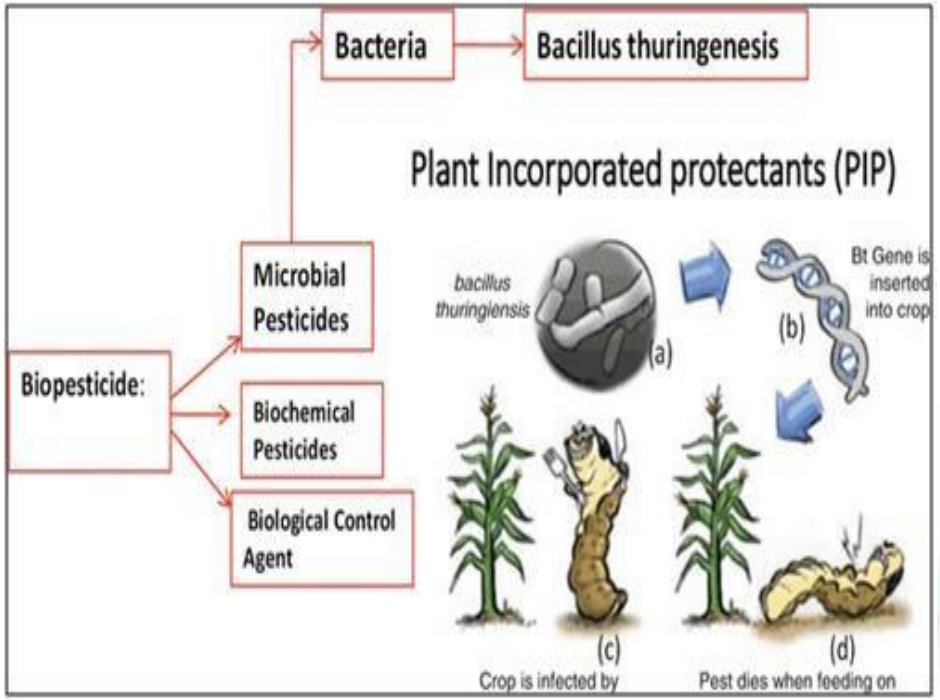
Fungi

Flowering Plants

17. Solution (d)

Biopesticides

- Biopesticides are certain types of pesticides derived from such natural materials as animals, plants, bacteria, and certain minerals.
- For example, canola oil and baking soda have pesticidal applications and are considered biopesticides.



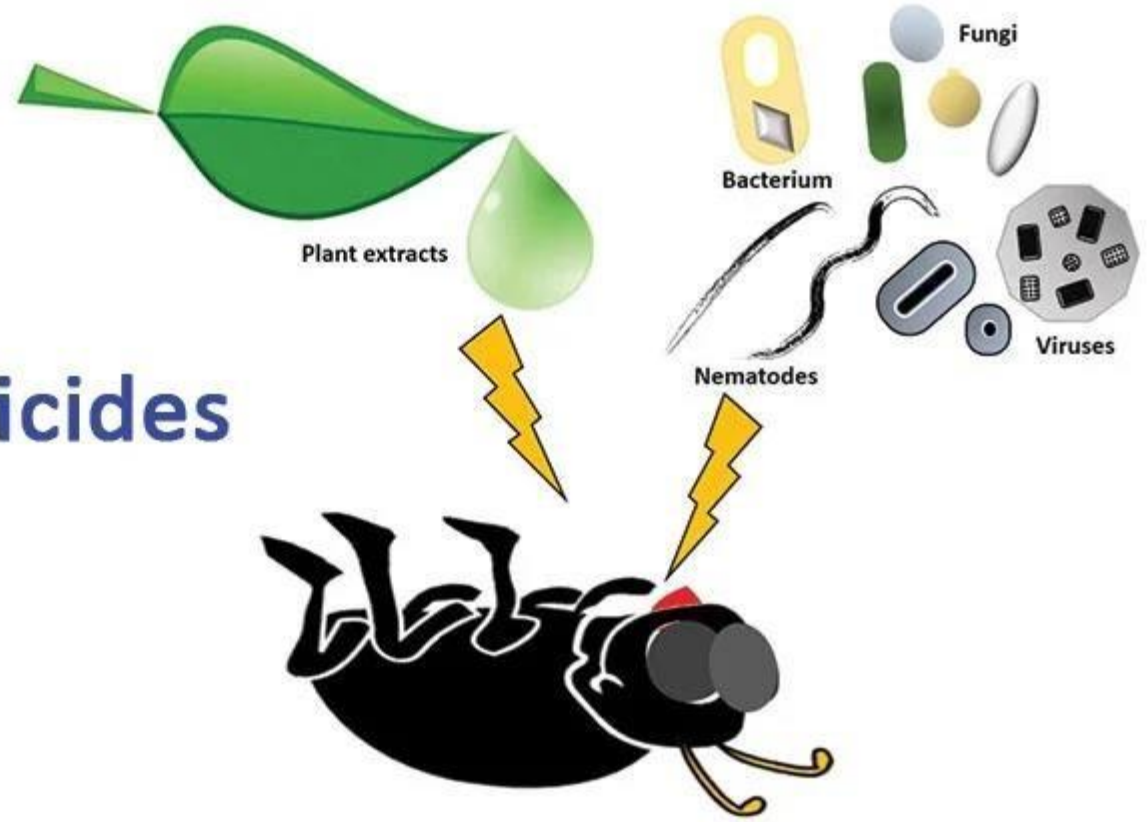
CLASSES OF BIOPESTICIDES

- **Biochemical pesticides:** are naturally occurring substances that control pests by non-toxic mechanisms.
- Conventional pesticides, by contrast, are generally synthetic materials that directly kill or inactivate the pest.
- Biochemical pesticides include substances that interfere with mating, such as insect sex pheromones, as well as various scented plant extracts that attract insect pests to traps.

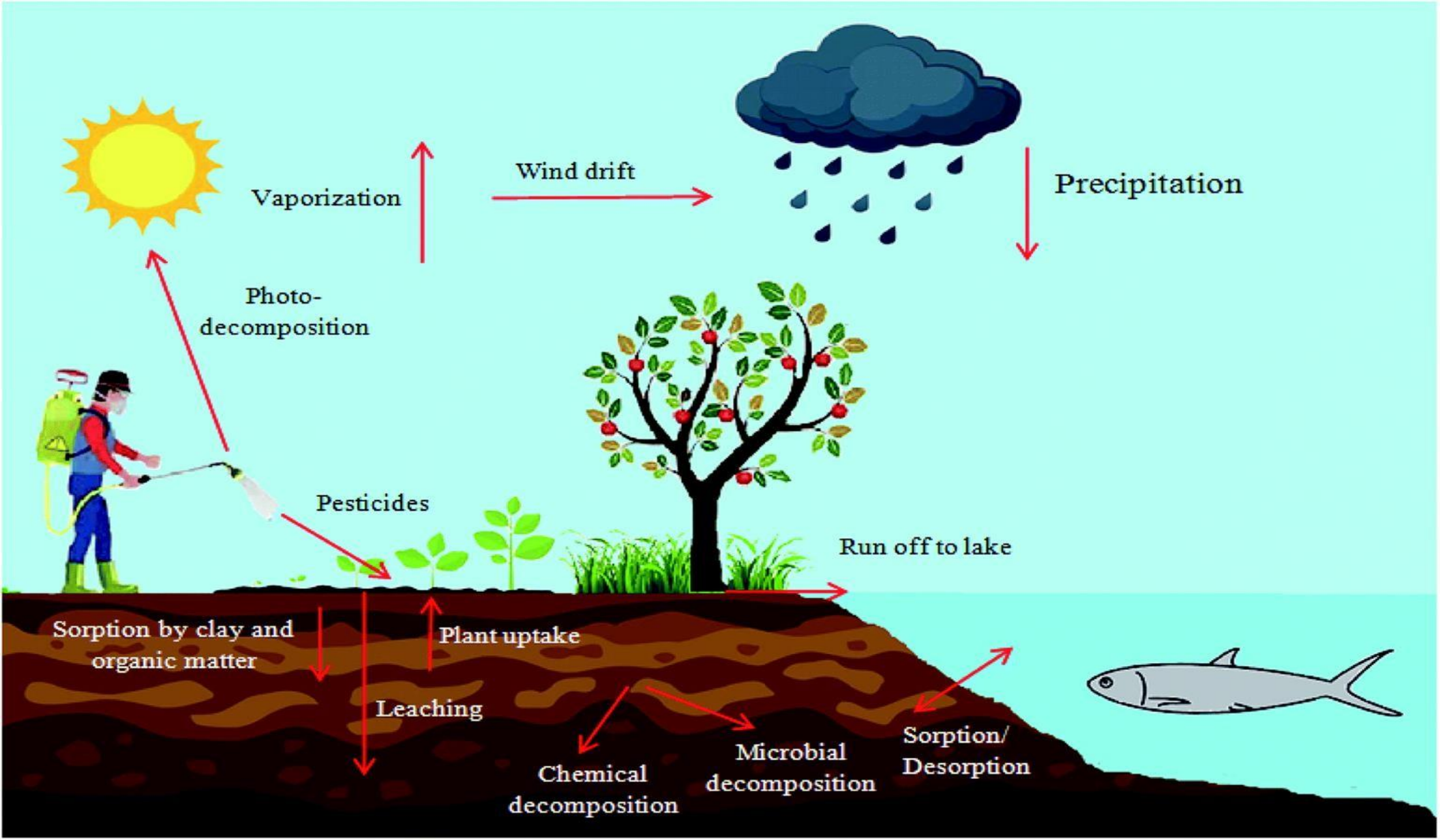
MICROBIAL PESTICIDES

- Microbial pesticides consist of a microorganism (e.g., a bacterium, fungus, virus or protozoan) as the active ingredient.
- Microbial pesticides can control many different kinds of pests, although each separate active ingredient is relatively specific for its target pest[s].
- For example, there are fungi that control certain weeds and other fungi that kill specific insects.

Biopesticides



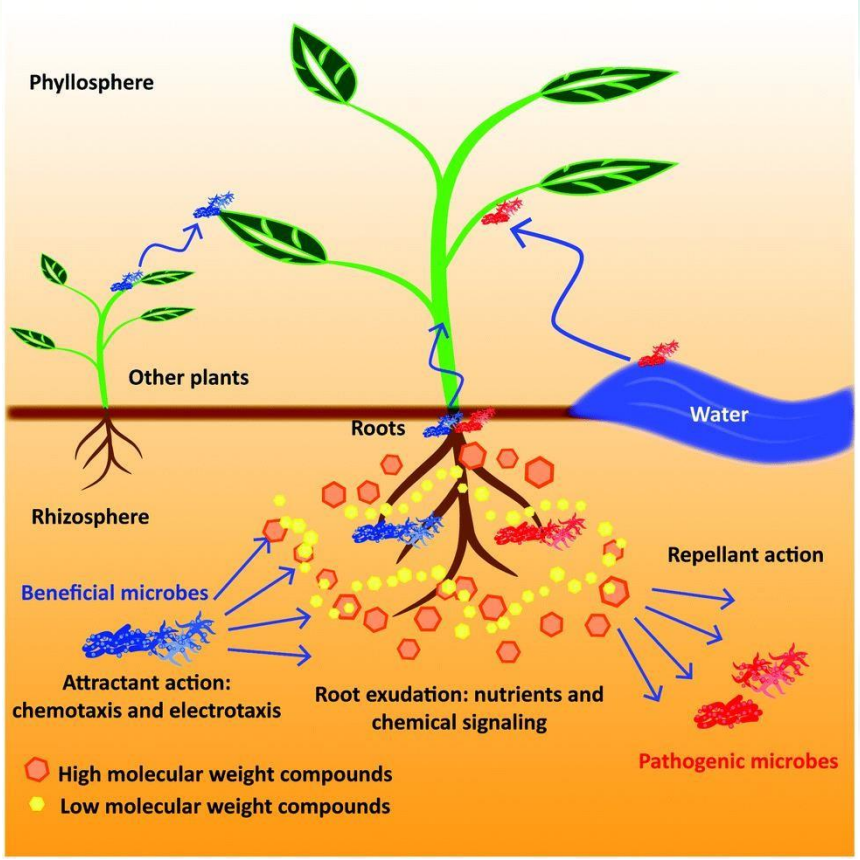
- **Plant-Incorporated-Protectants (PIPs):** are pesticidal substances that plants produce from genetic material that has been added to the plant. For example, scientists can take the gene for the Bt pesticidal protein and introduce the gene into the plant's own genetic material.
- Then the plant, instead of the Bt bacterium, manufactures the substance that destroys the pest.


Vaporization
Wind drift
Precipitation
Photo-
decomposition
Pesticides
Run off to lake
Sorption by clay and
organic matter
Plant uptake
Leaching
Chemical
decomposition
Microbial
decomposition
Sorption/
Desorption

ADVANTAGES OF USING BIOPESTICIDES

- Biopesticides are usually inherently less toxic than conventional pesticides.
- Biopesticides generally affect only the target pest and closely related organisms, in contrast to broad spectrum, conventional pesticides that may affect organisms as different as birds, insects and mammals.
- Biopesticides often are effective in very small quantities and often decompose quickly, resulting in lower exposures and largely avoiding the pollution problems caused by conventional pesticides.

- When used as a component of Integrated Pest Management (IPM) programs, biopesticides can greatly reduce the use of conventional pesticides, while crop yields remain high.



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Q18. Biomass gasification is considered to be one of the sustainable solutions to the power crisis in India. In this context, which of the following statements is/are correct?

1. Coconut shells, groundnut shells and rice husk can be used in biomass gasification.
2. The combustible gases generated from biomass gasification consist of hydrogen and carbon dioxide only.
3. The combustible gases generated from biomass gasification can be used for direct heat generation but not in internal combustion engines.

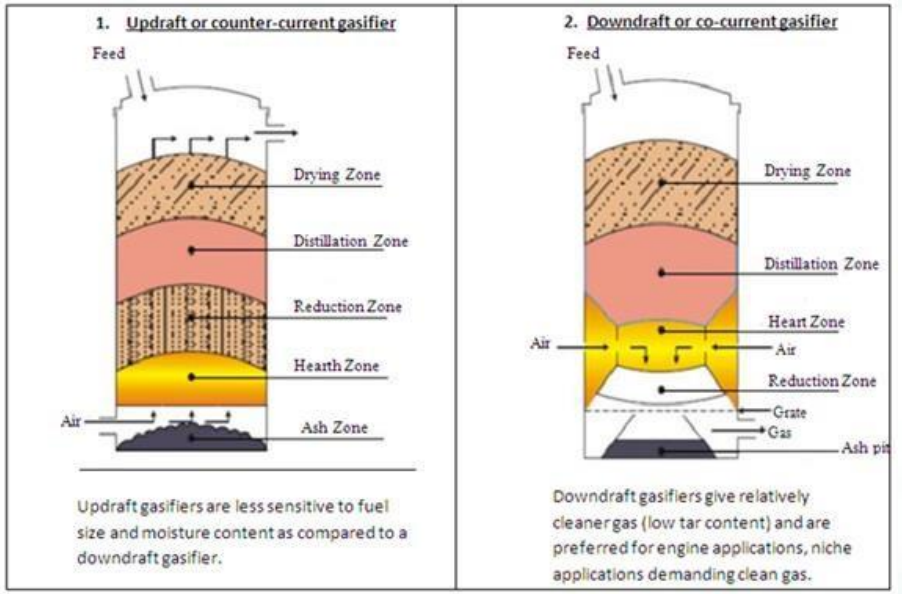
Select the correct answer using the codes given below :

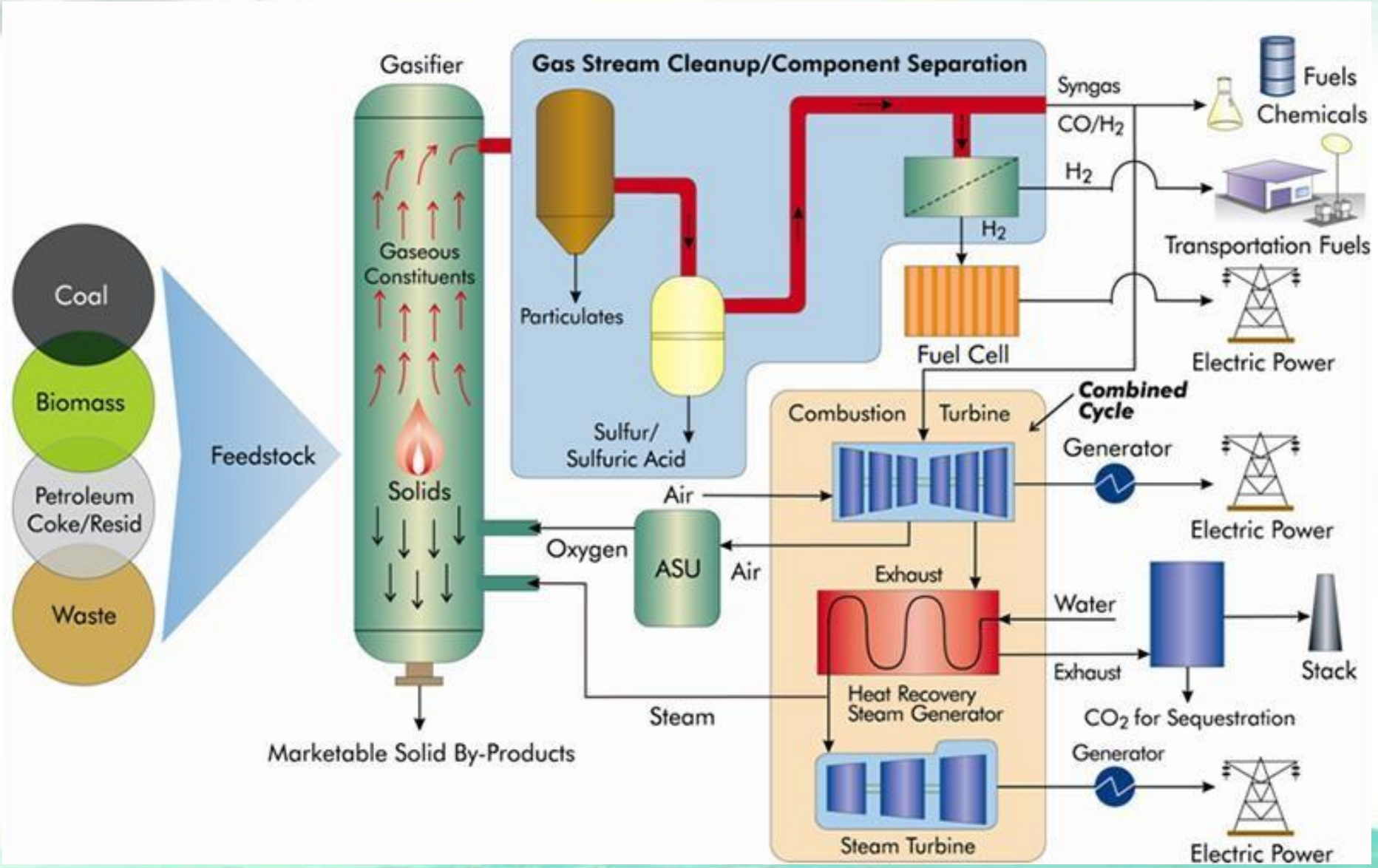
a) 1 only
b) 2 and 3 only
c) 1 and 3 only
d) 1, 2 and 3

18. Solution (a)

- Biomass gasification is a process of converting solid biomass fuel into a gaseous combustible gas (called producer gas) through a sequence of thermo-chemical reactions.
- Gasification, production of combustible gas from carbon containing materials, is already an old technology.
- Biomass gasification is another thermo chemical conversion process utilizing the following major feedstock: wood, agricultural waste, municipal solid waste.

- Chemical process of gasification means the thermal decomposition of hydrocarbons from biomass in a reducing (oxygen-deficient) atmosphere.
- The process usually takes place at about 850◦C.
- Because the injected air prevents the ash from melting, steam injection is not always required.




Coal
Biomass
Petroleum Coke/Resid
Waste
Feedstock
Gasifier
Gaseous Constituents
Solids
Marketable Solid By-Products
Gas Stream Cleanup/Component Separation
Particulates
Sulfur/ Sulfuric Acid
Syngas
CO/H2
H2
H2
Fuel Cell
Fuels
Chemicals
Transportation Fuels
Electric Power
Combustion Turbine
Combined Cycle
Air
Oxygen
ASU
Air
Generator
Electric Power
Exhaust
Water
Heat Recovery Steam Generator
Exhaust
Stack
CO2 for Sequestration
Steam
Generator
Steam Turbine
Electric Power

- A biomass gasifier can operate under atmospheric pressure or elevated pressure.
- The resulting gas product, the synthetic gas, contains combustible gases – hydrogen (H_2) and carbon monoxide (CO) as the main constituents; by-products are liquids and tars, charcoal and mineral matter (ash or slag).
- In general, the gasifying agent can be air, oxygen (O_2) or oxygen-enriched air.
- For biomass gasification, air is normally used as oxidant (oxygen as the oxidant agent is preferred in high capacity fossil fuel gasification systems).

Q19. Consider the following areas:

1. Bandipur
2. Bhitarkanika
3. Manas
4. Sunderbans

Expected Questions

1st April 1973 — Project Tiger → Ecosystem

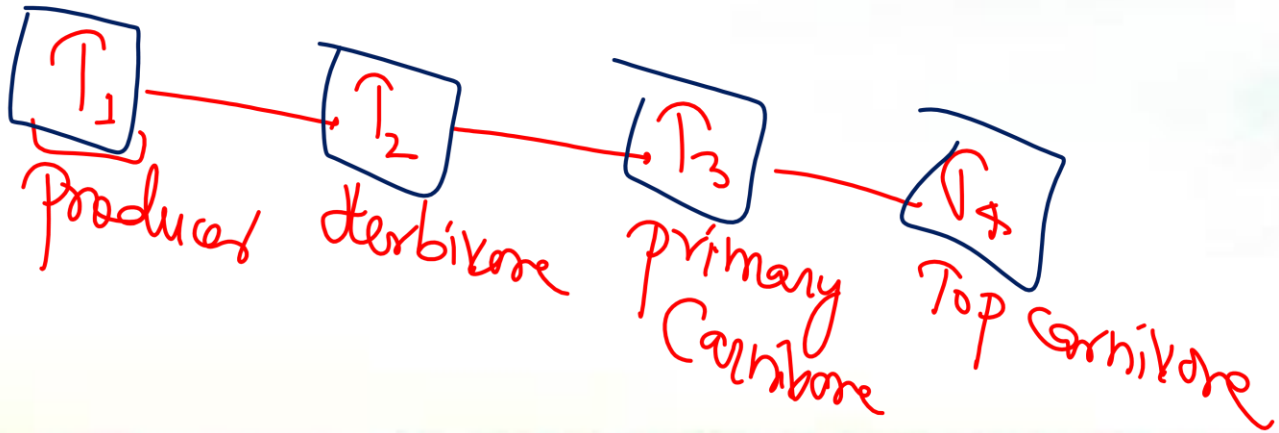
Which of the above are Tiger Reserves?

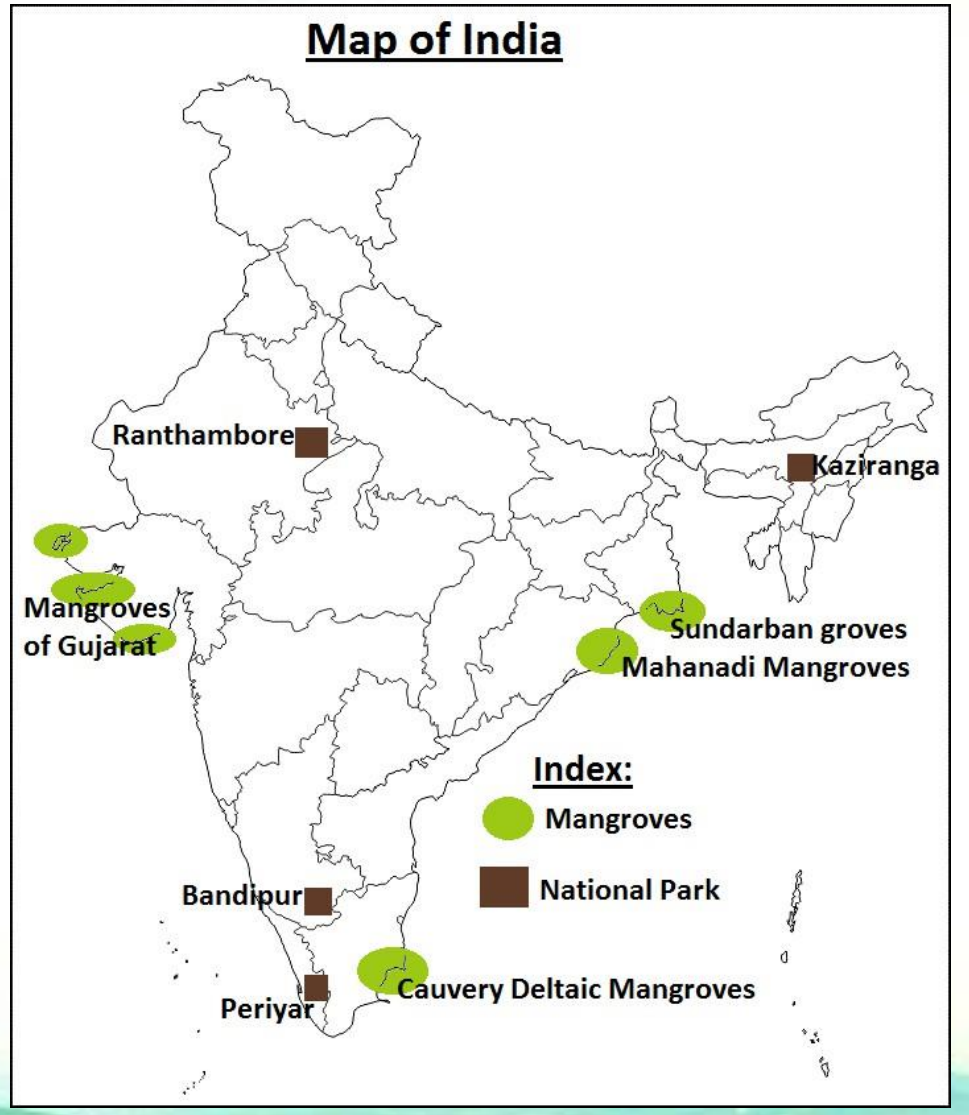
a) 1 and 2 only

b) 1, 3 and 4 only

c) 2, 3 and 4 only

d) l, 2, 3 and 4




Map of India
Ranthambore
Kaziranga
Mangroves of Gujarat
Sundarban groves
Mahanadi Mangroves
Index:
Mangroves
National Park
Bandipur
Cauvery Deltaic Mangroves
Periyar


Odisha
Bhitarkanika National Park
Indian Ocean


Manas
Wildlife
Sanctuary
INDIA
BANGLADESH
MYANMAR
LAOS
BAY OF
BENGAL
THAILAND


Kolkatta
Sunderbans
National Park

List of 57th Tiger Reserves in India

S No.	Tiger Reserves in India	State/UT	Location	Year	Total Area (sq km)
1	**Bandipur Tiger Reserve**	Karnataka	Western Ghats	1974	914.02
2	**Corbett Tiger Reserve**	Uttarakhand	Himalayan Foothills	1973	1,288.31
3	**Kanha Tiger Reserve**	Madhya Pradesh	Central India	1974	2,051.79
4	**Manas Tiger Reserve**	Assam	Eastern Himalayas	1973	2,837.10
5	**Melghat Tiger Reserve**	Maharashtra	Satpura Range	1974	2,768.52
6	**Palamu Tiger Reserve**	Jharkhand	Chota Nagpur Plateau	1973	1,129.93
7	**Ranthambore Tiger Reserve**	Rajasthan	Aravalli Range	1973	1,411.29
8	**Simlipal Tiger Reserve**	Odisha	Eastern Ghats	1973	2,750.00
9	**Sunderban Tiger Reserve**	West Bengal	Sundarbans	1984	2,584.89
10	**Periyar Tiger Reserve**	Kerala	Western Ghats	1978	925
11	**Sariska Tiger Reserve**	Rajasthan	Aravalli Range	1978	1,213.34
12	**Buxa Tiger Reserve**	West Bengal	Eastern Himalayas	1983	757.9
13	**Indravati Tiger Reserve**	Chhattisgarh	Bastar Plateau	1982	2,799.07

14	**Namdapha Tiger Reserve**	Arunachal Pradesh	Eastern Himalayas	1983	2,052.82
15	**Nagarjunsagar Tiger Reserve**	Telangana	Deccan Plateau	1983	3,296.31
16	**Dudhwa Tiger Reserve**	Uttar Pradesh	Terai	1987	2,201.77
17	**Kalakad Mundanthurai Tiger Reserve**	Tamil Nadu	Western Ghats	1988	1,601.54
18	**Valmiki Tiger Reserve**	Bihar	Gangetic Plains	1990	899.38
19	**Pench Tiger Reserve**	Madhya Pradesh	Satpura Range	1992	1,179.63
20	**Tadoba Andhari Tiger Reserve**	Maharashtra	Central India	1993	1,727.59
21	**Bandhavgarh Tiger Reserve**	Madhya Pradesh	Central India	1993	1,536.93
22	**Panna Tiger Reserve**	Madhya Pradesh	Central India	1994	1,598.10
23	**Dampa Tiger Reserve**	Mizoram	Mizo Hills	1994	988
24	**Bhadra Tiger Reserve**	Karnataka	Western Ghats	1998	1,064.29
25	**Pench Tiger Reserve**	Maharashtra	Satpura Range	1999	741.22
26	**Pakke Tiger Reserve**	Arunachal Pradesh	Eastern Himalayas	2002	1,198.45

27	**Nameri Tiger Reserve**	Assam	Eastern Himalayas	1999	464
28	**Satpura Tiger Reserve**	Madhya Pradesh	Central India	1999	2,133.31
29	**Anamalai Tiger Reserve**	Tamil Nadu	Western Ghats	2008	1,479.87
30	**Udanti Sitanadi Tiger Reserve**	Chhattisgarh	Maikal Hills	2008	1,842.54
31	**Satkosia Tiger Reserve**	Odisha	Eastern Ghats	2007	963.87
32	**Kaziranga Tiger Reserve**	Assam	Eastern Himalayas	2007	1,173.58
33	**Achanakmar Tiger Reserve**	Chhattisgarh	Maikal Hills	2009	914.02
34	**Kali Tiger Reserve**	Karnataka	Western Ghats	2010	1,097.51
35	**Sanjay Dhubri Tiger Reserve**	Madhya Pradesh	Central India	2011	1,674.50
36	**Mudumalai Tiger Reserve**	Tamil Nadu	Western Ghats	2012	688.59
37	**Nagarhole Tiger Reserve**	Karnataka	Western Ghats	2012	1,205.76
38	**Parambikulam Tiger Reserve**	Kerala	Western Ghats	2010	643.66
49	**Sahyadri Tiger Reserve**	Maharashtra	Western Ghats	2009	1,165.57
40	**Biligiri Ranganatha Temple Tiger Reserve**	Karnataka	Western Ghats	2010	574.82

41	**Kawal Tiger Reserve**	Telangana	Deccan Plateau	2012	2,015.44
42	**Sathyamangalam Tiger Reserve**	Tamil Nadu	Western Ghats	2013	1,408.40
43	**Mukundara Tiger Reserve**	Rajasthan	Aravalli Range	2013	759.99
44	**Nawegaon Nagzira Tiger Reserve**	Maharashtra	Central India	2013	1,894.94
45	**Amrabad Tiger Reserve**	Telangana	Deccan Plateau	2014	2,611.39
46	**Pilibhit Tiger Reserve**	Uttar Pradesh	Terai	2014	730.25
47	**Bor Tiger Reserve**	Maharashtra	Central India	2014	816.27
48	**Rajaji Tiger Reserve**	Uttarakhand	Shivalik Range	2015	1,075.17
49	**Orang Tiger Reserve**	Assam	Eastern Himalayas	2016	492.46
50	**Kamlang Tiger Reserve**	Arunachal Pradesh	Eastern Himalayas	2017	783
51	**Srivilliputhur Megamalai Tiger Reserve**	Tamil Nadu	Western Ghats	2021	1,016.57
52	**Ramgarh Tiger Reserve**	Rajasthan	Aravalli Range	2022	1501.8921
53	**Guru Ghasidas Tiger Reserve**	Chhattisgarh	Maikal Hills	2023	2,048
54	**Veerangana Durgavati Tiger Reserve**	Madhya Pradesh	Central India	2023	1414.28
55	**Dholpur-Karauli Tiger Reserve**	Rajasthan	Aravali Range	2023	599.64
56	**Guru Ghasidas-Tamor Pingla Tiger Reserve**	Chhattisgarh	–	2024	2,829.38
57	**Ratapani Tiger Reserve**	Madhya Pradesh	–	2024	1,271.4

Tiger Reserves in India 2024

- TOTAL 57
- The Guru Ghasidas National Park and the Tamor Pingla Wildlife Sanctuary are the newest Tiger Reserve of India in 2023.
- This is the 54th Tiger Reserve in India and is located in Chhattisgarh.
- Bandipur Tiger Reserve is the first Tiger Reserve in India.
- Tiger is the National Animal of India and also has a significant position in Indian culture.

- India is home to over 70% of the world’s tigers and Tiger signifies strength and power in Indian culture.
- The government of India has initiated various programs related to the conservation of the Tiger population.
- The project tiger was launched in India in 1973 by the government under the power of Indira Gandhi from the Jim Corbett National Park in Uttarakhand

India’s 57th Tiger Reserve: Ratapani Tiger Reserve

- The Ratapani Tiger Reserve, located in the Raisen district of Madhya Pradesh, has been officially designated as India’s 57th tiger reserve and the state’s eighth. This reserve encompasses a total area of approximately 1,271.4 square kilometers, comprising a core zone of 763.8 square kilometers and a buffer zone of 507.6 square kilometers. Established as a wildlife sanctuary in 1976, Ratapani is renowned for its rich biodiversity, including a significant population of Bengal tigers, leopards, and various herbivores such as chital and sambar. The landscape features undulating terrains with hills, plateaus, valleys, and plains, and is characterized by dry and moist deciduous forests, predominantly covered with teak

India’s 56th Tiger Reserve: Guru Ghasidas Tamor Pingla

- The Guru Ghasidas Tamor Pingla Tiger Reserve, located in Chhattisgarh, has been declared as India’s 56th Tiger Reserve.
- This reserve serves as a critical wildlife corridor between Madhya Pradesh and Jharkhand, promoting biodiversity conservation.
- Known for its rich ecosystem, it supports a variety of species, including tigers, and plays a vital role in protecting the region’s ecological balance.
- This declaration highlights India’s ongoing efforts toward tiger conservation under Project Tiger.

19. Solution (b)

List of Tiger Reserves in India

Sl. No.	State	Name of Tiger Reserve
1	Andhra Pradesh	Nagarjunsagar Srisailam
2	Arunachal Pradesh	Namdapha National Park
3	Arunachal Pradesh	Kamlang Tiger Reserve
4	Arunachal Pradesh	Pakke Tiger Reserve
5	Assam	Manas Tiger Reserve
6	Assam	Nameri National Park
7	Assam	Orang Tiger Reserve
8	Assam	Kaziranga National Park

Sl. No.	State	Name of Tiger Reserve
9	Bihar	Valmiki National Park
10	Chhattisgarh	Udanti-Sitanadi Wildlife Sanctuary
11	Chhattisgarh	Achanakmar Wildlife Sanctuary
12	Chhattisgarh	Indravati Tiger Reserve
13	Jharkhand	Palamau Tiger Reserve
14	Karnataka	Bandipur Tiger Reserve
15	Karnataka	Bhadra Wildlife Sanctuary
16	Karnataka	Dandeli-Anshi Tiger Reserve
17	Karnataka	Nagarahole National Park
18	Karnataka	Biligiri Ranganatha Temple Tiger reserve
19	Kerala	Periyar Tiger reserve

Sl. No.	State	Name of Tiger Reserve
20	Kerala	Parambikulam Tiger reserve
21	Madhya Pradesh	Kanha Tiger reserve
22	Madhya Pradesh	Pench Tiger reserve
23	Madhya Pradesh	Bandhavgarh Tiger reserve
24	Madhya Pradesh	Panna Tiger reserve
25	Madhya Pradesh	Satpura Tiger reserve
26	Madhya Pradesh	Sanjay-Dubri Tiger reserve
27	Maharashtra	Melghat Tiger reserve
28	Maharashtra	Tadoba-Andhari Tiger Reserve
29	Maharashtra	Pench Tiger Reserve
30	Maharashtra	Sahyadri Tiger Reserve

Sl. No.	State	Name of Tiger Reserve
31	Maharashtra	Nagzira Tiger Reserve
32	Maharashtra	Bor Tiger Reserve
33	Mizoram	Dampa Tiger Reserve
31	Maharashtra	Nagzira Tiger Reserve
34	Odisha	Similipal Tiger Reserve
35	Odisha	Satkosia Tiger Reserve
36	Rajasthan	Ranthambore Tiger Reserve
37	Rajasthan	Sariska Tiger Reserve
38	Rajasthan	Mukandra Hills Tiger Reserve
39	Tamil Nadu	Kalakad-Mundanthurai Tiger Reserve

Sl. No.	State	Name of Tiger Reserve
40	Tamil Nadu	Anamalai Tiger Reserve (Indira Gandhi Wildlife Sanctuary and National Park)
41	Tamil Nadu	Mudumalai Tiger Reserve
42	Tamil Nadu	Sathyamangalam Tiger Reserve
43	Telangana	Kawal Tiger Reserve
44	Telangana	Amrabad Tiger Reserve
45	Uttar Pradesh	Dudhwa Tiger Reserve
46	Uttar Pradesh	Pilibhit Tiger Reserve

Sl. No.	State	Name of Tiger Reserve
47	Uttar Pradesh	Amangarh Tiger Reserve (buffer zone of Corbett Tiger Reserve)
48	Uttarakhand	Jim Corbett National Park
49	Uttarakhand	Rajaji Tiger Reserve
50	West Bengal	Sunderban National Park
51	West Bengal	Buxa Tiger Reserve

52	Srivilliputhur Megamalai	Tamil Nadu
53	Ramgarh Vishdhari Tiger Reserve	Rajasthan
54	Guru Ghasidas Tiger Reserve	Chhattisgarh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Ajit Tiwari Sir (Founder & CEO Geno IAS)

Raimona NP (Assam)

Q20. In which one among the following categories of protected areas in India are local people not allowed to collect and use the biomass?

a) Biosphere Reserves

b) National Parks

c) Wetlands declared under Ramsar Convention

d) Wildlife Sanctuaries

106 National Park, State govt.

20. Solution (b)

- Amongst all protected areas National Park has the stringiest precisions regarding preservation and protection of flora and fauna in its natural form.
- No human activity is permitted in them unless there is granted permission by the ruling authorities.

- Currently in 2023, a total of 106 National Parks in India,
- Raimona National Park (newest national park in india), Park in Assam was recently added, as India's 106th National Park

What are National Parks?

- National Parks are protected areas established to conserve the natural environment, ecosystems, and wildlife.
- National Parks provide safe habitats for flora and fauna, and human activities like hunting, deforestation, and industrialisation are prohibited.

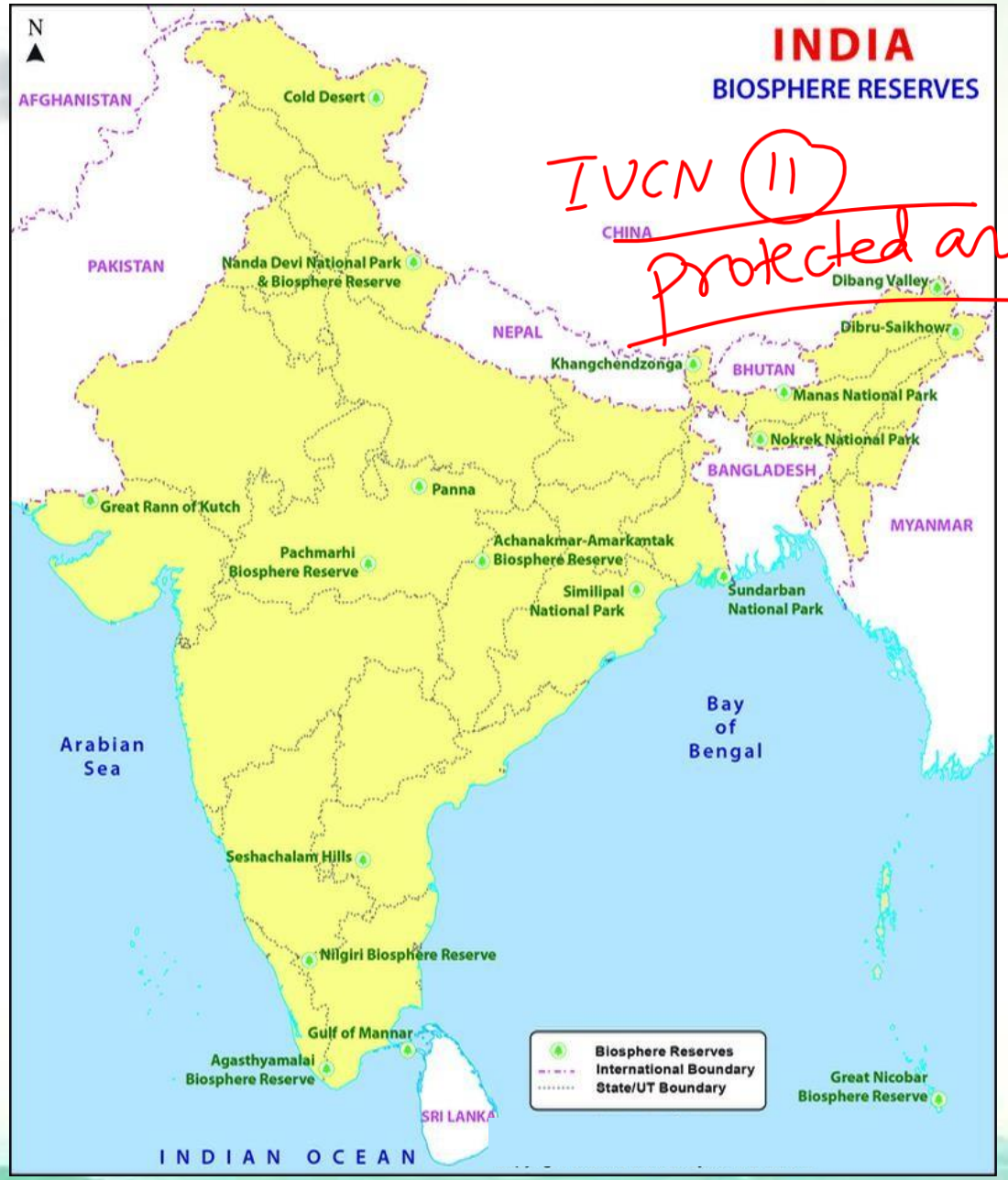
- National Parks play a crucial role in wildlife conservation by preserving biodiversity, protecting endangered species, and maintaining ecological balance.
- In India, national parks are vital for protecting the country's rich biodiversity, which includes some of the world's most iconic species, such as tigers, elephants, and rhinoceros, and numerous endemic species of plants and animals.
- India, one of the 17 megadiverse countries, uses national parks to safeguard its unique ecosystems, from the Himalayan highlands to the Western Ghats and Sundarbans.

Objectives of National Parks

Expected questions

The objectives of National Parks are as follows:

- To protect endangered and threatened species and their habitats and provide safe sanctuaries for wildlife to thrive and reproduce.
- To maintain the genetic diversity of plant and animal species.
- To maintain the ecological balance of the region and regulate ecosystems, prevent soil erosion, and protect water resources.
- To serve as natural laboratories for scientific research and study the behavior of wildlife, monitor ecosystems, and conduct research on conservation strategies.
- To promote environmental education and awareness among visitors.



IUCN (II) Protected areas

RAMSAR SITES IN INDIA

ABOUT NATIONAL PARK

- A National park is an area with enough ecological, geo-morphological and natural significance with rich fauna and flora, which is designed to protect and to develop wildlife or its environment.
- National parks in India are IUCN category II protected areas.
- Activities like grazing, hunting, forestry or cultivation etc. are strictly prohibited.
- No human activity is permitted inside the national park except for the ones permitted by the Chief Wildlife Warden of the state.

Important Facts about National Park of India

- All of India's national parks are classified within the IUCN's (International Union for Conservation of Nature) category II (second) of protected areas.
- However, India now has 106 national parks and Indian law(s) determines the limits of each national park in the country.
- In 1970, India had only five national parks.
- To protect the habitats of conservation-dependent species, India passed the Wildlife Protection Act 35(4) in 1972 and Project Tiger in 1973.

- In India, there are 106 National Parks that encompass 44,378 km^2, accounting for 1.35 percent of the country's total land area (National Wildlife Database, December 2020).
- The largest national park in India is Hemis National Park, established in 1981 and covers a total area of 4400 Km2 (square kilometres), which is located in the Ladakh's Leh area, Union Territory of India.
- South Button Island National Park is the smallest national park in India, which is located in the Union Territory of Andaman and Nicobar Islands.

Expected Questions

- Rani Jhansi Marine National Park is part of the Andaman and Nicobar Islands' southernmost national park.
- Madhya Pradesh has the most national parks in India, with 12 national parks, six of which have been designated as Tiger Reserves.
- The only floating national park in
- India is Keibul Lamjao National Park in the Indian state of Manipur.
- In Uttarakhand, India's first national park, Jim Corbett National Park, was established in 1936.
- The Project Tiger initiative was launched in India in 1973 at Uttarakhand's Jim Corbett National Park.


USA
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PARKS

- India’s first national park was established in 1936 as Hailey National Park, now known as Jim Corbett National Park, Uttarakhand.
- There are 106 existing national parks in India covering an area of 40501.13 km2, which is 1.23% of the geographical area of the country (National Wildlife Database, May 2019).

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