13. Our Environment - Board Exam Questions

2 Mark Questions

1) *We do not clean natural ponds or lakes whereas an aquarium or a swimming pool needs to be cleaned regularly. Why?*

Ponds and lakes have natural cleaners, the decomposers (microbes), which break down the waste. An aquarium or a swimming pool is an artificial ecosystem with no decomposers.

If we do not clean an aquarium, the waste keeps building up and harms the fish and plants.

2) *What are decomposers? List two consequences of their absence in an ecosystem.*

Decomposers are microorganisms (bacteria and fungi) that break down dead plants and animals into simple substances.

Without them: (i) the soil would not get its nutrients back; (ii) dead matter would pile up and smell bad.

3) *A lot of waste is generated in neighborhood. However, almost all of it is biodegradable. What impact will it have on the environment or human health?*

• It breaks down slowly and gives out bad smells and gases.
• It becomes a breeding place for germs and makes the area unhealthy.

4) *(a) Why are the organisms of first trophic level important in any food chain? (b) Justify the following statement: 'The flow of energy in an ecosystem is unidirectional.'*

(a) The producers (green plants) capture the Sun's energy and make it available to all the consumers.
(b) Energy moves forward from one trophic level to the next. It never comes back to the earlier level.

5) *Explain why food chains generally consist of three or four steps.*

Only about 10% of the energy passes from one trophic level to the next. The rest is lost as heat.

So after four levels, very little usable energy is left.

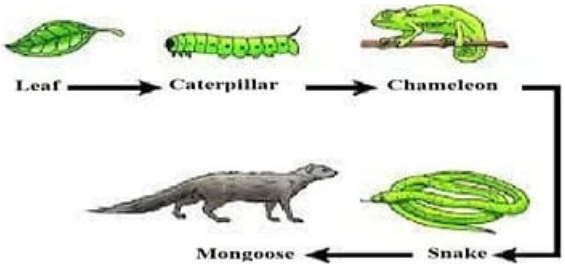
6) *In the following food chain, if 50 J of energy was available to the hawk, how much energy would have been present at the first and third tropic levels? Justify your answer. Grass → Grasshopper → Frog → Snake → Hawk*

Only 10% of the energy passes to the next level, so each level back has 10 times more energy.

Hawk 50 J ← Snake 500 J ← Frog 5000 J ← Grasshopper 50,000 J ← Grass 5,00,000 J

First trophic level (grass): 5,00,000 J. Third trophic level (frog): 5000 J.

7) *Study the food chain given below and answer the questions that follow: a) If the amount of energy available at the third trophic level is 100 joules, then how much energy will be available at the producer level? Justify your answer. b) Is it possible to have 2 more trophic levels in this food chain just before the fourth trophic level? Justify your answer.*



a) 10,000 J. Only 10% of the energy passes to the next level, so the producer level has 100 times the energy of the third level.

b) No. So much energy is lost at each step that very little usable energy would be left after 4 levels.

8) *About 100 acres of forest land was declared as Natural reserve park. The following organisms were predominant in the Natural reserve park:*

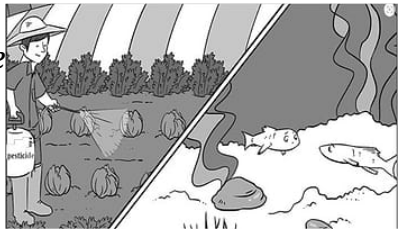
rabbit, frog, grass, fish, fox, water insects, zebra, peacock, snake, trees, bird, owl, insects, tiger, vulture, duck. Create a food web comprising two separate food chains with different producers by using the above data.

Food chain 1: Trees → Zebra → Tiger

Food chain 2: Grass → Zebra → Tiger

Food web: Join the two chains at the common animal (zebra), since zebras eat both.

9) *The cartoon below addresses a growing concern. What impact will the process shown in the image have on Humans if they occupy the last trophic level? Explain.*



Pesticides are non-biodegradable.

They build up more and more at each trophic level and stay for a long time. Humans, at the top, get the largest amount in their bodies, which harms their health.

10) *Name the term used for the materials which cannot be broken down by biological processes. Give two ways by which they harm various components of an ecosystem.*

Non-biodegradable substances.

(i) They stay in the environment for a long time and cause pollution.
(ii) They build up in food chains (biological magnification).

11) *Suggest one best way to dispose of the following wastes: (i) Kitchen waste (ii) Metallic waste (iii) Plastic bottles (iv) Sanitary waste*

(i) Kitchen waste: composting
(ii) Metallic waste: recycling
(iii) Plastic bottles: recycling
(iv) Sanitary waste: incineration (burning at high temperature)

3 Mark Questions

1) *What are decomposers? Give two examples. State how they maintain a balance in an ecosystem.*

Decomposers are microorganisms that break down dead plants and animals into simple substances.

Examples: bacteria and fungi.

The simple substances go back into the soil, and plants use them again. So nutrients keep going round and the ecosystem stays balanced.

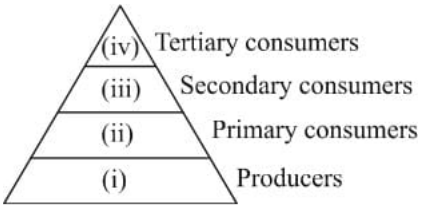
2) *(i) Why does a kitchen garden called an artificial ecosystem while a forest is considered to be a natural ecosystem? (ii) While designing an artificial ecosystem at home, write any two things to be kept in mind to convert it into a self-sustaining system. Give reason to justify your answer.*

(i) A kitchen garden is made and looked after by people. A forest is made and kept up by nature.

(ii) For an aquarium (a jar of water): (1) supply oxygen with a pump, and (2) add a few water plants and animals.

Reason: oxygen is kept up all the time, and the plants give food, so the system can run on its own.

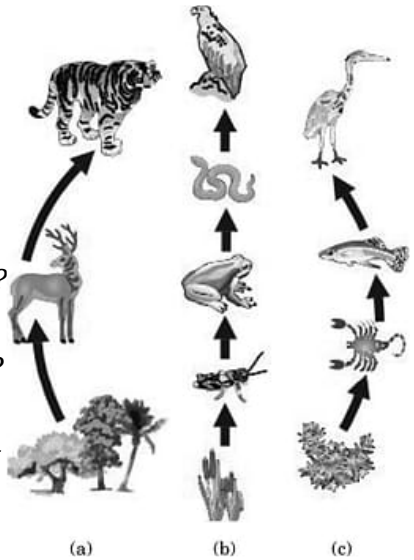
3) *Given below is a pyramid showing various trophic levels in an ecosystem. (a) From the organisms listed below, identify which one is to be placed at which trophic level? Deer, Grass, Lion, Snake, Rabbit (b) Discuss the reason why primary consumers will have more energy as compared to secondary consumers? (c) Why is the base of the pyramid broad?*



(a) (i) Grass (ii) Deer, Rabbit (iii) Snake, Lion (iv) Lion

(b) Primary consumers eat green plants, which have a lot of energy. Only 10% of their energy passes on to the secondary consumers.
(c) The base is broad because there are more producers than any other level.

4) *Study the picture given below showing three food chains (a), (b) and (c) and answer the following questions: (i) Name the type of ecosystems that exist in food chains (b) and (c). (ii) The first trophic level in all food chains are producers. Why? What percentage of solar energy do these producers capture for their use? (iii) Why are the arrows shown in the diagram in one direction only and not vice versa? Justify.*



(i) (b) Terrestrial (land) (c) Aquatic (water)
(ii) Producers can capture solar energy and change it into chemical energy (food). They capture about 1% of the solar energy.
(iii) Energy flows in one direction only. Once it passes to the next level, it cannot come back.

5) *(a) Write the percentage of (i) solar energy captured by the autotrophs and (ii) energy transferred from autotrophs to the next level in a food chain. (b) What are trophic levels? Why do different food chains in an ecosystem not have more than four to five trophic levels? Give reason.*
(a) (i) 1% (ii) 10%
(b) Each step of a food chain where energy is passed on is a trophic level.

The energy becomes less at every higher level, so very little usable energy is left after four levels.

6) *(a) "In a food chain energy flow is unidirectional." Give two reasons for the given statement. (b) If 10,000 J energy is available at the producer level, how much energy will be available to the secondary consumers? Give reason to justify your answer.*

(a) * The energy captured by plants does not go back to the Sun, and the energy passed to herbivores does not go back to the plants.

• As energy moves up the trophic levels, it is no longer available to the earlier level.

(b) 100 J. Only 10% passes on at each step:

Producers 10,000 J → Primary consumers 1000 J → Secondary consumers 100 J

7) *(i) Construct a food chain of four trophic levels comprising the following: Hawk, snake, plants, rat. (ii) 20,000 J of energy was transferred by the producers to the organism of second trophic level. Calculate the amount of energy that will be transferred by organisms of the third trophic level to the organisms of the fourth trophic level.*

(i) Plants → Rats → Snakes → Hawks

(ii) Second level (rats) gets 20,000 J.

Third level (snakes) gets 10% = 2000 J.

Fourth level (hawks) gets 10% of that = 200 J.

8) *Study the food chain given below: Phytoplankton → zooplankton → small fishes → large fish. A. In the given food chain, the amount of energy available at the fourth trophic level is 10 kJ, what will be the energy available at the producer level? B. Is it possible to have three more trophic levels in the above food chain? Justify. C. Which of these trophic levels will have the maximum amount of pesticide, if it had washed down in the water body from agricultural fields. Why?*

A. 10,000 kJ (each level back has 10 times more energy: 10 → 100 → 1000 → 10,000 kJ).

B. No. So much energy is lost at each step that very little usable energy would be left.

C. The large fish, because pesticides build up more at each higher level (biological magnification).

9) *Plants → Deer → Lion. In the given food chain, what will be the impact of removing all the organisms of second trophic level on the first and third trophic level? Will the impact be the same for the organisms of the third trophic level in the above food chain if they were present in a food web? Justify.*

The number of plants (first level) will increase, as no deer eat them.

The number of lions (third level) will decrease, as they have no food.

No. In a food web, the lions can eat other animals, so they will not starve.

10) *Differentiate between food chain and food web. In a food chain consisting of deer, grass and tiger, if the population of deer decreases, what will happen to the population of organisms belonging to the first and third trophic levels?*

A food chain is a single series of organisms, each eating the one before it. A food web is a network of many food chains joined together.

If deer decrease: grass (first level) will increase, and tigers (third level) will decrease.

11) *Use of pesticides to protect our crops affect organisms at various trophic levels especially human beings. Name the phenomenon involved and explain how does it happen.*

Biological magnification.

• Pesticides are washed into the soil and water.

• Plants take them in from the soil along with water and minerals, so they enter the food chain.

• These chemicals are not broken down, so they build up more and more at each trophic level.
• Humans are at the top of most food chains, so the largest amount collects in our bodies.

12) *(a) Mention any one harmful effect of using plastic bags on the environment. Suggest better alternatives to the usage of plastic bags. (b) Paddy fields require a large amount of water. The pesticides and chemical fertilizers used are washed down into the soil or waterbodies. How do these chemicals reach our bodies? What is this phenomenon known as?*

(a) Plastic bags do not break down, so they stay in the environment for a long time and pollute it.

Better: jute or cloth bags.

(b) These chemicals are not broken down. They enter the food chain and build up at each trophic level. Humans are at the top, so the most collects in our bodies.

This is biological magnification.

13) *Write one difference between biodegradable and non-biodegradable wastes. List two impacts of each type of the accumulated waste on environment if not disposed off properly.*

Biodegradable waste can be broken down by microbes. Non-biodegradable waste cannot.

Biodegradable waste piled up: (i) bad smell, (ii) a breeding place for germs and flies.

Non-biodegradable waste piled up: (i) biological magnification, (ii) the soil becomes less fertile.

14) *Write the essential function performed by ozone at the higher levels of the atmosphere. How is it formed in the upper atmosphere? Write the name of the group of chemicals mainly responsible for the depletion of ozone layer.*

Ozone (O_3) protects the Earth from the Sun's harmful ultraviolet (UV) rays.

UV rays split some oxygen molecules (O_2) into single oxygen atoms (O). These atoms join with oxygen molecules to form ozone: $O + O_2 \rightarrow O_3$.

Chlorofluorocarbons (CFCs)

15) *How is ozone formed in the higher levels of the atmosphere? "Damage to the ozone layer is a cause of concern." Justify this statement.*

UV rays split oxygen molecules (O_2) into free oxygen atoms (O). These atoms join with oxygen molecules to form ozone (O_3).

If the ozone layer is damaged, more UV rays reach the Earth. They cause harm such as skin cancer in humans.

16) *A gas 'X' which is a deadly poison is found at the higher levels of atmosphere and performs an essential function. Name the gas and write the function performed by this gas in the atmosphere. Which chemical is linked to the decrease in the level of this gas? What measures have been taken by an international organization to check the depletion of the layer containing this gas?*

Gas X is ozone.

It protects the Earth from the Sun's harmful UV rays.

CFCs (chlorofluorocarbons) are linked to its decrease.

In 1987, UNEP (United Nations Environment Programme) got countries to agree to freeze CFC production at 1986 levels.

17) *Why is damage to the ozone layer a cause for concern? What are its causes and what steps are being taken to limit this damage?*

The ozone layer protects the Earth from harmful UV rays, which cause skin cancer in humans. Damage to it lets more UV rays in.

Cause: man-made chemicals called CFCs, used in refrigerators and fire extinguishers.

Steps: Many countries follow UNEP's agreement to freeze CFC production at 1986 levels.