5. Our Environment

Very Short Answer Type Questions-Pg-226

1. Question

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

Answer

The functional unit of the environment comprising of the living and non-living components is called 'Ecosystem'.

Ecosystem includes all the living things (plants, animals) in an area interacting with each other and with their non-living environment (weather, soil, etc.) too

2. Question

Name two natural ecosystems and two artificial Ecosystems.

Answer

● Natural Ecosystem are Grassland Ecosystem and forest ecosystem; Grassland and forest are naturally created and interaction among the living and non-living things is common here. Natural ecosystem have no interference of human beings.

● Artificial ecosystem- Parks, garden, Aquariums. Artificial ecosystems are man-made ecosystem so man creates parks, gardens, aquariums where organisms interact with living and non-living components, For example- Aquarium is created by man where fishes are put inside and they are given necessary things for them to survive.

3. Question

Which one of the following is not a terrestrial ecosystem?

Forest, Grassland, Aquarium, Desert

Answer

Aquarium is not a terrestrial ecosystem because terrestrial ecosystems are found only on landforms and aquarium exists in water and is an example of man-made ecosystem. Thus, forest, grassland, and desert are terrestrial ecosystems whereas aquarium is an artificial ecosystem.

4. Question

Why are plants called producers?

Answer

Plants are called producers because they produce their own food through the process of photosynthesis where they utilize sunlight, carbon dioxide, water, chlorophyll to produce nutrients and release oxygen as a by-product.

5. Question

What name has been given to those organisms which break down the complex organic compounds present in dead animals and plants?

Answer

Organisms that break down the complex organic compounds present in dead animals and plants are known as Decomposers. Decomposers break down the complex organic compounds in dead animals and plants to obtain nutrients from the dead and decaying matter. For example – bacteria and fungi are decomposers.

6. Question

What are planktons?

Answer

Planktons are minute organisms that live in the water but are incapable of swimming against a current. They are a source of food to aquatic organisms like fishes.

7. Question

State whether the following statements are true or false:

(a) In biology, human beings are called producers.

(b) Secondary consumers and tertiary consumers, both are carnivores.

Answer

a) **False**. Plants are called producers because they make their own food as they have autotrophic mode of nutrition. Human beings obtain the food made by plants and other organisms because they follow hetrotrophic mode of nutrition.

b) **True**. Secondary consumers eat primary consumers. They are carnivores i.e. they eat flesh and also omnivores. Tertiary consumers are at the top in a food chain and they feed on secondary consumers. Tertiary consumers are also carnivores.

8. Question

Which category of organisms forms the starting point of a food chain?

Answer

Producers form the starting point of a food chain. Producers are autotrophic and they produce their own food through photosynthesis.

9. Question

Which of the following belong to the same trophic level?

Goat; Spider; Plants; Hawk; Rat

Answer

Goat and Rat belong to the same trophic level. They belong to Herbivores as they feed on plants

10. Question

Which of the following belong to the same trophic level?

Tree; Frog ; Snake ; Grass ; Lizard

Answer

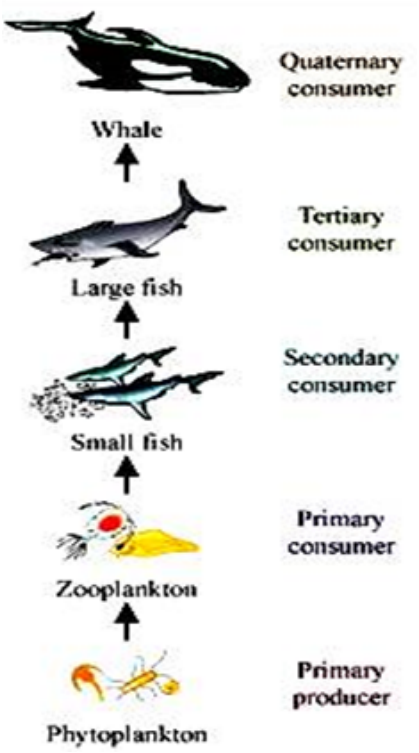
Tree and Grass belong to the same trophic level. They belong to producers as they are plants i.e. they contain chlorophyll which is required to perform photosynthesis in the presence of sunlight, water, and carbon dioxide.

11. Question

Write an aquatic food chain.

Answer

An aquatic food chain begins with phytoplankton like algae which are producers, these phytoplankton are eaten by zooplankton like protozoan (primary consumer). The primary consumers are eaten by secondary consumers which are small fishes in an aquatic food chain. These secondary consumers (fishes) are eaten by large fishes which are tertiary consumers. The tertiary consumers are further eaten by quaternary consumers, usually whale in an aquatic food chain. (Secondary, tertiary, and quaternary consumers are also known as carnivores).



12. Question

Name the organisms belonging to the second and the fourth trophic levels in the food chain comprising the following:

Frogs, Plants, Snakes, Hawk, Insects

Answer

Second trophich level in a food chain is Primary consumer. Primary consumers eat or feed on producers which ar eplants. Insects belong to the secondary trophich level i.e. they are primary consumers.

The fourth trophic level in a food chain is Tertiary consumers or carnivores. Snakes belong to the fourth tropic level.

13. Question

What are the various steps of food chain called?

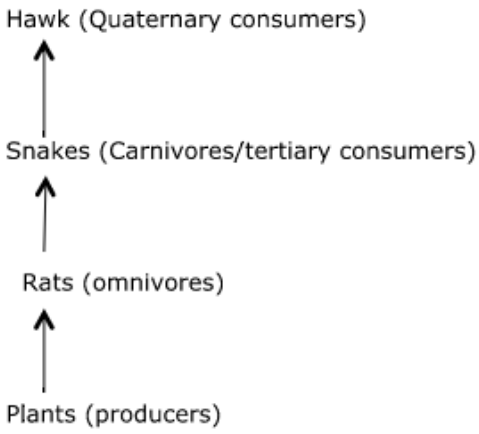
Answer

The various steps of food chain are called trophic level. A trophic level is a position that an organism occupies in a food chain.

14. Question

Construct a food chain comprising the following: Snakes, Hawk, Rats and plant.

Answer

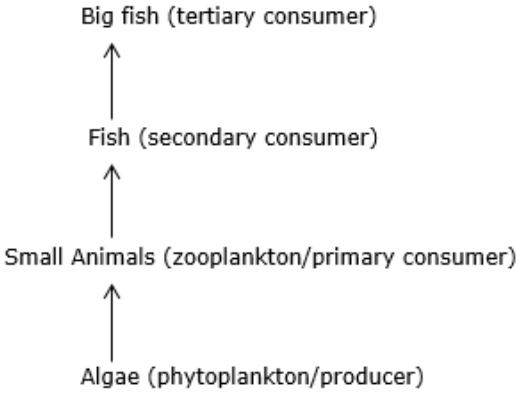


15. Question

Arrange the following in a food chain: Fish, Algae, Small animals, Big Fish

Answer

The following is an example of aquatic food chain.



16. Question

Which organisms belong to third and fourth trophic levels in the food chain comprising the following?

Rats, Plants, Hawk, Snakes

Answer

Third trophic level- Snakes (tertiary consumer) belong to the third trophic level.

Fourth tropic level- Hawk (quaternary consumer) belongs to the fourth trophic level.

17. Question

Which one term in the following includes the others?

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

Answer

Environment is the term which includes air, flora, fauna, water, sunlight and soil.

Environment is defined as the geographical surrounding in which an organism (plants, animals, human) lives. Air, flora (plants), fauna (animals) water, sunlight and soil; all are components of the environment.

18. Question

A food chain represents a unidirectional flow of X. What is X?

Answer

Unidirectional flow of X represents flow of energy in a food chain. Energy is transferred via trophic levels from producers to carnivores. The energy enters the plants from sun during photosynthesis. This energy is further passed on from one organism to another in the food chain .

19. Question

Fill in the following blanks with suitable words:

(a) Decomposer organisms are.....in their action.

(b) In nature, all green plants are..... whereas animals are consumers.

(c) A series of organisms, each of which feeds on the next organism, the beginning of which is a green plant, is called a.....

(d) The science that deals with the inter-relationships of living things with one another and their environment is called.....

(e) Plastic is a .....material whereas paper is a.....material.

Answer

a) Specific;

Decomposers (like bacteria and fungi) work only on dead and decaying matter to obtain nutrients from them.

b) Producer;

Green plants have chlorophyll and they use energy from sun, water and carbon dioxide to make their own food, so they are called producers. Animals are consumers because they cannot make their own food. They either eat plants or other animals.

c) Food chain;

Food chain can be defined as a series of organisms where each organism is dependent on the next for food.

d) Ecology;

Ecology is the study of how organisms interact with each other and their environment.

e) Non-biodegradable; biodegradable.

Plastic is non-biodegradable because it is rarely consumed by bacteria so they do not decompose. Whereas, paper is biodegradable because paper is made of plant material and plant materials are biodegradable.

Short Answer Type Questions-Pg-226

20. Question

Explain the terms 'producer' and 'consumer'. Give two examples of producers and two of consumers.

Answer

Producers are defined as organisms that prepare their own food using inorganic substances like water, carbon dioxide in the presence of chlorophyll and sunlight, and they release oxygen as a by-product. For example- green plants, blue algae, lichens etc. are producers , they make their own food by the process of photosynthesis.

Consumers are organisms that cannot make their own food and so they depend on producers for food. For example- Lion, Bears, Tiger are consumers.

21 A. Question

Define decomposers. Name one decomposer.

Answer

(A) Decomposers are organism that breakdown the organic components of dead and decaying matter (plants and animals) into simpler substances and feeds on them. Decomposers are usually microorganisms like bacteria and fungi which obtain their nutrients from dead and decaying matter.

21 B. Question

What is the role of decomposers in the ecosystem?

Answer

(B) Decomposers play a vital role in the ecosystem as they breakdown the organic components of dead and decaying matter into simpler substances. The organic matter is recycled in the ecosystem thus acting as cleansing agent for the environment.

22. Question

What is meant by a primary consumer, secondary consumer and a tertiary consumer? Give one example of each.

Answer

● Primary consumer- Primary consumers are living organisms that only eat plants i.e. producers. Herbivores/ plant eaters are primary consumers. For example- Goat, Rabbit.

● Secondary consumer- Secondary consumers are organisms that eat herbivores/ primary consumers for their food/ nutrient requirements. They are known as carnivores that feed on herbivores. For example- Frog, rat etc.

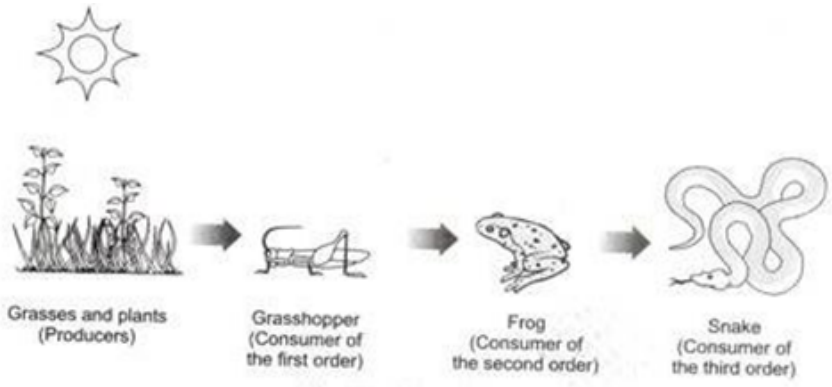
● Tertiary consumer- tertiary consumers are organisms that feed on secondary consumers. Basically, tertiary consumers are large carnivores which feed on small carnivores. For example- Owl, lion, etc.

23. Question

Give an example of a four step food chain operating in grassland. Name the secondary consumer in this food chain.

Answer

Example of a food chain operating in grassland



The secondary consumer is Frog in this food chain as it eats grasshopper which are primary consumers of grass.

24 A. Question

Define trophic level. Draw the food chain with four trophic levels.

Answer

(A)

Trophic level is the steps in a food chain where transfer of food in the form of energy takes place between organisms. At each step in a food chain is an organism that forms the trophic level.

A food chain consisting of four trophic levels

Grass ⟶ grasshopper/insect ⟶ Frog ⟶ Bird

(Producers) (Primary consumer) (Secondary consumer) (Tertiary consumer)

24 B. Question

What will happen if we kill all the organisms in one trophic level?

Answer

(B)

If all the organisms in one trophic level are killed then the transfer of energy to the next trophic level will stop. Also it will cause over population at one of the trophic level whose predators will be killed. Thus, disturbing the food chain completely.

25. Question

What is the difference between the food habits of organisms belonging to the first and the third trophic levels? Give one example each of the organisms belonging to these two trophic levels.

Answer

The organisms at first trophic level in a food chain are producers, always. They are autotrophs, they make their own food. For example- Plants are producers

The organisms at third trophic level in a food chain are consumers. They are carnivores at third trophic level. They feed on herbivorous animals. For example frog feeds on insects.

26. Question

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

Answer

No; If organisms from any trophic level are removed, the ecosystem may collapse because it will disturb the food chain completely. There will be no transfer of energy to the next trophic level and a population of organisms, whose predators will be removed, will increase in number; thus disturbing the entire food chain and causing a great damage to the ecosystem.

Yes the impact will be different for different trophic levels. The organisms whose predators will be removed from the trophic level will increase drastically in number. The organisms whose prey will be removed will not receive energy and nutrients and thus start to disappear.

For example, Plant—Insect—Frog—Snake.

Suppose if frogs are removed, the insects will increase in number because there predators are removed. The snakes would die of starvation as their prey i.e. frogs will be removed from the trophic level.

27. Question

Consider the food chain:

● Grass Deer Lion

What will happen if all the lions are removed from the above food chain?

Answer

If all the lions are removed from the given food chain, the number of deer will increase because there will be no lion to prey on them; as a result the deer population will increase which will graze on grasses. More the population of deer more will be the grazing on land. Overgrazing will lead to disappearance of vegetation and the forest will turn into a desert with no vegetation at all.

28. Question

The number of malaria patients in a village increased tremendously when large numbers of frog were exported from the village. What could be the cause for it?

Answer

The cause for this is increase in number of mosquitoes in the village. When large numbers of frog were exported from the village, the population of mosquito would have increased. This is because frog is predator of mosquito i.e. they eat mosquitoes, but when there were no frogs left to eat mosquito; the mosquitos increased in number thus spreading malaria.

29. Question

How does a biodegradable waste differ from a non-biodegradable waste? Give two examples of non -biodegradable wastes which pollute our environment.

Answer

Biodegradable wastes are those that can be recycled or decomposed by bacteria; therefore do not need dumping sites, and also do not cause pollution. For example- paper, wood, vegetable peels etc. Whereas, **non-biodegradable wastes** are those that cannot be recycled or decomposed by bacteria (not degradable) and cause pollution in the environment. Non-biodegradable waste when dumped onto large area causes soil pollution due to the poisonous chemicals present in them. For example- plastic

For example- Plastic, DDT and polythene are three such examples of non-biodegradable waste that pollute the environment.

30. Question

Which of the following are biodegradable and which non-biodegradable?

● Glass bottle, Paper, Ball point pen refill, Hay, DDT, Wheat, Cake, Wood, Polythene bag, Jute bag, Cotton cloth, Grass, Vegetable peels

Answer

BIODEGRADADABLE	NON-BIODEGRADABLE
1. Paper	1. Ball point pen refill
2. Wood	2. DDT
3. Vegetable peels	3. Polythene bag
4. Cake	4. Glass bottle
5. Wheat	
6. Hay	
7. Jute bag	
8. Cotton cloth	
9. Grass	

31 A. Question

Describe an activity to show that while paper is biodegradable but plastic (say, polythene) is non- biodegradable.

Answer

(A) Activity- Dig a ground to 15cms depth and bury a paper and a polythene bag into it and cover it with earth. After a month or so, remove the soil from the buried area. You'll find that the piece of paper had reduced in size because of being eaten up by the bacteria whereas the polythene bag remained as it is. The micro-organisms or the decomposers in

the soil have decomposed paper. But, because the polythene bag remained as it was, it means that micro-organisms could not decompose/degrade the polythene bag.

This activity shows that paper is biodegradables and plastic is non-biodegradable.

31 B. Question

Explain why, some materials are biodegradable but some are non-biodegradable.

Answer

(B) From the above activity we can say that some materials are biodegradable because they can be decomposed by micro-organisms/decomposers. Some substances are non-biodegradable because the micro-organisms/decomposers cannot break or decompose them.

Decomposers are specific in their action.

32. Question

Write down a food chain:

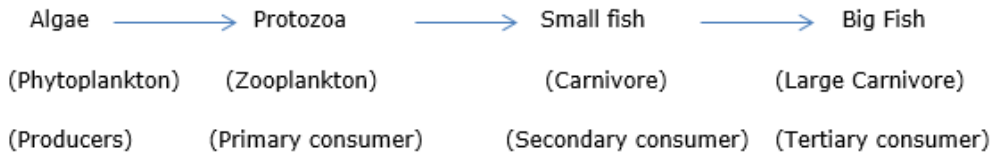
(a) In the sea

(b) Which ends with human-beings

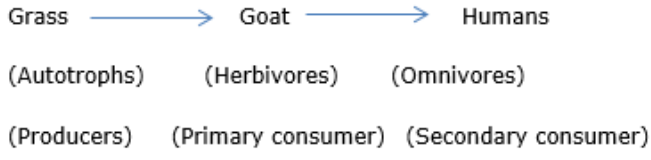
(c) With five links in it.

Answer

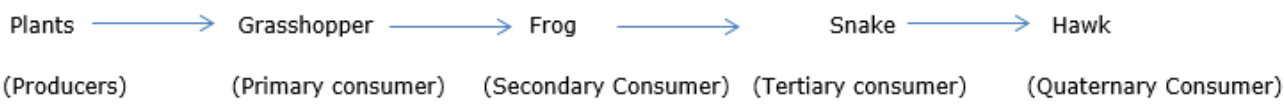
a) **Food chain in the sea**-



b) **Food chain that ends with humans**.



c) **Food chain with five links in it**



33. Question

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

(a) Roasted chicken

(b) Bread

(c) Eggs

(d) Apple

(e) Fish

Answer

a) Roasted chicken- Third trophic level/Secondary consumer. Chicken is primary consumer as it eats plant. Eating them will make a person a secondary consumer which is the third trophic level.

b) Bread- Second trophic level/Primary consumer. Bread is obtained from wheat plants. Eating products from plants will make a person primary consumer which is the second trophic level.

c) Eggs- Third trophic level/Secondary consumer. Egg comes from chicken which feeds on plants. Chicken are the primary consumer and eating a substance obtained from chicken will make the person a secondary consumer which is at the third trophic level, again.

d) Apple- Second trophic level/Primary consumer. Apple is obtained from plants. Eating products from plants will make a person primary consumer which is the second trophic level.

e) Fish-Fourth trophic level/Tertiary consumer. Fish is a carnivore which feeds on flesh of other animals. So fish is a secondary consumer. Eating fish will make a person tertiary consumer which is at the fourth trophic level.

34. Question

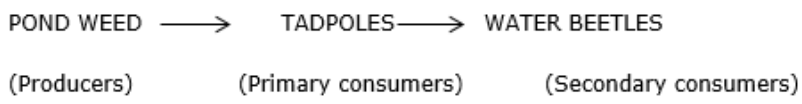
A student went to study a local pond. In one part of the pond she noticed tadpoles scraping at some pond weed. In another part she saw a water beetle holding a tadpole in its jaws.

(a) Construct a food chain for the pond.

(b) How many links are there in this chain?

Answer

a) Food chain-



b) There are three links in this food chain. Tadpoles that are primary consumers eat pond weeds. Water beetles in turn eat tadpoles.

35. Question

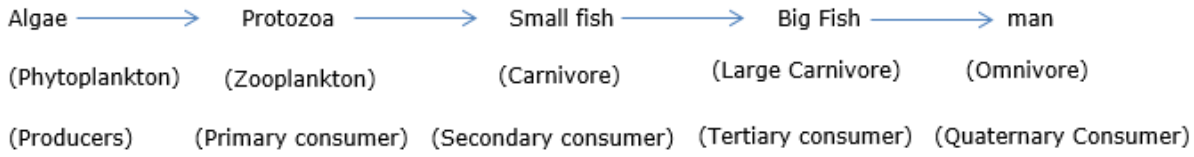
Construct.

(a) a long food chain, and

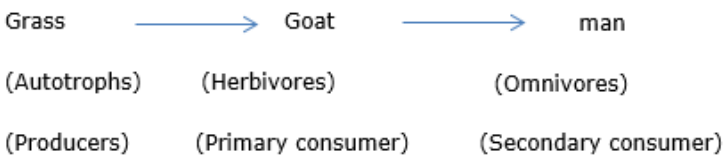
(b) a short food chain, ending with man.

Answer

a) **A long food chain ending with man**



b) **Short Food chain ending with man**



36 A. Question

State one advantage of using jute bags over plastic bags for shopping.

Answer

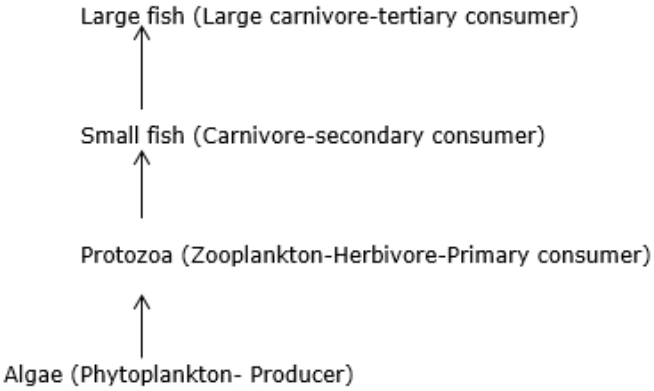
(A) one advantage of using jute bags over plastic bags is that jute bags are biodegradable and thus do not cause pollution. Whereas, plastic bags are non-biodegradable and they cause pollution by releasing toxic chemicals when burned.

36 B. Question

Write a common food chain of a pond ecosystem having four links.

Answer

(B) Pond ecosystem



Algae/producer are eaten by zooplankton like protozoan which are consumed by small fishes. Small fishes are prey of large fishes or large carnivores.

37. Question

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

Answer

Ponds and lakes are complete ecosystems, they have decomposers which decompose the dead bodies of plants and animals and thus keep the ponds and lakes clean automatically.

Aquarium does not have decomposers to clean the dead remains of fishes, or the aquatic organisms; so they need to be cleaned periodically in order to remove the dead matter pile up.

38. Question

What will be the consequence of the absence of decomposers in the ecosystem?

Answer

If decomposers get absent from the ecosystem then the dead remains of plants and animals will not be decomposed, as a result the dead matter would pile up and the nutrients will not be returned back to the plants through soil.

39. Question

Give two differences between food chain and food web.

Answer

1) A food chain is a single path of plants and animals eating each other and transferring energy accordingly. Food web is a network of interdependent food chains.

2) A food chain shows only one string of connected plants and animals and their food habits. On the other hand, a food web shows food habit of various plants and animals in an ecosystem.

40. Question

Write one or two words for each of the following statements/definitions:

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

(b) The physical factors like temperature, rainfall, light, soil, air and water of an ecosystem

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

(d) The physical and biological world where we live in

(e) Self-contained unit of living things and their non-living environment needing only sunlight for its functioning

Answer

a) Trophic level;

10% energy transfer takes place from one trophic level to the other

b) Abiotic components of ecosystem;

Factors like temperature, rainfall, light, soil, air and water are abiotic components of the ecosystem.

c) Consumers;

Consumers feed on producers for food.

d) Environment;

The surroundings where living beings operate i.e. the physical and biological world of living beings.

e) Ecosystem.

A community wherein organisms interact with each other and their physical environment.

Long Answer Type Questions-Pg-227

41 A. Question

What is meant by biodegradable waste materials? Give two examples of biodegradable wastes.

Answer

(A) Biodegradable waste materials are those that can be recycled or can be decomposed by bacteria and do not cause pollution. For example- Paper, wood, wool, fruits are biodegradable.

41 B. Question

Which of the following materials are non-biodegradable?

Aluminum wire, Tea leaves, Synthetic fibre, wool

Answer

(B) Non-biodegradable materials are those that cannot be degraded by bacteria. Amongst the given options, Aluminum wire and synthetic fibre are non-biodegradable.

42 A. Question

What is meant by non-biodegradable waste materials ? Give two examples of non-biodegradable wastes.

Answer

(A) Non-biodegradable waste materials are those that cannot be recycled or cannot be degraded by bacteria and thus cause pollution. For example- Plastic, synthetic fibre, aluminum wire, DDT insecticide are non-biodegradable.

42 B. Question

Which of the following materials are biodegradable?

Animal bones, Iron nails, Plastic mugs, Leather belts, Silver foil

Answer

(B) Biodegradable substances are those that can be degraded by bacteria and do not cause pollution. Amongst the following, Animal bones and leather belts are biodegradable.

43 A. Question

Define an ecosystem. Give examples of any two ecosystems.

Answer

Functional unit of the environment comprising of the living and non-living components where the living organisms interact amongst themselves and with the non-living components as well is known as ecosystem.

For example- A grassland ecosystem where plants, animals and micro-organisms live in an environment together and grasses are the primary form of vegetation.

A forest ecosystem is a woodland unit where plants, animals and micro-organisms function all together with the non-living components of the environment.

43 B. Question

List the biotic and abiotic components of an ecosystem.

Answer

Biotic components of an ecosystem are the living components that are inter-dependent and shape the ecosystem together. For example- producers make food for consumers; consumers after death are degraded by decomposers.

Abiotic components of an ecosystem are the non-living components. For example-light, temperature, water, soil, carbon dioxide, nitrogen, etc.

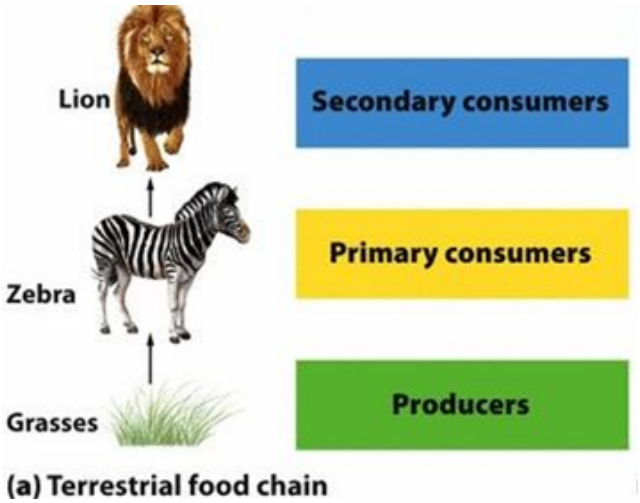
44 A. Question

What is a food chain? Give one example of a simple food chain.

Answer

Food chain is defined as a series/ chain of organisms wherein each organism is dependent on the other for energy (food).

Example of a simple food chain-



Zebra eats grasses and are in turn eaten by lions.

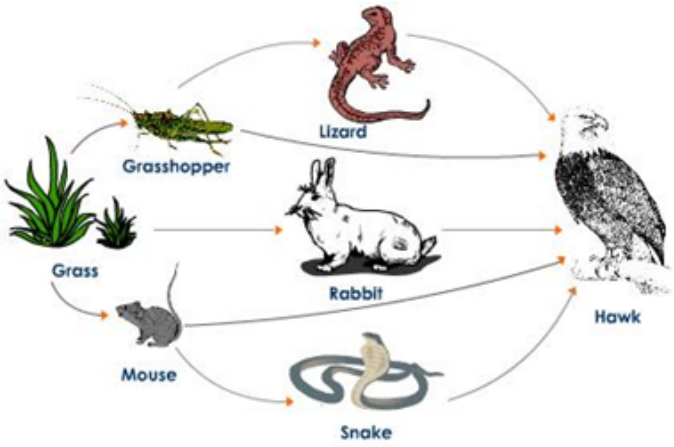
44 B. Question

What is a 'food web'? Show its formation.

Answer

Food Web is a network of interlocking and interdependent food chain which tells us what-eats-what in an ecological community and thus describing the relationship between species.

Formation of a food web – In the food web given below, the flow of energy is shown by the direction of arrows. There are three food chains in the given food web. The food web begins from grass which is producer, it provides food to grasshopper, mice, rabbit which are eaten by lizards, and snake. Lizards, snakes, and rabbits are eaten by hawk which is carnivore. Thus, the food web begins at producers (grass) and ends in top carnivore (hawk).



A Food Web in a Grassland Ecosystem With Five Possible Food Chains

45 A. Question

What is meant by 'environment'?

Answer

Environment refers to the conditions where living organisms like plants, animals, human beings lives or functions. It is the physical and biological world together.

45 B. Question

What type of substances are the major pollutants of the environment? Name two such substances.

Answer

Non-biodegradable substance are the major pollutants of the environment. Since they cannot be recycled, degraded by bacteria they cause pollution. Substances like plastics, synthetic fibre, and Aluminum wire are non-biodegradable.

45 C. Question

Name the organisms whose uncontrolled activities are damaging the environment.

Answer

Human beings are the organisms whose uncontrolled activities are damaging the environment. Human beings are destroying the environment for their needs for example deforestation which leads to destruction of natural habitat for wildlife. Human beings are polluting the environment by not adapting measures to control pollution. Use of polythene bags is one such example. Every household uses polythene bags which are discarded after use and are non-biodegradable; they pollute the environment.

45 D. Question

Explain why, it is better to use paper bags than plastic bags.

Answer

It’s better to use paper bags than plastic bags because paper is recyclable whereas plastic is not. Plastic cannot be degraded and they pollute the environment; whereas paper is biodegradable and does not cause any pollution. Moreover, even if burned, paper will not cause much pollution but plastics on burning will release toxic chemicals into the environment thus polluting the environment.

Multiple Choice Questions (MCQs)-Pg-228

46. Question

Which of the following constitutes a food chain?

A. Grass, Wheat and Mango

B. Grass, Goat and Human

C. Goat, Cow and Elephant

D. Grass, Fish and Goat

Answer

Grass is eaten by goat and Goat may be eaten by Human.

47. Question

In a food chain, the initial organism is usually:

A. Photosynthetic

B. Herbivore

C. Saprophytic

D. Parasitic

Answer

It is the Photosynthetic organisms that produce food, for example plants, which are further eaten by consumers.

48. Question

Which of the following represents a possible food chain found in a pond:

Primary Producers	Primary Consumers	Secondary Consumers
a) Green Algae	fish	mosquito larvae
b) Fish	green algae	mosquito larvae
c) Mosquito Larvae	fish	green algae
d) Green algae	mosquito larvae	fish

A. a

B. b

C. c

D. d

Answer

This represents a possible food chain in a pound. Green algae produce food which is consumed by mosquito larvae (primary consumers/zooplankton). Mosquito larvae are eaten by fishes that are secondary consumers.

49. Question

Which of the following are decomposers of dead organisms?

Bacteria	Fungi	Viruses
(a) no	yes	yes
(b) yes	no	yes
(c) yes	yes	no
(d) yes	yes	yes

A. a

B. b

C. c

D. d

Answer

Bacteria, Fungi are decomposers of dead organisms as they breakdown the organic matter in dead and decaying organisms and feeds on them. Whereas. Viruses are not decomposers of dead organisms.

50. Question

Which of the following is an artificial ecosystem?

A. pond

B. crop field

C. lake

D. forest

Answer

Crop field is an artificial ecosystem because it is a man-made ecosystem. Man makes field to grow crops and does necessary activities that are required by crops to grow. Thus, it is an artificial ecosystem.

51. Question

Disposable plastic plates should not be used because:

A. they are made of light-weight materials

B. they are made of toxic materials

C. they are made of biodegradable materials

D. they are made of non-biodegradable materials

Answer

Plastics cannot b degraded and as a result they pollute the environment and threaten health.

52. Question

In a food chain, the third trophic level is always occupied by:

A. Carnivores

B. Herbivores

C. Decomposers

D. Producers

Answer

the first trophic level is occupied by producers and the second by herbivores.

53. Question

Accumulation of non-biodegradable pesticides in the food chain in increasing amount at each higher trophic level is known as:

A. Eutrophication

B. Pollution

C. Bio-magnification

D. Accumulation

Answer

The process of accumulation of pesticides at each trophic level increases with increase in trophic levels in a food chain. This is known as bio-magnification.

54. Question

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. Secondary consumer to tertiary consumer

Answer

Primary consumer to secondary consumer; Grasshopper is a primary consumer which feeds on plants. Frogs are secondary consumers which eat grasshoppers.

55. Question

An ecosystem includes:

A. all living organisms

B. non-living objects

C. both living organisms and non-living objects

D. all living organisms and input of sun's energy

Answer

both living organisms and non-living objects. An ecosystem is a function unit of environment where living organisms interact with each other and the non-living objects.

56. Question

The decomposers in an ecosystem:

A. convert inorganic material to simpler forms

B. convert organic material to inorganic forms

C. convert inorganic material into organic compounds

D. do not break down organic compounds

Answer

Decomposers like bacteria and fungi breakdown the organic components present in the dead and decaying matter of plants and animals into simpler inorganic forms.

57. Question

What will happen if deer is missing in the food chain given below?

Grass → Deer → Tiger

A. The population of tigers increases

B. The population of grass decreases

C. Tigers will start eating grass

D. The population of tigers decreases and the population of grass increases.

Answer

The population of tigers decreases and the population of grass increases.

This is because tigers will not have food if deer go missing and hence will starve to death on not getting food and their number would decrease. On the other hand, the population of grass will increase because there will be no deer’s to eat them.

58. Question

Organisms which synthesize carbohydrates from inorganic compounds by using radiant energy are called:

|

A. decomposers

B. producers

C. herbivores

D. carnivores

Answer

Producers i.e. plants use inorganic components water and carbon dioxide in the presence of chlorophyll and sunlight to synthesize carbohydrates and release oxygen as a by-product.

59. Question

Organism of a higher trophic level which feed on several types of organisms belonging to a number of lower trophic levels constitute the:

A. Ecosystem

B. Food web

C. Ecological pyramid

D. Food chain

Answer

A food web is a system of interlocking food chains. So, the organism of a higher trophic level that feeds on several types of organisms belonging to a number of lower trophic level will constitute the food web.

60. Question

In the following groups of materials, which group/groups contain only non-biodegradable materials ?

(i) wood, paper, leather

(ii) polythene, detergent, PVC

(iii) plastic, detergent, grass

(iv) plastic, Bakelite, DDT

A. (iii)

B. (iv)

C. (i) and (iii)

D. (ii) and (iv)

Answer

Polythene, detergent, PVC, Plastic, Bakelite and DDT are non-biodegradable materials i.e. they cannot be degraded.

61. Question

Which of the following statement is incorrect?

A. all green plants and blue green algae are producers

B. green plants get their food from readymade organic compounds

C. producers prepare their own food from inorganic compounds

D. plants convert solar energy into chemical energy

Answer

green plants get their food from readymade organic compounds.

Green plants or producers do not get their food from readymade organic compounds. Instead they use inorganic compound water and carbon dioxide to synthesize food in the presence of chlorophyll and sunlight.

62. Question

Which of the following group of organisms are not constituents of a food chain?

(i) Grass, lion, rabbit, wolf

(ii) Plankton, man, fish, grasshopper

(iii) Wolf, grass, snake, tiger

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

A. (i) and (iii)

B. (iii) and (iv)

C. (ii) and (iii)

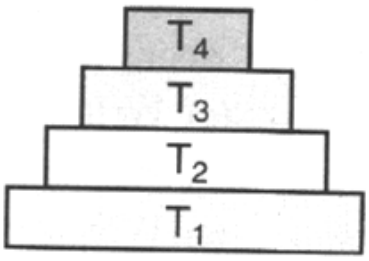
D. (i) and (iv)

Answer

Plankton, man, fish, grasshopper; Wolf, grass, snake, tiger are not group of food chain. Plankton and fish belong to aquatic food chain. Similarly, Wolf does not exist in a food chain with grass snake and tiger.

63. Question

In the figure given alongside, the various trophic levels are shown in the form of a pyramid. At which trophic level the maximum energy is available?



A. T_4

B. T_2

C. T_1

D. T_3

Answer

Maximum energy is available at the lowest trophic level which is T_1 here. The lowest trophic level in a food chain is producers. Producers have the maximum energy that they absorb from the sun. 10% of energy that they absorb from the sun is transferred to the next trophic level and so on (10% energy rule).

64. Question

One of the following is not a biodegradable material. This one is:

A. cotton

B. animal bones

C. aluminum foil

D. wood

Answer

Aluminum foil is a non-biodegradable material.

Cotton, animal bones and wood are degradable.

65. Question

Which of the following is not a non-biodegradable material?

A. Nylon socks

B. Plastic school bag

C. Jute carry bag

D. Polyester clothes

Answer

Plastic school bags are non-biodegradable.

Nylon, Jute, Polyester are degradable.

66. Question

The use of one of the following will pollute the environment. This one is:

A. paper carry bags

B. cotton cloth carry bags

C. nylon cloth carry bags

D. jute carry bags

Answer

Nylon is a polymer of plastic and since plastic is non-degradable and create pollution in the environment, thus nylon cloth carry bags will pollute the environment.

67. Question

One of the following is not a consumer. This one is:

A. Giraffe

B. Antelope

C. Algae

D. Alligator

Answer

Algae are producer.

68. Question

Which of the following is not a producer?

A. Grass

B. Zooplankton

C. Phytoplankton

D. Paddy

Answer

Zooplankton; Zooplankton is a primary consumer.

Grass, phytoplankton and paddy are producers.

69. Question

One of the following is a micro-consumer. This one is:

A. ant

B. lice

C. fungi

D. mosquito

Answer

Fungi; Fungi is a micro-consumer. They feed by breaking down complex organic compounds of dead and decaying matter.

70. Question

Which of the following act as decomposers in an ecosystem?

A. Lactobacillus bacteria

B. Cyanobacteria

C. Putrefying bacteria

D. Rhizobium bacteria

Answer

They recycle nitrogen from dead organisms.

71. Question

One of the following helps in the recycling of materials in an ecosystem. This one is:

A. Autotrophs

B. Saprotrophs

C. Omnivores

D. Carnivores

Answer

Saprotrophs (decomposers) derives nutrition from dead and decaying organic matter and thus recycles material in an ecosystem.

72. Question

In the food chain comprising of a snake, grass, insect, and frog, the secondary consumer is:

A. Insect

B. Snake

C. Frog

D. Grass

Answer

Grass is producer. Insect is primary consumer as it eats grass. Frog eats insects, so it is a secondary consumer.

73. Question

Sahara Desert was formed over a period of time due to one of the following uncontrolled activities of man:

A. Excessive cutting down of forest plants and trees

B. Excessive killing of large herbivores

C. Excessive killing of large carnivores

D. Excessive use of poisonous chemicals called herbicides

Answer

Carnivores i.e. lions were captured by the Romans and no carnivores were left to eat herbivores. So herbivores increased in number and they ate up all the vegetation, turning the forest into Desert.

Questions Based on High Order Thinking Skills (HOTS)-Pg-230

74. Question

The sea water contains water beetles, tadpole, fish and weeds.

(a) Write a food chain comprising all the given organisms.

(b) Which organisms in the food chain is

(i) Herbivore

(ii) Carnivore

(c) Which organisms are

(i) Predators

(ii) Prey

(d) Which organisms can trap solar energy to make food?

(e) Which organism is a secondary consumer?

Answer

a) Food Chain= Weeds-Tadpoles-Water beetles-Fish

b) i) Tadpole are herbivore since they eat weed plants.

ii) Water beetle and fish are carnivore

c) i) Predators in this food chain are water beetles and fish. Water beetle eats tadpole i.e. it preys on tadpole. Fish eats water beetles i.e. it preys on water beetles

ii) Prey in this food chain are Tadpoles and water beetle. Tadpole is eaten by water beetle and water beetles are eaten by fish.

d) Weeds can trap solar energy to make food since they are green plants and contain chlorophyll.

e) Secondary consumer here is water beetle. The primary consumer is tadpole that eats weeds. The secondary consumer is water beetle, it eats tadpoles.

75. Question

The following is a food chain that ends with human:

Plants → bee → human

(a) Explain how plants provide food for bees.

(b) How do bees provide food for humans?

(c) How does this food chain differ from a usual food chain involving human such as: plants goat human?

(d) Do you think that the food chain given in this question can really be regarded as a food chain? Explain your answer.

Answer

a) Bees suck nectar from flowers of the plants. Bees collect nectar and convert it to honey.

b) Humans obtain honey from bees. The honey in bees comes from sucking nectar from flowers.

c) In a food chain comprising plant goat humans, humans directly eat goat meat. Whereas, in this food chain of plants bees and humans, humans do not directly eat bees, they eat honey obtained from bees. In this way the two food chains differ.

d) The food chain given in the question is not really a food chain because humans do not directly eat the bee as a food; they first obtain food from bees in the form of honey and then consume honey.

76. Question

A food chain occurring in the sea which provides food for many people can be written as:

Phytoplankton → Zooplankton → X → Y

(a) Name one phytoplankton.

(b) Name two zooplanktons.

(c) What could be X?

(d) Name the organism which Y could be.

(e) Which organism in the above food chain is a

(i) Primary consumer, and

(ii) Tertiary consumer

Answer

a) Algae is one phytoplankton found in the sea. It is a producer and it makes its own food by photosynthesis i.e. using water, carbon dioxide in the presence of sunlight and chlorophyll.

b) Crustacea, krill, copepods, protozoa, tadpole are few examples of zooplankton in the sea.

c) X could be small fishes; fishes feed on zooplankton in aquatic food chain.

d) Y could be a carnivorous fish or it can also be a man. Both, Carnivorous fish and humans feed on small fishes.

e) i) Primary consumer in the above food chain are zooplankton as they feed on phytoplankton like algae.

ii) Tertiary consumer in the above food chain can be carnivorous fish or man as they eat small fishes i.e. secondary consumers.

77. Question

Some hunters are roaming in the plush green forest of Africa. They spot a deer and kill it. They decide to roast the deer there and then eat it. When the hunters had just finished enjoying the feast of roasted deer, a lion attacks them. The lion kills one of the hunters and eats his flesh.

(a) Write a food chain which provides food to lion in this case.

(b) Which animal (other than deer) the lion could look for food if he did not get the hunter as prey?

(c) Which other animal in the forest could have been in place of lion?

(d) How does the above food chain differ from the food chain such as:

plants → goat → man?

a) Humans are at the end of most of the food chains in which they occur (as this picture of man taking home a fish for food shows)

b) But sometimes luck runs out and humans are forced to become food for others (as this picture of lion eating a man shows). Here the human is no longer at the end of food chain. Look at the miracle of GOD: hunter has become hunted!

Answer

a) Food chain

Plants → Deer → hunter (man) → Lion

b) If the lion did not get hunter as a prey, he could look for rabbits in the forest

c) There could have been tiger in place of lion, in the forest. Tiger too are flesh eating animal, they could have attacked the hunter.

d) In this food chain (plant—goat--man) man is at the end and he is eating the flesh of goat. Man is a predator here.

Whereas, in the other food chain (plants—deer—man—lion) man is not at the end of the food chain and is being eaten up by the lion. Man is a prey here.

78. Question

What would happen to the number of rabbits and grass plants if the number of foxes:

(a) Increased

(b) Decreased

Answer

a) If the fox population increased, the number of rabbits will decrease because more foxes will feed on rabbits thus decreasing the population of rabbits and as a result of decrease in number of rabbits, the grass plants will increase as there will be few rabbits to feed on grass.

b) If the number of foxes decreased, the number of rabbits will increase as there will be few foxes to feed on rabbits and hence it will increase the population of rabbits. When the population of rabbits will increase there will be a decrease in population of grass plants, as more and more rabbits will eat grasses so there will be a decline in grass plants.

79. Question

What would happen to the number of grass plants and foxes if the number of rabbits:

(a) Increased

(b) Decreased

Answer

a) Rabbits eat grass and if they increase in number, soon the grass population would decline because rabbits will feed on grass faster than they can regrow.

b) Fox feeds on rabbits. If the number of rabbits decreased, soon the fox population will decrease because it will not get to feed on rabbits and foxes would begin to die because of starvation. And if the rabbits will decrease, the grass plants will increase in number because there will be less population of rabbits to eat grass plant.

80 A. Question

Match the terms given in column I with the terms given in column II and column III having the same meaning:

Column I	Column II	Column III
(i) Secondary consumer	Herbivore	1st trophic level
(ii) Primary consumer	Autotroph	3rd trophic level
(iii) Producer	Carnivore	4th trophic level
(iv) Tertiary consumer	Large carnivore	2nd trophic level

Answer

(A)

i) consumer-Carnivore-3rd trophic level

ii) Primary consumer-Herbivore- 2nd trophic level

iii) Producer-Autotroph-1st trophic level

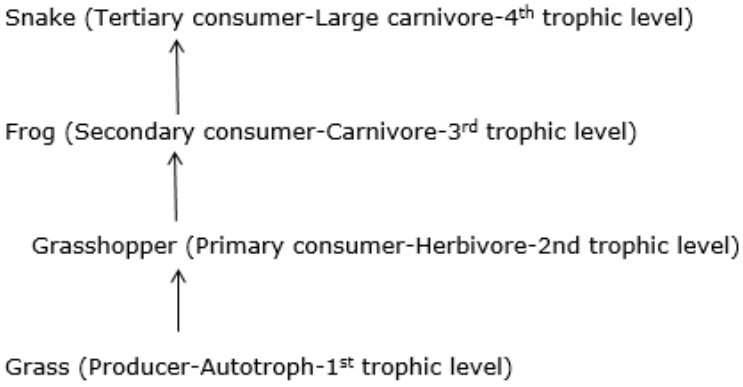
iv) Tertiary consumer-Large Carnivore-4th trophic level

80 B. Question

Give one example of a food chain having four organisms. Below each organism write the three appropriate terms from the part (a) above which you think it represents.

Answer

(B) Food chain – Grass-Grasshopper-Frog-Snake



Very Short Answer Type Questions-Pg-240

1. Question

What percentage of the solar energy is trapped and utilized by the plants?

Answer

1-2% of energy is trapped and used by the plant to make food. Rest of the 99-98% of solar energy that reaches the earth is reflected from surface of leaves and is absorbed by certain molecules which convert the energy into heat.

2. Question

What percentage of energy available at the producer level is transferred at successive trophic levels in a food chain?

Answer

10% of energy is transferred from producer to the next trophic level in food chain. As little as 10 percent of energy is transferred at each trophic level. The rest is lost in metabolic processes through heat.

3. Question

Name the process in which a harmful chemical enters the food chain and gets concentrated at each trophic level.

Answer

Chemicals, pesticides and heavy metals move up the food chain, get into aquatic bodies and are eaten by organisms like fishes which are in turn eaten by hawks/eagles. This process where the chemical enters the food chain and gets concentrated at each trophic level is known as Biological Magnification.

4. Question

In a food chain consisting of grass, frog, bird and insects, where will the concentration of the harmful chemical be maximum?

Answer

Out of above mentioned animals, birds will have maximum concentration of harmful chemicals. Birds are tertiary consumes/ carnivores, they are at top in a food chain so due to biological magnification, the concentration of harmful chemicals will be maximum in birds.

5. Question

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

Answer

Cat will have the maximum concentration of harmful chemicals in its body because mice will feed on plants and cats feed on mice. The concentration of chemicals increases with increase in each trophic level.

6. Question

Which radiations are absorbed by ozone layer?

Answer

Ozone layer absorbs harmful ultraviolet radiations coming from the sun and prevent it from reaching the surface of the earth.

7. Question

Name the group of chemical compounds which damages the ozone layer.

Answer

Chlorofluorocarbon damages the ozone layer by destroying the ozone molecules.

8. Question

Name two waste materials which can be recycled.

Answer

paper, plastic, cardboard, aluminum foil can be recycled in mixed recycling containers.

9. Question

Name the process by which the volume of solid wastes can be reduced.

Answer

Incineration is a process by which solid waste can be reduced by burning.

10. Question

If 5 joules of energy is available at producer level (plants), then how much energy will be transferred to the lion in the following food chain?

Plants Goat Lion

Answer

0.05joule of energy will be passed from plant to lion because only 10% of energy is transferred at each trophic level. So Goat will get 0.5joule of energy from plants and lion will get 0.05joule of energy from goat.

11. Question

State whether the following statement is true or false:

Only 10 per cent of the light energy given by the sun is available for transfer at each higher trophic level a food chain.

Answer

False; Pants absorb only 1% of sun energy. 10% of this one percent energy absorbed by the plants is transferred at each trophic level.

12. Question

Where does all the energy in living organisms originate from?

Answer

Sun is the major source of energy for all living organisms. Plants absorb sun's energy to make food through photosynthesis. All the other components of a food chain obtain energy from plants

13. Question

Why are there rarely more than five links (or five organisms) in a food chain?

Answer

There are rarely more than five organisms in a food chain because there is a decrease in energy with every transfer to next trophic level and energy availability will be so small that animals will not be able to survive with small amount of energy.

14. Question

Name two predators of snakes in a food web operating in a forest ecosystem.

Answer

In a forest ecosystem, peacock and hawk feed on snake.

15. Question

Fill in the following blanks with suitable words :

(a) Ultraviolet rays can cause skin.....

(b) Pesticides enter the food chain at the .....level

(c) Grass → …….. → Human

(d) lettuce → …….. → Fox

(e) Plants → Antelope → ……..

Answer

a) Caner;

UV rays can cause skin cancer as they damage the genetic material of the skin cells causing the cells to grow out of control.

b) Producer;

Pesticides enter the food chain at the producer level as plants are the producers which are fed with pesticides.

c) Goat (or any herbivore);

Herbivores feed on Producers; herbivores are in turn eaten by consumers.

d) Rabbit ;

Rabbits feed on Lettuce which are in turn eaten by Fox

e) Lion; Plants are eaten by Antelope and Antelope are eaten by carnivores (consumers)

Short Answer Type Questions-Pg-241

16. Question

What is ten per cent law? Explain with an example.

Answer

According to this law, only 10% of energy entering into trophic level of energy will be available to be transferred to the next trophic level.

For example if 1000joule of sunlight energy falls on plants and is to be transferred to herbivore and then a carnivore.

The plants or first trophic level (producers) has only 10joule of energy because plants absorb only 1% of energy that they receive from sun and according to 10% law, only 10% of 10joule will be transferred from plants to the next higher trophic level (herbivores) which is 1joule. Now 10% of 1joule =0.1 Joule which will be transferred to next higher trophic level (carnivores). So carnivores will receive 0.1 joule of energy if 1000joule of sunlight energy falls on plants

17. Question

Write the full form of CFC. Give its one harmful effect.

Answer

CFC stands for chlorofluorocarbons

Chlorofluorocarbons released into the atmosphere gradually react with ozone gas present in ozone layer and destroys ozone layer slowly thus allowing ultraviolet radiations enter into the earth.

18. Question

Explain how, harmful ultraviolet radiations of sunlight are prevented from reaching the earth's surface.

Answer

Ozone layer in the stratosphere absorbs the harmful ultra violet radiations coming from the sun and thus prevent from reaching the earth surface.

19. Question

What are the causes of depletion of ozone layer? Which diseases are likely to be caused if the ozone layer will become thinner?

Answer

chlorofluorocarbons and certain ozone depleting substances are responsible for depletion of ozone layer. If the ozone layer becomes thinner, ultraviolet radiations will penetrate through the layer and reach the surface of earth which when fall on humans will destroy the genetic material of skin cells thus causing their unlimited growth and thus resulting in skin cancer.

20. Question

Explain how harmful chemicals enter our bodies.

Answer

Harmful Chemicals like pesticides are sprayed on crop plants to protect them from diseases. These sprayed pesticides are absorbed by the plants because they mix up in the soil with water. From soil and water, plants absorb these pesticides. Plants are producers, they make food. Herbivores like goat consume these plants which have pesticides in them. On consuming plants accumulated with pesticides herbivores get those harmful chemicals in them. Herbivores are further eaten by carnivores like lions. Carnivores thus receive these harmful chemicals from herbivores. Humans being omnivores (both herbivores and plant eater), when eat plants or herbivores, the harmful pesticides are transferred into their bodies. This process of accumulation of harmful chemicals through each trophic level in food chain is known as biological magnification and this is how harmful chemicals reach into the bodies of humans.

21. Question

'If we excessively use pesticides to protect the crops from diseases, then it may cause long -term damage to mankind'. Justify this statement.

Answer

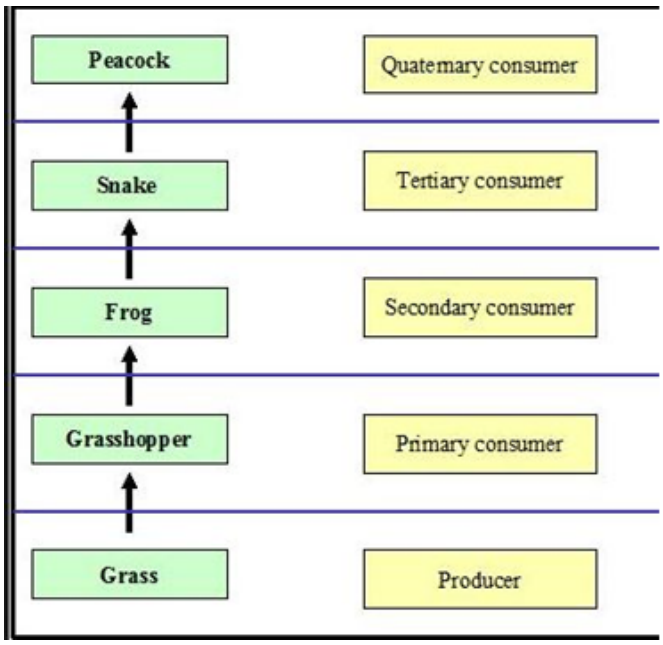
Pesticides are used to protect the crops from diseases. In this process pesticides mix up in the soil and water which are absorbed by plants. Producers are eaten by herbivores, and herbivores are eaten by carnivores. Man occupies the topmost level in a food chain as a omnivore, it eats plants as well as herbivores. The maximum amount of pesticide are accumulated at the topmost level of a food chain (biological magnification) and since human beings occupy the topmost level, the pesticides get accumulated in humans at maximum level which causes serious health issues.

22. Question

What is meant by biological magnification? With the help of a food chain, explain how biological magnification of harmful chemicals can occur.

Answer

Chemicals, pesticides and heavy metals move up the food chain, get into aquatic bodies and are eaten by organisms like fishes which are in turn eaten by hawks/eagles. This process where the chemical enters the food chain and increase in concentration with increasing trophic level is known as biological magnification.



For example in the above food chain, Grass is a producer; it grows by consuming harmful chemicals from the soil. Grass is eaten by grasshopper which is further eaten by frog. Frog is eaten by snake and peacocks feed on snake. Since peacock is at the highest trophic level it will have the maximum concentration of harmful chemicals in its body, according to bio-magnification. The chemicals enter from soil to grass and they increase in concentration with increasing trophic level.

23. Question

What is meant by bio-concentration of pesticides? Which common pesticide has accumulated in human body in considerable amounts?

Answer

Bio-concentration of pesticides refers to accumulation of pesticides and harmful chemicals in organisms through food chain. Bio-concentration is also defined as increase in chemical concentration in aquatic organism more than the chemicals in water.

Dichlorodiphenyltrichloroethane (DDT) is an insecticidal pesticide that accumulates in human body through the food chain. Since human beings occupy the highest trophic level in a food chain, the pesticide concentration in humans is considerably greater than the other organisms in the food chain.

24. Question

What is garbage? What does garbage consist of?

Answer

Garbage is defined as anything that cannot be re-used and is waste. It usually comprises of waste from household. Garbage consists of vegetable/fruit peels, paper, plastic, cans, used packaging material, left-over food, etc.

25. Question

Name the various modes of waste disposal.

Answer

There are various modes of waste disposal. Few of them are- incineration, pyrolysis, sewerage, composting, landfill, recycling, burial, biogas plant, etc.

26. Question

How can the wastes such as paper, plastic and metal objects be disposed of?

Answer

Waste paper can be recycled in industries where it is processed again to form new paper. Plastics can be discarded completely by incineration. Metals are even recycled depending on their nature i.e. ferrous or non-ferrous.

27. Question

Give a method for the disposal of household wastes such as left-over food, fruit and vegetable peels, and leaves of potted plants.

Answer

The best method for disposal of left-over food, fruit, vegetable peels, leafs of potted plants is composting. Compost consists of organic matter in a composting pit which is dug deep into the ground and covered with earth to ground level. The compost acts as manure to the soil as organic nutrients will be returned back to the soil when the compost decomposes.

28. Question

What is meant by incineration? For what purpose is it used?

Answer

Incineration is burning of waste materials at very high temperature, in an incinerator. Incineration is used mostly by hospitals for destruction of pathogen and sharp materials completely.

29. Question

How are most of the solid wastes in urban areas disposed of?

Answer

Most of the solid waste in urban areas is disposed of by creating landfill sites. The solid waste (garbage, dump, trash etc.) is dumped into landfill sites (low line areas) and covered with earth to the ground. Waste material is disposed of by burial in this method.

30. Question

State two advantages of using disposable paper cups over disposable plastic cups.

Answer

1) Disposable paper cups are easily biodegradable. They breakdown without harming the environment and can be recycled into new paper. Whereas, disposable plastic cups are made of low grade plastics and does not decompose easily and pollute the environment.

2) Even on burning paper cups will not cause air pollution as much as will be caused by burning of plastic cups. Plastic on being burned will release toxic gases whereas paper will not.

31. Question

What is sewage? How is sewage disposed of?

Answer

Sewage is defined as system of carrying waste matter such as water or human urine and faeces, through underground pipes/sewers.

Sewage can be disposed of by treating it first at the sewage treatment plant where contaminants are removed from sewage to produce environmentally safe waste which is then releases into the river.

32. Question

Write the harmful effects of ozone depletion.

Answer

The harmful effects of ozone depletion are-

a) More skin cancer in humans due to ultraviolet radiations which will easily reach the skin cells through stratosphere if ozone layer depletes.

b) UV radiations would also damage parts of eyes thus causing cataracts, blindness and other diseases.

c) Immunosuppression. UV radiations could damage the immune system.

33. Question

What would happen if the ozone layer in the atmosphere completely disappears?

Answer

If the ozone layer in the stratosphere disappears completely then ultraviolet radiations from the sun would easily reach the earth's surface and damage skin cells in humans with radiations thus causing cancer. It will also lead to diseases in animals and damages in plants.

Long Answer Type Questions-Pg-241

34 A. Question

With the help of a flow diagram, describe how energy from the sun flows through various trophic levels.

Answer

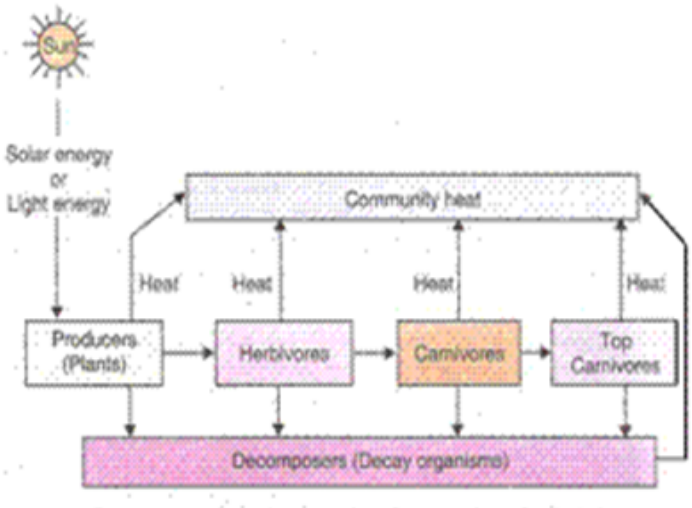


Diagram to show the transfer of energy in a food chain.

The energy from sun flows from producers to herbivores to carnivores.

Producers (plants) absorb sun's energy to make food by photosynthesis. In the presence of water, carbon dioxide and chlorophyll, plants absorb 1% of sun's energy available to them to make food in form of carbohydrates and release oxygen as a by-product. This food in the form of chemical energy flows through the food chain.

In the next step, Plants are eaten by herbivores and according to 10% energy law only 10% of energy is transferred from plants to herbivores; the rest is lost in transfer and other activities. Herbivores utilize this energy in metabolic activities and release some of the energy in form of heat into the environment.

Further, herbivores are eaten by carnivores. 10% of energy from herbivores gets transferred to carnivores. Carnivores utilize this energy for activities like respiration etc. and release some part of the un-utilized energy into the environment.

The top Carnivores obtain energy by feeding on the flesh of small carnivores and the transfer of energy keeps on happening.

34 B. Question

Explain why, the flow of energy in the ecosystem is said to be unidirectional.

Answer

Energy flows from plants to herbivores, then to carnivores in a food chain. Most of the energy is utilized by the organism for its activities and un-utilized energy is dissipated in the form of heat; this energy in the form of heat cannot be returned back to plant for photosynthesis. Therefore, The flow of energy in the ecosystem is said to be unidirectional.

35 A. Question

What is ozone? How is it formed?

Answer

Ozone is a toxic gas formed from reaction of ultraviolet radiations with oxygen. It differs from oxygen in having three molecules (O_3) instead of two.

Ozone is formed when Ultraviolet radiations act on oxygen molecules. Oxygen molecules O_2 are converted to ozone O_3 when Ultraviolet radiations act upon them.

35 B. Question

How does ozone layer protect us from harmful effects in the environment?

Answer

Ozone layer protects by blocking the harmful ultraviolet radiations coming from the sun, reaching the earth and thus protecting from ailments like skin cancer, cataract and immunosuppression which occur when ultraviolet radiations reach humans.

35 C. Question

What is UNEP? What step has been taken by UNEP in 1987 to prevent too much damage to the ozone layer?

Answer

UNEP stands for United Nations Environment Program.

In 1987, UNEP signed an agreement to stop the CFC production at 1986 level, amongst its member countries. Montreal Protocol was signed in September 1987 which states to reduce the consumption and production of ozone depleting substances in order to reduce their quantity in the environment thus protecting the fragile ozone layer.

36 A. Question

How is energy introduced into the ecosystem?

Answer

Energy is introduced into the ecosystem from sun through the process of photosynthesis. Producers make their own food which flows as energy through the entire food chain. Producers use water, carbon dioxide in the presence of sunlight and chlorophyll to make food. This process is known as photosynthesis. This food then flows as energy in the entire ecosystem.

36 B. Question

Consider the following food chains:

(i) Plants → Mice → Snakes → Hawks

(ii) Plants → Mice → Hawks

If energy available at the producer level in both the food chains is 100 J, in which case will hawks get more energy as food and by how much? Justify your answer.

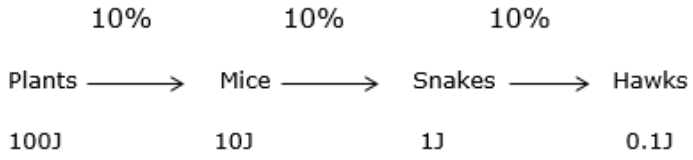
Answer

i) Plants—Mice—Snakes—Hawks.

If 100J is available at producer level (plants); mice will receive 10% of it- 10J.

10% of energy transfer will take from mice to snakes. 10% of 10J=1J. Snake will receive 1J of energy.

10% of energy will be transferred from snake to hawks. 10% of 1J=0.1J. Hawk will receive 0.1J of energy in this food chain.

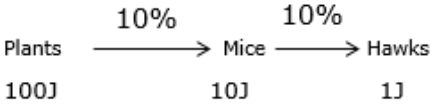


ii) Plants—Mice—Hawks.

If 100J is available at producer level (plants); mice will receive 10% of it-10J

10% of 10J energy will be transferred from mice to hawks. 10% of 10J=1J.

The Hawks will receive 1J energy in this food chain.



Therefore, hawks will get more energy in the food chain which is equal to 1J and is more than 10% than the energy it is receiving in the first food chain. This is because in the first food chain Mice were being eaten by snakes, and hawks had to eat snakes, so it received

less energy. In the second food chain, hawks directly ate mice, there were no snakes to consume energy in between so hawks received more energy.

37 A. Question

Explain why, a food chain usually cannot have more than three or four steps.

Answer

10% energy transfer takes place from one trophic level to the next trophic level. Producers absorb one percent of sun's energy to make food and then transfer 10% of it to the next trophic level and so on. There cannot be more than three or four steps in food chain because after that the energy availability to the organisms will be so less that the organism will not be able to survive with that less amount of energy available to them.

37 B. Question

Calculate the amount of energy that will be available to big fish in the following food chain, if 10,000 J of energy is available to small algae from the sun:

Small algae → Zooplankton → Fish → Big fish

Answer

Food chain= Small algae—Zooplankton—Fish—Big fish

The algae receive 10,000J of energy out of which it absorbs only 1% i.e. 100J. 10% of 100J i.e. 10J is transferred to zooplankton. Fish receives 10% of this 10J= 1J. Out of 1J energy available to the fish, 10% is transferred to the next trophic level i.e. big fish. 10% of 1J is 0.1J. Hence, 0.1J of energy will be available to big fish if 10,000J of energy is available to small algae from the sun.

38 A. Question

Name and state the law given by Lindeman which tells us how much energy entering a particular trophic level of organisms is available for transfer to the next higher trophic level.

Answer

Raymond Lindeman in 1942 gave the Ten percent law. According to this law, only 10% of the energy transfer takes place from one trophic level to the next trophic level. The remaining energy is lost during transfer or broken down in respiration.

38 B. Question

How much energy will be available to hawks in the food chain comprising hawk, snake, paddy and mice, if 10,000 J of energy is available to paddy from the sun?

Answer

Food chain will be = Paddy—Mice—Snake—Hawk

10,000J of energy is available to paddy from sun, out of which only 1% is absorbed, 1% of 10,000J is 100J. 100J energy is absorbed by Paddy. 10% of this 100J is transferred to mice, 10% of 100J is 10J; mice receives 10J energy. 10% of 10J i.e. 1% reaches the next trophic level i.e. snake. Snake will transfer 10% of 1J to hawks; 10% of 1J is 0.1J.Thus, 0.1J of energy will be available to hawks in the given food chain.

Multiple Choice Questions (MCQs)-Pg-242

39. Question

What provides the energy which then flows through a food chain?

A. Glucose

B. Oxygen

C. Respiration

D. Sunlight

Answer

Plants that are producers in a food chain synthesize food using water and carbon dioxide in the presence of chlorophyll and sunlight which then flows in the form of energy through the food chain.

40. Question

Which pollutant released into the air during refrigeration and air-conditioning is the greatest contributor to the depletion of ozone layer?

A. BHC

B. DDT

C. CFC

D. UNEP

Answer

Chlorofluorocarbon, released from refrigerators and air-conditioners are the greatest contributor in depleting the ozone layer.

41. Question

In the food chain given below, if the amount of energy available at fourth trophic level is 5 kJ, what was the energy available at the producer level?

Grass $\rightarrow$ Grasshopper $\rightarrow$ Frog $\rightarrow$ Snake $\rightarrow$ Hawk

A. 500 kJ

B. 50 kJ

C. 5000 kJ

D. 5 kJ

Answer

According to the 10% energy law, 10% of energy is transferred at each trophic level. So, when 5000 kJ energy is available at producer, 10% of it will be transferred to second trophic level, i.e. 500 kJ. Now, 10% of this 500 kJ will be transferred to the third trophic level i.e. 50 kJ. 10% of 50kJ will be transferred to the fourth trophic level, i.e. 5kJ.

42. Question

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

A. Insufficient food supply from producer level

B. Decrease in energy at higher trophic levels

C. Increase in the number of organisms at higher trophic levels

D. Accumulation of harmful chemicals at higher trophic levels

Answer

Since only 10% of energy is transferred at each trophic level, the higher trophic level get very low amount of energy which is not sufficient for the organisms to sustain life. So, the trophic level gets restricted to amount of energy available at which the organisms at that trophic level can sustain life.

43. Question

What percentage of sun's energy falling on the leaves of green plants is utilized by the plants in the process of photosynthesis and stored as chemical energy of food?

A. 99 per cent

B. 10 per cent

C. 1 per cent

D. 20 per cent

Answer

Out of all the energy that falls on leaves of green plants, only one percent is utilized by plants to make food through photosynthesis, the rest is reflected back by the leaves.

44. Question

The depletion of ozone layer in the upper atmosphere is mainly due to the emission of:

A. Un-burnt hydrocarbons

B. Chlorofluorocarbons

C. Greenhouse gases

D. Ultraviolet radiations

Answer

Chlorofluorocarbon that is emitted by refrigerators and air-conditioners are responsible for depletion of ozone layer in the stratosphere.

45. Question

In an ecosystem, the ten per cent energy available for transfer from one trophic level to the next is in the form of:

A. Heat energy

B. Light energy

C. Chemical energy

D. Mechanical energy

Answer

According to 10% energy rule, 10% of total energy available at each trophic level is transferred to the next trophic level in the form of food i.e. chemical energy.

46. Question

The flow of energy in an ecosystem is always:

A. Unidirectional

B. Bidirectional

C. Cyclic

D. Multidirectional

Answer

The energy enters the plants from sun, during the making of food. This energy is passed from one trophic level to another in food chain.

47. Question

The excessive exposure of humans to ultraviolet rays results in:

(i) Damage to immune system

(ii) Damage to lungs

(iii) Skin cancer

(iv) Peptic ulcers

A. (i) and (ii)

B. (ii) and (iv)

C. (i) and (iii)

D. (iii) and (iv)

Answer

Damage to immune system and skin cancer

Excessive exposure of UV radiations to human skin cells results in destruction of genetic material thus leading to uncontrolled growth of cells and hence causing cancer. Exposure to UV radiations also causes immunosuppression and hence damage to immune system.

48. Question

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

A. Carnivore

B. Large carnivore

C. Producer

D. Herbivore

Answer

According to the ten percent energy rule, 10% energy is transferred at each trophic level; so the organism that is at the top in a food chain will receive the lowest amount of energy. Hence, large carnivore which will be at the top in food chain will get minimum amount of energy through the food chain.(Producer-herbivore-carnivore-large carnivore)

49. Question

A food chain comprises of cat, seed-eating bird, plants, and dog. The organism which will have the maximum concentration of harmful pesticides coming through the food chain is most likely to be:

A. Cat

B. Plants

C. Dog

D. Seed-eating bird

Answer

Biological magnification is the accumulation of harmful chemicals and pesticides at trophic levels in a food chain, and it is the maximum at the topmost trophic level. In this food chain, plant-seed eating bird-cat-dog; dogs are at the top so they will have the maximum concentration of harmful pesticides.

50. Question

An aquatic food chain comprises of the organisms like tadpoles, weeds, fish and water beetles. The organism which gets the minimum energy through this food chain is:

A. Water beetles

B. Tadpoles

C. Weeds

D. Fish

Answer

According to 10% energy rule, the organism at the topmost level in a food chain will receive minimum energy because of 10% energy transfer at each trophic level. So in this food chain, fish being at the topmost trophic level will get minimum amount of energy through the food chain.

51. Question

Most of the water surface of a lake is covered with algae. This algae is part of the food chain which also includes small fish, bird, larvae and big fish. Which of the following will obtain the maximum energy?

A. Big fish

B. Bird

C. Larvae

D. Small fish

Answer

According to 10% energy rule, 10% of energy is transferred at each trophic level. In this food chain, larvae will have the maximum amount of energy because they are at the second trophic level in a food chain and we already know that energy decreases as it moves or flows in a food chain, so after algae, larvae will have maximum energy.

52. Question

If the energy available at the producer level in a food chain is 150 J, how much energy will be transferred to: tertiary consumer?

A. 15 J

B. 10 J

C. 1.50 J

D. 0.15 J

Answer

According to ten percent energy rule- 10% of energy available at producer is transferred to primary consumer, so primary consumer receives 15J energy. 10% of 15J is transferred to secondary consumer. The secondary consumer receives 1.5J energy. The tertiary consumer will receive 10% of 1.5J i.e. 0.15J.

53. Question

If the energy transferred to a tertiary consumer in a food chain is 10 J, how much energy was available to the primary consumer?

A. 100 J

B. 500 J

C. 1000 J

D. 5000 J

Answer

According to 10% energy law, 10% energy is transferred at each trophic level. So if tertiary consumer gets 10J, primary consumer would have had 1000 J of energy out of which, 10% i.e. 100J gets transferred to secondary consumer, 10% of 100J will be transferred to tertiary consumer i.e. 10J.

54. Question

In addition to wheat plants, a crop field ecosystem has organisms such as snake, peacock, eagle and mice. If the wheat plants are sprayed with pesticides periodically, which of the following will have the minimum concentration of pesticides in the body?

A. Snake

B. Eagle

C. Mice

D. Peacock

Answer

The food chain will be [wheat plants-mice-snake-peacock-eagle]. Mice will have the minimum concentration of pesticides. This is because, biological magnification is the increasing concentration of pesticides and harmful chemicals in organisms at higher levels in a food chain. So, eagle will have the maximum concentration and mice will have the minimum concentration of pesticide.

55. Question

Which of the following is the best method to dispose of biological wastes from hospitals?

A. Landfill

B. Recycling

C. Incineration

D. Composting

Answer

Disposal of bio-medical waste i.e. waste from hospitals is best done by incineration as it destroys pathogen and sharp materials completely

56. Question

In an ecosystem:

(i) The flow of energy is unidirectional

(ii) The flow of materials is unidirectional

(iii) The flow of materials is cyclic

(iv) The flow of energy is cyclic

A. (i) and (ii)

B. (ii) and (iii)

C. (i) and (iv)

D. (i) and (iii)

Answer

The flow of energy is unidirectional. The flow of materials is cyclic. Energy enters a food chain through producers and transfer of energy takes place from producers to decomposers through the food chain on the basis of ten percent energy rule, and is unidirectional.

The flow of materials takes place in a cyclic manner. Materials like water, carbon dioxide and nitrogen are taken up by plants to make food. This food passes from producers to herbivores and carnivores. After the death of animals, these materials are returned back to the soil from where they were taken. The materials hence are re-used for growth of new plants. Hence, flow of nutrients is cyclic in food chain.

57. Question

The ten per cent law is associated with

A. Transfer of energy from various trophic levels to decomposers in a food chain

B. Transfer of ATP energy into muscular energy

C. Transfer of chemical energy from one organism to another

D. Transfer of sun's energy to the organisms called producers.

Answer

According to ten percent law, 10% of total energy available at a trophic level is transferred to the next trophic level. Transfer of energy begins from producers and continues up to decomposers in a food chain.

58. Question

The harmful chemical which is accumulating in human beings through food chain is:

A. Benzene hexa-chloride

B. Dichlorodiphenyltrichloroethane

C. Chlorofluorocarbon

D. Abscisic acid

Answer

DDT (dichlorodiphenyltrichloroethane) is an insecticide that is used to kill insects. Plants absorb it through soil and pass it up in the food chain. Because of biological magnification, it gets accumulated in human beings and may accumulate in large amount too.

59. Question

O_2 is converted into O_3 by the action of:

A. Infrared radiations

B. Ultraviolet radiations

C. Gamma radiations

D. Cosmic radiations

Answer

Oxygen released from the plants, floats upwards into the atmosphere and is converted into ozone by ultraviolet radiations. Formation of ozone thus blocks ultraviolet radiations from reaching the earth surface

60. Question

Which of the following cannot be added in a composting pit to prepare compost?

A. Sunflower plants

B. Fruit and vegetable peels

C. Flowers of plastic

D. Red worms

Answer

Compost consists of organic matter, and plastic is not organic in nature, moreover plastic is non-degradable. To prepare compost, organic matter is added in a composting pit.

Questions Based on High Order Thinking Skills (HOTS)-Pg-243

61. Question

The gas A is used by most of the animals to obtain energy from food by the process of respiration. When A is acted upon by radiation X, it gets converted into another gas B which is an allotrope of A but poisonous when inhaled. B forms a kind of layer C in the upper atmosphere which absorbs radiations X coming from a source Y and prevents them from reaching the earth. Some chemicals Z released from the various devices on the earth are destroying the layer C slowly. In fact, a hole has already been formed in layer Cover the area D of the earth.

(a) What are gases?

(i) A, and

(ii) B? Write their molecular formulae.

(b) Name the layer C.

(c) What are (i) X, (ii) Y, and (iii) Z?

(d) Name the area D.

(e) Name any two human ailments which may be caused by X.

Answer

a) i) The gas A used by animals to obtain energy from food by respiration is Oxygen O_2.

ii) The gas B is Ozone O_3. Radiations X (ultraviolet) when act on oxygen, convert oxygen to ozone.

b) The layer C is Ozone layer. Gas B i.e. Ozone forms ozone layer in the stratosphere.

c) i) X- Ultraviolet radiations

ii) Y- Sun. Ultraviolet radiations come from the sun

iii) Z- Chlorofluorocarbons. CFC's are released from refrigerator and air-conditions which are destroying the ozone layer.

d) Ozone hole has been formed over Antarctica's upper atmosphere.

e) The radiations X i.e. ultraviolet radiations cause skin cancer, when they fall on skin; they destroy the genetic material of the cells, thus resulting in uncontrolled growth of cells. These radiations are also absorbed by the lens of the eyes which leads to formation of free radicals inside the lens that causes cataract over time. Ultraviolet radiations also cause immunosuppression.

62. Question

The surface of water in a lake appears green due to a layer of tiny free-floating organisms X on its surface. The lake water also contains organisms like water beetle, fish and tadpole. The sun shines over the lake water and provides energy for the functioning of this lake ecosystem.

(a) What could organisms X be?

(b) Write a food chain comprising of all the four organisms mentioned.

(c) What is the general name of the food chains like the one written above?

(d) Name

(i) Secondary consumer

(ii) Producer

(iii) Tertiary consumer, and

(iv) Primary consumer in the above food chain

(e) If the tertiary consumer gets 0.2 J of energy from the secondary consumer, then how much energy was radiated by the sun to the producer?

Answer

a) Phytoplankton- Algae are tiny free floating organisms on surface of water.

b) Food chain= Algae- tadpole- water beetle- fishes.

c) Aquatic food chain is the name given to the above food chain because this food chain exists in aquatic bodies where algae are producers, tadpoles are primary consumers, water beetles are secondary consumers and fishes are tertiary consumers.

d) i) Water beetles- secondary consumer

ii) Algae-producers

iii) Fishes- tertiary consumer

iv) Tadpole- primary consumer

e) If the tertiary consumer gets 0.2J of energy from the secondary consumer, then the producer would have received 20000J of energy from the sun. This is because of the 10% energy law. Producer receives 20,000J energy from sun and uses 1% of it to make food. 200J of energy is available at the producer. 10% of 200J is transferred to primary consumer which is 20J. Secondary consumer will obtain 10% of 20J=2J. The tertiary consumer will at last receive 10% of 2J which is equal to 0.2J. Thus, 20,000J energy was radiated from sun to producer.

63. Question

A forest ecosystem having a lot of green plants has some foxes, lions and rabbits in it.

(a) Write a food chain comprising all the four organisms mentioned above.

(b) Name

(i) one herbivore, and

(ii) two carnivores, in this food chain.

(c) Name the link which is a predator as well as a prey.

(d) Name

(i) second trophic level, and

(ii) third trophic level.

(e) Which link of this food chain can feed on second trophic level as well as third trophic level, independently?

(f) If the sun provides 1000 J of energy to the plants, then how much energy will be transferred to fox through the food chain.

Answer

a) Food Chain= Green plants- rabbits-fox-lions

b) i)Herbivore- Rabbit is a herbivore

ii) Carnivore- Fox and lion are carnivores.

c) Fox is a predator as well as a prey. It eats rabbits as well as gets eaten by lion

d) i) Second trophic level- Rabbits

ii) Third trophic level- Fox.

e) Lion can feed on rabbits (secondary trophic level) as well as Fox (third trophic level), because they are carnivores.

f) If 1000J of energy is provided by sun to plants, the plant will absorb only 1% of this energy to make food. 1% of 1000J = 10J. Further, applying the ten percent rule,

The rabbits will receive 10% of 10J i.e. 1J.

10% of 1J= 0.1 J will be passed on to the foxes,.

64. Question

A food chain consists of fish, larvae, phytoplankton and birds. The level of pesticides in water in which the fish, larvae and phytoplankton live is quite high.

(a) In which organisms the pesticides enter from the polluted water? What is this level of organisms known as?

(b) Which organism will have the maximum amount of pesticides accumulated through the food chain? What is this process known as?

(c) Write the food chain comprising all the organisms mentioned above.

(d) Which other organism you could write in place of bird in the above food chain?

Answer

a) Pesticides enter the Phytoplankton from the polluted water. This level of organism is known as producers. They produce their own food through the process of photosynthesis.

b) Birds will have the maximum amount of pesticides accumulated through the food chain because they are at the top in the food chain.

The process of accumulation of substances like pesticides where they move up the food chain, enter the aquatic organisms which are in turn are eaten by birds or humans is known as biological magnification.

c) Food chain= Phytoplankton-Larvae-Fish-Birds.

d) Human being can be considered in place of birds in the above food chain since they are omnivore too like certain birds; they eat food both of plant and animal origin.

65. Question

Every household produces a lot of material A daily. In one of the methods of disposal B, material A is burned at a very high temperature of about 1000°C in a structure called C. During this process, the organic matter present is removed as D and E whereas F is left behind (which can be dumped in a landfill site).

(a) What is material A

(b) Name the method of disposal B.

(c) What is structure C known as?

(d) What are

(i) D

(ii) E, and

(iii) F?

(e) This method is especially suitable for the disposal of materials produced by certain institution. Name such institutions.

Answer

a) A-Garbage; Every household produces a lot of garbage daily.

b) B-Incineration; it is a method of destroying waste material by burning at high temperature.

c) C-Incinerator; incineration is carried out in an incinerator.

d) (i) D-Carbon dioxide; CO_2 is the organic matter that is removed by burning of garbage.

(ii) E- Water is left behind after burning of garbage.

(iii) F- Ash is also left behind after burning of garbage.

e) Hospitals use incineration for disposal of biomedical wastes. An efficient incinerator will destroy pathogens and sharp materials and the source materials are not found in the ash that is left behind.