Our Environment

Definitions

1. **Ecosystem:** It is the structural and functional unit of biosphere which comprises of both biotic and abiotic components that interact with each other to form a stable and self-supporting system.
2. **Natural ecosystem:** The ecosystems which operate themselves in nature without any interference of human beings are called natural ecosystems.
3. **Artificial ecosystem:** The ecosystem which is maintained by human beings like croplands, aquarium etc. is called artificial ecosystem.
4. **Abiotic components:** The non-living physio-chemical factors like soil, humidity, sunlight, rainfall, temperature etc. are the abiotic components.
5. **Biotic components:** The living organisms like autotrophs, heterotrophs forms the biotic components.
6. **Food chain:** The sequential interlinking of organisms involving transfer of food energy starting with a producer through a series of organisms where one is eaten by the other is called a food chain.
7. **Trophic levels:** The distinct sequential steps in the food chain

where transfer of energy occurs are referred to as trophic levels.

8. **Food web:** A network of food chains which are interconnected at various trophic levels to form a number of feeding connections among different organisms is called a food web.

9. **Biodegradable wastes:** The wastes which get degraded in a natural process by the action of microbes into simpler forms are called biodegradable wastes. Example, food waste, human waste, paper waste, manure, sewage etc.

10. **Non-biodegradable wastes:** The wastes which cannot be degraded by the action of microbes in a natural way and they persist in environment for a longer period of time are called non-biodegradable wastes. Examples, Glass, metal, batteries, plastic bottles, tetra packs.

Multiple Choice Questions

11. The % of solar radiation absorbed by all the green plants for the process of photosynthesis is about:
[NCERT Exemplar]

(a) 1%

(b) 5%

(c) 8%

(d) 10%

Ans. (a) 1%

Explanation :

For the process of photosynthesis, green plants capture roughly 1% of the energy of sunlight that falls on their leaves. This energy is

converted into chemical energy, which is then used to make food.

12. Which of the following statements is incorrect ?

(a) All green plants and blue green algae are producers.

(b) Green plants get their food from organic compounds.

(c) Producers prepare their own food from inorganic compounds.

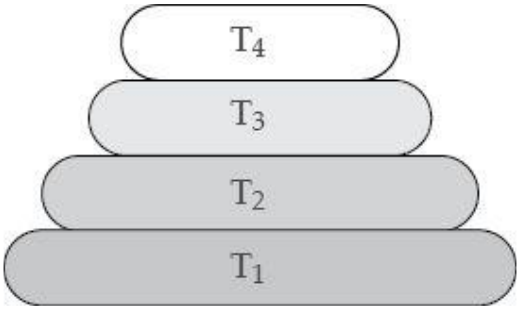
(d) Plants convert solar energy into chemical energy.

Ans. (b) Green plants get their food from organic compounds.

Explanation :

Green plants and algae are both producers which means that they can make their own food with the help of inorganic substances and sun energy, through the process of photosynthesis.

13. At which trophic level is maximum energy available in the figure given below for the various tropic levels in a food chain ?



(a) T_4

(b) T_2

(c) T_1

(d) T_3

Ans. (c) T_1

Explanation :

All ecosystems are characterised by a unidirectional flow of energy. At each trophic level, most of the energy available is utilised for respiration and excretion and only ten percent of the available energy is passed on to the next level because only ten percent of the available energy can be passed on to the next trophic level, higher trophic levels have substantially less energy content and the number of trophic levels in a food chain is limited. The lower the trophic level higher will be energy content. Hence, the greatest amount of energy is expected to be in trophic level T1.

14. What will happen if deer is missing in the food chain given below ? [NCERT Exemplar]

Grass → Deer → Tiger

(a) The population of tiger increases.

(b) Tiger will start eating grass.

(c) The population of grass decreases.

(d) The population of tiger decreases and the population of grass increases.

Ans. (d) The population of tiger decreases and the population of grass increases.

Explanation :

The tiger is a secondary consumer which eats deer. If the deer is missing, there will be no food for the tiger. So if deer are missing, the population of grass will increase.

15. Flow of energy in an ecosystem is always:

[NCERT Exemplar]

(a) unidirectional

(b) bidirectional

(c) multidirectional

(d) no specific direction

Ans. (a) unidirectional

Explanation :

The energy flow in an ecosystem is always unidirectional. Energy coming from the sun in most natural ecosystems, is used by producers, and then passed on to subsequent trophic levels in the form of food. Energy never flows in the reverse direction, it always get transferred from the prey to the predator.

16. Food chain does not comprise of which of the following groups of organisms?

(i) Grass, lion, rabbit, wolf

(ii) Plankton, man, fish, grasshopper

(iii) Wolf, grass, snake, tiger

(iv) Frog, snake, eagle, grass, grasshopper

(a) (i), (iii)

(b) (iii), (iv)

(c) (ii), (iii)

(d) (i), (iv)

Ans. (c) (ii), (iii)

Explanation :

The flow of energy from one organism to another taking part at

various biotic levels forms a food chain. A food chain describes the feeding relationships between the organisms within that ecosystem. Food chain (ii) is an aquatic food chain so grasshopper cannot be a part of it. In food chain (iii), wolf, snake and tiger all are carnivores. There is no herbivore to eat grass or herbivore is missing from the chain.

17. In an ecosystem, the 10% of energy available for transfer from one trophic level to the next is in the form of :* [NCERT Exemplar]

(a) heat energy

(b) light energy

(c) mechanical energy

(d) chemical energy

Ans. (d) chemical energy

Explanation :

The sun is the ultimate source of energy in an ecosystem, and green plants capture it and convert it to chemical energy, which is then stored in the form of carbohydrates. This chemical energy, in the form of food, is transmitted down the food chain in the ecosystem from one trophic level to the next following 10 per cent law according to which only 10% of the chemical energy is transferred from one trophic level to subsequent higher trophic level.

18. Excessive exposure of humans to UV rays results in :[NCERT Exemplar]

(i) damage to immune system

(ii) damage to lungs

(iii) skin cancer

(iv) peptic ulcers

(a) (i), (ii)

(b) (ii),(iv)

(c) (i), (iii)

(d) (iii), (iv)

Ans. (c) (i), (iii)

Explanation :

UV rays are extremely hazardous to humans, animals, and even plants. It can cause skin cancer, cataracts in the eyes, and immune system damage by reducing the body's response to infections.

19. Why do all food chains start with plants?

[CBSE Question Bank]

(a) Because plants are easily grown.

(b) Because plants are nutritious.

(c) Because plants can produce its own energy.

(d) Because plants do not require energy.

Ans. (c) Because plants can produce its own energy.

Explanation :

A food chain starts with a plant. This is because every food chain needs the presence of organisms that can manufacture their own food. Green plants are called as producers as they can synthesis their own food in the presence of sunlight and therefore, most of the food chains start with plants.

20. Which of the following limits the number of trophic levels in a food chain ?

[NCERT Exemplar]

(a) Decrease in energy at higher trophic levels

(b) Deficient food supply

(c) Polluted air

(d) Water

Ans. (a) Decrease in energy at higher trophic levels

Explanation :

A considerable amount of energy is used to keep organisms alive at each trophic level. As an organism progresses through the trophic levels, it receives less and less energy. The number of trophic levels is restricted to 3-4 since the energy available for the next level is insufficient to keep the organisms alive after that.

21. Which of the following constitute a food chain ?

(a) Grass, wheat and mango

(b) Grass, goat and human

(c) Goat, cow and elephant

(d) Grass, fish and goat

Ans. (b) Grass, goat and human

Explanation :

A food chain is a group of creatures that are all dependent on one another for food. Grass is the food chain's primary producer, goats eat grass (herbivores), and humans eat goat (carnivore).

22. If a grasshopper is eaten by a frog, then the energy transfer will be from:

(a) producer to decomposer

(b) producer to primary consumer

(c) primary consumer to secondary consumer

(d) pecondary consumer to primary consumer

Ans. (c) primary consumer to secondary consumer.

Explanation :

If a frog eats a grasshopper, energy is transferred from primary consumer to secondary consumer in a food chain. Grasshoppers eat producers, such as grass and plants. So, it is classified as a primary consumer. As a result, frogs, which eat grasshoppers, become the secondary consumer.

23. Organisms of a higher trophic level which feed on several types of organisms belonging to a lower tropic level constitute the : [NCERT Exemplar]

(a) food web

(b) ecological pyramid

(c) ecosystem

(d) food chain

Ans. (a) food web

Explanation :

A food web is a network of interrelated food chains. In a food chain, a creature can occupy more than one trophic level. It eats a variety

of organisms of lower trophic level and may be devoured by organisms of higher trophic level.

24. In the given food chain, suppose the amount of energy at fourth trophic level is 5 kJ, what will be the energy available at the producer level?

Grass → Grasshopper → Frog → Snake → Hawk

(a) 5 kJ

(b) 50 kJ

(c) 500 kJ

(d) 5000 kJ

Ans. (d) 5000 kJ

Explanation :

According to the 10 per cent law only 10% of the energy available in a trophic level is passed on to the next trophic level. As a result, if the energy available at the fourth trophic level is 5 kJ, then the energy available at the producer level is 5,000 kJ: 5 → 50 → 500 → 5,000.

25. The decomposers in an ecosystem:

[NCERT Exemplar]

(a) convert inorganic material to simpler forms.

(b) convert organic material to inorganic forms.

(c) convert inorganic materials into organic compounds.

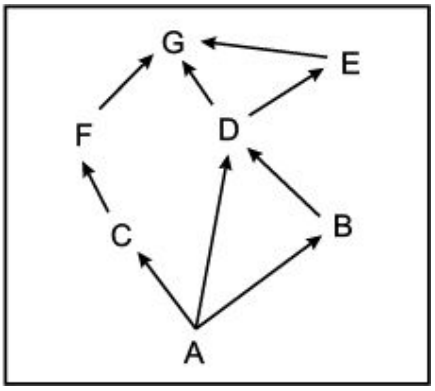
(d) do not break down organic compounds.

Ans. (b) convert organic material to inorganic forms.

Explanation :

Decomposers in an ecosystem transform organic material into inorganic forms, which are then re-used by plants in the soil. Decomposers eat dead bodies, waste products, and organisms.

26. In the food web, which two organisms are competing for food? [CBSE Question Bank]



(a) A and B

(b) A and C

(c) D and F

(d) B and D

Ans. (d) B and D

Explanation :

When members of various species compete for the same resource in an environment, competition develops. Here, B and D are competing for the same resources or food in this food web.

27. The _____ is the functional unit of environment.

(a) genus

(b) ecosystem

(c) class

(d) biome

Ans. (b) ecosystem

Explanation :

The ecosystem is the structural and functional unit of the environment through which various biotic and abiotic components interact with one another in relation to their surroundings.

28. _____ are producers.

(a) Amoeba

(b) Mushrooms

(c) Sunlight

(d) Green plants

Ans. (d) Green plants

Explanation :

Green plants are producers. They produce their own food, which provides them with the energy they require to grow, reproduce, and survive. They are the only living beings on earth capable of producing their own supply of food energy, which makes them unique.

29. _____ is not an abiotic factor.

(a) Humidity

(b) Animals

(c) Temperature

(d) Altitude

Ans. (b) Animals

Explanation :

Both plants and animals are the biotic components of a habitat as they are the species that live there. The abiotic components of the ecosystem are non-living materials like rocks, soil, air, and water.

30. _____ is a herbivore.

(a) Whales

(b) Eagle

(c) Bear

(d) Cow

Ans. (d) Cow

Explanation :

An herbivore is a creature that receives its energy only from eating plants or grass. Cows, elk, buffalo are examples of herbivores.

31. _____ are biotic factors.

(a) Mountains

(b) Rocks

(c) Grass

(d) All of these

Ans. (c) Grass

Explanation :

Any living component that impacts another organism or shapes the environment is referred to as a biotic component, or biotic factor. Animals, plants, grass, fungus, bacteria, and protists are examples of biotic factors.

32. A _____ is considered a terrestrial ecosystem.

(a) ocean

(b) pond

(c) underground caves

(d) forest

Ans. (d) forest

Explanation :

A terrestrial ecosystem is a land-based population of species that includes biotic and abiotic interactions in a specific area. Therefore a forest is considered a terrestrial ecosystem.

33. _____ is an omnivore.

(a) Panther

(b) Bear

(c) Wolf

(d) Lion

Ans. (b) Bear

Explanation :

An omnivore is an organism that feeds on both plants and animals. Examples of omnivores are dogs, bears, pigs, etc.

34. zone has the chemical formula _____.

(a) O_5

(b) O_4

(c) O_3

(d) O_2

Ans. (c) O_3

Explanation :

The inorganic molecule ozone, often known as trioxygen, has the chemical formula O_3. It is a pale blue gas with a distinctively pungent odour.

35. Which of the following is an abiotic component of the ecosystem?

(a) Lichens on a bare rock

(b) Weathered rock

(c) Planktons in a pond

(d) Sea-weed

Ans. (b) Weathered rock

Explanation :

Weathered rock is an abiotic or non-living component of the ecosystem.

36. The depletion of ozone layer is caused by

(a) carbon dioxide and methane

(b) burning of fossil fuels

(c) sulphur dioxide and cabon monoxide

(d) chlorofluorocarbons and other halons

Ans. (d) chlorofluorocarbons and other halons

Explanation :

Use of chlorofluorocarbons and other halons causes ozone depletion.

37. Which of the following occupies the first trophic level in the food chain they form together?

(a) Apple tree

(b) Honey bee

(c) Grasshopper

(d) Mouse

Ans. (a) Apple tree

Explanation :

Producers occupy the first trophic level in a food chain, which in this case is the apple tree.

38. Cutting of forests for growing crops would

(a) reduce the stability of the ecosystem

(b) enhance the stability of the ecosystem

(c) not affect the stability of the ecosystem

(d) first increase and then decrease the stability of the ecosystem

Ans. (a) reduce the stability of the ecosystem

Explanation :

Cutting a large number of trees would affect all the other organisms dependent on those plants. Many organisms would even die. Some would migrate to other places. All such events would disturb the ecological balance and thus would decrease the stability of the ecosystem.

39. The amount of energy that is passed from one trophic level to the next is _____.

(a) 1%

(b) 10%

(c) 11%

(d) 1.1 %

Ans. (b) 10%

Explanation :

Only 10% of the energy is passed from one trophic level to the next.

40. Ozone prevents the entry of

(a) UV radiations from the sun

(b) IR radiations

(c) all solar radiations

(d) all radiations with the large wavelength

Ans. (a) UV radiations from the sun

Explanation :

Ozone prevents the UV radiations from reaching the earth.

41. Which of the following is NOT a type of natural ecosystem?

(a) Sea

(b) Crop field

(c) Lakes and ponds

(d) Estuaries

Ans. (b) Crop field

Explanation :

A crop field is made by humans. Hence, it is not a type of natural ecosystem.

42. In an area, the frog population decreased due to the spread of some diseases. Frogs are prey for snakes, but no major effect was seen in the population of snakes. Instead, there was a decline in the pesticide sale. What could be the possible reason?

(a) Frogs stopped eating grains due to their infection.

(b) There is no relation between the decrease in frog population and pesticide sales.

(c) Both frog and snake migrated to some other are.

(d) Snakes now depended on other organisms that must be the pests for the crops grown.

Ans. (d) Snakes now depended on other organisms that must be the pests for the crops grown.

Explanation :

Given scenario is an example of a food we(b) Infection in frogs could have possibly made snakes shift towards another prey such

as rats. Rats destroy the stocked grains. When snakes started eating rats, the sale of pesticides against rats decrease(d)

43. Supriya listed some important points for energy transfer in a food chain. She made an error. Point out that error.

(i) Primary consumers transfer 10% of energy to the next trophic level in the food chain.

(ii) The population at a lower trophic level is greater than the population at a higher trophic level.

(iii) Producers depend entirely on sunlight to make food

(iv) Decomposers work at a double pace to convert complex molecules into simpler forms in case of an epidemi(c)

(a) Only (ii)

(b) Only (iv)

(c) (i) and (iii)

(d) All of the above

Ans. (b) Only (iv)

Explanation :

The populations at a lower trophic are greater in number than the populations at higher trophic level to fulfil the energy demand of the latter. The population of decomposers might vary but not the pace.

44. Which of the following gets the minimum amount of energy through the food chain in an ecosystem?

(a) Herbivore

(b) Carnivore

(c) Producer

(d) Large carnivore

Ans. (d) Large carnivore

Explanation :

When the energy is transferred in an ecosystem, only 10% of the energy is passed to the next trophic level. Therefore, the large carnivore, being at the highest level, receives the minimum energy.

45. The population at each trophic level is less than the previous one. How does this phenomenon help?

(i) It maintains a balance in the energy demand and supply.

(ii) Organisms at lower trophic levels are more complex and organise(d)

(iii) Organisms at higher trophic levels are less complex, and hence, this decreases the population of lower trophic levels.

(iv) Organisms at higher trophic levels have lesser energy demands than the ones at lower levels.

(a) Only (i)

(b) Only (ii)

(c) Only (iv)

(d) (i), (ii) and (iii)

Ans. (a) Only (i)

Explanation :

A higher population at lower trophic levels and lower populations at higher trophic levels maintains a balance in demand and supply of

energy and organic matter in the ecosystem.

46. UV rays are harmful to the life on earth. However, they play an important role in the upper atmosphere. Which of the following statements holds for this fact?

(i) UV rays are needed for the formation of the ozone layer in the upper atmosphere.

(ii) UV rays are less active and inside the atmosphere, they become activated due to the other atmospheric contents.

(iii) In the upper atmosphere, UV rays have less energy and are not harmful and form the part of the atmosphere.

(a) Only (i)

(b) Only (ii)

(c) Only (iii)

(d) Both (i) and (iii)

Ans. (a) Only (i)

Explanation :

In the upper atmosphere, high energy UV rays are required for the formation of the ozone layer. Ozone prevents the entry of UV rays into the earth's atmosphere.

47. Which of the statements given below is correct?

(a) Omnivores are in the middle of the food chain.

(b) Omnivores areeither in the middle or at the top of the food chain.

(c) Omnivores are at the top of the food chain.

(d) Omnivores are capable of modifying the natural food chain.

Ans. (b) Omnivores areeither in the middle or at the top of the food chain.

Explanation :

Omnivores can consume plants (producers) as well as animals (consumers). They can be at the middle just after plants or at the top of the food chain.

48. In an ecosystem, if a species of secondary consumers is affected by a deadly disease, this will affect the ecosystem by _____.

(a) giving more opportunity of survival to the prey of the secondary consumer

(b) giving more opportunity of survival to the predators of the secondary consumer

(c) disturbing the food chain of which the secondary consumer is a part

(d) decreasing the population of the producers

Ans. (c) disturbing the food chain of which the secondary consumer is a part

Explanation :

Change in the population of the organism at any trophic level can distress the whole food chain in the ecosystem. This can be detrimental to the balance of energy transfer in the ecosystem.

49. In an ecosystem, the matter is recyclable because of

(a) decomposition activity of decomposers

(b) the sun, which is an ultimate source of energy

(c) the fact that matter is made up of atoms

(d) None of these

Ans. (a) decomposition activity of decomposers

Explanation :

Decomposers convert the complex organic molecules into simpler ones and make them available for other organisms.

50. All the organisms are not capable of utilising the sun's energy directly for meeting their energy requirements. This gap is filled by

(i) all green plants

(ii) some species of bacteria

(iii) algae

(iv) all bacterial species and plant species

(a) (ii) and (iv)

(b) (i) and (iii)

(c) (i), (ii) and (iii)

(d) Only (i)

Ans. (b) (i) and (iii)

Explanation :

All green plants, some species of bacteria and green algae are capable of converting sunlight into a useful form by the process of photosynthesis.

51. Despite the presence of an adequate amount of decomposers, a lot of waste is accumulating in the ecosystem because

(a) decomposers keep mutating

(b) there is a high amount of non-biodegradable wastes being generated in that ecosystem

(c) decomposers are unable to survive in this ecosystem

(d) the rate at which waste is generated is higher than the rate of decomposition

Ans. (b) there is a high amount of non-biodegradable wastes being generated in that ecosystem

Explanation :

Generation of a large amount of non-biodegradable wastes can lead to their accumulation in the ecosystem.

52. Identify A, B and C in the given food chain.

Sunlight → A → B → C→Large fish

(a) A: Phytoplanktons; B: Zooplanktons; C: Small fish

(b) A: Zooplanktons; B: Phytoplanktons; C: Small fish

(c) A: Zooplanktons; B: Small fish; C: Phytoplanktons

(d) A: Phytoplanktons; B: Small fish; C: Zooplanktons

Ans. (b) A: Phytoplanktons; B: Zooplanktons; C: Small fish

Explanation :

The correct sequence of the food chain is: Sunlight → Producers (phytoplanktons) → Herbivores (zooplanktons) → Carnivores (small fish) →Top Carnivores (Large Fish)

53. Lakes and ponds do not require cleaning but an aquarium does because

(a) an aquarium is an artificial and an incomplete ecosystem

(b) lakes and ponds are natural and incomplete ecosystems

(c) an aquarium possesses a pool of decomposers

(d) lakes do not possess any deomposers and thus BOD always remain low

Ans. (b) lakes and ponds are natural and incomplete ecosystems

Explanation :

Lakes and ponds do not require cleaning but an aquarium does because an aquarium is an artificial ecosystem. It is incomplete and lacks natural decomposers.

54. If UNEP had not passed any regulation to control the CFC levels, then what could have been the possible consequences after a few years?

(a) Increase in CFC levels and thus increase in global warming.

(b) Major amount of UV radiations reaching the earth, therefore, multifold increase in problems like cancer.

(c) Increase in natural calamities like Tsunamis and cyclones.

(d) Lowering of the temperature of the earth.

Ans. (b) Major amount of UV radiations reaching the earth, therefore, multifold increase in problems like cancer.

Explanation :

If UNEP has not controlled the CFC levels, then after 20 years there would have been major destruction of the ozone layer due to an increase in CFC levels in the environment.

55. Which of the following sets represents the substances required for the formation of ozone?

(a) Oxygen and IR radiations

(b) Oxygen and UV radiations

(c) Oxygen and radiations of longer wavelengths

(d) Carbon dioxide, water vapour and UV radiations

Ans. (b) Oxygen and UV radiations

Explanation :

Ozone is formed by the action of UV radiations on the oxygen atoms in the upper layers of the atmosphere.

56. The most important trophic level in a terrestrial food chain is

(a) the one with the highest energy requirement per individual

(b) the one withthe least energy requirement per individual

(c) the one with moderate energy requirement per individual

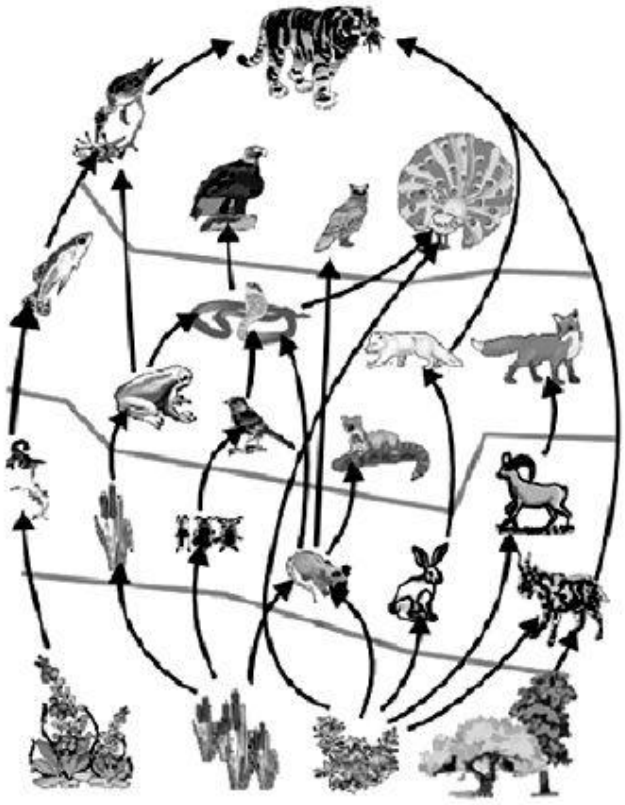
(d) not dependent on the energy requirement per individual, thus, all are equally important

Ans. (b) not dependent on the energy requirement per individual, thus, all are equally important

Explanation :

In any food chain, all the trophic levels are of equal importance.They maintain ecological balance.

57. Which food chain is NOT a part of the given food web?



(a) Plants → Frog → Snake → Peacock

(b) Plants → Frog → Snake → Owl

(c) Hydrophytes → Crabs → Fish → Hawk → Tiger

(d) Both A and B

Ans. (b) Plants → Frog → Snake → Owl

Explanation :

The given image shows a food web in the ecosystem. A food web is formed when the different food chains are interconnected in the ecosystem. Food chain comprising Plants → Frog → Snake → Owl is not the part of this food we(b)

58. Which of the following options complete the statementgiven below?

Ozone is both harmful and beneficial because it is _____.

(a) not poisonous to the ecosystem

(b) poisonous but not for humans

(c) poisonous in very high amounts, and its concentration is very low in the atmosphere

(d) poisonous to humans but it also prevents UV rays from entering into the earth's atmosphere

Ans. (d) poisonous to humans but it also prevents UV rays from entering into the earth's atmosphere

Explanation :

Ozone acts as a blanket around the earth and prevents the UV rays from entering the earth's atmosphere. However, at the surface level, it acts as a pollutant.

59. The accumulation of the heavy metals in birds have caused a decline in their population. This is because

(a) the eggs produced by these birds have very thin and brittle shells

(b) heavy metals damage the eyesight of these birds

(c) heavy metals kill the fish that is the major diet of these birds

(d) heavy metals damage the feathers of these birds

Ans. (a) the eggs produced by these birds have very thin and brittle shells

Explanation :

The accumulation of the heavy metals causes a decline in the population of predatory birds because heavy metals interfere with

bird reproduction by bringing about changes like thinning of the egg shells of the birds.

60. Which of the following statements is correct?

(a) All plants and bacteria are producers.

(b) All green plants and certain bacteria are producers.

(c) Only some species of green plants and all bacteria are producers.

(d) Only green plants are producers.

Ans. (b) All green plants and certain bacteria are producers.

Explanation :

All green plants and certain bacteria are producers in an ecosystem.

61. Ozone formation is possible in the upper layers of atmosphere because of the

(a) presence of active molecules of carbon

(b) presence of high energy UV rays

(c) presence of activated oxides of carbon

(d) presence of longer wavelength radiations

Ans. (b) presence of high energy UV rays

Explanation :

The high energy of UV rays help in the formation of ozone from oxygen.

62. Different types of enzymes are present in our body because:

(i) each enzyme has a specific function

(ii) each enzyme has a specific substrate

(iii) it makes the metabolic process faster

(iv) it makes the replacement of the defective enzymes easy

(a) (i) and (ii)

(b) (iii) and (iv)

(c) (i) and (iv)

(d) All of the above

Ans. (b) (i) and (ii)

Explanation :

Each enzyme has a specific substrate and has a specific function to perform. Each enzyme is a protein and each protein is made by a specific gene.

63. In _____ presence of _____, along with sunlight is required to make organic compounds.

(a) producers; chlorophyll

(b) decomposers; chlorophyll

(c) producers; carbon

(d) consumers; carbon

Ans. (a) producers; chlorophyll

Explanation :

In producers, the presence of chlorophyll, along with sunlight is required to produce glucose.

64. Which of the following statements holds true for the energy flow in an ecosystem?

(a) Energy can never be transferredbidirectionally between producers to consumers.

(b) Energy flows in a unidirectional manner in an ecosystem.

(c) Only 10% of the energy is transferred from one trophoc level to the next trophic level.

(d) All of the above

Ans. (d) All of the above

Explanation :

The flow of energy is always unidirectional. It flows from the sun to the producers and ultimately to the consumers. According to the 10% law, only 10% of the energy is transferred from one trophic level to the next.

65. The maximum number of levels in a food chain can be

(a) 7 – 8

(b) 5 – 6

(c) 3 – 4

(d) 1 – 3

Ans. (c) 3 – 4

Explanation :

At each trophic level, some amount of energy is lost; hence, food chains can have maximum 3-4 trophic levels. After four levels, there is no significant amount of energy left to pass on.

66. Fishes living in a crop field with standing water are the part of a/an _____ ecosystem.

(a) natural

(b) artificial

(c) indigenous

(d) None of these

Ans. (b) artificial

Explanation :

Crop fields are man-made ecosystems.If these have standing water as in the case of rice field, they can be used to culture fish. The fish in this water would be the part of an artificial ecosystem.

67. Which of the following would be affected by the decrease in the producer population?

(a) All the organisms in the ecosystem.

(b) The organisms in the next trophic level.

(c) The organisms at the highest trophic level.

(d) None of the organisms in the food chain will be affecte(d)

Ans. (a) All the organisms in the ecosystem.

Explanation :

A decrease in the population of producers would directly and indirectly affect all the organisms in that ecosystem.

68. Which activity would gradually reduce the occurrence of pests, thereby reducing damage to the crops year by year without affecting the environment?

(a) Use of nitrogen based fertiliser

(a) Crop rotation

(a) Use of DDT

(a) Use of manure

Ans. (b) Crop rotation

Explanation :

Crop rotation can gradually reduce the occurrence of pests, thereby reducing damage to crops year by year without affecting the environment

69. Fish diet can play significant role in biological magnification of pesticides like DDT because

(a) harmful chemicals get washed into water bodies and enter the aquatic food chains

(b) fishes can also produce these chemicals in their bodies

(c) fishes increase in number rapidly

(d) fishes have special enzymes in their body to digest these pesticides

Ans. (a) harmful chemicals get washed into water bod ies and enter the aquatic food chains

Explanation :

Biological magnification occurs when the harmful chemicals used in the crop fields get washed into water bodies and enter the food chains.

70. Which of the following sets of substances can be used for

vermicomposting?

(a) Glass, sea shells, vegetable and fruit peels

(b) Shells, vegetable peels, fruit peels and paper

(c) Plastic cans, newspapers and cooked food

(d) Styrofoam cups, disposable plates, cooked food and newspapers

Ans. (b) Shells, vegetable peels, fruit peels and paper

Explanation :

Only the degradable waste can be used for vermicomposting. Vermicomposting involves compost formation with the help of worms. Shells, vegetable and fruit peels and paper are some of the ideal substances that can be used in vermicomposting.

71. _____ are the smallest and the most important components of an ecosystem.

(a) Decomposers

(b) Viruses

(c) Algae

(d) Phytoplanktons

Ans. (a) Decomposers

Explanation :

Decomposers are the smallest and the important components of an ecosystem. They convert the complex organic molecules into the simpler ones. These simpler molecules then are available for reuse.

72. The direction of energy flow in an ecosystem is

(a) unidirectional but in any direction

(b) multidirectional

(c) unidirectional but from lower trophic level towards the higher trophic level

(d) bidirectional

Ans. (c) unidirectional but from lower trophic level towards the higher trophic level

Explanation :

Energy flows in a unidirectional manner in an ecosystem from the lower trophic level towards the higher trophic level.

73. Biological magnification is defined as

(a) the accumulation of harmful chemicals at each trophic level of the food chain.

(b) the accumulation of organic matter at the first trophic level of the food chain.

(c) the reduction of energy at each trophic level of the food chain.

(d) an increase in the population of a species at each trophic level of the food chain.

Ans. (a) the accumulation of harmful chemicals at each trophic level of the food chain.

Explanation :

The accumulation of harmful chemicals at each trophic level is called biological magnification.

74. Which of the following is an eco-friendly activity?

(a) Use of fertilizers

(b) Use of paper bags

(c) Use of styrofoam cups

(d) Use of insecticides and pesticides

Ans. (b) Use of paper bags

Explanation :

Using biodegradable substances instead of non-biodegradable substances is considered to be an eco-friendly activity.

75. Classify the given activities under reuse and recycle.

(i) Using plastic bucket for growing plants

(ii) Using old newspaper to make paper bags

(iii) Using broken glass to melt and make a new glass

(iv) Dissolving paper, bleaching and drying it to form a new paper.

(a) (i) and (ii) are examples of reuse and (iii) and (iv) are the examples of recycle.

(b) (ii) and (iii) are the examples of reuse and (i) and (iv) are the examples of recyle.

(c) (i), (ii) and (iii) are the examples of reuse and (iv) is the example of recycle.

(d) (i), (ii) and (iii) are the examples of recycle and (iv) is the example of reuse.

Ans. (a) (i) and (ii) are examples of reuse and (iii) and (iv) are the examples of recycle.

Explanation :

Reuse involves using again the same substance for some other purpose. Recycle involves forming a new substance from the old substance to be used for the same or different purpose.

76. Which agricultural activites are affecting the environment?

(a) Overuse of fertlisers and pesticides

(b) Using groundwater for irrigation

(c) Extensive cropping in the same area of land

(d) All of the above

Ans. (d) All of the above

Explanation :

Different agricultural activities are affecting the environment. Fertilisers and pesticides are non-biodegradable. They cause soil and water pollution. Soil loses fertlilty due to extensive cropping and water table is lowering due to the overuse of groundwater for irrigation.

77. Which set of the organisms belong to the same trophic level?

(a) Plants; phytoplanktons

(b) Rabbit; snake

(c) Deer; tiger

(d) Phytoplanktons; zooplanktons

Ans. (a) Plants; phytoplanktons

Explanation :

Plants and phytoplanktons belong to the same trophic level. Both are producers.

78. Pesticide can disturb the balance within the ecosystem by

(a) indiscriminately killing pests and the predators of these pests

(b) biomagnification

(c) eutrophication

(d) bioaccumulation

Ans. (a) indiscriminately killing pests and the predators of these pests

Explanation :

Pesticides can disturb the balance within the ecosystem by indiscriminately killing pests and the predators of these pests.

79. If the energy at the third trophic level is 5J. What would be energy at the first trophic level?

(a) 5000 J

(b) 500J

(c) 50J

(d) 5 J

Ans. (b) 500J

Explanation :

There is 10% transfer of energy at every trophic level. Therefore, the amount of energy at second trophic level must be 50 J and first trophic level must be 500 J.

80. Which of the following is the best way for the disposable of kitchen

waste?

(a) Landfill

(b) Composting

(c) Incineration

(d) Reusing

Ans. (b) Composting

Explanation :

Kitchen waste contains all the organic waste that can be used in composting and manure formation.

81. A large number of food chains are interconnected because the organisms at the higher trophic level can depend on different types of organisms at the lower trophic level. The existence of this phenomenon in nature is called

(a) food chain

(b) ecological balance

(c) ecological pyramid

(d) food web

Ans. (d) food web

Explanation :

Different food chains interconnect to form food webs.

82. The amount of energy absorbed by the plants in the form of solar energy is ____% and then _____% of this energy is transferred to the next level.

(a) 10%; 10%

(b) 1%; 10%

(c) 10%; 1%

(d) 1%; 1%

Ans. (b) 1%; 10%

Explanation :

Plants absorb only 1% of the solar energy and then 10 % of this 1 % is transferred to the next trophic levels.

83. Which of the following is the set of greenhouse gases in the atmosphere?

(a) Ozone and CFC

(b) Carbon monoxide and sulphur dioxide

(c) Carbon dioxide and methane

(d) Hydrogen sulphide and ozone

Ans. (c) Carbon dioxide and methane

Explanation :

Gases that maintain the temperature of the earth by trapping the solar energy in the earth's atmosphere are called greenhouse gases. Increase in the amount of greenhouse gases in the atmosphere can lead to global warming. Carbon dioxide and methane are the greenhouse gases.

84. Which of the following occupies the top-most trophic level?

(a) Humans

(b) All producers

(c) All carnivores

(d) All omnivores

Ans. (a) Humans

Explanation :

Human beings are most intelligent of all the organisms. Hence, they occupy the top-most trophic level in the ecosyetm.

85. Which of these is NOT a correct sequence of a food chain?

(a) Phytoplanktons → Zooplanktons → Fish

(b) Seed grains → Rodents → Eagle

(c) Grass → Insects → Frog → Snake

(d) Seaweed → Zooplanktons →Phytoplanktons

Ans. Seaweed → Zooplanktons →Phytoplanktons

Explanation :

Phytoplanktons are the primary producers. They should occupy the first trophic level in the aquatic food chain.

86. The amount of a chemical used in a farmland was in nanograms. But its amount was found to be in milligrams in higher tropical levels. This happened because _____.

(a) of biological magnification

(b) of the existence of the food web

(c) organisms of lower trophic levels were consumed by the organisms of higher trophic levels

(d) All of the above

Ans. (d) All of the above

Explanation :

Even if the usage is low, due to biological magnification, harmful chemicals get accumulated at the lower trophic level. These are then consumed by the organisms of higher trophic levels. As food chains are interconnected, the chemicals are also passed on from one organism to another easily. Gradually, the concentration of the chemicals increases at higher trophic levels.

87. Four students gave 4 different statements about ecosystem. Who is incorrect?

Student A: “Energy can be recycled in an ecosystem.”

Student B: “Matter cannot be recycled in an ecosystem.”

Student C: “Energy cannot be recycled but matter can be recycled in an ecosystem.”

Student D: “Neither energy nor matter can be recycled in an ecosystem.”

(a) Both students A and B

(b) Students A, B and D

(c) Student C

(d) Students A and C

Ans. (b) Students A, B and D

Explanation :

In an ecosystem, the sun is the only source of energy. The energy

is not recycled, but the organic matter, which passes from one trophic level to the next, is recycled by the action of decomposers.

88. Which of the following are environment friendly practices ? [NCERT]

(a) Carrying cloth bags to put purchases in while shopping.

(b) Switching off unnecessary lights and fans.

(c) Walking to school instead of getting your mother to drop you on her scooter.

(d) All of the above

Ans. (d) All of the above

Explanation :

Being eco-friendly refers to a way of life that is better for the environment. It involves taking little measures towards ensuring that the Earth's environment is properly maintained for current and future generations. Carrying cloth bags to put purchases in while shopping, switching off unnecessary lights and fans, walking to school instead of getting your mother to drop you on her scooter are all examples of environment friendly practices.

89. Several factories were pouring their wastes in rivers A and B. Water samples were collected from these two rivers. It was observed that sample collected from river A was acidic while that of river B was basic. The factories located near A and B are :**

(a) Soaps and detergents factories near A and alcohol distillery near B.

(b) Soaps and detergents factories near B and alcohol distillery near A.

(c) Lead storage battery manufacturing factories near A and soaps and detergents factories near B.

(d) Lead storage battery manufacturing factories near B and soaps and detergents factories near A.

Ans. (c) Lead storage battery manufacturing factories near A and soaps and detergents factories near B.

Explanation :

The lead storage batteries uses sulphuric acid which is acidic in nature while soaps and detergents are basic in nature.

90. Disposable plastic plates should not be used because :[NCERT Exemplar]

(a) They are made of materials with light weight.

(b) They are made of toxic materials.

(c) They are made of biodegradable materials.

(d) They are made of non-biodegradable materials.

Ans. (d) They are made of non-biodegradable materials.

Explanation :

There are some substances that cannot be acted upon by decomposers and hence, these item are called as non-biodegradable. Example- plastics, chemicals like DDT, etc. When items like disposable plastic plates are used they persist in the environment because they cannot be degraded and may cause hazardous effects on the other biotic components of the ecosystem. Therefore, usage of disposable plastic should be avoided as they have hazardous effects on the environment.

91. Refrigerators have led to an environmental imbalance and destroyed ecosystems. How?

(a) Refrigerators emit CFCs that are harmful to only plant species.

(b) Storing food in refrigerators makes them environmentally unhealthy.

(c) Refrigerators use CFCs that are harmful to the ozone layer which forms a blanket around the earth.

(d) Refrigerators emit greenhouse gases.

Ans. (c) Refrigerators use CFCs that are harmful to the ozone layer which forms a blanket around the earth.

Explanation :

CFCs are used in refrigerators. They are dangerous for the ozone layer that acts as a blanket around the earth and prevents UV rays from the sun to enter the atmosphere.

92. Which of the following cannot be called a biodegradable substance?

(a) Dead leaves

(b) Cotton balls

(c) Plastic coverings

(d) Food wastes

Ans. Ans. (c) Plastic coverings

Explanation :

Plastics cannot be decomposed by the action of decomposers. Hence, the covering made up of plastic cannot be called a

biodegradable substance.

93. Some wastes stay in the environment for a longer duration because

(a) they are non-biodegradable materials and decomposers cannot decompose them

(b) they are biodegradable materials but decomposers do not act on these materials

(c) these play role in maintaining ecological balance

(d) these are recyclable

Ans. (a) they are non-biodegradable materials and decomposers cannot decompose them

Explanation :

Some waste materials are non-biodegradable. Decomposers cannot break them into simpler forms. Therefore, these materials stay in the environment for a longer duration.

94. The government of a country banned the use of plastic bags at various places. Is this step justified? Why?

(i) No; because it will not affect the environment in any manner.

(ii) Yes; because it will reduce the amount of non-biodegradable waste (plastic) in the environment.

(iii) Yes; because it will reduce the cost of waste management.

(iv) Yes; because it would be replaced with paper bags which are more economical.

(a) (i)

(b) (ii) and (iii)

(c) (iii) and (iv)

(d) (ii), (iii), and (iv)

Ans. (b) (ii) and (iii)

Explanation :

Banning plastic will greatly reduce the amount of non-biodegradable waste in the environment. It will also decrease the amount spent in handling the non-biodegradable waste.

95. Which of the following sets contain only non-biodegradable materials?

(a) Wood, detergent, leather

(b) Polythene, detergent, paper

(c) DDT, plastic, bakelite

(d) Plastic, bakelite, kitchen waste

Ans. (c) DDT, plastic, bakelite

Explanation :

DDT, plastic and bakelitecannot be degraded by the action of decomposers. Hence, they are non-biodegradable.

96. Which of the following wastesis NOT broken down by decomposers?

(a) Glass

(b) Dead leaves

(c) Wood

(d) Carcass

Ans. (a) Glass

Explanation :

Decomposers breakdown biodegradable wastes. Hence, dead leaves, wood and carcass can be broken down by decomposers. However, glass and plastic form non-biodegradable waste. It cannot be broken down by the action of decomposers.

97. Which of the following statements is correct?

(a) It is important to segregate biodegradable and non-biodegradable wastes.

(b) Non-biodegradable substances cannot be buried in landfills.

(c) We cannot dispose off non-biodegradable waste.

(d) We can use the inorganic waste for vermi-composting.

Ans. (a) It is important to segregate biodegradable and non-biodegradable wastes.

Explanation :

It is important to segregate biodegradable and non-biodegradable wastes and treat them separately. Biodegradable waste can be used for composting and non-biodegradable waste can be reused or recycle(d) They can also be buried in landfills in extreme cases.

98. In the following groups of materials, which groups contain only non-biodegradable items ?

[NCERT Exemplar]

(i) Wood, paper, leather

(ii) Polythene, detergent, PVC

(iii) Plastic, detergent, grass

(iv) Plastic, bakelite, DDT

(a) (iii)

(b) (iv)

(c) (i), (iii)

(d) (ii), (iv)

Ans. (d) (ii), (iv)

Explanation :

Those items which cannot be acted upon by detrivores or decomposers are called as non-biodegradable. As a result, such materials are unable to degrade or decompose. They are, in some ways, an inextricable part of the environment that cannot be removed. Polythene, thermosetting plastics such as Bakelite, insecticides such as DDT, detergent, and PVC are few examples of non-biodegradable items.

99. _____ is a biodegradable substance.

(a) Polythene

(b) Paper

(c) Plastic

(d) Glass

Ans. (b) Paper

Explanation :

Biodegradable substances are organic waste materials that can be decomposed biologically into compost or simple organic molecules.

Examples are plant products such as wood, paper, food material.

100. _____ is a non-biodegradable substance.

(a) Human/ animal waste

(b) Newspaper

(c) Aluminium

(d) Plant products

Ans. (c) Aluminium

Explanation :

Non-biodegradable compounds are wastes that do not breakdown naturally in the environment, causing pollution and being detrimental to living things. Chemicals, paints, plastics, rubber, metals such as aluminium, and other materials are some examples.

Assertion and Reasoning Based Questions

101. Assertion: The flow of energy is unidirectional.

Reason: Energy as it progresses through the various trophic levels is no longer available to the previous level.

(a) If both assertion and reason are true and reason is the correct explanation of assertion.

(b) If both assertion and reason are true, but reason is not the correct explanation of assertion.

(c) If assertion is true, but reason is false.

(d) If assertion is false, but reason is true.

Ans. (a) If both assertion and reason are true and reason is the correct explanation of assertion.

Explanation :

The flow of energy is unidirectional. The energy that is captured by the autotrophs does not revert to the solar input and the energy which passes to the herbivores does not come back to autotrophs. As it moves progressively through the various trophic levels it is no longer available to the previous level. Moreover, the energy available at each trophic level gets diminished progressively due to loss of energy at each level. Thus, both assertion and reason are true and reason is the correct explanation of the assertion.

102. Assertion: Energy available at each trophic level gets diminished progressively.

Reason: Little usable energy remains after four trophic levels.

(a) If both assertion and reason are true and reason is the correct explanation of assertion.

(b) If both assertion and reason are true, but reason is not the correct explanation of assertion.

(c) If assertion is true, but reason is false.

(d) If assertion is false, but reason is true.

Ans. (c) If assertion is true, but reason is false.

Explanation :

The energy available at each trophic level gets diminished progressively due to loss of energy at each level. The usable

energy available at each trophic level gets diministed progressively due to loss of energy at each level.

Thus, assertion is true but reason is false.

103. **Assertion:** Chemicals and toxins accumulate more and more as we move up the food chain.

Reason: Anything that gets into biological tissue, that is not normally there, has the potential to accumulate and magnify.

(a) If both assertion and reason are true and reason is the correct explanation of assertion.

(b) If both assertion and reason are true, but reason is not the correct explanation of assertion.

(c) If assertion is true, but reason is false.

(d) If assertion is false, but reason is true.

Ans. (a) If both assertion and reason are true and reason is the correct explanation of assertion.

Explanation :

Biomagnification is the increase in concentration of toxins up the food chain. Chemicals and toxins accumulate more and more as we move up the food chain, because they do not get broken down in the body. Anything that gets into biological tissue, that is not normally there, has the potential to accumulate and magnify as it moves up the food chain. Thus, both assertion and reason are true and reason is the correct explanation of the assertion.

104. **Assertion:** Green plants of the ecosystem are the transducers.

Reason: Producers trap the radiant energy of the sun and change it into chemical energy.

(a) If both assertion and reason are true and reason is the correct explanation of assertion.

(b) If both assertion and reason are true, but reason is not the correct explanation of assertion.

(c) If assertion is true, but reason is false.

(d) If assertion is false, but reason is true.

Ans. (a) If both assertion and reason are true and reason is the correct explanation of assertion.

Explanation :

Green plants of the ecosystem are the transducers because producers trap the radiant energy of the sun and change it into chemical energy. Thus both assertion (A) and the reason are correct and reason is the correct explanation of the assertion.

105. Assertion: Arctic's ozone depletion tends to be milder and short lived than the Antarctic's.

Reason: CFCs, Frigid temperatures and sunlight are not present at the Arctic at the same time.

(a) If both assertion and reason are true and reason is the correct explanation of assertion.

(b) If both assertion and reason are true, but reason is not the correct explanation of assertion.

(c) If assertion is true, but reason is false.

(d) If assertion is false, but reason is true.

Ans. (a) If both assertion and reason are true and reason is the correct explanation of assertion.

Explanation :

It is necessary to have all three at the same time for ozone layer to deplete. Thus, both assertion and reason are true and reason is the correct explanation of the assertion.

106. Assertion: Plastics are non-biodegradable.

Reason: Enzymes cannot degrade plastics.

(a) If both assertion and reason are true and reason is the correct explanation of assertion.

(b) If both assertion and reason are true, but reason is not the correct explanation of assertion.

(c) If assertion is true, but reason is false.

(d) If assertion is false, but reason is true.

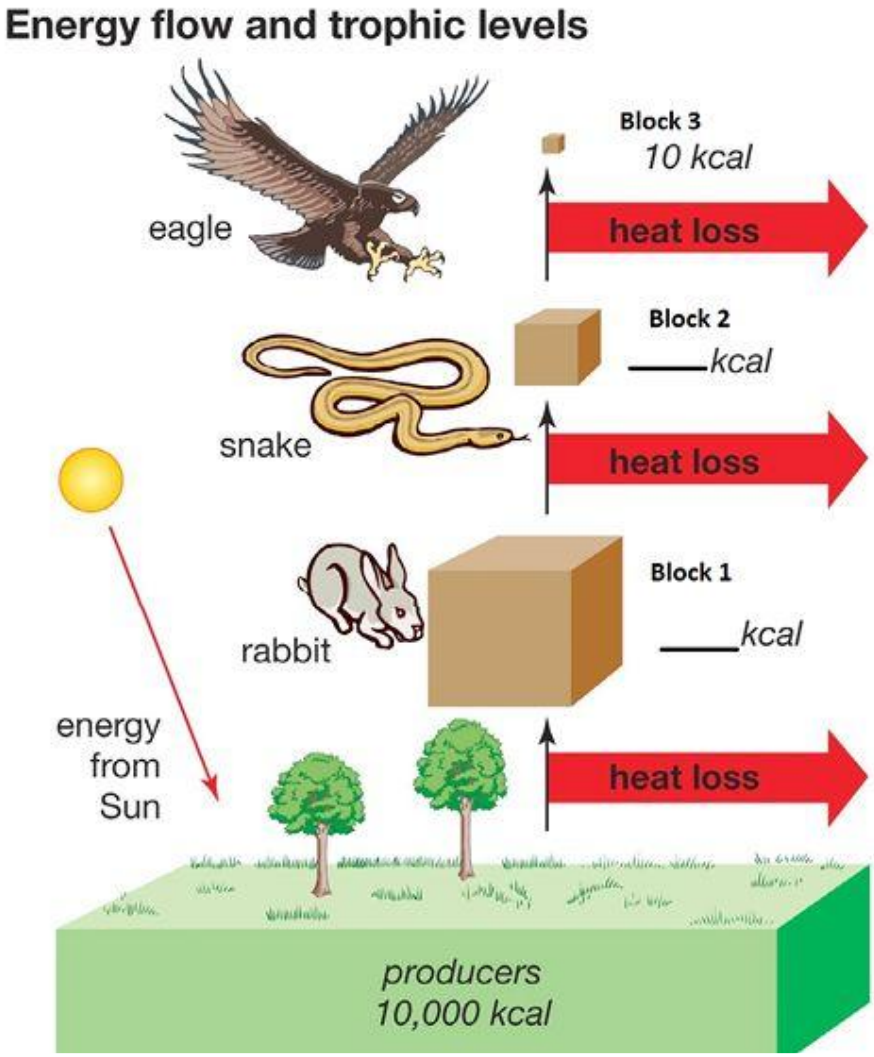
Ans. (a) If both assertion and reason are true and reason is the correct explanation of assertion.

Explanation :

Substances which cannot be decomposed by the action of microorganisms are known as non-biodegradable substances. Mircroorganisms release enzymes which decompose the materials but these enzymes are specific in their action that is why enzymes cannot decompose all the materials. Thus, both assertion and reason are true and, reason is the correct explanation of the assertion.

Case Based Questions

107 . Refer the figure below carefully and answer the following questions.



I. How are the organisms on Block 1 level best described as:

(a) primary consumers

(b) secondary consumers

(c) tertiary consumers

(d) decomposers

II. In the figure given above what would be the amount of energy available at block 1 and block 2 levels if energy at producer level is 10,000 kcal?

(a) 1000 kcal and 100 kcal

(b) 100 kcal and 1000 kcal

(c) 10,000 kcal and 100 kcal

(d) 100 kcal and 10 kcal

III. What is represented by eagle at black 3?

(a) decomposers

(b) secondary consumers

(c) tertiary consumers

(d) predator

IV. After solar energy enters our atmosphere, which statement does not hold good regarding subsequent the events?

(a) Most of the radiation is absorbed by the Earth's surface and used to warm the surface.

(b) Some of the solar radiation is reflected by Earth and atmosphere.

(c) Some of the infra-red radiation is absorbed by the atmosphere and re-emitted in all directions by the green-house gases.

(d) No infra-red radiation is emitted by Earth.

V. Energy flow diagram definitely conveys all the points given below, except:

(a) the flow of energy is multi-directional.

(b) the energy captured by the autotrophs does not return to the solar input.

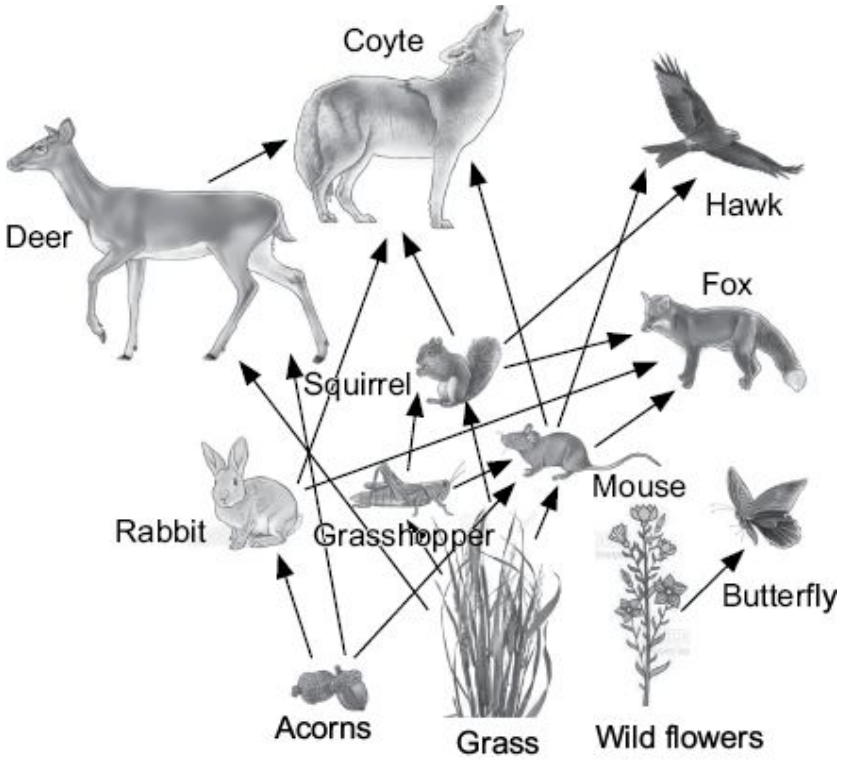
(c) the energy that passes to the herbivores does not come back to the autotrophs.

(d) the energy moves progressively through the various trophic levels and it is no longer available to the previous level.

Ans. (i) (a) primary consumers
(ii) (a) 1000 kcal and 100 kcal

Ans. (iii) (c) tertiary consumer
(iv) (d) No infra-red radiation is emitted by Earth
(v) (a) the flow of energy is multi-directional

108. Study the figure given below carefully and answer the following questions.



I. What is the name of the interrelation shown in this figure?

(a) Food chain

(b) Food web

(c) Trophic level

(d) Energy conservation

II. The series of branching lines shown in above figure appears in nature because:

(a) the length and complexity of food chains vary.

(b) each organism is generally eaten by two or more other kinds of organisms.

(c) straight line food chains are not practically possible.

(d) all of the above

III. Which one of the following is true for a food web?

(a) Food web does not help in stabilising the ecosystem.

(b) secondary consumers cannot feed on other species in the event of decrease in population of prey.

(c) A food web provides alternative pathways of food availability.

(d) Food webs are straight.

IV. The main source of energy flowing in any food web is the:

(a) animals

(b) consumer

(c) primary producer

(d) sun

V. In the picture shown above concentration of a chemical absorbed from soil is likely to be highest in:

(a) wildflowers

(b) grass

(c) coyote

(d) rabbit

Ans. (i) (b) Food web
(ii) (d) all of the above
(iii) (c) A food web provides alternative pathways of food availability.
(iv) (d) sun
(v) (c) coyote

109

. Read the following and answer the following questions.

The energy flow in the ecosystem is one of the major factors that support the survival of such a great number of organisms. For almost all organisms on earth, the primary source of energy is solar energy. It is amusing to find that we receive less than 50 per cent of the sun's effective radiation on earth. When we say effective radiation, we mean the radiation, which can be used by plants to carry out photosynthesis.

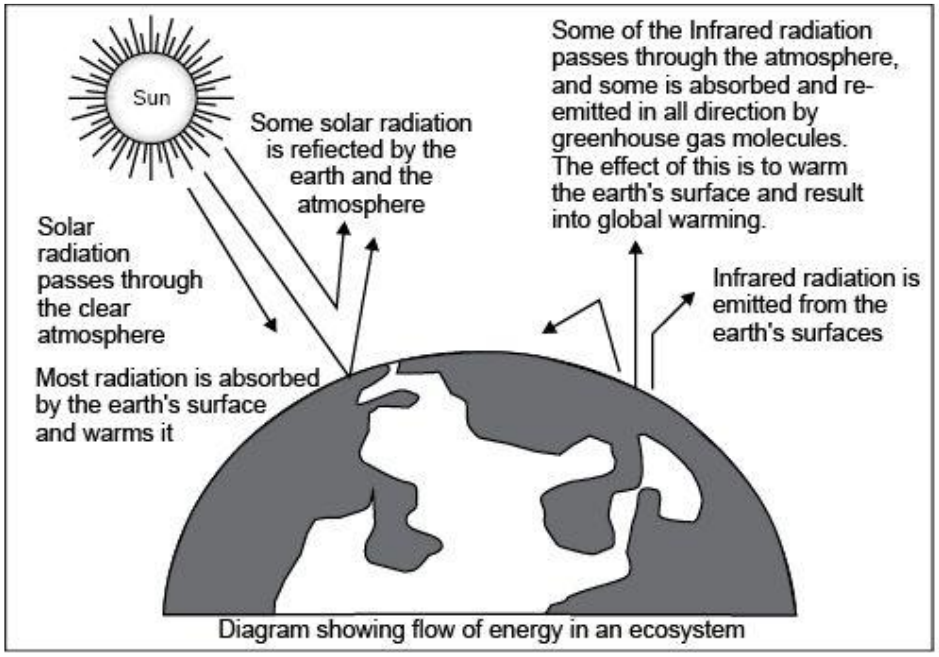


Diagram showing flow of energy in an ecosystem

I. Every food chain in the ecosystem begins with _____. Which are the original?

(a) saprophytes

(b) parasites

(c) producers

(d) none of these

II. If 100 J energy is available at the producer level in a food chain

then the energy available to the secondary consumer will be:

(a) 10 J

(b) 0.1 J

(c) 1 J

(d) 0.01 J

III. The constituents which do not form eco-system are:

(a) Biotic constituents

(b) Plastic bags

(c) Abiotic constituents

(d) All of the above

IV. Which of the two sets belong to the same trophic level?

(a) Frog : Lizard

(b) Rabbit : Tiger

(c) Vulture : Crow

(d) Deer : Hawk

V. A food chain comprising birds, green plants, fish and man. The concentration of harmful chemical entering the food chain will be maximum in:

(a) plant

(b) man

(c) birds

(d) fish

Ans. (i) (c) Producers
(ii) (c) 1 J
(iii) (b) Plastic bags
(iv) (a) frog : lizard
(v) (b) man

110. Read the following and answer the following questions. [CBSE Question Bank]

Frothing in Yamuna:

The primary reason behind the formation of the toxic foam is high phosphate content in the wastewater because of detergents used in dyeing industries, dhobi ghats and households.

Yamuna's pollution level is so bad that parts of it have been labelled 'dead' as there is no oxygen in it for aquatic life to survive.

(i) Predict the pH value of the water of river Yamuna if the reason for froth is high content of detergents dissolved in it.

(a) 10-11

(b) 5-7

(c) 2-5

(d) 7

(ii) Which of the following statements is correct for the water with detergents dissolved in it?

(a) Low concentration of hydroxide ion (OH^-)and high concentration of hydronium ion (H_3O^+)

(b) High concentration of hydroxide ion (OH^-)and low concentration of hydronium ion (H_3O^+)

(c) High concentration of hydroxide ion (OH^-) as well as hydronium ion (H_3O^+)

(d) Equal concentration of both hydroxide ion (OH^-) and hydronium ion (H_3O^+).

(iii) The table provides the pH value of four solutions P, Q, R and S:

P	2
Q	9
R	5
S	11

Which of the following correctly represents the solutions in increasing order of their hydronium ion concentration?

(a) P > Q > R > S

(b) P > S > Q > R

(c) S < Q < R < P

(d) S < P < Q < R

(iv) High content of phosphate ion in river Yamuna may leads to:

(a) decreased level of dissolved oxygen and increased growth of

algae.

(b) decreased level of dissolved oxygen and no effect of growth of algae.

(c) increased level of dissolved oxygen and increased growth of algae.

(d) decreased level of dissolved oxygen and decreased growth of algae.

(v) If a sample of water containing detergents is provided to you, which of the following methods will you adopt to neutralise it?

(a) Treating the water with baking soda.

(b) Treating the water with vinegar.

(c) Treating the water with caustic soda.

(d) Treating the water with washing soda.

Ans. (i) (a) 10-11

(ii) (b) high concentration of hydroxide ion (OH^-)and low concentration of hydronium ion (H_3O^+)

(iii) (c) S < Q < R < P

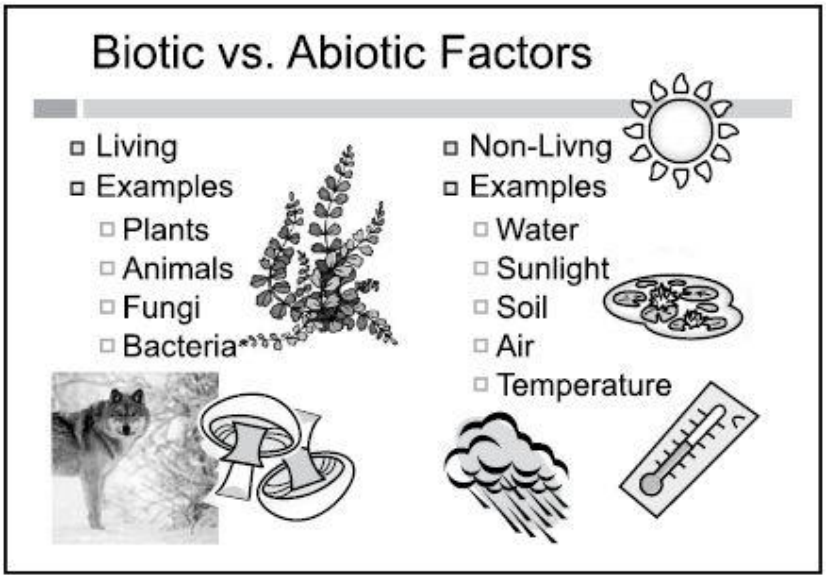
(iv) (a) decreased level of dissolved oxygen and increased growth of algae.

(v) (b) Treating the water with vinegar.

111. Read the following and answer the following questions. [CBSE Question Bank]

Biosphere is a global ecosystem composed of living organisms and abiotic factors from which they derive energy and nutrients. The

ecosystem is defined as structural and functional unit of the biosphere comprising of living and non-living environment that interact by means of food chains and chemical cycles resulting in energy flow, biotic diversity and material cycling to form a stable, self-supporting system.



(i) Which trophic level is incorrectly defined?

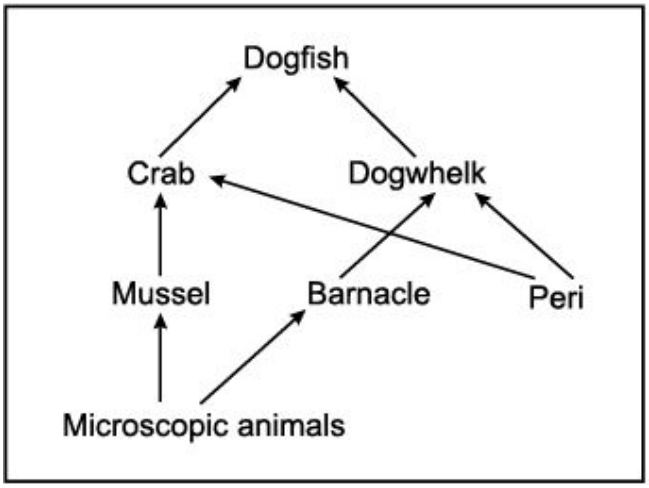
(a) Carnivores–secondary or tertiary consumers.

(b) Decomposers–microbial heterotrophs

(c) Herbivores–primary consumers

(d) Omnivores–molds, yeast and mushrooms

(ii) The diagram below shows a food web from the sea shore.



The mussel can be described as:

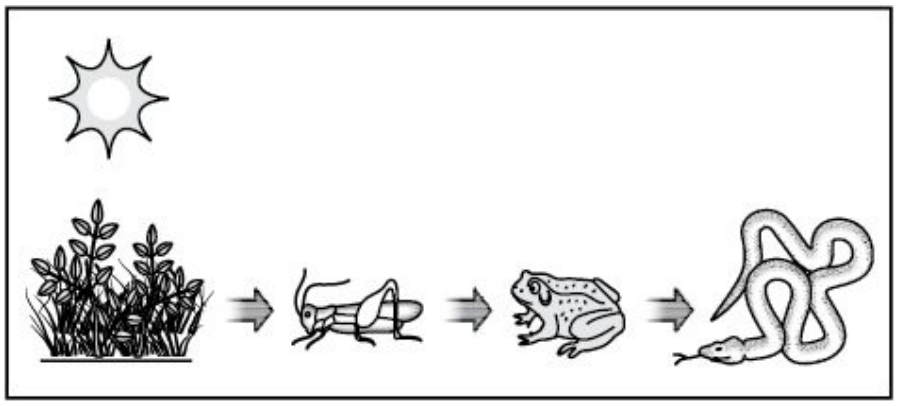
(a) Producer

(b) Primary consumers

(c) Secondary consumer

(d) Decomposer

(iii) The given figure best represents:



(a) Grassland food chain

(b) Parasitic food chain

(c) Forest food chain

(d) Aquatic food chain

(iv) Consider the following statements concerning food chains:

(i) Removal of 80% tigers from an area resulted in greatly increased growth of vegetation

(ii) Removal of most of the carnivores resulted in an increased population of herbivores.

(iii) The length of the food chains is generally limited to 3 – 4 trophic levels due to energy loss.

(iv) The length of the food chains may vary from 2 to 8 trophic levels.

Which two of the above statements are correct?

(a) (i), (iv)

(b) (i), (ii)

(c) (ii), (iii)

(d) (iii), (iv)

(v) Which of the following groups of organisms are not included in ecological food chain?

(a) Carnivores

(b) Saprophytes

(c) Herbivores

(d) Predators

Ans. **(i)** (d) Omnivores–molds, yeast and mushrooms

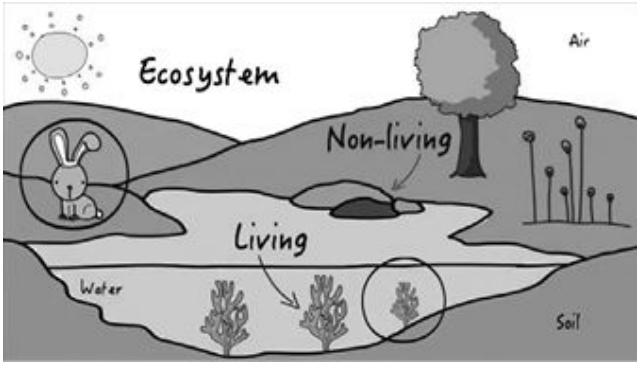
(ii) (c) Secondary consumers

(iii) (a) Grassland food chain

(iv) (c) (ii), (iii)

(v) (b) Saprophytes

112. Take a look at the picture carefully and answer the following questions.



(i) While designing an aquarium what are the things you would like to include to make it a complete ecosystem?

(a) Fishes, aquatic plants, pleco fish (algae eating fish), aerator, pebbles, fish food.

(b) Fishes, grass, plants, pleco fish (algae eating fish), fish food.

(c) Fishes, plants, oxygen pump, food, stones.

(d) Animals, fishes, plants, oxygen pump, food.

(ii) Which one of the following is not a producer?

(a) Blue green algae

(b) Cactus

(c) Fungi

(d) Spinach

(iii) Herbivores, carnivores, omnivores, and parasites all come under:

(a) producers

(b) consumers

(c) ecosystem

(d) food web

(iv) Which one is not true about an ecosystem?

(a) Ecosystem consists of living and non-living things both.

(b) Living organisms interact with each other.

(c) Growth, reproduction, and other activities of living organisms are not affected by the abiotic components of ecosystem.

(d) A garden is considered an ecosystem.

(v) Ecosystems can be of how many types?

(a) Two types – man-made and natural

(b) Two types – terrestrial and aquatic

(c) Four types – forests, ponds, lakes, and garden

(d) All of the above imply as correct answer.

Ans. (i) (a) Fishes, aquatic plants, pleco fish (algae eating fish), aerator, pebbles, fish food

(ii) (c) Fungi

(iii) (b) consumers

(iv) (c) Growth, reproduction, and other activities of living organisms are not affected by the abiotic components of ecosystem

(v) (d) All of the above imply as correct answer.

113. Read the passage and answer the following questions.

Humans modify the environment around them through agriculture and urbanisation as the major activities. Human impact on the environment is so substantial that there is nothing left called pristine nature or ecosystems untouched by human intervention. The major impact of these interventions is ever increasing levels of all forms of pollution on our Earth. Waste disposal and depletion of ozone layer are two major concerns in this world.

(i) Which one of the following sentences is not true about ozone?

(a) Ozone is a deadly poison.

(b) Ozone protects us from harmful UV rays emitted by the sun.

(c) Ozone is formed from oxygen in presence of UV rays.

(d) Ozone causes skin cancer in humans.

(ii) Which one of the below given reason holds good for increase in the amount of waste generated by humans?

(a) Religious practices

(b) Change in packaging style and products

(c) Home cooking

(d) Use of plant-based products

(iii) An environment enthusiast would certainly not choose one of these for a tea party at her home.

(a) Paper cups

(b) Thermocol cup

(c) Steel cup

(d) Earthen cups

(iv) Which of the following groups contains a non-biodegradable item?

(a) Grass, flowers, lime-juice, and leather.

(b) Grass, wood, leather, and plastic.

(c) Cake, wood, flowers, and grass.

(d) Fruit-peels, cake, leather, and lime-juice.

(v) Which of the following waste management plan is likely to work the best?

(a) Integrated waste management plan

(b) Recycling waste management plan

(c) Reducing waste management plan

(d) Reusing waste management plan

Ans. (i) (d) Ozone causes skin cancer in humans.

(ii) (b) Change in packaging style and products

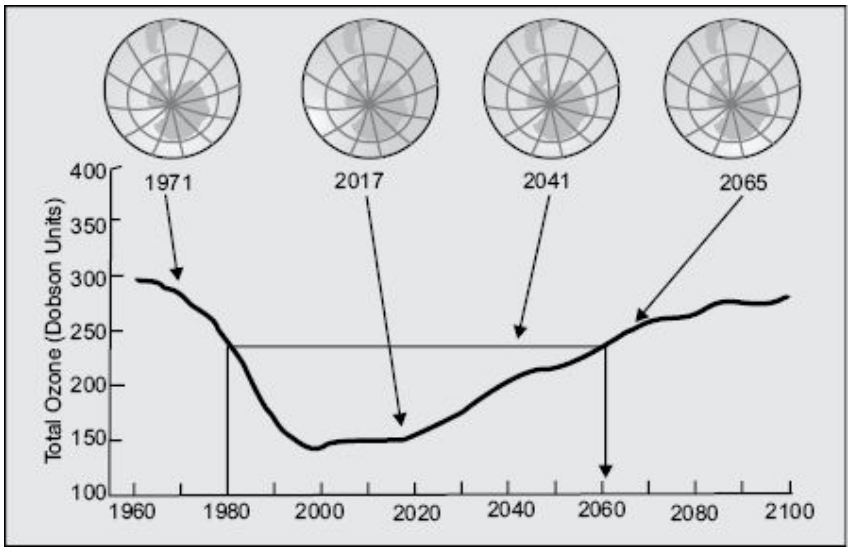
(iii) (b) Thermocol cup

(iv) (b) Grass, wood, leather, and plastic

(v) (a) Integrated waste management plan

114. Read the following and answer the following questions.

The amount of ozone in the atmosphere has begun to drop sharply from 1980s. This decrease has been linked to synthetic chemicals. In 1987, the United Nations Environment Programme (UNEP) succeeded in forging an agreement to freeze harmful chemicals production at 1986 levels.



(i) At what level of atmosphere ozone layer is found?

(a) Troposphere

(b) Stratosphere

(c) Biosphere

(d) Ionosphere

(ii) At higher level of atmosphere radiations act upon oxygen molecule to form:

(a) oxygen

(b) ozone

(c) carbon monoxide

(d) all of the above

(iii) What is the major cause of ozone depletion?

(a) Chlorofluorocarbons

(b) Hydrochlorofluorocarbons

(c) Carbon tetrachloride and methyl chloroform

(d) All of the above

(iv) Which of the following sources is responsible for the depletion of ozone layer?

(a) 

(b) 

(c) 

(d) All of the above

(v) In which of the following countries Ozone hole has appeared?

(a) Africa

(b) North America

(c) Japan

(d) Antarctica

Ans. (i) (b) Stratosphere

(ii) (b) Ozone

(iii) (d) All of the above

(iv) (d) All of the above

(v) (d) Antarctica

115. Read the passage carefully and answer the following questions from Q 115 (i) to 115 (v).

The waste generated by humans has been detrimental to our environment and is causing threat to our ecosystem. We are generating too much trash and failing to deal with it in a sustainable way. Every day we are disposing tons and tons of non-biodegradable and unrecyclable waste into our oceans and landfills. Plastic waste is an example. In 2017 the Environmental Protection Agency in the US calculated that the total generation of municipal solid waste in the United States in 2017 was 267.8 million tons; compared with 2015 levels, it was a 5.7 million increase.

(i) Non-biodegradable substances are:

(a) broken down by biological processes.

(b) not broken down by biological processes.

(c) prepared by biological processes.

(d) cannot be broken down by physical processes.

(ii) Which one of the following is not likely to happen in the case of solid waste disposal in landfills?

(a) Unpleasant odours

(b) Ground water pollution

(c) Fires and explosions

(d) Infrared radiation

(iii) Humans are not supposed to get any energy by eating coal, because:

(a) coal is harmful.

(b) coal is burnt.

(c) humans do not have enzymes to digest coal.

(d) coal is black.

(iv) Man-made plastics are not bio-degradable because:

(a) they are hard.

(b) bacteria and saprophytes do not contain enzymes to decompose plastics.

(c) plastics are made in industries.

(d) plastics do not absorb water.

(v) The depletion in the Ozone layer is caused by _____ .

(a) nitrous oxide

(b) carbon dioxide

(c) chlorofluorocarbons

(d) methane

Ans. (i) (b) not broken down by biological processes.

(ii) (d) Infrared radiation.

(iii) (c) humans do not have enzymes to digest coal.

(iv) (b) bacteria and saprophytes do not contain enzymes to decompose plastics.

(v) (c) chlorofluorocarbons.

Reasoning Based Questions

116. Why do harmful chemicals concentrate as we go up in a food chain?

Ans. The process of increasing concentration of harmful chemicals at each trophic level of a food chain is called biomagnification. These substances are non-biodegradable so they persist in environment for a long time and are not easily degraded or excreted and when they move up in the food chain their concentration goes on increasing and gets accumulated in tissues or internal organs.

117. Why does vegetarian habit help us in getting more energy? In terms of energy who is at an advantageous position (vegetarian or a non-vegetarian) and Why?

Ans. Vegetarians obtain food directly from plants, while non-vegetarians get food from animals which feed upon plants. As a result animals which are herbivores get 10% of energy from plants suppose 100 J according to 10% rule. When non-vegetarians feed upon these animals they get only 10 J which is 10% of 100 J. But vegetarians which feed directly on plants get 100 J hence vegetarians are at an advantageous position and get more energy than non-vegetarians.

118. The first trophic level in a food chain is always a green plant. Why?

Ans. Green plants are the producers which prepare their own food by utilizing solar energy from inorganic sources and all other living organisms depends on them for food. Herbivores and carnivores depend upon green plants either directly or indirectly for food. Hence the first trophic level in a food chain is always a green plant.

119. Why is damage to the ozone layer a cause of concern? What steps are being taken to limit this damage?
[NCERT]

Ans. Ozone layer is found in stratosphere which prevents the harmful UV rays of sun from entering earth's surface. Various ozone depleting substances like CFCs cause a great damage to ozone

layer thus leading to its depletion. So harmful UV rays from sun can easily pass through this layer and cause various genetic disorders, mutations, cancer, eye diseases etc., in humans. UV rays also affect plants and animals. In 1987, **UNEP [United Nations Environment Programme]** succeeded in forging an agreement called Montreal Protocol which states that to reduce the use of CFCs and replace CFCs with other alternatives.

120. Why is food chain having two trophic levels most advantageous in terms of energy?

Ans. A food chain having two trophic levels only would minimise the energy lost as heat which is an advantage in terms of energy.

121. Why is lake considered to be a natural ecosystem?*

Ans. A lake is considered as a natural ecosystem as it consists of both biotic and abiotic components and these components are interdependent on each other and do not require any human interference for their sustenance.

122. Give reason to justify the following:*

(i) The existence of decomposers is essential in a biosphere.

(ii) Flow of energy in a food chain is unidirectional.

Ans. (i) Decomposers breakdown complex organic substances into simple inorganic substance. These simple substances get mixed up in the soil and are used as nutrients by the producers. Thus, they replenish the soil naturally and help in degradation of biodegradable wastes. So, the existence of decomposers is essential in a biosphere as they maintain the balance in the

ecosystem and provide space for new life in ecosystem.

(ii) In a food chain the energy moves progressively through the various trophic levels and it is no longer available to the previous trophic level. Energy captured by autotrophs cannot be reverted back to sun but it passes to herbivores then to carnivores following 10% Law. Thus flow of energy from sun to autotrophs then to heterotrophs to carnivores is unidirectional.

123. Why is it necessary to conserve the environment?

Ans. It is necessary to conserve the environment to prevent the damage to the environment and to protect the endangered species.

124. Why did United Nations act to control the production of CFCs used in refrigerators?

Ans. CFCs is an ozone layer depleting substance which is used in refrigerators, air-conditioners etc. So United Nations act to control the production of CFCs used in refrigerators.

125. Why is improper disposal of waste a curse to environment?

Ans. Improper disposal of waste would lead to environmental pollution, which causes harmful effects on living organisms like plants, animals, human beings etc.

126. We do not clean ponds or lakes, but an aquarium needs to be cleaned. Why?

Ans. Ponds or lakes are natural, self-sustaining and complete ecosystem. They have decomposers like bacteria or fungi which break down the waste material

and hence they remain clean. But an aquarium is a man-made, incomplete ecosystem and they do not have decomposers to clean the waste material. So an aquarium needs to be cleaned but we do not clean ponds or lakes.

127. Why non-biodegradable substances persist in environment for longer time?

Ans. Non-biodegradable substances cannot be degraded by microbes through biological process to simpler forms hence they persist in environment for longer time.

128. Why should biodegradable and non-biodegradable wastes be discarded in two separate dustbins?

Ans. Biodegradable wastes can be easily degraded by natural organisms like bacteria and fungi but non-biodegradable wastes cannot be degraded in a natural way by the action of microbes, they stay in environment as such. There are various techniques like recycling to degrade these non-biodegradable substances. Hence both biodegradable and non-biodegradable wastes should be discarded in two separate dustbins.

129. Why are some substances biodegradable and some non-biodegradable? [NCERT]

Ans. There are various types of waste substances released into our environment. Those substances which are degraded into simpler form naturally by the action of microbes like bacteria or fungi are called biodegradable substances. Examples–Vegetables and fruits peels, paper, agricultural wastes etc. Those substances which cannot be degraded into simpler forms naturally by the action of microbes are called non-biodegradable substances. Examples–Aluminium foils, plastic bottles, glass apparatus etc.

Very Short Answer Type Questions

130

. What is the role of decomposers in the ecosystem?

[NCERT]

Ans. Decomposers act upon dead and decay organisms and convert them into simpler forms. These simple substances get mixed up in the soil and are used as nutrients by the producers. From producers it goes to consumers and so on. They maintain the balance in the ecosystem and provide space for new life in ecosystem.

131

. What will happen if we kill all the organisms in one trophic level? [NCERT]

Ans. If we kill all the organisms of one trophic level, it will lead to an increase in the number of organisms at the lower trophic level and decrease in the number of organisms at the higher trophic level. This will result in disruption in the food web and hence the ecosystem.

132

. In the following food chain, grass provides 4000 J of energy to the grasshopper. Grass, grasshopper, frogs, snakes.

How much energy will be available to snakes and frogs?

Ans. If grass provides 4000 J energy, then according to 10 per cent law, it will give 10% of its energy to next trophic level.

Hence,

Grass ----> Grasshopper ------->

(4000 J) (400 J)

Frogs -------> Snakes (40 J) (4 J)

So, for snakes and frogs, 4 J and 40 J energy will be available by 10 per cent law

133. Consider a food chain of the following:

Fish, crab, plankton, shark.

Arrange the above chain in proper order of trophic level. Assign trophic level to shark.

Ans. Plankton → Crab → Fish → Shark.

Shark occupies fourth tropic level (Tertiary consumer).

134. What limits the number of trophic levels in a food chain?

Ans. The flow of energy in each trophic level follows 10% law *i.e.*, only 10% of the energy is available to the next higher trophic level hence the amount of energy goes on decreasing at each trophic level which limits the number of trophic levels in a food chain.

135. Write the full name of the group of compounds mainly responsible for the depletion of ozone layer?

Ans. CFCs (Chlorofluorocarbons) are mainly responsible for the depletion of ozone layer.

136. Mention one negative effect of our affluent lifestyle on the environment?

Ans. The affluent life style of few persons results in overuse of natural resources and in long term effects it can led to scarcity of resources. For example: usage of personal vehicles instead of public transport increases consumption of fuel, pollution, use of air conditioners, refrigerators etc., which contain CFCs when released into atmosphere leads to depletion of ozone layer.

137

. In the following food chain, 100 J of energy is available to the lion. How much energy was available to the producer?****

Plant → Dear → Lion

Ans. There are three trophic levels the producer, the consumer and the secondary consumer according to 10 per cent law of energy transfer in trophic level, If the lion has 100 J of energy then, deer will have:

According to 10% law 100 J of energy is available to lion, so dear will get:

10% of x = 100 J

x = 1000 J

Plant is the producer, it will have:

10% of y = 1000

y = 10000 J

138

. In the following food chain plants provide 500 J of energy to rats. How much energy will be available to hawks from snakes?*

Plants → Rats → Snakes → Hawks

Ans. 500 J of energy is available to rats from plants is then according to 10 per cent law 50 J of energy will be available to snakes and

only 5 J of energy will be available to hawks.

139. In a food chain of frog, grass, insect and snake assign trophic level to frog.*

Ans. Frog will be at third trophic level.

Grass ⟶ Insect ⟶ Frog ⟶ Snake

140. What will be the amount of energy available to the organisms of the second trophic level of a food chain, if the energy available at the first trophic level is 10,000 J?*

Ans. 1000 J amount of energy will be available to the organisms of the second trophic level of a food chain, if the energy available at the first trophic level is 10,000 J.

141. Why is biogas considered an excellent fuel?*

Ans. Biogas is considered as an excellent fuel because:

(i) It causes no pollution, as it is environmental friendly.

(ii) Biogas plant from which biogas is produced serves as an excellent way of waste disposal.

(iii) It is economical and produces a large amount of heat per unit mass.

142. Write the name of the main constituent of biogas. Also state its percentage.*

Ans. Methane is the main constituent of biogas. Its formula is CH_4. Its percentage is approximately 50-75%.

143

. If a harmful chemical enters a food chain comprising snakes, hawks, mice and plants which of these organisms is likely to have maximum concentration of the harmful chemicals in its body ?

Ans. Hawks are likely to have maximum concentration of the harmful chemicals in their body as they are placed at top in this example of food chain.

144

. Expand the term UNEP.

Ans. United Nations Environment Programme.

145

. Write the common food chain of a pond ecosystem.

Ans. Phytoplanktons → Zooplanktons → Fish → Bird

146

. What is an ecosystem?*[CBSE, 2017]

Ans. An ecosystem is a self-sustaining system where biotic and abiotic organisms of various communities interact with each other. Ponds, forests, grasslands etc., are the few examples of ecosystem.

147

. Why is forest considered a natural ecosystem?

Ans. Forests are considered as natural ecosystem because they have species of plants and animals that grow without human intervention and they are naturally sustainable.

148

. Name two natural ecosystems.*

Ans. River, pond, forest, ocean etc., are natural ecosystems.

149. Select the mis-matched pair and correct it:

(a) Detritivores–Organisms which feed on detritus and degrade into simple substances.

(b) Ecosystem–Abiotic and biotic components of environment.

(c) Trophic level–It is made of interlinking of food chains

(d) Producers–They synthesize their own food from inorganic substances

Ans. (c) Trophic levels are distinct sequential steps in the food chain where transfer of energy occurs.

150. What are the by-products of fertilizer industries? How do they affect the environment?

Ans. The by-products of fertilizer industries are oxides of nitrogen and sulphur which when released into atmosphere causes air pollution. They are mainly responsible for formation of acid rain. Acid rain damages marbles of monuments, statues etc. Acid rain also reduces the fertility of soil by decreasing the pH of soil thus growth of food crops is affected. They affect the microbes in soil and aquatic organisms in water bodies.

151. How can you help in reducing the problem of waste disposal? Give any two methods. [NCERT]

Ans. We can help in reducing the problem of waste disposal by the following two methods:

(a) By separating biodegradable substances from non-biodegradable substances.

(b) By putting the biodegradable organic waste into compost pits dug in the ground and preparing compost.

152. Why is improper disposal of waste a curse to environment ?

Ans. Improper disposal of waste would lead to environmental pollution, which causes harmful effects on living organisms like plants, animals, human beings etc.

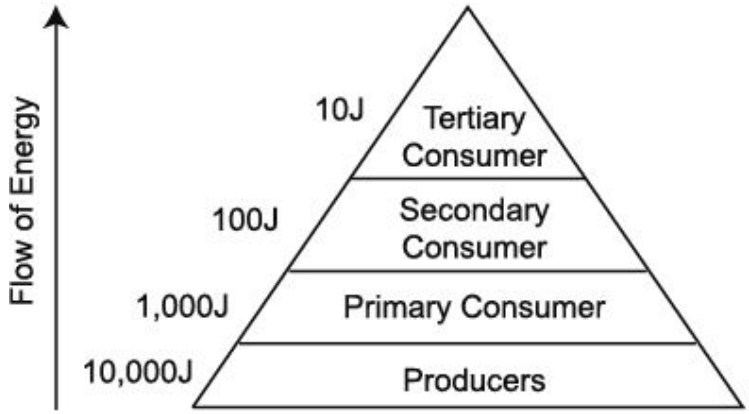
153. List two non-biodegradable wastes generated daily in kitchen which can be recycled ?

Ans. Milk bags, tin cans are non-biodegradable wastes generated daily in kitchen which can be recycled.

Short Answer Type Questions

154. Define an ecosystem. Draw a block diagram to show the flow of energy in an ecosystem.***

Ans. Ecosystem refers to the interaction of all the biotic and abiotic components present in a particular area. Energy flows across the trophic levels following the 10% law. Only 10% of the energy, available to a trophic level is passed on to the next trophic level.



155

. What are trophic levels? Give an example of food chain and state the different trophic levels in it?

[NCERT]

Ans. The distinct sequential steps or levels in the food chain where transfer of energy occurs are referred to as trophic levels.

Example of a food chain is:

Grass → Grasshopper → Lizard → Snake → Hawk

Grass is producer, it belongs to first trophic level. Grasshopper is primary consumer, it belongs to second trophic level. Lizard is secondary consumer, it belongs to third trophic level. Snake is tertiary consumer and it belongs to fourth trophic level and hawk is quaternary consumer, it belongs to fifth trophic level.

156

. Will the impact of removing all the organisms in a trophic level be different for different trophic levels? Can the organisms of any trophic level be removed without causing any damage to the ecosystem? [NCERT]

Ans. Yes, the impact of removing all the organisms in a trophic level will be different for different trophic levels. For example, If all producers will be removed then all herbivores will die of

starvation. The various categories of carnivores which depend on herbivores for food will also be affected. Similarly if we will remove all organisms of higher trophic level the number of organisms in lower trophic level will increase thus creating imbalance in the ecosystem. So if organisms of any trophic level would be removed it will cause damage to the ecosystem.

157. What is biological magnification? Will the levels of this magnification be different at different levels of the ecosystem? [NCERT]

Ans. The increase in concentration of harmful toxic substances in the body of organisms at each trophic level of a food chain is called biological magnification. Yes, the levels of this magnification will be different at different levels of the ecosystem because the concentration of chemicals goes on increasing at different trophic levels. It is maximum at higher trophic levels and minimum at lower trophic levels. Suppose a food chain is
Grass → Rabbit → Eagle, it will be the highest in eagle and minimum in grass.

158. What is a food web? Give few characteristics of a food web? Give an example of a food web?

Ans. Food web is a network of food chains which become interconnected at various trophic levels so as to form a number of feeding connections amongst different organisms of a biotic community.

Some characteristics of a food web are:

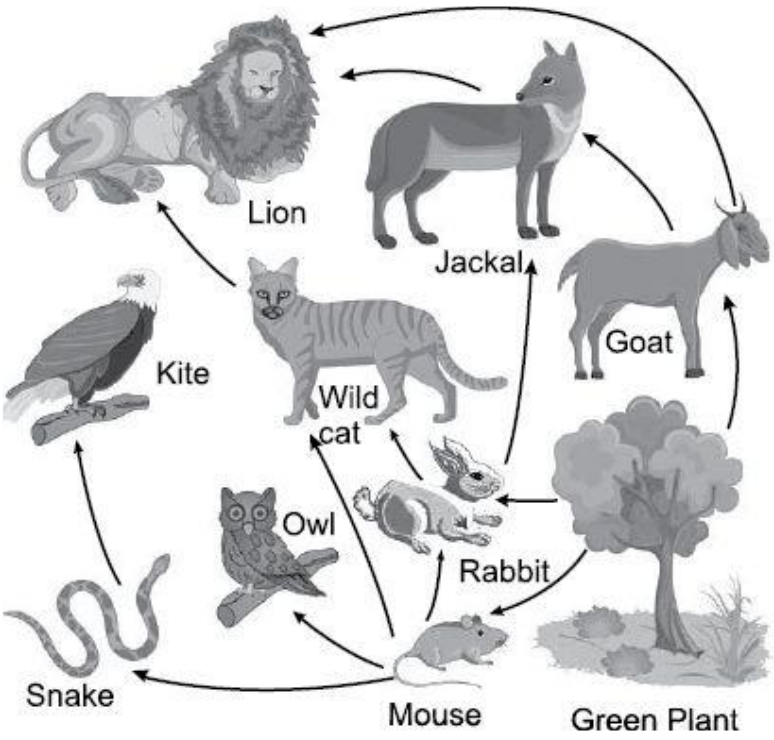
(a) Food web is an interlink of different food chains.

(b) It provides alternative pathways of food availability.

(c) Due to greater alternatives for food, it makes the ecosystem stable.

(d) It helps in development of an ecosystem.

Example of food web:



159

. What are the characteristics of energy transfer in biosphere?

Ans. The characteristics of energy transfer in biosphere are:

(a) The ultimate source of energy is sun and is converted from one form to another.

(b) Energy gets continuously transferred through food chain and energy flow is unidirectional.

(c) There is loss of some energy during transfer from one trophic level to the next.

(d) Only 10% of energy is transferred from one trophic level to the next. The solar energy trapped by producers does not revert back to the sun.

(e) At each trophic level, some of the energy is utilized by organisms, rest is lost to environment and only 10% is available to the next trophic level.

160

. What are decomposers? What will be the consequence of their absence in an ecosystem?

Ans. Decomposers are the microbes that feed on dead and decay organisms. Dead plants and animals will get accumulated in the ecosystem as there would be no decomposers to decompose them. The decomposers will act upon dead and decayed organisms into simpler forms and get mixed in the soil which is used by producers again. But in the absence of decomposers this whole process would not occur and the dead organisms will get accumulated in the ecosystem.

161

. "The maximum concentration of harmful chemicals accumulates in human beings." State the phenomenon involved and justify this statement.

Ans. Human beings are always placed at the top of a food chain. The concentration of harmful chemicals [non-biodegradable substance] goes on increasing at every trophic level as a result as human beings are placed at the apex of every food chain so maximum concentration of harmful chemicals get accumulated in their body. This phenomenon is called biomagnification.

162

. What is ozone and how does it affect any ecosystem? [NCERT]

Ans. Ozone is a triatomic molecule made of three oxygen atoms. It is present as a layer in stratosphere which prevents the harmful UV radiations of sun from entering the earth's surface, thus protecting us from skin cancers, genetic mutations, eye diseases like cataract etc. Ozone is a molecule made from three atoms of oxygen.

The harmful chemicals like CFCs which are used as coolants in refrigerators, air conditioners when released into atmosphere break down the ozone thus leading to depletion of ozone layer. Hence harmful UV rays can easily pass through ozone layer and cause various types of disorders in humans, plants and animals.

163. Show the reactions of formation of ozone from oxygen in the atmosphere? Name the pollutant and its role in depletion of ozone layer.

Ans. Ozone is formed by absorption of UV rays coming from sun.

$$O_2 \leftrightarrow O + O$$
$$O + O_2 \rightarrow O_3$$

UV radiations splits oxygen molecules to oxygen atoms and the oxygen atoms combine with oxygen molecule to form ozone.

CFCs are mainly responsible for ozone layer depletion. CFCs release chlorine atoms which break ozone to oxygen. More amounts of CFCs thus released will cause depletion of ozone layer.

164. You have been selected to talk on "Ozone layer and its protection" in the school assembly on Environment Day".*

(i) Why should ozone layer be protected to save the environment?

(ii) List any two ways that you would stress in your talk to bring in

awareness among your fellow friends that would also help in protection of ozone layer as well as the environment.

Ans. (i) Ozone layer is present in stratosphere which prevents the ultra-violet rays from sun to penetrate the Earth's surface. But due to depletion of ozone layer ultra-violet rays enter into the surface of Earth and cause many health hazards like skin cancer, cataract in eyes etc. So, it is necessary to save the environment by protecting the ozone layer.

(ii) Some of the ways to protect the ozone layer are:

(a) Banning the use of CFC's and other ozone depleting substances.

(b) Reducing the use of fluorescent lights, limited use of supersonic planes, control over large scale nuclear explosions etc.

165

. Write the essential function performed by ozone at the higher levels of the Earth's atmosphere? How is it produced? Name the synthetic chemicals mainly responsible for the drop of amount of ozone in the atmosphere. How can the use of these chemicals be reduced?*

Ans. Ozone layer absorbs most of the harmful ultraviolet radiations from the sun to the earth. It is formed high up in the atmosphere by the action of ultraviolet radiation on oxygen gas. Chlorofluorocarbons are the synthetic chemicals responsible for the drop of amount of ozone in the atmosphere.

The use of these chemicals can be reduced by:

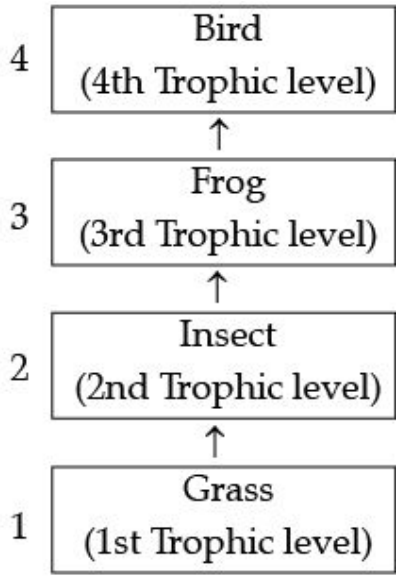
(a) Replacement of chloroflurocarbons with hydrochlorofluorocarbons because it breaks down more quickly.

(b) Safe disposal of old appliances such as refrigerators and freezers.

166

. Define a food chain. Design a terrestrial food chain of four trophic levels. If a pollutant enters at the producer level, the organisms of which trophic level will have the maximum concentration of the pollutant in their bodies? What is this phenomenon called?*

Ans. It is the sequence of arrangement of living organism in a community in which one organism consumes another organism to transfer food energy.



Grass ⟶ Insect ⟶ Frog ⟶ Bird

The organism at higer tropic level will have the maximum concentration of pollutants. This phenomenon is called biological magnification.

167

. Give some characteristics of a food chain?

Ans. Some characteristics of food chain are:

(a) A food chain always progress in a straight chain.

(b) There is an unidirectional flow of energy from sun to producers to a series of consumers.

(c) There are 3-4 trophic levels or maximum upto 5 levels in a food chain.

(d) It helps in understanding the food relationships and interaction among various living organisms present in an ecosystem.

168. Give any two examples of each:

(i) Organisms occupying the first trophic level.

(ii) Carnivores.

(iii) Biodegradable wastes of humans.

(iv) Ecosystem.

(v) Abiotic factors of an ecosystem

Ans. (i) Grass, green plants

(ii) Tiger, Eagle

(iii) Kitchen waste like peels of vegetables, fruits, left over foods and old newspaper.

(iv) Natural ecosystem includes forest, pond and artificial ecosystem which include garden, parks, crop fields.

(v) Physical factors like temperature, sunlight and edaphic factors like soil.

169. The following organisms form a food chain.

Insects, hawk, grass, snake, frog.

Arrange them in proper sequence to form a food chain? Which of these will have the highest concentration of non-biodegradable chemicals? Name the phenomenon associated with it?

Ans. Grass, insects, frog, snake, hawk.

Hawk will have the highest concentration of non-biodegradable chemicals as it is placed at the top level of the food chain. This phenomenon is called Biomagnification.

170

. Describe how decomposers facilitate recycling of matter in order to maintain balance in the ecosystem?

Ans. Decomposers act upon dead and decay organisms to convert them into simpler forms. These simple substances get mixed up in the soil and are used as nutrients by the producers. From producers it goes to consumers and so on. Thus there is recycling of matter which is done by decomposers that maintain the balance in the ecosystem.

171

. Briefly describe different methods of wastes disposal?

Ans. The various methods of waste disposal are:

(a) Land-fills: In urban areas wastes are filled or deposited in low lying areas. These are also known as dumping grounds where wastes are buried.

(b) Recycling of wastes: Some wastes like papers, plastics, metals etc., which can be recycled are send to special recycling treatment plants so that new substances can be made from them.

(c) Preparation of compost: Biodegradable wastes like kitchen

wastes, peels of fruits and vegetables etc., can be used to prepare compost which serves as a good manure to the plants.

(d) Incineration: Some wastes like medical wastes, chemical wastes are burnt at very high temperature in an incinerator and the ashes left behind are disposed by landfills.

(e) Production of biogas: Biodegradable wastes can be used in biogas plants to produce biogas which is used for several purposes like as a fuel.

172. What are the advantages of paper bags over plastic bags during shopping?

Ans. The advantages of paper bags are:

(a) They are made up of biodegradable material.

(b) They do not cause any environmental pollution.

(c) They can be recycled and reuse.

(d) They are capable of carrying more things and are washable.

(e) They are more strong and durable than plastic bags.

173. Suggest any four activities in daily life which are ecofriendly? [NCERT]

Ans. The four activities in daily life which are ecofriendly are:

(a) Carrying paper bags instead of polythene bags for shopping.

(b) Use of compost and biofertilisers, biopesticides instead of chemical fertilisers and pesticides.

(c) Segregating biodegradable and non-biodegradable substances

and putting them in separate dustbins.

(d) Rain water harvesting.

174. Give any two ways in which biodegradable substances would affect the environment.

[NCERT]

Ans. The two ways in which biodegradable substances would affect the environment are:

(a) Decomposition of biodegradable substances results in production of foul smell.

(b) The area where biodegradable wastes are accumulated serves as a good breeding place for mosquitoes, flies etc. which are the main carriers of germs for diseases like cholera, jaundice, typhoid etc.

175. What are the problems caused by the non-biodegradable wastes that we generate? [NCERT]

Ans. The problems caused by the non-biodegradable wastes are:

(i) mulate in the soil causing pollution and also reduces the fertility of the soil.

(ii) Some pesticides like DDT, mercury etc., which are non-biodegradable undergo biological magnification by entering into food chain.

(iii) If these substances do not undergo proper disposal techniques they will accumulate in soil thus reduces the fertility of soil.

(iv) Some harmful non-biodegradable substances may cause

diseases in living organisms.

176. If all the waste we generate is biodegradable, will this have no impact on the environment?

[NCERT]

Ans. If all the waste we generate is biodegradable then their decomposition at right time will not be possible as number of decomposers would be less as compared to the amount of biodegradable substances. It will get accumulated in the environment causing foul smell and will form a good breeding place for flies, mosquitoes etc., which will carry many disease causing germs. Thus various diseases like cholera, typhoid, jaundice, malaria, dengue etc., will be spread.

Long Answer Type Questions

177. What is an ecosystem? What are the components of an ecosystem? Also discuss the types of ecosystem? Draw a block diagram to show the flow of energy in an ecosystem?

Ans. An ecosystem is the structural and functional unit of biosphere where there is an interaction between living and non-living components to maintain balance between them.

The components of ecosystem are:

(a) Biotic components: They are the living organisms like plants, animals, human beings etc. Basing on the mode of obtaining food they are classified as producers, consumers and decomposers.

1. **Producers:** They are autotrophs which have the capacity to prepare their own food by trapping solar energy and converting

them to chemical energy in the form of carbohydrates by the process of photosynthesis.

2. **Consumers:** They depend upon producers for food either directly or indirectly. They can be primary, secondary, tertiary or quaternary consumers.

3. **Decomposers:** They obtain food from dead and decayed organisms by breaking them down into simpler forms.

(b) Abiotic components: They are the non-living components i.e., the physical factors like temperature, light, wind, water, humidity and edaphic factors like soil, minerals etc.

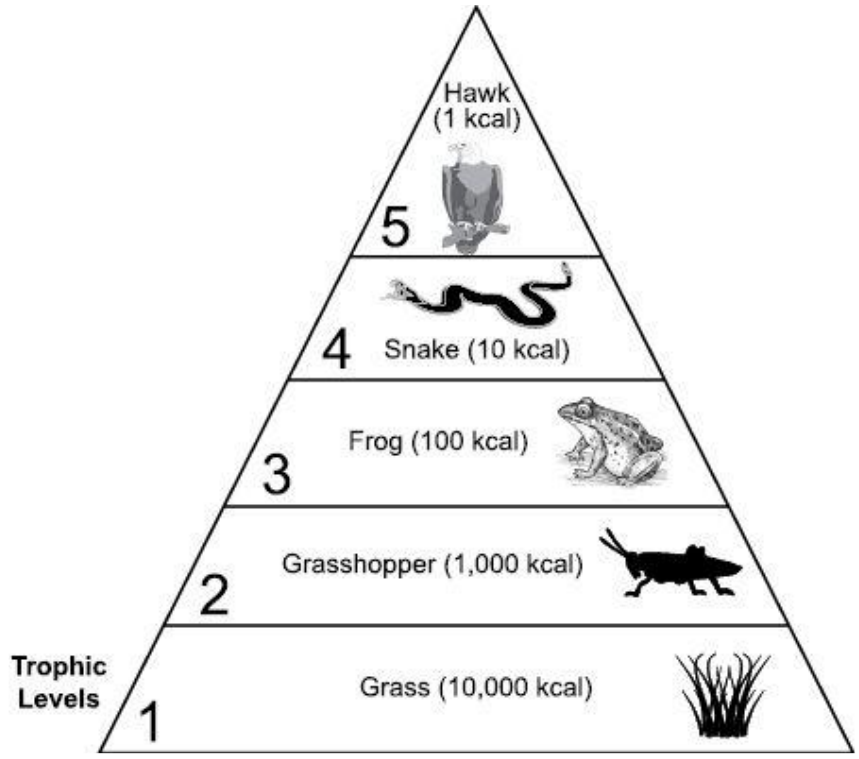
The two types of ecosystem are:

1. Natural ecosystem: They are made by nature themselves without human interference. They can be terrestrial like forest, grassland and desert ecosystem and aquatic like freshwater and marine ecosystem.

2. Artificial ecosystem: They are made and maintained by human beings. Examples–Gardens, parks, croplands etc.

178

. Explain energy relationships with trophic levels?



Ans. Each step or level of the food chain where transfer of food or energy takes place is referred to as a trophic level. The energy relationship within trophic levels is shown in a form of pyramid. Consider a food chain Grass → Grasshopper → Frog → Snake → Hawk. This food chain can also be considered as energy chain. We can place these animals in different trophic levels, for example:

Grass: They are the producers so are placed in first trophic level. They utilize solar energy to prepare food. They transfer this energy to grasshopper, but only 10% of the energy is available to grasshopper according to Lindeman's 10% Law. If grass has 10,000 kcal of energy only 1000 kcal will be transferred to grasshopper. So energy at next trophic level is reduced.

Similarly grasshopper is placed at second trophic level; frog in third, snake in fourth and fifth trophic level is occupied by hawk. At each trophic level the energy goes on decreasing i.e., frog will receive

100 kcal of energy, snake 10 kcal and finally hawk only 1 kcal. Thus energy at each trophic level goes on decreasing and the animal placed at apex will receive lowest energy. Thus a food chain can be only up to maximum 5 trophic levels. In this way there exists a relationship between trophic levels and energy.

179

. Answer the following questions:

(i) If Sita is consuming curd/yogurt for lunch, which trophic level in a food chain should she be considered as occupying?

(ii) Aquarium needs to be cleaned once in a while whereas ponds or lakes do not require any cleaning. Explain.

(iii) To protect the food plants from insects, an insecticide was sprayed in small amounts but it was detected in high concentration in human beings. How did it happen?

Ans. (i) In the predatory food chain, it consists of first, second, and third to fifth trophic levels where the first trophic level is occupied by producer's i.e, plants. The animals which consume plants are placed in the second trophic level. They are primary consumers. Herbivores are included in this trophic level. The organisms that depend on the organisms in the second trophic level are called secondary consumers; they are categorized under the third trophic level. Curd and yogurt are the products of cow or buffalo that belong to the second trophic level. So, Sita who is eating either curd or yogurt belongs to the third trophic level.

(ii) Aquariums are artificially built ecosystems which generally do not contain every aspect of a natural ecosystem. These artificial systems do not contain any form of natural decomposers and cleaners in the ecosystem as a result, food and waste generated by the organisms living in the aquarium accumulate and contaminate

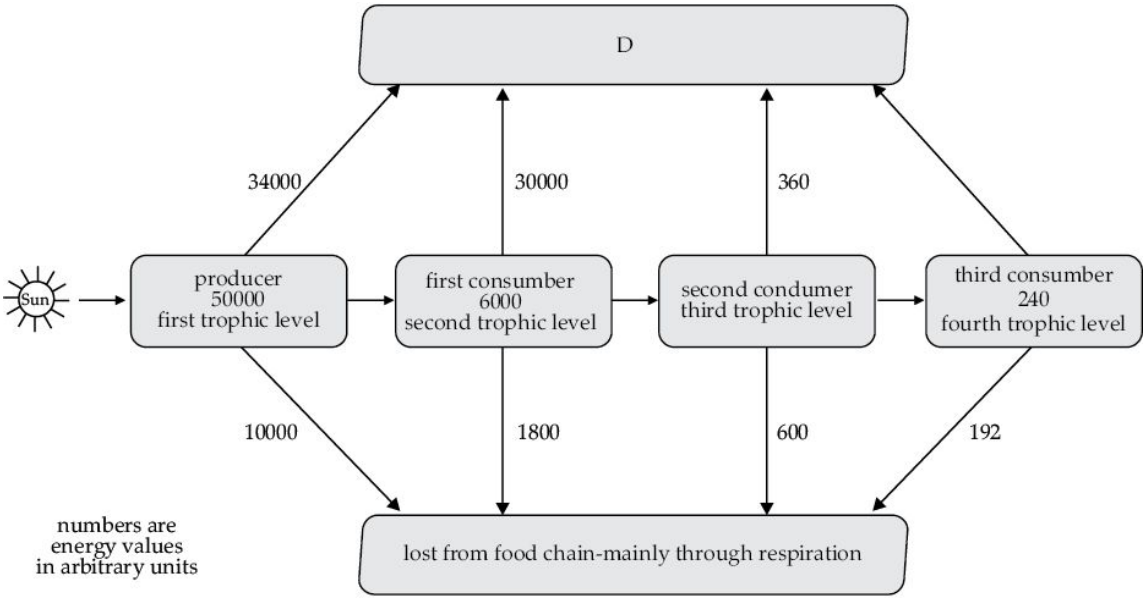
the water in the tank making it toxic. Hence, they have to be cleaned manually.

Ponds and lakes being natural ecosystems have natural decomposers and cleaners embedded as an integral part of the ecosystem, hence we do not have to clean them.

(iii) Insecticide are chemicals that are either washed down into the soil or into the water bodies. From the soil, these are absorbed by the plants along with water and minerals, and from the water bodies these are taken up by aquatic plants and animals. This is one of the ways in which they enter the food chain. As these chemicals are not degradable, these get accumulated progressively at each trophic level. As human beings occupy the top level in any food chain, the maximum concentration of these chemicals get accumulated in our bodies. This phenomenon is known as biological magnification. This is the reason why our food grains such as wheat and rice, vegetables and fruits, and even meat, contain varying amounts of pesticide residues. They cannot always be removed by washing or other means.

180

. Study the given flow chart and answer the below given questions.



(i) Which form of the Sun's energy is trapped by the producer?

(ii) Into which energy form is the Sun's energy converted when it is trapped by the producer?

(iii) What does D refer to in the box?

Ans. (i) Sun's energy is trapped by the producer in the form of Light (or solar) energy.

(ii) Sun energy trapped by producer is converted into Chemical energy.

(iii) D refer to Decomposers like bacteria or fungi.

181

. A team of Indian researchers went to Antarctica to study the ozone layer. They confirmed the presence of largest ozone hole over Antarctica and was just short of 27 million sq. km. After few days of their return, one of the scientists developed rashes, burning sensation and other skin problems which the doctors have confirmed as skin cancer.

(i) What may be the cause of cancer just after return from

Antarctica?

(ii) What do we learn from this incident?

Ans. (i) The scientists were exposed to harmful UV-radiations of the sunlight as there was a big hole over Antarctica and this might be the cause of skin cancer. The ozone layer acts as an ozone shield and absorbs the harmful UV-radiations. The UV-radiations have extremely harmful effects on human beings, animals as well as plants.

(ii) We learn that the ozone layer is very important for the existence and survival of life on earth. Ozone layer absorbs high energy UV-radiations causing a rise in temperature of the stratosphere. The use of chemicals like CFCs has endangered the ozone layer. CFCs used as refrigerator coolants rise to the stratosphere where these molecules are broken down by UV-rays resulting in attack on the ozone molecules damaging the ozone umbrella of earth. Due to ozone layer depletion UV-rays reaching the earth cause skin cancer, cataracts, damage immune system, etc. UV-rays also decreases crop yield and certain fish larvae which are important constituents of aquatic food chains. It may also disturb global rainfall causing ecological disturbance. In this way all on the earth would be destroyed gradually.

182

. Name the wastes which are generated in your house daily. What measures would you take for their disposal?

Ans. The wastes which are generated in our house daily are:

(a) Peels of vegetables and fruits.

(b) Old and used newspaper.

(c) Old plastics apparatus, broken glass apparatus.

(d) Plastic and polythene bags.

(e) Wastes from kitchen like left over foods, broken plates, cups etc.

(f) Old clothes, toys, utensils.

Measures that should be taken for their disposal are:

(a) Biodegradable and non-biodegradable substances should be separated and disposed separately.

(b) Kitchen wastes can be used to make compost.

(c) Old clothes, toys, utensils etc., can be reused by giving to poor and needy people.

(d) Plastic, polythene and glass apparatus can be recycled by using proper recycling techniques.

(e) Old and used newspaper can also be recycled.

(f) Safe disposal of plastic and polythene bags.

183

. Answer the following:

(i) What is meant by non-biodegradable waste? Identify non-biodegradable wastes from the following: Empty packet of chips, empty plastic bottle of mineral water, empty paper box of sweets, empty tin of cold drink.

(ii) Pesticides added to the field are seen in increased amounts in the crop and in the birds that feed on them. What is this phenomenon called?

(iii) Which gas shields the surface of the earth from the harmful UV

radiations from the sun?

(iv) Name the group of chemical compounds which adversely affects the ozone layer?

Ans. (i) The substances that cannot be degraded naturally by the action of microbes and persist in environment for longer period of time are called non-biodegradable substances. The non-biodegradable wastes are empty packet of chips, empty plastic bottle of mineral water, empty tin of cold drink.

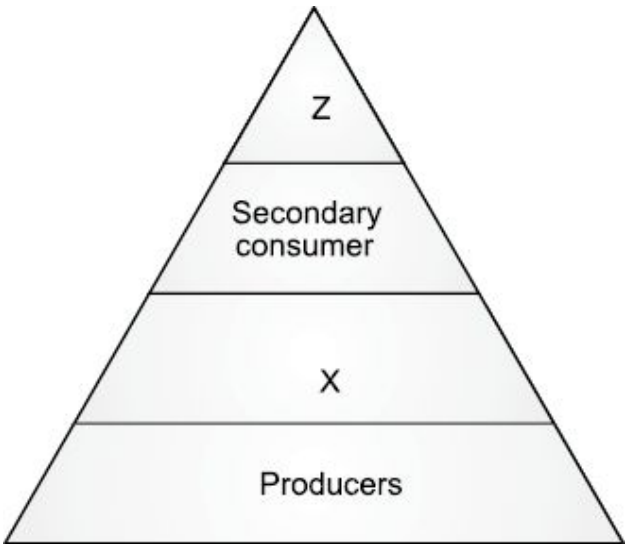
(ii) This phenomenon is called biological magnification.

(iii) Ozone gas shields the surface of the earth from the harmful UV radiations of the sun.

(iv) Chlorofluorocarbons [CFCs] are the group of chemical compounds which adversely affect the ozone layer.

Diagram Based Questions

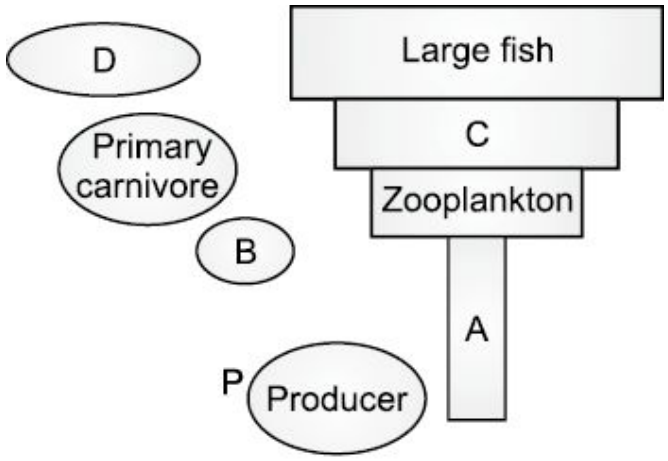
184. Write the appropriate names of the trophic levels Z and X in the figure given below:



Ans. X –Primary consumers; Z – Tertiary consumers

185

. Complete the below diagram by filling spaces marked as A, B, C and D:

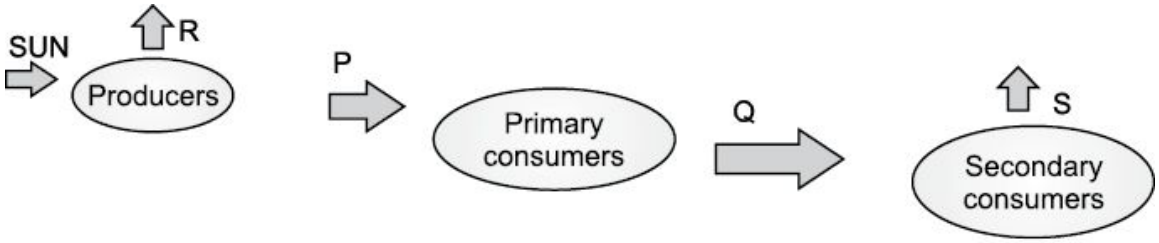


Ans. A – Phytoplankton; B – Herbivores

C – Small fish; D – Secondary carnivores

186

. Which of the labelled arrows in the below diagram represents the smallest amount of energy transferred between organisms and the largest amount of energy lost to ecosystem?



Ans. The arrow which represents the smallest amount of energy transferred between organisms is Q and the largest amount of energy lost to ecosystem is R.

Differentiate Between

187. Distinguish between producers and consumers.

Ans.

Producers	Consumers
(a) They prepare their own food.	They depend on producers for their food.
(b) They prepare food from inorganic material by the process of photosynthesis.	They depend on readymade food.
(c) They always constitute the first trophic level.	They are placed at second or higher trophic levels.
(d) They possess chlorophyll which helps them in synthesising their own food.	They do not possess chlorophyll pigments.
(e) They have the capacity to trap solar energy and convert them to chemical energy in the form of carbohydrates. Examples – Green plants, algae etc.	They cannot trap solar energy and convert to chemical energy. They eat producers to get chemical energy. Examples – Humans, other animals like goat, rabbit, lion, tiger etc.

188. Differentiate between food chain and food web?

Ans.

Food chain	Food web
(a) The sequential interlinking of organisms where energy in the form of food is transferred from the producers through a series of consumers.	It is a network of food chains interlinking many organisms at different trophic levels which eat or being eaten and thus formed a number of feeding connections.
(b) A food chain shows one path how energy in form of food flows from producers to consumers.	A food web shows many paths *i.e.*, it is a network of food chains where an organism eat several types of organisms or eaten by many different organisms.

189. Differentiate between biodegradable and non-biodegradable

substances.

Ans.

Biodegradable Substances	Non-biodegradable Substances
(a) These substances are easily degradable in nature by the action of microbes like bacteria and fungi.	These substances are not degraded in nature by the action of microbes.
(b) These substances remain for a short period of time in environment. Examples – Peels of vegetables, fruits, paper etc.	They persist for longer period of time in the environment. Examples – Plastic, metals, glass objects etc.

Analysis and Evaluation Based Questions

190. Suggest one word for each of the following statements or definitions.

(i) The physical and biological world where we live in.

(ii) Each level of food chain where transfer of energy takes place.

(iii) The physical factors like temperature, rainfall, wind and soil of an ecosystem.

(iv) Organisms which depend on the producers either directly or indirectly for food.

Ans. (i) Environment

(ii) Trophic level

(iii) Abiotic factors

(iv) Heterotrophs

191

. Given below is a reaction which occurs in the stratosphere.

$$O_3 \leftrightarrow O_2 + [O]$$

(i) Name the two reactions which are in equilibrium thereby maintaining steady concentration of ozone in the ozonosphere.

(ii) What is being absorbed by the ozone for the occurrence of above two reactions ?

Ans. (i) Photodissociation of ozone and generation of ozone are the two reactions which are in equilibrium thereby maintaining steady concentration of ozone in the ozonosphere.

(ii) Ultraviolet radiations from sun are being absorbed by the ozone for the occurrence of above two reactions.

192

. Why are crop fields known as artificial ecosystems?

Ans. Crop fields are made by man, most of the factors like sowing of seeds, watering etc., are done by man. Various types of crops are grown depending upon the type of soil and climatic conditions. Hence crop fields are known as artificial ecosystems.

193

. Complete the following analogy.

(i) Sewage : Biodegradable : : Mercury : _____

(ii) Automobile exhaust : Gaseous waste : : Trash and rubbish : _____

(iii) Paper and plastic : Recycling : : Hospital waste : _____

(iv) Global warming : Troposphere : : Ozone depletion : _____

(v) Household waste : Compost : : Incineration : _____

Ans. (i) Non-biodegradable

(ii) Solid waste

(iii) Incineration

(iv) Stratosphere

(v) Chemical waste

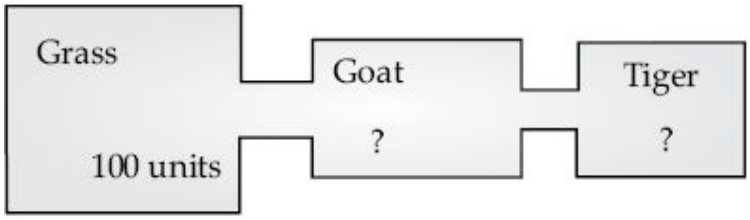
194

. Why have been kulhads banned for serving tea on platforms ? What types of cups are used in trains and platforms ?

Ans. Kulhads are made from the top fertile layer of soil. Use of this soil to make kulhads on a large scale would lead to loss of fertile top soil. This fertile top soil is of great use for the growth of plants as it contains many useful nutrients. Hence kulhads have been banned for serving tea on platforms. Nowadays disposable paper cups are used in trains and platforms.

195

. Given below is an energy flow diagram. Study it carefully and answer the following questions :



(i) How much energy (in units) will pass from grass to goat ?

(ii) How much energy (in units) will pass from goat to tiger ?

(iii) Which law operates during the transfer of energy from grass to goat to tiger ?

Ans. (i) 10 units of energy will pass from grass to goat.

(ii) 1 unit of energy will pass from goat to tiger.

(iii) Lindeman's Ten percent law operates during the transfer of energy from grass to goat to tiger.

196. What is energy pyramid ? Why is it broader at base and narrower at the apex region ?

Ans. An energy pyramid is a graphical representation of the flow of energy from the producers through the various consumers. It shows the amount of energy available and the loss of useful energy at each step of the food chain in an ecosystem. As the energy gets transferred from lower trophic level to the higher one, there is a loss of large amount of energy due to metabolism and as heat. As a result very little energy (*i.e.*, 10%) gets transferred to the next level. So the trophic level at the base has maximum energy and that at the top has the least amount of energy. Hence energy pyramid is broader at the base and narrower at the top.

197. When plants are eaten by primary consumers a great deal of energy is lost as heat to the environment and some amount goes in carrying out various life processes. State the average percentage of energy lost in this manner.

Ans. The average percentage of energy lost when plants are eaten by primary consumers is 90%.

198. Write one word answer for the following statements or definitions ?

(i) Decline in the thickness of ozone layer over a restricted area.

(ii) The substances which react with the ozone layer in the stratosphere and destroy it.

(iii) The useless left over or discarded materials.

Ans. (i) Ozone hole
(ii) Ozone depleting substances.
(iii) Wastes

199

. "Industrialization is one of the main cause of deterioration of environment." List any four reasons in favour of this statement.

Ans. (a) Industrialization leads to generation of harmful gases which when released to environment deteriorate the quality of air. It causes air pollution which affects life of plants, humans, animals etc.
(b) The effluents generated from industries if comes in contact with water bodies like rivers, lakes etc., will cause water pollution.
(c) Big machines used in industries produce a lot of noise causing noise pollution.
(d) The harmful chemicals and toxic substances generated from industries if released into soil will contaminate the soil leading to loss of fertility of the soil thus causing soil pollution.

Application Based Questions

200

. Your uncle has come from the village to renew the contract to supply frogs to the laboratories of the colleges of the town. While talking to you, he mentioned that cases of malaria have increased in his village. In addition population of grasshoppers has also increased that are damaging crops.

(i) What could be the reasons for such problems faced by

villagers?

(ii) What suggestions will you give to your uncle?

Ans. (i) As uncle is supplying frogs from his village to laboratories so the number of frog population is decreasing. Frogs eat grasshoppers and mosquitoes. But as the number of frogs population is reduced so the population of grasshoppers and mosquitoes are increasing. So malaria is spreading in the village by mosquitoes and grasshoppers are causing damage to the crops.

(ii) He must stop the supply of frogs to the laboratories as the reduced frog population is causing an imbalance in the food chain and proper ratio of frogs, grasshoppers and mosquitoes can not be maintained in the ecosystem.

201

. Meera saw that her friend Reema was carrying polythene bags for shopping. She immediately stops her and told her not to carry polythene bags.

(i) Why Meera stopped her friend Reema to carry polythene bags for shopping?

(ii) What alternatives could be done to replace polythene bags?

Ans. (i) Polythene is made from a polymer which is a chemical and is non-biodegradable which needs proper disposal techniques. It can accumulate in soil causing loss of fertility or might block drains leading to water logging. If not disposed properly, animals like cow would eat them which might block their alimentary canal. So, Meera stopped her friend Reema to carry polythene bags for shopping.

(ii) We can replace polythene bags with jute bags or paper bags for shopping.

202

. Ayush went to a nearby park with his friends for a picnic. He saw that after picnic is over all his friends were throwing the leftover food, plates, cups, glasses here and there. He suggests them not to do like that and segregate the wastes and dispose them in red and green dustbins kept in park.

(i) Why do you think Ayush told his friends to segregate wastes and throw in separate dustbins?

(ii) How can we contribute in keeping parks, roads, sea beaches clean?

Ans. (i) Ayush told his friends to segregate wastes because there are two types of wastes- biodegradable wastes which include leftover foods, peels of vegetables, fruits, paper plates etc., and the other type of wastes is non-biodegradable which includes plastic cups, glasses etc. Both these wastes undergo separate techniques for their degradation hence they should kept in separate dustbin.

(ii) We can help in keeping parks, roads, sea beaches clean by not littering, organise campaigns to create awareness among people about cleanliness, keeping dustbins in these places and throwing wastes only in dustbins, separating biodegradable and non-biodegradable wastes and proper disposal of these wastes.

203

. A huge water body was being used for fishing, but after the set of industries near this water bodies when people consume fishes they start falling
ill.

(i) What might be the cause of their illness after setting up of industries?

(ii) What steps must be taken by authorities to overcome this problem?

(iii) Name the biological phenomenon involved in this case.

Ans. (i) The effluents of industries containing non-biodegradable wastes get mixed with water bodies. These non-biodegradable toxic wastes get accumulated in the body of the fishes and when people consumed these fishes they fall ill.
(ii) Effluents should be properly treated before letting them into water bodies.
(iii) This phenomenon is called biomagnification.

204. While going to school and coming back from school Tarun watches that in a slum area they burn plastics which produce lot of gases.

(i) Is burning of plastic environmental friendly?

(ii) Suggest two alternatives for proper disposal of plastics?

Ans. (i) No, burning of plastics is not environment friendly because it releases various harmful and toxic gases which may cause health hazards. Some of the gases are carcinogenic and they also cause respiratory problems.
We should reuse plastics or we can recycle plastics in recycle plants.

Creating Based Questions

205. Why energy transfer is said to be unidirectional whereas biochemical transfer is said to be cyclic?

Ans. Energy transfer is said to be unidirectional because when the energy is absorbed by autotrophs from the sun, it is never

reabsorbed by it. Similarly, when consumers eat up the producers directly or indirectly the energy transferred in this process can never be reversed in the food chain. In biogeochemical cycles chemical elements move from environment to organism and back to the environment.

206

. Study the table and complete the missing terms.

S. No.	Nature of food chain	Producers	Consumers	Consumers	Consumers
1.	Forests	Trees, shrubs	Deer	……(a)……	Man
2.	Grasslands	……(b)……	Grasshopper/Frog	……(c)……	Vulture
3.	Pond	Decay plants	Worms	Fish	……(d)……

Ans. (a) Tiger

(b) Grass

(c) Snake

(d) Shark

207

. Rita wants to have an aquarium at home. What are the things that she needs to keep in mind in designing an aquarium?

Ans. The fish would need a free space for swimming, water, oxygen and food. Thus, she needs a good aquarium tank, oxygen can be provided through an oxygen pump (aerator) and fish food is available in the market.

Water parameters for nitrate, nitrite, ammonia and pH levels are to be maintained. To condition water properly, use a de-chlorinating

and biological aquarium supplement. It is recommended to change 25 percent of the aquarium water at least once a month. This will help maintain a clean and healthy tank, plus it keeps nitrate concentrations at a safe level. Overcrowding can lead to low oxygen levels in the water. Another crisis of overcrowding includes excess waste, which clogs the filter and degrades the aquarium water.

208

. Using the following information, form a pathway which shows the flow of energy at each trophic level. And also include information that is not mentioned below to complete it.light energy, organic products, first trophic level, herbivores, second trophic level, energy.

Ans. Light energy green surfaces of plants → chemical energy stored in various → organic products in the plants first trophic level herbivores consume → plants as food second trophic level convert **chemical energy** into **kinetic energy** herbivores → are consumed by carnivores of the first order → **(secondary consumers)** third trophic level → **primary carnivores** are consumed by → **top carnivores** (last level) energy will be degraded.

209

. Using the following information form a pathway showing the formation of ozone at higher levels. And also include information that is not mentioned below to complete it.

Ozone, UV, Molecular oxygen.

Ans. Ozone production → UV radiation acting on oxygen (O_2) molecule → the higher energy UV radiations split apart some molecular oxygen (O_2) → $O_2 \xrightarrow{UV} O + O$ →free oxygen (O) atoms

then → combine with molecular oxygen ozone $O + O_2 \rightarrow {}^{O_3}_{(Ozone)}$

210

. Shyam was very upset after reading the news of a whale shark that was found dead in waters off the Tanjung Aru beach in Menumbok. Postmortem results showed the shark had died of starvation and indigestion as it had a huge plastic bag stuck in its stomach. Suggest some measures that can be taken to reduce plastic waste.

Ans. Cloth bags can be used instead of using plastic bags as they are washable, strong and more durable than plastic bags. They are made of biodegradable material and do not pollute the environment. They can be recycled and reused and are capable of carrying more things. These days, new types of plastics which are said to be biodegradable, are available.

Self-Assessment

211. What is the functional unit of the environment comprising of the living and non-living components called?

212

. Name two natural ecosystems and two artificial ecosystems?

213

. Which one term in the following includes the others?

Air, flora, fauna, environment, water, sunlight, soil.

214

. State a way to prevent accumulation of harmful chemicals in our bodies.

215

. What is the difference between the food habits of organisms

belonging to the first and third trophic levels? Give one example each of the organisms belonging to these two trophic levels.

216. What are planktons?

217. Give reasons:

(i) Forest ecosystem is more stable than a cropland ecosystem.

(ii) Available energy goes on decreasing at each trophic level in a food chain.

218. Give examples of the following:

(i) Two step food chain in a forest ecosystem.

(ii) Three step food chain in a forest ecosystem.

(iii) Four step food chain in a pond ecosystem.

219. Name the following:

(i) Organisms feeding on animal and plant food.

(ii) Organisms breaking down wastes of living beings.

(iii) The organisms occupying the first trophic level of any food chain.

(iv) A complex network of many interconnected food chains and feeding relationships.

(v) The cumulative increase in the concentrations of a persistent substance in successively higher levels of the food chain.

220

. At which trophic level a person is feeding when he is eating:

(i) Roasted chicken

(ii) Bread

(iii) Eggs

(iv) Apple

(v) Fish

221

. A student went to study a local pond. In one part of the pond she noticed tadpoles scraping at some pond weed. In another part she saw a water beetle holding a tadpole in its jaws.

(i) Construct a food chain for the pond ecosystem.

(ii) How many trophic levels are there in this chain?

222

. Explain why there are greater chances of accumulation of harmful chemicals in the body?

223

. We often observe domestic waste decomposing in the by-lanes of residential colonies. Suggest ways to make people realize that improper disposal of waste is harmful to the environment.

224

. What is Montreal Protocol? Why was it signed?

225

. Very briefly explain the phenomenon of ozone layer depletion.

226

. **Assertion:** Arctic's ozone depletion tends to be milder and short lived than the Antarctic's.

Reason: CFCs, Frigid temperatures and sunlight are not present at the Arctic at the same time.

227

. The amount of ozone in the atmosphere began to drop sharply in the 1980s. This decrease has been linked to synthetic chemicals like chlorofluorocarbons (CFCs) which are used as refrigerants and in fire extinguishers. In 1987, the United Nations Environment Programme (UNEP) succeeded in forging an agreement to freeze CFC production at 1986 levels. It is now mandatory for all the manufacturing companies to make CFC-free refrigerators throughout the world. Suggest an alternative coolant that can be used.

228

. What kind of disposable cups being used on large scale in trains now a days and why?