

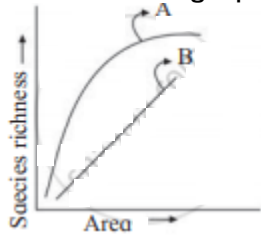
Biodiversity, Conservation and Environmental Issues

EXERCISE [PAGE 342]

Exercise | Q 1.1 | Page 342

Choose the correct option

Observe the graph and select the correct option.



1. Line A represents, $S = CA^2$
2. Line B represents, $\log C = \log A + Z \log S$
3. **Line A represents, $S = CA^Z$**
4. Line B represents, $\log S = \log Z + C \log A$

Solution: Line A represents, $S = CA^Z$

Exercise | Q 1.2 | Page 342

Choose the correct option

Select the odd one out on the basis of Ex-situ conservation.

1. Zoological park
2. Tissue culture
3. Sacred groves
4. **Cryopreservation**

Solution: Cryopreservation

Exercise | Q 1.3 | Page 342

Choose the correct option

Which of the following factors will favour species diversity?

1. Invasive species
2. Glaciation
3. **Forest canopy**
4. co extinction

Solution: Forest canopy

Exercise | Q 1.4 | Page 342

Choose the correct option

The term “terror of Bengal’ is used for _____.

1. algal bloom
2. **water hyacinth**
3. increased BOD
4. eutrophication

Solution: The term “terror of Bengal’ is used for **water hyacinth.**

Exercise | Q 1.5 | Page 342

Choose the correct option

CFC are air polluting agents which are produced by _____.

1. Diesel trucks
2. **Jet planes**
3. Rice fields
4. Industries

Solution: CFC are air polluting agents that are produced by **Jet planes.**

Exercise | Q 2.1 | Page 342

Very short answer type question

Give two examples of biodegradable materials released from the sugar industry.

Solution: Bagasse (dry pulpy residue left after extraction of juice from sugarcane), molasses (the liquid left after the first extraction of sugar) and press mud (organic waste) are biodegradable materials released from the sugar industry.

Exercise | Q 2.2 | Page 342

Very short answer type question

Name any 2 modern techniques of protection of endangered species.

Solution: i. Tissue culture

ii. In vitro fertilization

Exercise | Q 2.3 | Page 342

Very short answer type question

Where was the ozone hole discovered?

Solution: The ozone hole was discovered over the Antarctic region, wherein a depletion of the ozone layer has resulted in the formation of a large area of the thinned ozone layer, commonly called the ozone hole.

Exercise | Q 2.4 | Page 342

Very short answer type question

Give one example of natural pollutants.

Solution: Natural pollutants: Dust (fine particles from sand), fog, mist, fungi, bacteria, moulds, algae, viruses, etc.

Exercise | Q 2.5 | Page 342

Very short answer type question

What do you understand by the EW category of a living being?

Solution: Extinct in the Wild (EW): A category containing those species whose members survive only in captivity.

Exercise | Q 3.1 | Page 342

Short answer type question

Dandiya raas is not allowed after 10.00 pm. Why?

Solution:

- i. During dandiya raas, the use of amplifiers or loudspeakers create lots of noise.
- ii. Noise pollution may have many ill effects on human health:
 - a. Noise causes psychological and physiological changes in human beings.
 - b. Exposure to extremely high sound level (150 decibels or more) like that generated during a jet plane or rocket take off, may damage eardrums and cause permanent hearing loss.
 - c. Noise also can cause sleeplessness, increased heartbeat, altered breathing pattern, and psychological stress.
 - d. Noise may negatively interfere with a child's learning and behaviour pattern.
- iii. There is a need for creating awareness about noise pollution caused during festivals and processions in our society. Thus the Govt. of India has rules and regulations against firecrackers and loudspeakers.

iv. The Supreme court of India banned loudspeakers at public gatherings after 10:00 pm.

v. Also, playing loudspeakers or having public gatherings like dandiya raas after 10 p.m. violates the supreme court orders. Hence, dandiya raas is not allowed after 10.00 pm.

Exercise | Q 3.2 | Page 342

Short answer type question

Tropical regions exhibit species richness as compared to polar regions. Justify.

Solution:

- i. Factors like overall stability of tropical regions for millions of years, lesser climatic changes throughout the year, and availability of plenty of sunlight have favoured speciation.
- ii. Tropical areas have less often experienced drastic disturbances like periodic glaciations observed at poles. Such stability over millions of years might have favoured speciation.
- iii. Lesser migrations in tropics might have reduced gene flow between geographically isolated regions and favoured speciation.
- iv. Scientists also have considered the availability of more intense sunlight, warmer temperatures and higher annual rainfall in tropics, as factors responsible for the bountifulness of these regions.
- v. Some animals enjoy food preferences under climatic conditions and abundance of resources. e.g. Fruits being available throughout the year in rain forests, a variety of frugivorous organisms is obviously more as compared to the temperate regions.
- vi. In short, species richness or diversity for plants and animals decreases as we move away from the equator to the poles. It is maximum in tropical rain forests.

e.g. Amazon rain forest (40,000 plants, 1300 birds, 427 mammals, 3000 species).

Hence, tropical regions exhibit species richness as compared to polar regions.

Exercise | Q 3.3 | Page 342

Short answer type question

How does genetic diversity affect the sustenance of a species?

Solution:

Genetic diversity includes variation within a population and diversity between populations that are associated with adaptation to local conditions.

Genetic variations (e.g. allelic genes) lead to individual differences within species. Such variations eventually lead to evolution. They also improve the chances of continuation of species in the changing environmental conditions or allow the best adapted to survive.

The greater the genetic diversity, the better would be the sustenance of a species.

e.g.

a. Existence of subspecies or races

b. There are about 1000 varieties of mangoes and 50,000 varieties of rice or wheat in India.

c. A medicinal plant *Rauwolfia vomitoria* which secretes active component reserpine is found in different Himalayan ranges. This plant shows variations in terms of potency and concentration of the active chemical, from location to location.

Exercise | Q 3.4 | Page 342

Short answer type question

The greenhouse effect is boon or bane? Give your opinion.

Solution:

i. Greenhouse effect is responsible for the heating of the earth's surface and atmosphere. Without the greenhouse effect, the average temperature of Earth would have been -18°C rather than the current average of 15°C . Hence, the greenhouse effect can be considered a boon for keeping Earth warm.

ii. However, increasing concentrations of greenhouse gases result in global warming which causes unfavourable climatic changes i.e., melting of polar ice caps. Hence, the greenhouse effect is also a bane. Thus, it can be said that the greenhouse effect is a boon only until the emission of greenhouse gases is kept under control.

Exercise | Q 3.5 | Page 342

Short answer type question

How does CO cause giddiness and exhaustion?

Solution:

Carbon monoxide is a poisonous gas which binds with haemoglobin of the blood more readily than oxygen to form carboxyhaemoglobin. The presence of CO, therefore, reduces the amount of haemoglobin available in the blood for the transport of oxygen to the body cells. The harmful effects of inhaling increased amount of CO include

giddiness, exhaustion, weak eyesight, headache, nervousness and cardiovascular disorders.

Exercise | Q 3.6 | Page 342

Short answer type question

Name two types of particulate pollutants found in the air. Add a note on ill effects of the same on human health.

Solution:

i. Two types of particulate pollutants:

- a. Natural pollutants: Dust (fine particles from sand), fog, mist. fungi, bacteria, moulds, algae, viruses, etc.
- b. Manmade pollutants: Smoke, smog, pesticides, heavy metals, radioactive elements, etc.

ii. Adverse effects of particulate pollutants:

- a. Particulates of about $1.0\text{ }\mu\text{m}$ in size enter lungs easily and those greater than $5\text{ }\mu\text{m}$ get lodged in nasal passage causing irritation in the respiratory tract. Viable particulate matters such as fungi, bacteria, moulds, and algae cause various air-borne diseases.
- b. Heavy metal - mercury (Hg) particulate causes heaviness, headache, fatigue and nervousness along with a number of other problems. Prolonged exposure may cause CNS (Central Nervous System) breakdown. Accumulation of heavy metal - lead (Pb) in human tissue may disrupt normal functioning of RBC (Red Blood Corpuscles), which leads to anaemia. It also damages organs like liver, kidneys, intestines and also affects the CNS.
- c. Women exposed to fine particulate matter (having a diameter less than $10\text{ }\mu\text{m}$) give birth to children with small heads and bodies. These children also suffer from learning disability and have an increased risk of cancer. Polynuclear hydrocarbon coated particulates cause irreversible damage to DNA of the growing foetus.

Exercise | Q 4.1 | Page 342

Long answer type question

Montreal protocol is an essential step. Why is it so?

Solution:

- i. Recognising the harmful effects of ozone depletion, an international treaty, known as the Montreal Protocol was signed at Montreal (Canada) in 1987 to control the emission of ozone-depleting substances.
- ii. Later, many more efforts have been made and protocols have laid down definite roadmaps separately for developing and developed countries for reducing the emission of CFCs and other ozone-depleting chemicals.

- iii. Montreal Protocol primarily focuses on chloro or Bromo derivatives of hydrocarbons which are the main reasons for the depletion of the ozone layer.
- iv. Montreal Protocol has provided a mechanism to reduce and phase-out the global production and consumption of substances that deplete the ozone layer.
- v. Montreal Protocol has helped in successfully reducing the global production, consumption, and emissions of substances that deplete the ozone layer.
- vi. Encouraging evidence for recovery of stratospheric ozone has been found. If the Montreal Protocol was not brought in, ozone depletion likely would be much greater than observed today. Hence, the Montreal Protocol is an essential step.

Exercise | Q 4.2 | Page 342

Long answer type question

Name any 2 personalities who have contributed to control deforestation in our country. Elaborate on the importance of their work.

Solution:

Saalumarada Thimmakka, an Indian environmentalist from the state of Karnataka, and Moirangthem Loiya from Manipur have contributed to control deforestation in our country.

- i. Saalumarada Thimmakka, an Indian environmentalist from the state of Karnataka noted for her work in planting and tending to 385 banyan trees along a 4 km stretch of highway between Hulikal and Kudur. She has also planted nearly 8000 other trees. Her work has been honoured with the National Citizens Award of India. She was also conferred with Padma Shri in 2019.
- ii. Moirangthem Loiya from Manipur dedicated 17 years of his life to restore the Punshilok forest. He left his job and took over the task of bringing back the lost glory of 300 acres of forest land. He planted a variety of trees like, bamboo, oak, Ficus, teak, jackfruit, and Magnolia. Today the forest has over 250 varieties of plants including 25 varieties of bamboo. It is now selected as home by the great diversity of animals too.

Exercise | Q 4.3 | Page 342

Long answer type question

How BS emission standards changed over time? Why is it essential?

Solution:

- i. According to the new fuel policy, the norms are set to reduce sulphur and aromatic content of petrol and diesel. Another provision is the up-gradation of engines. For this, Bharat stage emission standards (BS) are set. These standards are equivalent to Euro norms and have evolved on similar lines as Bharat Stage II (BS-II) to BS-VI from 2001 to 2017.

- ii. It is essential to change BS emission standards in order to limit the release of air pollutants from the internal combustion engine.
- iii. In 2001, Bharat stage II emission norms were set for CNG and LPG vehicles. As per Bharat Stage II, the emission of sulphur should be controlled at 50 ppm in diesel and 150 ppm in petrol. Aromatic hydrocarbons should be just 42% in concerned fuel.
- iv. The aim was to reduce sulphur emission to 50 ppm in petrol and diesel along with aromatic hydrocarbons to 35%. Hence, the Government of India directly adapted BS-VI in the year 2018, skipping BS V. These efforts decreased the levels of CO₂ and SO₂ in Delhi.

v. BS emission standards in cities of India:

Vehicle	Norms	Cities of Implementation
4 wheelers	Bharat Stage II	All metro cities
4 wheelers	Bharat Stage III	Throughout the country since October 2010
4 wheelers	Bharat Stage IV	13 megacities (Delhi and NCR, Mumbai, Kolkata, Chennai, Bengaluru, Surat, Kanpur, Agra, Lucknow, Solapur) since April 2010.
2 wheelers	Bharat Stage III	Throughout the country since October 2010
3 wheelers	Bharat Stage III	Throughout the country since October 2010

Exercise | Q 4.4 | Page 342

Long answer type question

During large public gatherings like Pandharpur vari mobile toilets are deployed by the government. Explain how this organic waste is disposed of.

Solution:

- i. During large public gatherings like Pandharpur vari mobile toilets are deployed by the Government. These mobile toilets are an example of ecological sanitation.
- ii. This is a practical, efficient, and cost-effective solution for human waste disposal.
- iii. In order to conserve water and prevent the creation of sewage, ecological sanitation (ecosan) is a sustainable system for handling human excreta using dry composting toilets.

iv. Organic waste disposal:

Ecological sanitation (Ecosan) is an approach to sanitation provision which safely reuses excreta in agriculture. This reduces the need for chemical fertilizers.

Ecosan toilet is a closed system that does not need water. It is an alternative to leach pit toilets in a place where water is scarce or where there is a risk of groundwater contamination. It is based on the principle of recovery and recycling of nutrients from excreta to create a valuable resource for agriculture. When the pit of an ecosan toilet fills up, it is closed and sealed.

After about 8-9 months, the faeces are completely composted to organic manure.

Exercise | Q 4.5 | Page 342

Long answer type question

How Indian culture and traditions helped in bio-diversity conservation?

Solution:

- i. Indian culture and traditions are always connected with nature, and rituals are laid down to protect biodiversity.
- ii. In many cultures, stretches of forests were set aside and protected in the name of Almighty, which is called sacred groves.
- iii. Such sacred groves are found in Khasi and Jaintia hills in Meghalaya, Western ghat regions of Maharashtra and Karnataka, Aravalli hills of Rajasthan and Bastar, and Chanda and Sarguja areas of Madhya Pradesh.
- iv. Sacred groves serve the only chance of survival for some endangered varieties of animal and plant species. Tribals do not allow to cut even a single branch of a tree from a sacred grove.

Exercise | Q 4.5 | Page 342

Long answer type question

Give the importance of conservation in terms of utilitarian reasons.

Solution:

The reasons for the conservation of biodiversity can be classified into three categories:

i. Narrowly utilitarian reasons:

- a. Since ancient times, humans are reaping material benefits from biodiversity.

b. This includes, deriving resources for basic needs such as food, clothes, shelter, or industrial products like resins, tannins, perfume base, etc. or aesthetic use like ornaments and artifacts.

c. The medicinal use of plants and animals is another major factor. It shares 25% of the global medicine market. Around 25000 species are put to use by tribals worldwide as traditional medicines. Several are yet to be explored for their potential as medicinal plants.

d. Nowadays, bioprospecting of economically important species is carried out. Bioprospecting is a systematic search for the development of new sources of chemical compounds, genes, micro-organisms, macro-organisms, and other valuable products from nature.

ii. Broadly utilitarian reasons:

a. Animals play a crucial role in pollination and seed dispersal.

b. Amazon forest is estimated to produce 20% of the total oxygen of Earth's atmosphere. We need to consider the recreational use of biodiversity.

c. Devastating fires in the amazon rainforest were reported in August 2019. Such fires are mainly caused in Brazil and are more manmade than natural. The slash and burn policy of locals to reclaim forestland has caused a towering 906000 hectares of forest devastation, only in the year 2019.