

CHAPTER 15

OUR ENVIRONMENT

Syllabus

Ecosystem, Environmental problems, ozone depletion, waste production and their solution, biodegradable and non-biodegradable substances.



STAND ALONE MCQs

(1 Mark each)

Q. 1. 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?

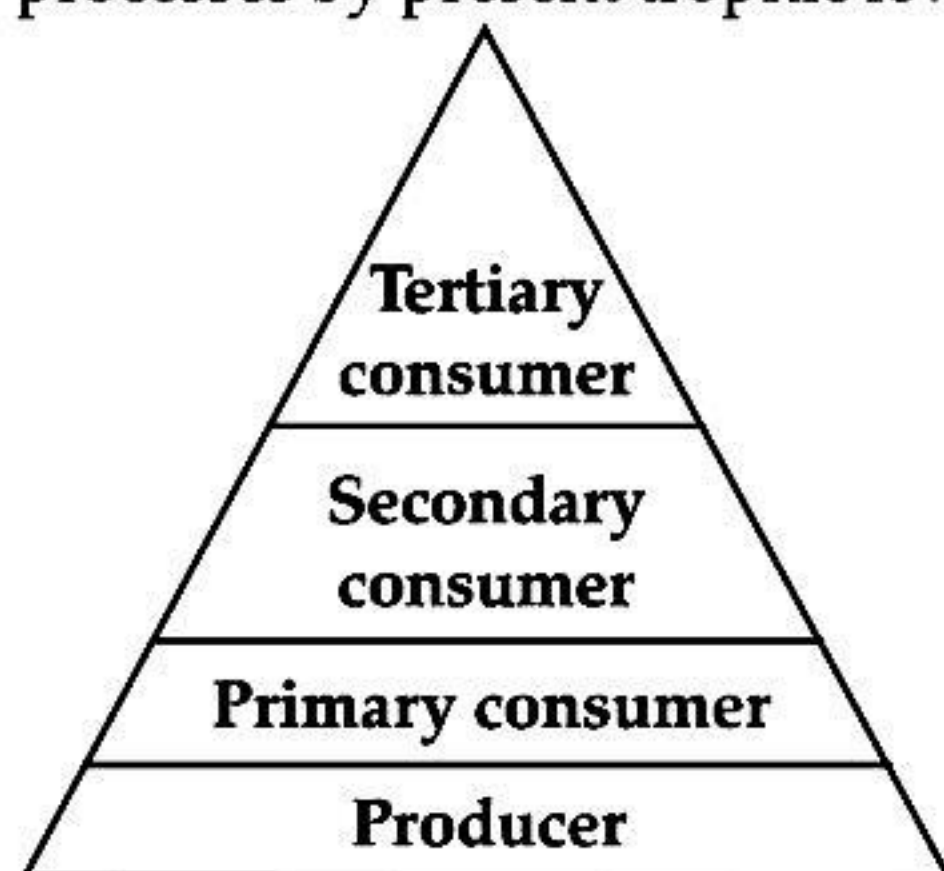
Grass → Grasshopper → Frog → Snake → Hawk

- (A) 5 kJ (B) 50 kJ
(C) 500 kJ (D) 5,000 kJ

AE

Ans. Option (D) is correct.

Explanation: According to 10% law, only 10% of energy is transferred to the next trophic level and remaining 90% energy is used in life processes by present trophic level.



Trophic levels

Therefore,

Energy available to Grass = 10% of 5000 kJ.

Energy available to Grasshopper = 10% of 500 kJ

Energy available to Frog = 10% of 500 kJ = 50 kJ

Energy available to Hawk = 10% of 50 kJ = 5 kJ

Q. 2. In an ecosystem, the 10% of 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.

U

Ans. Option (C) is correct.

Explanation: In an ecosystem, the 10% of energy available for transfer from one trophic level to the next is in the form of chemical energy. The producers or green plants capture the energy in sunlight and convert it into chemical energy which is passed onwards to the other trophic level.

Q. 3. Organisms of a higher trophic level which feed on several types of organisms belonging to a lower trophic level constitute the

- (A) food web. (B) ecological pyramid.
(C) ecosystem. (D) food chain.

U

Ans. Option (A) is correct.

Explanation: Food web is a network of food chains. Each organism is generally eaten by two or more kinds of organisms which are again eaten by several other organisms and so instead of straight line food chain, the series of organisms dependent on one another for their food can be shown by branched chain which is called as a food web.

Q. 4. Which 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)

Ans. Option (C) is correct.

Explanation: Food chain (ii): It 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 are no herbivores to eat grass therefore grass cannot be a part of food chain (iii).

- Q. 5. The percentage of solar radiation absorbed by all the green plants for the process of photosynthesis is about :

- (A) 1%. (B) 5%.
 (C) 8%. (D) 10%. R

Ans. Option (A) is correct.

Explanation: Green plants in a terrestrial ecosystem capture about 1% of the energy of sunlight that falls on the leaves and converts it into food energy.

- AIQ. 6. Select the mismatched pair in the following and correct it.

- (A) Bio-magnification — Accumulation of chemicals at the successive trophic levels of a food chain
 (B) Ecosystem — Biotic components of environment
 (C) Aquarium — A man-made ecosystem
 (D) Parasites — Organisms which obtain food from other living organisms AE

Ans. Option (B) is correct.

Explanation: Both biotic and abiotic components of environment constitute an ecosystem.

- Q. 7. Which one of the followings is an artificial ecosystem?

- (A) Pond (B) Crop field
 (C) Lake (D) Forest R

Ans. Option (B) is correct.

Explanation: Ecosystems which are made by man, are called artificial ecosystem. For example, in crop fields abiotic and biotic components are selected by humans. Sowing of seeds, irrigation and further progress in crop fields is also closely kept under observation to get good crop yield.

- Q. 8. In a food chain, the third trophic level is always occupied by

- (A) carnivores. (B) herbivores.
 (C) decomposers. (D) producers.

Ans. Option (A) is correct.

Explanation: In food chain, (i) plants occupy the first trophic level. (ii) herbivores occupy the second trophic level. (iii) carnivores occupy the third trophic level.

- Q. 9. Which one of the following green house gases is a contributor due to incomplete combustion of coal and petroleum?

- (A) Oxides of nitrogen (B) Methane
 (C) Carbon monoxide (D) Carbon dioxide

[Board SQP, 2020]

Ans. Option (C) is correct.

Explanation: Incomplete combustion of coal and petroleum releases carbon monoxide, which is a contributor of greenhouse effect.

- Q. 10. Depletion of ozone is mainly due to _____.

- (A) chlorofluorocarbon compounds.
 (B) carbon monoxide.
 (C) methane.
 (D) pesticides. R

Ans. Option (A) is correct.

Explanation: Depletion of ozone layer occurs due to chlorofluorocarbons (CFCs). Other chemicals do not cause depletion of ozone layer in the environment.

- Q. 11. Excessive exposure of humans to UV-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) U

Ans. Option (C) is correct.

Explanation: Excessive exposure of humans to ultraviolet (UV)-rays results in :

- (i) Skin cancer.
 (ii) Damage to the immune system of the body.

- Q. 12. Which of the followings are environment-friendly practices?

- (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. A

Ans. Option (D) is correct.

Explanation: The eco-friendly habits that we should adopt in our day-to-day life are:

- (i) Switch off the lights when not in use.
 (ii) Walk to school or use bicycle.
 (iii) Always carry cotton bags instead of using plastic bags.

- AIQ. 13. 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. U

Ans. Option (C) is correct.

Explanation: The phenomenon of increasing accumulation of non-biodegradable pesticides at each higher trophic level in a food chain is known as bio-magnification.

Q. 14. Disposable plastic plates should not be used because

- (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. Option (D) is correct.

Explanation: Disposable plastic plates should not be used because they are made of non-biodegradable materials. Under certain conditions, the non-biodegradable substances can persist for longer time and can also harm the various components of ecosystem.

Q. 15. What happens to the earth's temperature due to the greenhouse effect?

- (A) Increases
- (B) Decreases

- (C) Remains the same
- (D) All of the above

Ans. Option (A) is correct.

Explanation: When the carbon dioxide concentration in the atmosphere increases, it creates a blanket around the earth, trapping heat that is reflected from the earth. The trapped heat causes the earth's temperatures to rise leading to global warming.

Q. 16. Why is it difficult to degrade non-biodegradable wastes?

- (A) Because non-biodegradable wastes cannot be recycled.
- (B) Because microorganisms cannot decompose it.
- (C) They can be made into organic wastes.
- (D) All of the above

Ans. Option (B) is correct.

Explanation: It is difficult or rather impossible to degrade non-biodegradable wastes because microorganisms cannot decompose these.



ASSERTION AND REASON BASED MCQs (1 Mark each)

Directions : In the following questions, A statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as.

- (A) Both A and R are true and R is the correct explanation of A.
- (B) Both A and R are true but R is NOT the correct explanation of A.
- (C) A is true but R is false.
- (D) A is false and R is true.

Q. 1. **Assertion (A):** Food chain is responsible for the entry of harmful chemicals in our bodies.

Reason (R): The length and complexity of food chains vary greatly. [A] [CBSE SQP, 2020]

Ans. Option (B) is correct.

Explanation: Through biomagnification, harmful chemicals that are not metabolised by our body pass into the food chain, irrespective of the length and complexity of the food chain, which may vary in nature.

Q. 2. **Assertion (A):** Greater number of individuals are present in lower trophic levels.

Reason (R): The flow of energy is unidirectional. [CBSE SQP, 2020]

Ans. Option (B) is correct.

Explanation: There are generally a greater number of individuals at the lower trophic levels of an ecosystem; the greatest number is of the producers. The flow of energy in an ecosystem is always linear or unidirectional. The energy captured from producers does not revert to the solar input. Also, the energy which passes to the herbivores does not come back to autotrophs.

Q. 3. **Assertion (A):** Herbivores are called first order consumers.

Reason (R): Tiger is a top carnivore.

Ans. Option (B) is correct.

Explanation: Herbivores obtain their food from plants. Hence, are known as *first order carnivores*. The carnivores like tiger that cannot be preyed upon further, lie at the top of food chain and hence termed as top carnivores.

Q. 4. **Assertion (A):** Flow of energy in a food chain is unidirectional.

Reason (R): Energy captured by autotrophs does not revert back to the solar input and it passes to the herbivores.

Ans. Option (A) is correct.

Explanation: The flow of energy through different steps in the food chain is unidirectional. This means that energy captured by autotrophs does not revert back to the solar input and it passes to the herbivores.

Q. 5. **Assertion (A):** First trophic level in a food chain is always a green plant.

Reason (R): Green plants are called producers.

Ans. Option (A) is correct.

Explanation: Green plants are producers. The first trophic level in a food chain is the producers *i.e.* those organisms which produce food by photosynthesis.

Q. 6. **Assertion (A):** Decomposers keep the environment clean.

Reason (R): They recycle matter by breaking down the organic remains and waste products of plants and animals.

Ans. Option (A) is correct.

Explanation: Decomposers keep the environment clean by decomposing or consuming the dead remains of other organisms.

Q. 7. Assertion (A): The concentration of harmful chemicals is more in human beings.

Reason (R): Man is at the apex of the food chain.

Ans. Option (A) is correct.

Explanation: Harmful chemicals accumulate progressively at each trophic level. Since the man is at the apex of all the food chains, the concentration of harmful chemicals may be more in human beings. The phenomenon involved is known as biomagnification.

Q. 8. Assertion (A): CFCs deplete the ozone layer.

Reason (R): CFCs are used as refrigerants and in fire extinguishers.

Ans. Option (A) is correct.

Explanation: Ozone layer is getting depleted at the higher levels of the atmosphere due to effect of chlorofluorocarbons (CFCs) which are used as refrigerants and in fire extinguishers.

Q. 9. Assertion (A): Polythene bags and plastic containers are non-biodegradable substances.

Reason (R): They can be broken down by micro-organisms in natural simple harmless substances.

Ans. Option (C) is correct.

Explanation: Substances like polythene bags and plastics are non-biodegradable because they cannot be broken down by micro-organisms into simpler harmless substance in nature. Substances that can be broken down by micro-organisms in natural simple harmless substances are biodegradable substances.

Q. 10. Assertion (A): Ozone is both beneficial and damaging.

Reason (R): Stop the release of chlorofluorocarbons to protect the ozone.

Ans. Option (B) is correct.

Explanation: Ozone is damaging as it is a deadly poison. It is beneficial as it shields the surface of the earth from UV radiations of the Sun. We should stop the release of Chlorofluorocarbons (CFCs) to protect the ozone.

Q. 11. Assertion (A): Wastes such as plastics, paper, vegetable or fruit peels, which are generated in our house daily are biodegradable.

Reason (R): Biodegradable wastes can be broken down into simpler, harmless substance in nature in due course of time by the biological processes such as action of microorganisms.

Ans. Option (D) is correct.

Explanation: Household wastes like paper, vegetable and fruit peels are biodegradable wastes that can be degraded by microorganisms while waste like plastics are non-biodegradable. They cannot be broken down into simpler, harmless substances in nature.

CASE-BASED MCQs

Attempt any 4 sub-parts from each question.

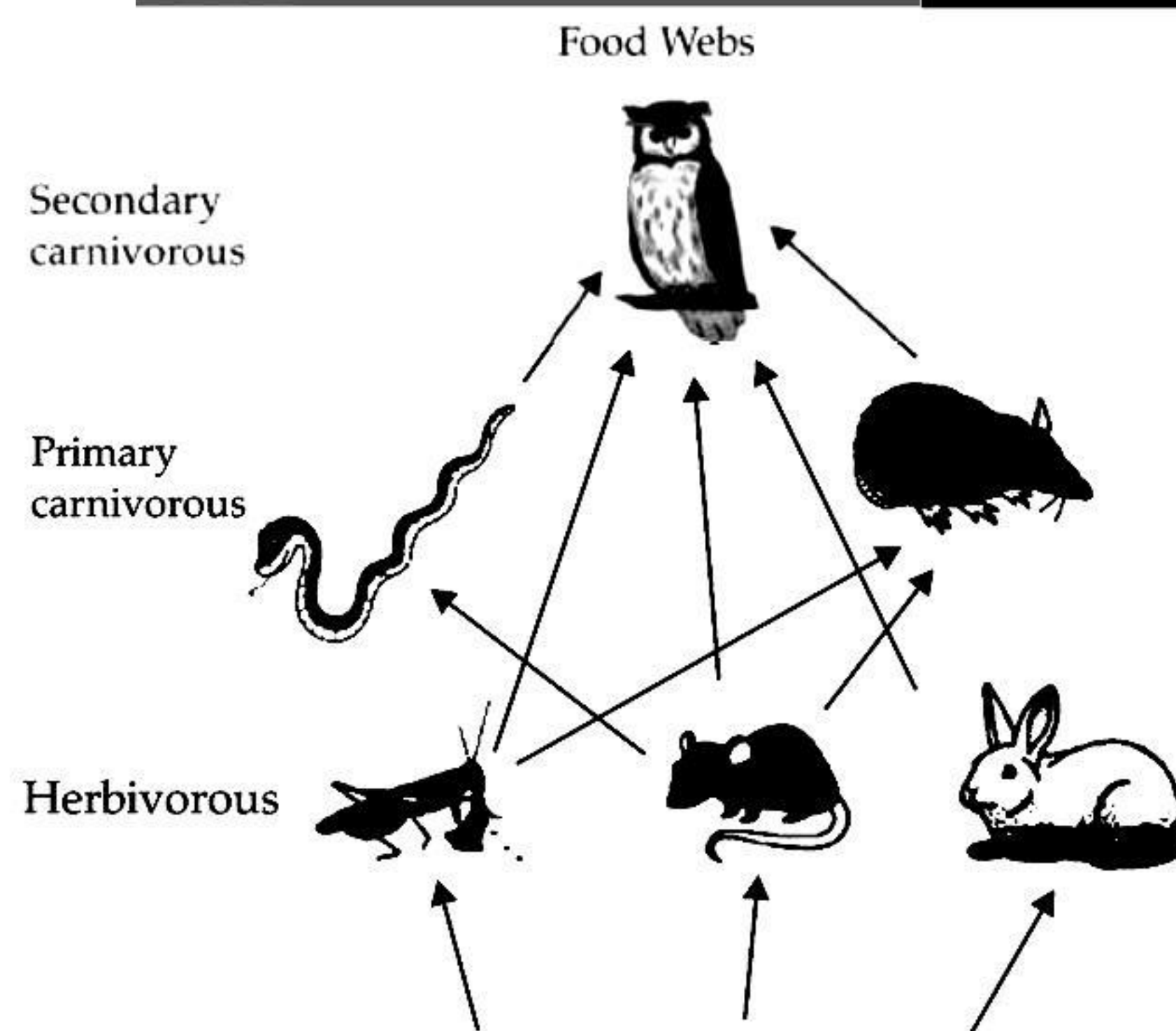
Each sub-part carries 1 mark.

I. Read the following and answer any four the questions from Q.1 to Q.5.

Food chains are very important for the survival of most species. When only one element is removed from the food chain it can result in extinction of a species in some cases. The foundation of the food chain consists of primary producers.

Primary producers, or autotrophs, can use either solar energy or chemical energy to create complex organic compounds, whereas species at higher trophic levels cannot and so must consume producers or other life that itself consumes producers. Because the sun's light is necessary for photosynthesis, most life could not exist if the sun disappeared. Even so, it has recently been discovered that there are some forms of life, chemotrophs, that appear to gain all their metabolic energy from chemosynthesis driven by hydrothermal vents, thus showing that some life may not require solar energy to thrive.

[CBSE–QB 2021]



Q. 1. If 10,000 J solar energy falls on green plants in a terrestrial ecosystem, what percentage of solar energy will be converted into food energy?

- (A) 10,000 J
- (B) 100 J
- (C) 1000 J
- (D) It will depend on the type of the terrestrial plant.

Ans. Option (B) is correct.

Explanation: As we know, only 1 % of energy of sunlight that falls on leaves is converted into food energy by plants.

So, of 10,000 J is the energy of the sunlight, then $(1/100) \times 10,000 = 100$ J of energy will be converted into food energy.

- Q. 2. If Ravi is consuming curd/yogurt for lunch, which trophic level in a food chain he should be considered as occupying ?

OR

Mr. X is eating curd/yogurt. For this food intake in a food chain he should be considered as occupying

- (A) First trophic level
- (B) Second trophic level
- (C) Third trophic level
- (D) Fourth trophic level

Ans. Option (C) is correct.

Explanation: Curd is made from milk which is obtained from cow. Cow is a primary consumer that feeds on producer (grass) and occupies second trophic level. Thus, consuming the produce obtained from an organism at second trophic level makes Ravi belong to third trophic level.

- Q. 3. The decomposers are not included in the food chain. The correct reason for the same is because decomposers:
- (A) Act at every trophic level of the food chain
 - (B) Do not breakdown organic compounds
 - (C) Convert organic material to inorganic forms
 - (D) Release enzymes outside their body to convert organic material to inorganic forms

Ans. Option (A) is correct.

Explanation: Decomposers act at every trophic level of the food chain. So, they do not belong to any particular trophic level.

- Q. 4. Matter and energy are two fundamental inputs of an ecosystem. Movement of
- (A) Energy is bidirectional and matter is repeatedly circulating.
 - (B) Energy is repeatedly circulation and matter is unidirectional.
 - (C) Energy is unidirectional and matter is repeatedly circulating.
 - (D) Energy is multidirectional and matter is bidirectional.

Ans. Option (C) is correct.

Explanation: The flow of energy in an ecosystem is always linear or unidirectional. The energy captured from producers does not revert to the solar input. Also, the energy which passes to the herbivores does not come back to autotrophs. Also, the matter is repeatedly circulating in ecosystem.

- Q. 5. Which of the following limits the number of trophic levels in a food chain?

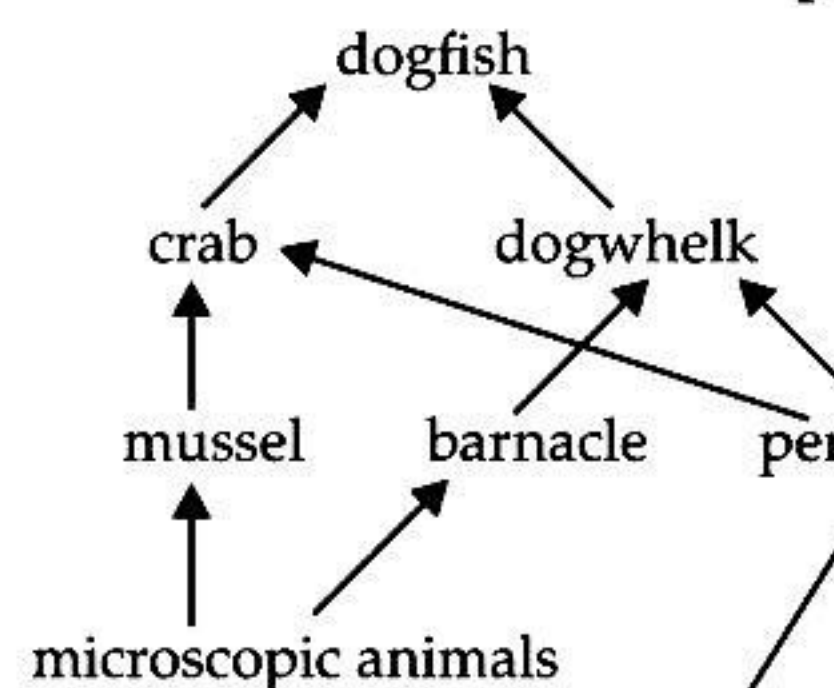
- (A) Decrease in energy at higher trophic levels
- (B) Less availability of food
- (C) Polluted air
- (D) Water

Ans. Option (A) is correct.

Explanation: At every step in a food chain the energy received by the organism is also used for its own metabolism and maintenance. The left over is passed to next higher trophic level. Thus energy flow decreases with successive trophic levels. This means, the number of trophic levels in a food chain is restricted by 10 % flow of energy, less amount of energy available to the last trophic level.

- II. Carefully study the given food web and answer any four questions from Q.1. to Q.5.

[CBSE-QB 2021]



- Q. 1. The mussel can be described as

- (A) Producer
- (B) Primary consumer
- (C) Secondary consumer
- (D) decomposer

Ans. Option (C) is correct.

Explanation: In the give food web, the algae is the primary producer, microscopic animals consume algae and are the primary consumers and mussels are at the next trophic level and are the secondary consumers.

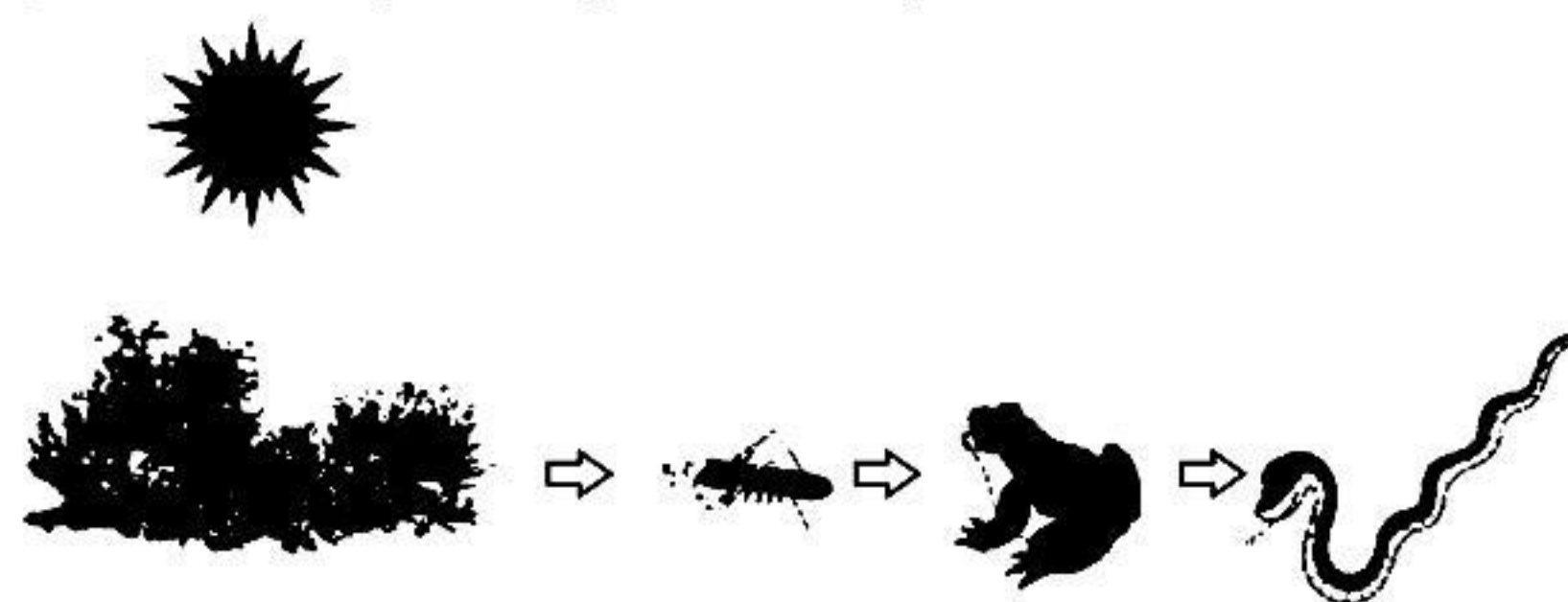
- Q. 2. Which trophic level is incorrectly defined?

- (A) Carnivores – secondary or tertiary consumers
- (B) Decomposers – microbial heterotrophs
- (C) Herbivores – primary consumers
- (D) Omnivores – molds, yeast and mushrooms

Ans. Option (D) is correct.

Explanation: Omnivores consume both plant and animal matter. Molds, yeast and mushrooms are saprophytes that feed on dead and decaying matter.

Q. 3. The given figure best represents:



- (A) Grassland food chain
- (B) Parasitic food chain
- (C) Forest food chain
- (D) Aquatic food chain

Ans. Option (A) is correct.

Explanation: Since, the given food chain comprises grass, grasshopper, frog and snake, so they belong to grassland food chain.

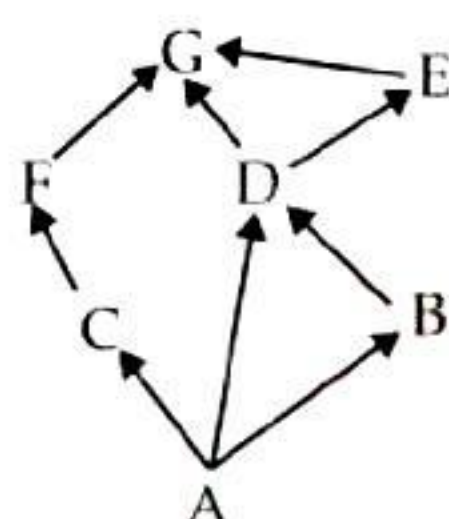
Q. 4. Why do all food chains start with plants?

- (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. Option (C) is correct.

Explanation: The first trophic level in a food chain is producer i.e. those organisms which produce food by photosynthesis.

Q. 5. In the food web, which two organisms are competing for food?



- (A) A and B
- (B) D and F
- (C) A and C
- (D) B and D

Ans. Option (D) is correct.

Explanation: B and D are present at the same trophic level. This means they consume the same organisms and thus compete for the food.

III. Read the following and answer the questions any four from Q.1. to Q.5. [CBSE–QB 2021]

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

Biotic vs. Abiotic Factors

Living	Non-Living
Examples	Examples

Plants	Water
Animals	Sunlight
Fungi	Soil
Bacteria	Air
	Temperature

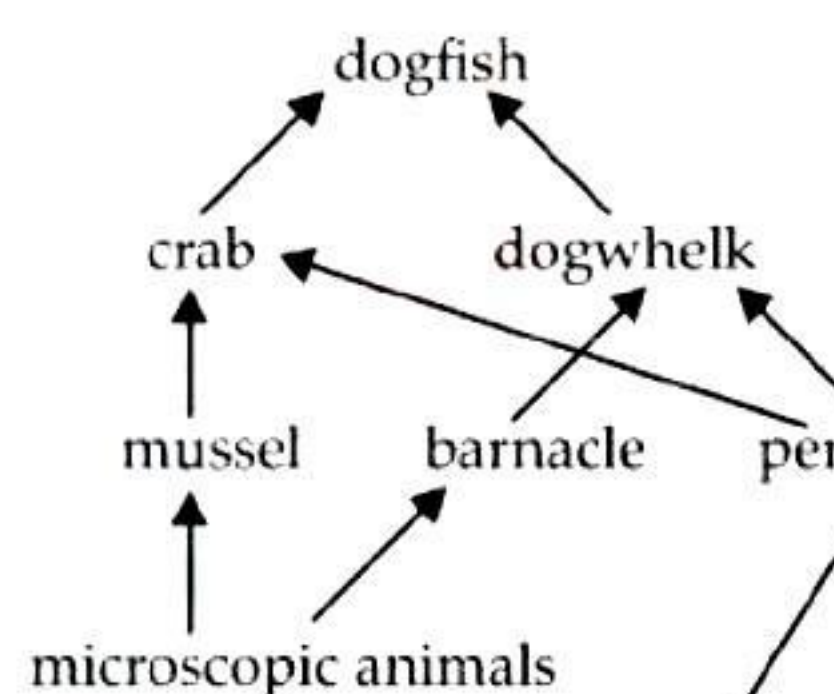
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- (B) Decomposers – microbial heterotrophs
- (C) Herbivores – primary consumers
- (D) Omnivores – molds, yeast and mushrooms

Ans. Option (C) is correct.

Explanation: Omnivores consume both plant and animal matter. Molds, yeast and mushrooms are saprophytes that feed on dead and decaying matter.

Q. 2. The diagram below shows a food web from the sea shore



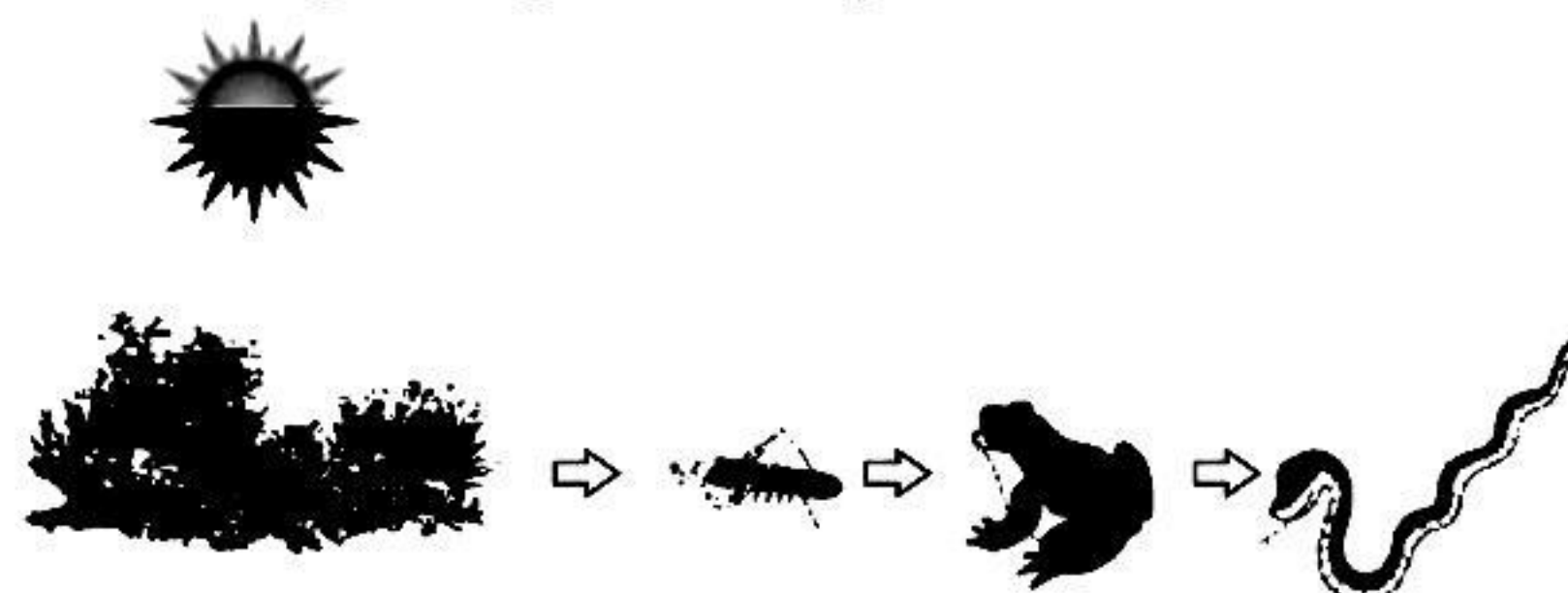
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- (A) Producer
- (B) Primary consumer
- (C) Secondary consumer
- (D) Decomposer

Ans. Option (A) is correct.

Explanation: In the give food web, the algae is the primary producer, microscopic animals consume algae and are the primary consumers and mussels are at the next trophic level and are the secondary consumers.

Q. 3. The given figure best represents:



- (A) Grassland food chain
- (B) Parasitic food chain
- (C) Forest food chain
- (D) Aquatic food chain

Ans. Option (C) is correct.

Explanation: Since, the given food chain comprises grass, grasshopper, frog and snake, so they belong to grassland food chain.

Q. 4. 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)

Ans. Option (C) is correct.

Explanation: Removal of tigers from an area will lead to an increase in number of herbivores and hence there will be decreased growth of vegetation in that particular area. The number of trophic levels in a food chain does not reach 8 rather there are 3 or 4 trophic levels.

Q. 5. Which of the following group of organisms are not included in ecological food chain?

- (A) Carnivores (B) Saprophytes
(C) Herbivores (D) Predators

Ans. Option (B) is correct.

Explanation: Saprophytes feed on dead and decaying matter. So they act on every trophic level of the food chain. Thus they do not belong to any particular trophic level and are not part of any ecological pyramid though they play an important role in the ecosystem.

V. Read the given passage and answer any of the four questions from Q.1. to Q.5.

Waste management is essential in today's society. Due to an increase in population, the generation of waste is getting doubled day by day. Moreover, the increase in waste is affecting the lives of many people. [CBSE–QB 2021]

Waste management is the managing of waste by disposal and recycling of it. Moreover, waste management needs proper techniques keeping in mind the environmental situations. For instance, there are various methods and techniques by which the waste is disposed of. You must have come across 5 R's to save the environment: refuse, reduce, reuse, repurpose and recycle.

Q. 1. Choose the waste management strategy that is matched with correct example.

(A)	Refuse	Choose products that use less packaging
(B)	Reduce	Give unwanted toys and books to hospitals or schools
(C)	Reuse	Not using single use plastic
(D)	Repurpose	Making flower pot from used plastic bottle

Ans. Option (D) is correct.

Explanation: Reusing a waste material to make something that is useful is called repurposing. Using a plastic bottle to make a flower pot is thus repurposing.

Q. 2. Recycling of paper is a good practice but recycled paper should not be used as food packaging because

- (A) recycled papers take lots of space
(B) recycled papers can't cover food properly
(C) recycled papers can cause infection
(D) recycled papers are costly

Ans. Option (C) is correct.

Explanation: It is because decomposition of paper produces chemicals like methane which may cause infection.

Q. 3. According to the 'Solid Waste Management Rule 2016', the waste should be segregated into three categories. Observe the table below and select the row that has correct information.

	Wet waste	Dry waste	Hazardous waste
(A)	Cooked food, vegetable peels	Used bulbs, fluorescent lamps	Plastic carry bags, bottles, newspaper, cardboard
(B)	Coffee and tea powder, garden waste	Plastic carry bags, bottles, newspaper, cardboard	Expired medicines, razors, paint cans
(C)	Leftover food, vegetable peels	Coffee and tea powder, garden waste	Insect repellents, cleaning solutions
(D)	Uncooked food, tea leaves	Old crockery, frying pans	Coffee and tea powder, garden waste

Ans. Option (B) is correct.

Explanation: Coffee and tea powder, garden waste are recyclable wet waste, plastic carry bags, bottles, newspaper, cardboard are kitchen dry waste while expired medicines, razors, paint cans are domestic hazardous wastes.

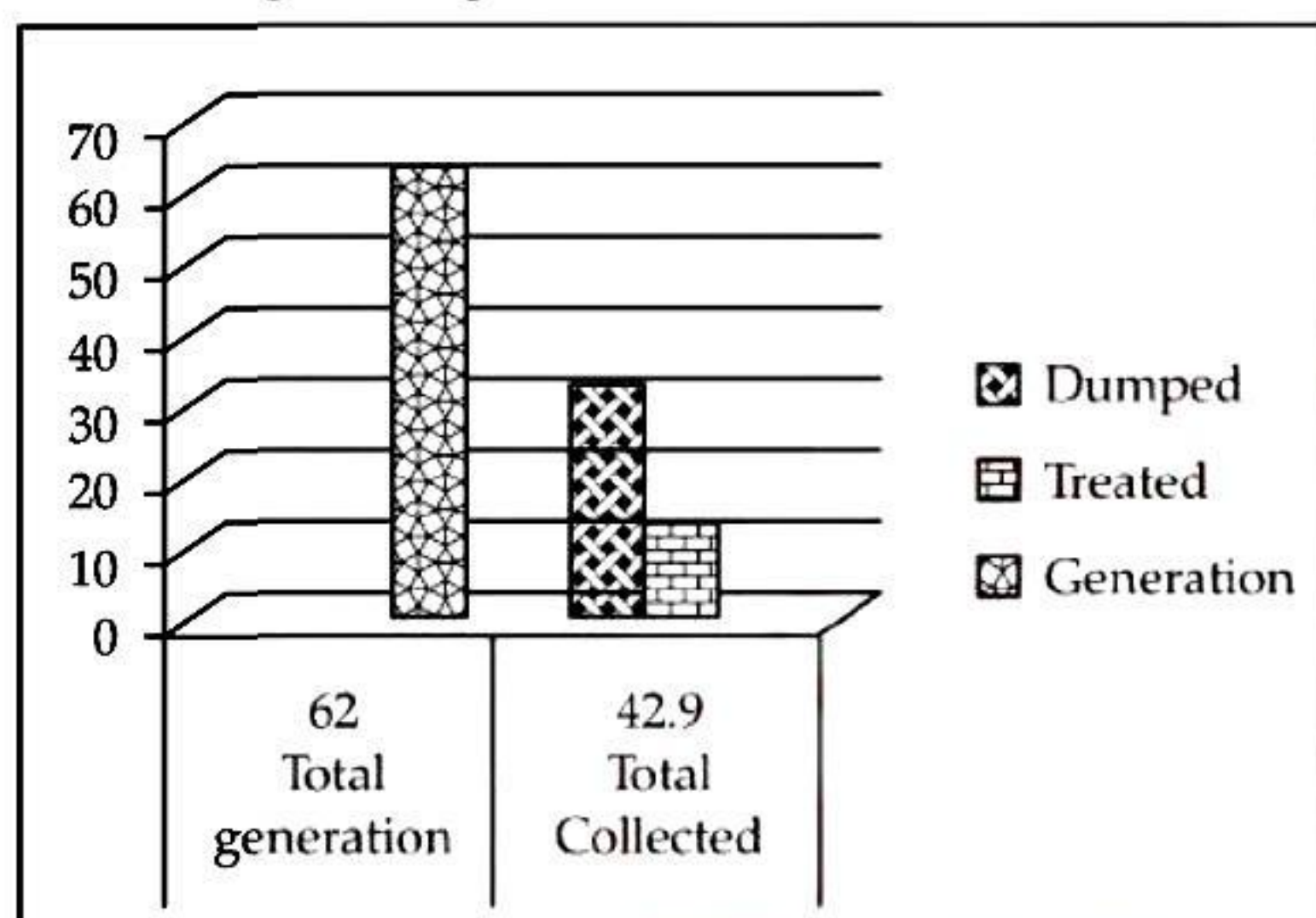
Q. 4. Effective segregation of wastes at the point of generation is very important. Select the appropriate statements giving the importance of waste segregation.

- (i) less waste goes to the landfills
- (ii) better for public health and the environment
- (iii) help in reducing the waste
- (iv) resulting in deterioration of a waste picker's health
- (A) both (i) and (ii)
- (B) both (i) and (iii)
- (C) both (ii) and (iii)
- (D) both (i) and (iv)

Ans. Option (A) is correct.

Explanation: Waste segregation is included in law because it is much easier to recycle. Effective segregation of wastes means that less waste goes to landfill which makes it cheaper and better for people and the environment. It is also important to segregate for public health.

Q. 5. The given graph shows the amount of waste generated, dumped and treated in percentage. Identify the reason of low success rate of waste management process.



- (A) only 15% of urban India's waste is processed
- (B) less than 60% of waste is collected from households
- (C) more than 60% of waste is collected from households
- (D) both (A) and (B)

Ans. Option (D) is correct.

Explanation: The reason for the low success rate of waste management process is that only 15 % of urban India's waste is processed and less than 60 % of waste is collected from households.

V. Read the following passage and answer the questions from Q.1. to Q.5.

Human body is made up of five important components, of which water is the main component. Food as well as potable water is essential for every human being. The food is obtained from plants through agriculture; Pesticides are being used extensively for a high yield in the fields. These

pesticides are absorbed by the plants from the soil along with water and minerals and from the water bodies these pesticides are taken up by the aquatic animals and plants. As these chemicals are not biodegradable, they get accumulated progressively at each trophic level. The maximum concentration of these chemicals gets accumulated in our bodies and greatly affects the health of our mind and body.

Q. 1. The maximum concentration of pesticides are found in

- (A) Man
- (B) Plants
- (C) Deer
- (D) Tiger

Ans. Option (A) is correct.

Explanation: It is because humans are at the top of the food chain and due to biomagnification, the concentration of pesticides increases as one goes up the trophic levels.

Q. 2. Which of these methods could be applied to reduce our intake of pesticides through food to some extent ?

- (A) Organic farming
- (B) Mixed cropping
- (C) Single cell protein
- (D) Biofortification

Ans. Option (A) is correct.

Explanation: Organic farming should be done or more bio-pesticides should be used.

Q. 3. Various steps in a food chain represent:

- (A) Food web
- (B) Trophic level
- (C) Ecosystem
- (D) Biomagnification

Ans. Option (B) is correct.

Explanation: Trophic levels in a food chain represent various steps where transfer of food energy takes place.

Q. 4. With regard to various food chains operating in an ecosystem, man is a:

- (A) Consumer
- (B) Producer
- (C) Producer and consumer
- (D) Producer and decomposer

Ans. Option (A) is correct.

Explanation: With regards to various food chains operating in an ecosystem, man is a consumer. They consume the products of producers and eat other organisms.

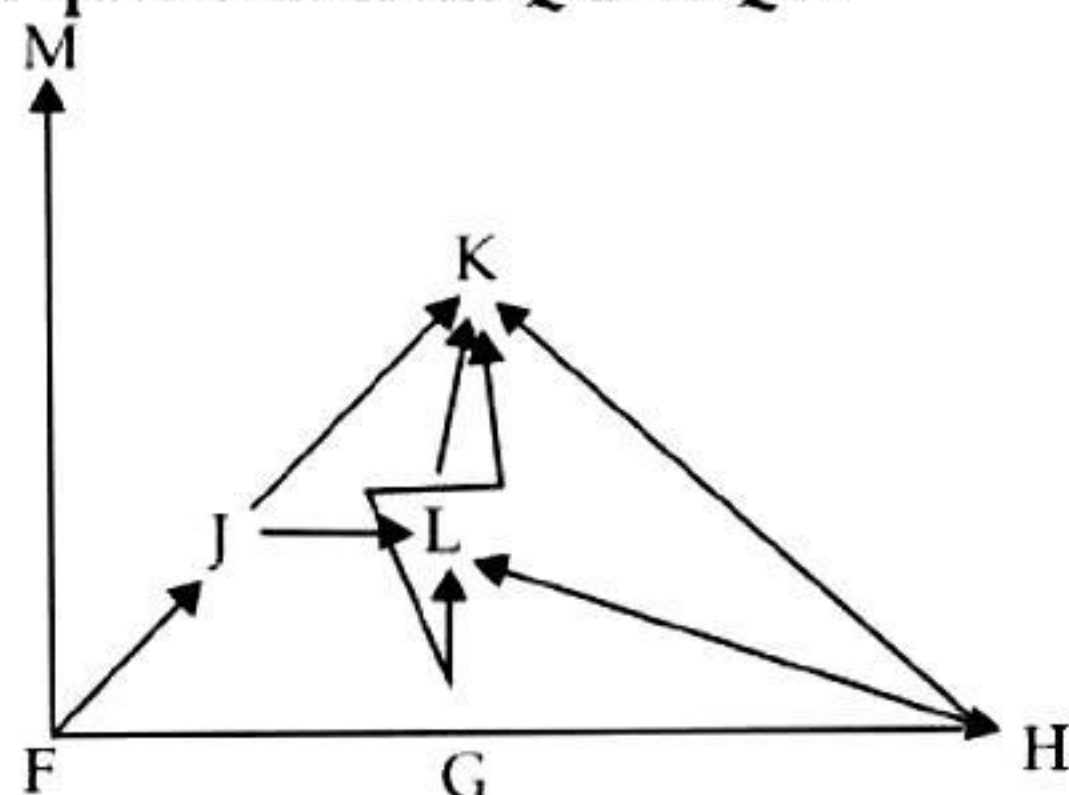
Q. 5. First link in any food chain is usually green plants. Which of the following statements gives the correct explanation about the above statement?

- (A) Only green plants have the capacity to synthesize food using sunlight.
- (B) There are more herbivores than carnivores in a food chain.
- (C) Green plants are the only ones fixed at one place in the soil and do not show any kind of movements.
- (D) Green plants are widely distributed.

Ans. Option (A) is correct.

Explanation: The first link in any food chain is green plants because only they have the capacity to trap sunlight and synthesize food.

VI. Study the following food web and answer any four questions from Q.1. to Q.5.



Q. 1. Which of these is the producer?

- (A) K (B) G
(C) J (D) F

Ans. Option (B) is correct.

Explanation: G is the producer.

Q. 2. Which organisms are primary consumers?

- (A) F, L, H, K (B) M, G, J, H
(C) J, L, K, M (D) F, K, M, H

Ans. Option (A) is correct.

Explanation: F, L, H, K are primary consumers.

Q. 3. Which organisms will receive maximum energy in the ecosystem?

- (A) M (ii) K
(C) F (D) G

Ans. Option (D) is correct.

Explanation: G will receive the maximum energy in the ecosystem.

Q. 4. Which organisms represent top level carnivores?

- (A) K (B) M
(C) G (D) Both (A) and (B)

Ans. Option (D) is correct.

Explanation: K and M are top level carnivores.

Q. 5. Which of the following results when there is an increase in the population of sharks?

Plankton → Fish → Seal → Shark

- (A) A decrease in the population of seals
(B) A decrease in the population of fish
(C) An increase in the population of seals
(D) An increase in the population of plankton

Ans. Option (A) is correct.

Explanation: The number of seals will decrease because there are more predators (sharks). Decrease in the number of seals will increase the number of fish and thus the population of plankton will decrease.

VII. Read the following passage given below and answer the any of the four questions from Q.1. to Q.5.

A water body characterized by nutrient rich water supports abundant growth of phytoplanktons and

other water plants on its surface. Over time, the water body gets filled with a large number of such plants and the process is called *Eutrophication*. In such water bodies, dissolved oxygen content is nil or very less.

Q. 1. Eutrophicated water usually looks turbid green in colour because of

- (A) Excessive growth of phytoplanktons
(B) Accumulation of minerals and nutrients
(C) Water body becoming polluted
(D) Release of degraded plant chlorophyll in water

Ans. Option (A) is correct.

Explanation: Eutrophicated water usually looks turbid green in colour because of excessive growth of phytoplanktons.

Q. 2. In eutrophicated water body, growth rate of phytoplankton is high because of:

- (A) Light penetrating the lower surfaces of water body
(B) Enrichment of nutrients in the water body
(C) Less of dissolved oxygen in the water body.
(D) Aquatic fauna flourishes well in eutrophicated water body.

Ans. Option (B) is correct.

Explanation: In eutrophicated water body, growth rate of phytoplankton is high because of enrichment of nutrients in the water body.

Q. 3. There is an extremely low level of dissolved oxygen in a eutrophicated water body because:

- (A) Excessive growth of bacterial decomposers feeding on dead material which consume the dissolved oxygen
(B) Plants grow to such a great extent that they do not allow free flow of water hence oxygen in the atmosphere does not get mixed with water.
(C) The dissolved oxygen in water reacts with minerals and nutrients to form compounds and hence greatly reduces the quantity of oxygen.
(D) Oxygen released is consumed by fishes in the eutrophicated water and hence the quantity of dissolved oxygen is very low.

Q.4. A portion of a river is covered with a green layer of tiny floating organisms L on its surface and the pond water also contains organisms like tadpole, small fish, Alligator. Which of the following is the correct food chain for the above organisms?

- (A) Algae → Tadpole → Small fish → Alligator
(B) Tadpole → Small fish → Algae → Alligator
(C) Algae → Tadpole → Alligator → Small fish
(D) Algae → Alligator → Small fish → Tadpole

Ans. Option (A) is correct.

Explanation: The correct food chain is :
Algae → Tadpole → Small fish → Alligator

Ans. Option (A) is correct.

Explanation: There is an extremely low level of dissolved oxygen in a eutrophicated water

body because excessive growth of bacterial decomposers feeding on dead material which consume the dissolved oxygen.

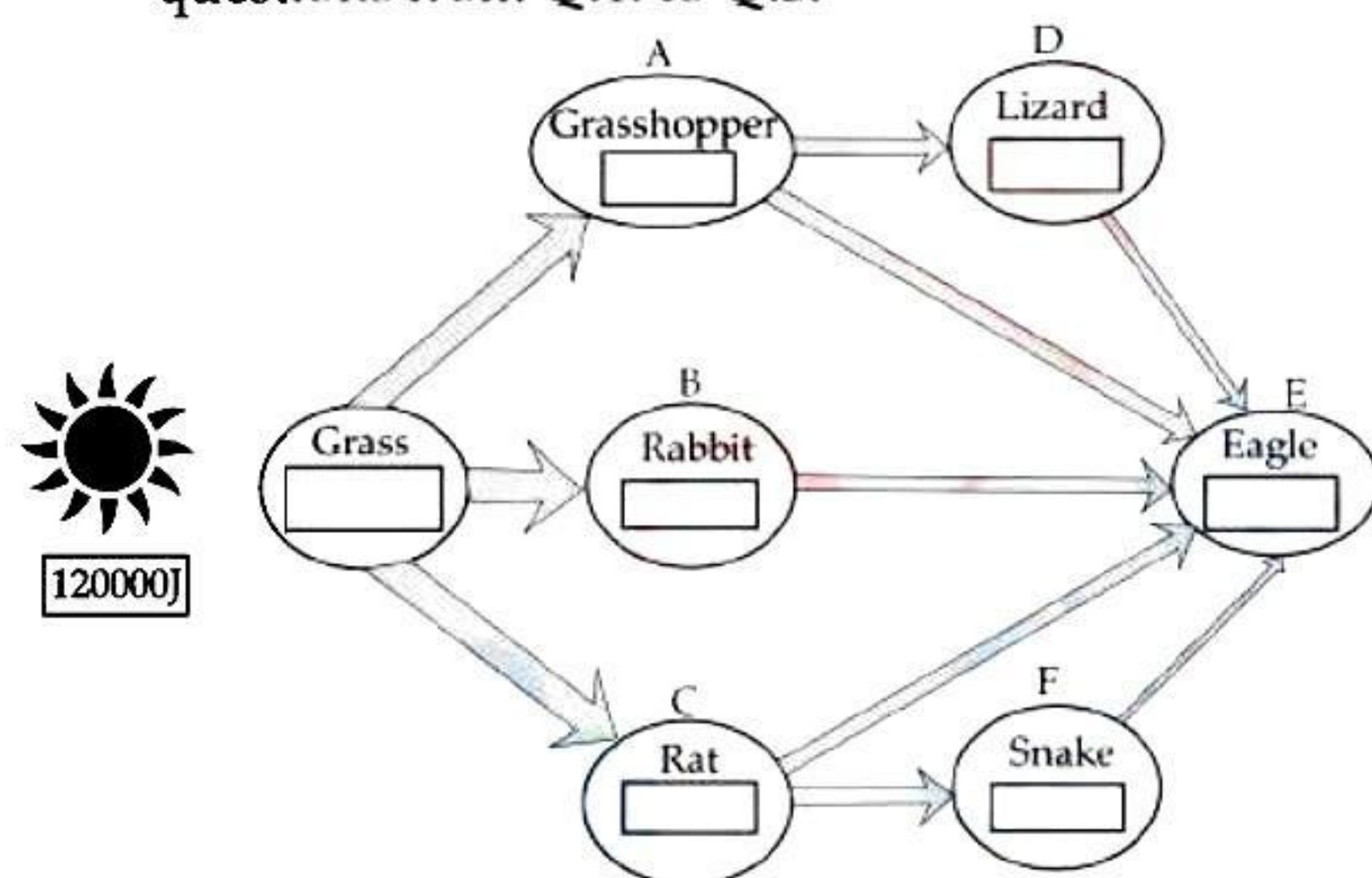
Q. 5. Which of the following steps are used to treat industrial wastes and reduce pollution?

- (i) Recycle the wastes
 - (ii) Discharge the wastes into the sea
 - (iii) Treat and neutralise harmful chemicals in the wastes
- (A) Only (i) and (iii) (B) Only (i) and (ii)
(C) Only (ii) and (iii) (D) All the these

Ans. Option (A) is correct.

Explanation: Discharging industrial wastes into the sea can cause water pollution.

VIII. Food chains and the energy flow within an ecosystem provide an important understanding of contingencies and mutual dependencies of organisms. The given below flow chart depicts the energy flow within some members of a grassland ecosystem. The grass in the below ecosystem transducer 120,000 J of sunlight and fixes it into 12,000 J of energy. It is established that 90% of the energy of one trophic level is not passed to the next trophic level. Further assume that the energy transferred from one trophic level to the next is equally shared among the different organisms at that trophic level. Based on the information given and your knowledge, answer any of the four questions from Q.1. to Q.5.



Q. 1. How many food chains are present in the food web depicted above?

- (A) 2 (B) 3
(C) 5 (D) 6

Ans. Option (C) is correct.

Explanation: There are five food chains depicted in the above flow chart.

Q. 2. Based on the above information, indicate the amount of energy that an organism C may have received from an organism from the previous trophic level.

- (A) 1,20,000 J (B) 12, 000 J
(C) 1200 J (D) 120 J

Ans. Option (C) is correct.

Explanation: This is based on ten percent law. According to ten percent law, only 10% of energy

entering a particular trophic level of organisms is available for transfer to the next higher trophic level.

A = 1200 J, B = 1200 J, C = 1200 J, D = 120 J, E = 12 or 120 J, F = 120 J

Q. 3. In the food web depicted above, identify the most energy efficient link for tertiary consumer.

- (A) Rabbit (B) Rat
(C) Lizard (D) Grasshopper

Ans. Option (A) is correct.

Explanation: Tertiary consumer here is Eagle, so for eagle the most energy efficient link is rabbit, as the rabbit is not being eaten in any other food chain.

Q. 4. Which organism acts as both the secondary consumer and the tertiary consumer?

- (A) Snake (B) Hawk
(C) Chicken (D) Rat

Ans. Option (B) is correct.

Explanation: In the given food web hawk acts as both the secondary consumer and the tertiary consumer.

Q. 5. Trophic levels are formed by which of the following components?

- (A) Only plants
(B) Only animals
(C) Only carnivores
(D) Organisms linked in food chain

Ans. Option (D) is correct.

Explanation: Trophic levels are formed by organisms linked in food chains. They include various plants and animals in the different feeding (trophic) levels.

IX. Read the given passage and answer any of the four questions from Q.1. to Q.5. given below:

A farmer is growing a crop regularly in his field. He uses chemical fertilizers, pesticides, organic manure as well as bio-fertilizers. Very close to his field is a factory which emits smoke as a byproduct. There is also a huge lake in the nearby area.

Q. 1. A considerable increase in plant life in the lake was noticed after the farming activity intensified. The most likely reason for this could be:

- (A) Chemical fertilizers leached into the lake from the field.
(B) Pesticides leached into the lake from the field.
(C) Organic manure leached into the lake from the field.
(D) Smoke particles from the industry got settled in moist surroundings of the lake.

Ans. Option (A) is correct.

Explanation: A considerable increase in plant life in the lake was noticed after the farming activity intensified. The most likely reason for this could be chemical fertilizers leached into the lake from the field.

Q. 2. Consider the following food chain in the same lake. Aquatic plant → Small fish → Big fish → Birds

Which of the above organisms is likely to show minimum amount of pesticide concentration in them after considerable time?

- (A) Aquatic plants. (B) Small fish.
(C) Big fish. (D) Birds.

Ans. Option (A) is correct.

Explanation: Aquatic plants beings at the first trophic level will show minimum amount of pesticide concentration in them after considerable time.

Q. 3. _____ is the increase in the concentration of harmful chemical substances in the body of living organisms.

- (A) Biological oxygen demand
(B) Biomagnification
(C) Biosynthesis
(D) Biogeochemical cycle

Ans. Option (B) is correct.

Explanation: Increase in the concentration of harmful chemical substances in the body of living organisms is known as biomagnification. Biological magnification increases at each trophic level.

Q. 4. An expert agriculturist suggests to the farmer to minimize the use of chemical fertilizers and instead use biofertilizers as they have many advantages over chemical fertilizers.

Which of the following is NOT true for biofertilizers?

- (A) They are economical
(B) They help in reducing pollution in the lake
(C) They are renewable
(D) They require large set-up for their production.

Ans. Option (D) is correct.

Explanation: Biofertilisers do not require large set-up for their production.

Q. 5. Which of these is a way to prevent accumulation of harmful chemicals in our bodies ?

- (A) Minimize the use of pesticides in agriculture
(B) Minimize the use of CFCs.
(C) Plant more and more trees.
(D) All of these

Ans. Option (A) is correct.

Explanation: Minimize the use of chemicals/ pesticides in agriculture is a way to prevent biomagnification.

X. Study the passage and answer any four questions from Q.1. to Q.5.

The activities of man had adverse effects on all forms of living organisms in the biosphere.

Unlimited exploitation of nature by man disturbed the delicate ecological balance between the living and non-living components of the biosphere. The unfavourable conditions created by man himself threatened the survival not only of him but also of the entire living organisms on the mother earth. One of your classmates is an active member of 'Eco club' of your school which is creating environmental awareness amongst the school students, spreading the same in the society and also working hard for preventing environmental degradation of the surroundings.

Q. 1. Which of the following does NOT exist in a balanced ecosystem?

- (A) Interconnected food chains
(B) Interdependence among living organisms and the environment
(C) Animals dependent on plants but plants are not dependent on animals
(D) Communities made up of different populations of organisms

Ans. Option (C) is correct.

Explanation: The components of an ecosystem depend on each other to maintain the ecological balance. Plants not only depend on animals for their supply of carbon dioxide but also for other processes like pollination and dispersal of seed.

Q. 2. The green dustbin signifies:

- (A) Non- biodegradable waste
(B) Biodegradable waste
(C) Plastic waste
(D) Garbage

Ans. Option (B) is correct.

Explanation: Green dustbins are for biodegradable wastes while blue dustbins are for non-biodegradable wastes.

Q. 3. Degradation of non-biodegradable waste is difficult because :

- (A) Non-biodegradable wastes cannot be recycled.
(B) Microorganisms cannot decompose it.
(C) They can be made into organic wastes.
(D) All of the above

Ans. Option (B) is correct.

Explanation: It is difficult or rather impossible to degrade non-biodegradable wastes because microorganisms cannot decompose them.

Q. 4. Which of these group(s) contains only non-biodegradable items?

- (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)

Ans. Option (D) is correct.

Explanation: Substances which are not broken down by the bacteria or saprophytes are called non-biodegradable substances. Under certain conditions, the non-biodegradable substances can persist for longer time and can also harm the various components of our ecosystem.

Q. 5. We should minimize the use of disposable plastic bags as

- (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. Option (D) is correct.

Explanation: Disposable plastic plates should not be used because they are made of non-biodegradable materials