Chapter 14

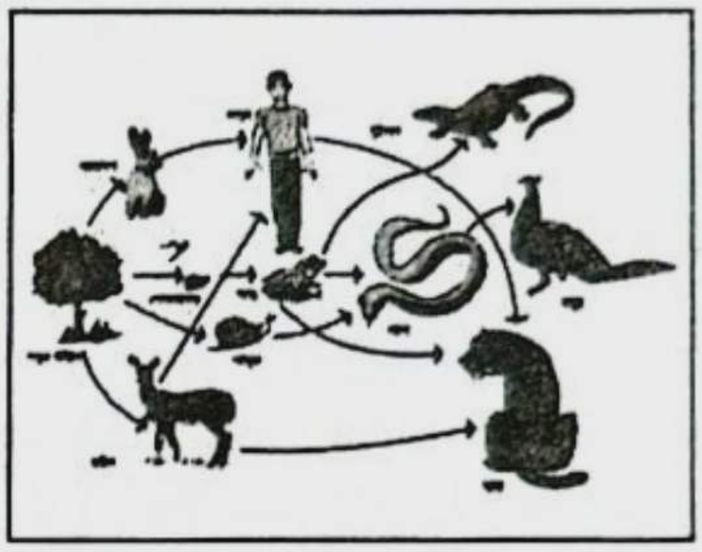
Environment and Ecosystem

Contents for Discussion

• Ecosystem • Components of ecosystem • Types of ecosystem • Food chain and Food web • Energy How in the ecosystem • Role of ecosystem in maintaining balance of nature.

Learning Outcomes : After studying this chapter I will be able to–

- explain different environmental components and environmental types;
- explain food chain and food web;
- explain the flow of energy in the ecosystem;
- analyze the role of ecosystem in maintaining environmental (ecological) balance;
- realize the impact of ecosystem on living beings and make aware of the protection of ecosystem.



Practice

Multiple Choice, Short & Creative Q/A following 100% accurate format for best prep.

Dear learners, the Q/A of this chapter have been divided into exercise, multiple choice, short, creative & exercise-based activities in light of the learning outcomes. Practice the questions well to ensure the best preparation in the exam.

Textual Q/A — Let's learn the textbook Q/A

Fill in the Blanks

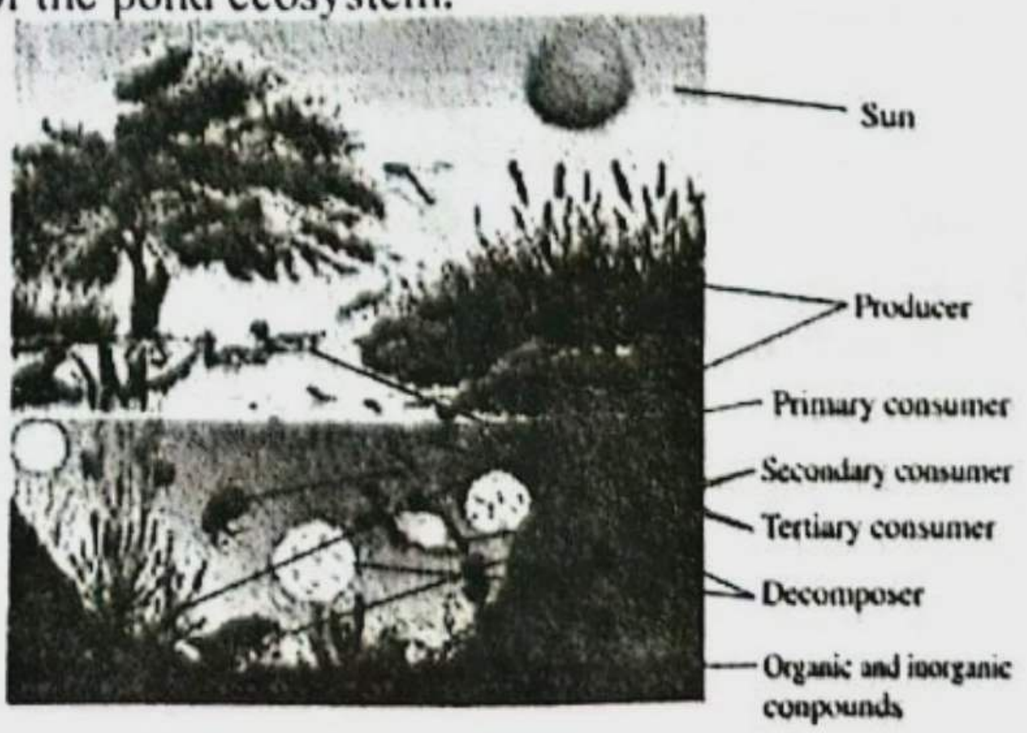
a. The animals which — are primary consumers.
b. Non-living components of an ecosystem are known as — components.
c. In nature, living organisms are interrelated with one another by different —.
d. Due to action-reaction between biotic and abiotic components in nature—remain active.

Ans. a. consume plants or plant parts; b. abiotic; c. food chains; d. ecosystem.

Short Answer Questions

Question 1. Describe pond ecosystem with a figure.

Ans. In a pond there exists abiotic and biotic components. The abiotic components are water, dissolved oxygen, carbon dioxide and some organic matters. Organisms can use these elements directly. The elements that constitute the biotic components of a pond ecosystem are producers, primary consumers, secondary consumers, tertiary consumers and decomposers of different types. In a pond ecosystem producers are minute floating or suspended small plants, these are known as phytoplankton. Water lily (Shapla), Eichhomia, etc. are among floating macrophytes. Like minute floating plants, there are also some microscopic animals too. Those are known as zooplankton. Aquatic insects, small fish, mussels, snails, etc. feed on producer and is known as primary consumers. Medium sized fishes those live on eating the primary consumers, are called secondary consumers. Again, big fish, stork, etc. who eat secondary consumers are tertiary consumers. Bacteria, fungi decompose dead organisms. The decomposed substances again used by the producer of the pond ecosystem.



Question 2. Discuss how nature maintains environmental balance.

Ans. Environment is a tremendous concept. It consists of light, temperature, snowfall, rainfall, water bodies, air, plants, animals, hills, mountains, planets and so forth. All the elements are in this or that way, either directly or indirectly correlated. Let us cite the most vivid example, plants and animals are dependent on one-another for a great many necessities including respiration—the first vital condition for survival. Water evaporation and rainfall — all these are caused by each other.

Ecosystem is a self-sufficient and self-regulating unit. The living organisms depend on one another. One living being binds another in the food chain. One living organism cannot get increased in number, nor can it become extinct easily.

Consequently, the number of living organisms at different trophic levels remains more or less constant. Different changes may occur in nature, still the balance of nature is maintained for longtime. We know that there lives tigers, deer and hogs in a forest. Tigers eat deer and hogs as their food. If due to any reason the number of deer and hogs get increased in nature, the number of tigers will increase. The reason is , tigers get enough food. Again, if the number of tigers get increased, the number of deer and hogs will be decreased. Thus, the number of tigers will be decreased due to inadequate food supply. Further, if the number of tigers is decreased, the number of deer and hogs will be increased. From the example it is clear that the number of increased organisms (tiger) will be reduced soon and it returns to the previous condition. In this way, natural balance of an ecosystem is maintained naturally.

MCQs with Answers

Put tick (✓) the correct answer :

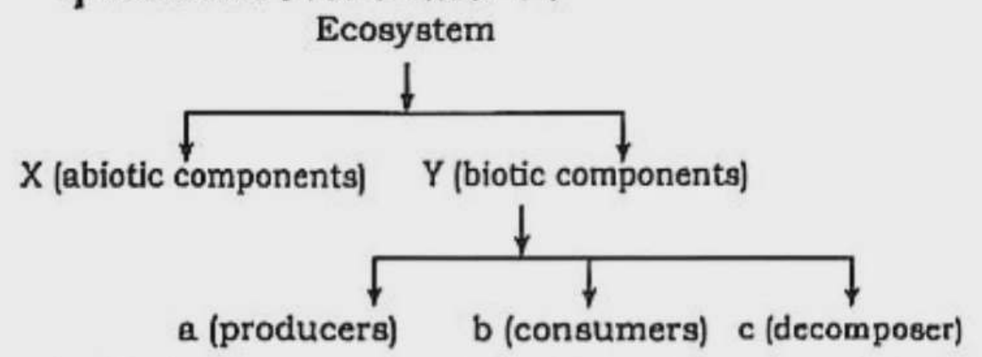
1. Which one of the following is primary consumer?

ⓐ Phytoplankton ⓑ Snail
ⓑ ⓒ Tiger ⓓ Stork

2. Which one of the following food chain is correct?

ⓐ Phytoplankton → Small fish → Zooplankton
ⓑ Fruit → Insect → Bird
ⓒ Grass → Tortois → Small fish
ⓑ ⓓ Khudepana → Fish → Snail

Based on the following chart, answer questions No. 3 and 4 :



3. Which one of the following is included under c?

ⓐ Phytoplankton ⓑ Zooplankton
ⓒ ⓒ Bacteria ⓓ Insects

4. In the above chart —.

i. Y is dependent on X
ii. 'b' is dependent on 'a'
iii. 'a' and 'c' are interdependent

Which one of the following is correct?

ⓐ i & ii ⓑ i & iii
ⓓ ⓒ ii & iii ⓓ i, ii & iii

Creative Questions with Answers

Ques. 01 Fahim during his visit to a forest saw different types of plants and varieties of animals. They include rabbit, deer, monkey, tigers, hogs etc. During his visit he witnessed the felling of large trees in an area and the low presence of those animals there.

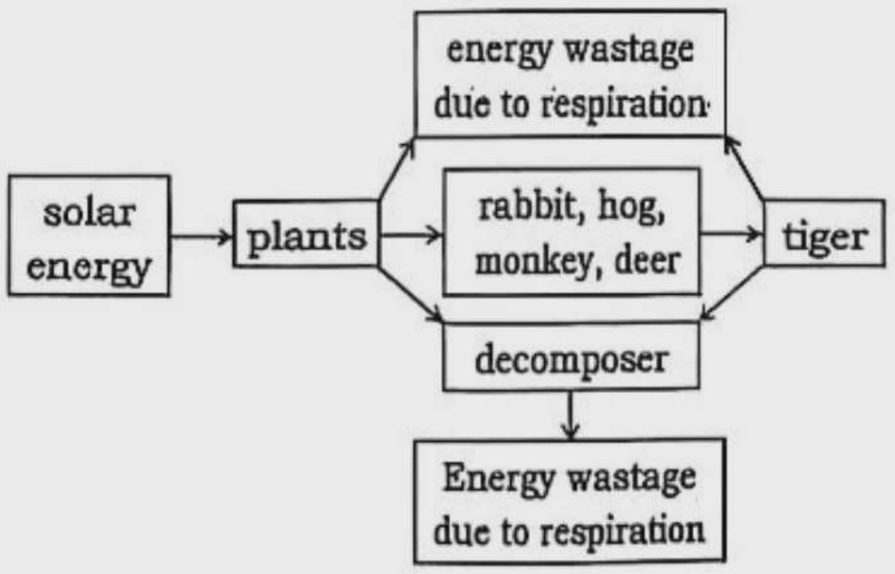
a. What is ecosystem? 1
b. What do you mean by decomposer? 2
c. Make a food chain with the above mentioned animals that Fahim witnessed and explain. 3
d. Explain causes of decline of the number of animals in the area where felling of trees takes place. 4

Answer to Question No. 01 :

a That the living components of a particular environment is functioning and interacting with the abiotic components to form a relatively stable system is called ecosystem.

b Decomposers are wide range of micro-organisms including bacteria and fungi. After the death of plants and animals, these micro-organisms act on their bodies and decompose.

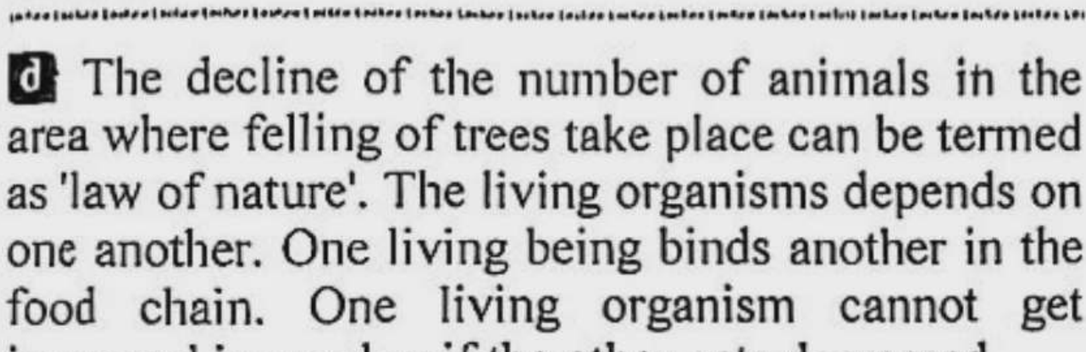
c



d The decline of the number of animals in the area where felling of trees take place can be termed as 'law of nature'. The living organisms depends on one another. One living being binds another in the food chain. One living organism cannot get increased in number if the other gets decreased.

Deer, rabbit, hog and monkey live on plants. Since large trees felled in a certain area of the forest, the above mentioned animals managed to find food in some other areas. Again, tigers were also not available because the animals tigers depends on for food had gone away somewhere else in the forest. This is why tigers are also hardly seen in the certain area of the jungle.

Ques. 02



a. What is a biotic component? 1
b. What do you mean by food web? 2
c. Explain the flow of energy in the above mentioned food chain? 3
d. What would be the nutrient cycle of the above mentioned stem? Analyse. 4

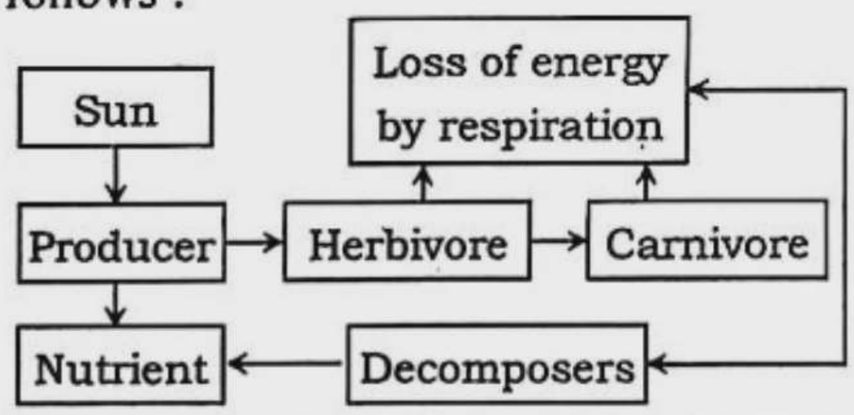
Answer to Question No. 02 :

a Plants, animals and micro-organisms are biotic components.

b There are numerous food chains in an ecosystem. These chains do not work in isolation. Most food chains connect other chains. Food chains are linked together to form a food web. In any ecosystem, more than one food chain remain attached to each other. This complex chain is called food web.

c What comes first is that grass gets energy from the sun. It transforms solar energy into chemical energy and initiates food chain. The energy content at successive trophic levels, from producer (grass) to tartiary consumers (snake, eagle) gradually decreases. In each stage of transformation, energy get released during respiration. One agent of transformation of energy is used as the food of the next agent grass is eaten by grasshopper, grasshopper by frog, frog by snake and snake by eagle. After their death, their bodies are decomposed by micro-organism and the bodies mixup with soil and air. Plants take up this ogranism and thus provide food to the animals.

d The nutrient cycle of the above mentioned stem is as follows :



It is observed that plants take in inorganic substances and make food by respiration. A small portion of the food produced by the plants is used by them and the rest is reserved in the body. The herbivores eat this and gradually the herbivores are eaten by the carnivores. Again, the decomposers transform the plants (producers), herbivores and carnivores (primary, secondary and tertiary consumers) into inorganic substances. Using these inorganic substances, the green plants further make food by means the help of solar energy.

Multiple Choice Q/A — Designed as per topic

Lesson 1 : Ecosystem ▸ Textbook Page 148

1. **Which one is the lifeless element?** *(Knowledge)* *[DjB '18]*
ⓐ Producers ⓑ Decomposers
ⓒ Organic element ⓓ Consumer

Lesson 2 : Components of ecosystem ▸ Textbook Page 149

2. **Which one of the following is a consumer?** *(Comprehension)*
ⓐ cow ⓑ crow
ⓒ crane ⓓ all the above
3. **Which one of the following is a primary consumer?** *(Comprehension)*
ⓐ frog ⓑ sheep ⓒ leopard ⓓ lizard
4. **Which one of the following is at the same time a primary, secondary and tertiary consumer?** *(Higher ability)*
ⓐ hog ⓑ porcupine
ⓒ man ⓓ tortoise
5. **The word 'trophic' relates to —.** *(Application)*
ⓐ primary consumers
ⓑ secondary consumers
ⓒ tertiary consumers
ⓓ decomposers
6. **What is the organic element of ecosystem?** *(Knowledge)* *[SB '19]*
ⓐ Soil ⓑ Water
ⓒ Wind ⓓ Dead organism

7. **Which level of consumers the deer belongs to?** *(Knowledge)* *[MB '19]*
ⓐ First ⓑ Second
ⓐ ⓒ Third ⓓ Omnivorous

8. **Which one is the primary consumer?** *(Comprehension)* *[RB '18]*
ⓐ Tortoise ⓑ Frog
ⓒ ⓒ Goat ⓓ Eagle

9. **Which one is the primary consumer?** *(Comprehension)* *[CB '18]*
ⓐ Frog ⓑ Man
ⓓ ⓒ Bird ⓓ Goat

10. **The consumer of which stage is Rahim when he eats rice and potato?** *(Application)* *[BB '18]*
ⓐ Primary stage
ⓑ Secondary stage
ⓒ Tertiary stage
ⓐ ⓓ Secondary and tertiary stage

11. **Which one is a decomposer?** *(Comprehension)* *[BB '18]*
ⓐ Algae ⓑ Fungi
ⓒ Bacteria ⓓ Plankton
**[N.B. : Correct Answer both (b) and (c)]*

12. **Second types of consumers —.** *(Comprehension)* *[DjB '18]*
i. cow and goat
ii. bird and frog
iii. man and monkey
Which one of the following is correct?
ⓐ i & ii ⓑ i & iii
ⓒ ⓒ ii & iii ⓓ i, ii & iii

13. **Which one is secondary consumer?** *(Comprehension)* *[Ideal School & College, Dhaka]*
ⓐ Spotted deer ⓑ Hogs
ⓒ ⓒ Jackal ⓓ Crocodile

14. **Which one is the physical element of ecosystem?** *(Comprehension)* *[CtgB '17]*
ⓐ khudepana ⓑ light
ⓑ ⓒ bird ⓓ fungi

15. **Primary consumer is —.** *(Comprehension)* *[DB '16]*
i. man ii. cow iii. goat
Which one is correct?
ⓒ ⓐ i & ii ⓑ i & iii ⓒ ii & iii ⓓ i, ii & iii

Lesson 3-5 : Types of ecosystem

▸ Textbook Page 149

16. **Which omnivore can you find in the Sundarbans?** *(Knowledge)*
ⓑ ⓐ tiger ⓑ hog ⓒ jackal ⓓ crane

17. **Carnivores except tigers in the Sundarbans —.** *(Comprehension)*
i. reindeer ii. crocodiles iii. leopard
Which one of the following is correct?
ⓑ ⓐ i & ii ⓑ ii & iii ⓒ i & iii ⓓ i, ii & iii

18. **Which is the tertiary consumer in the ecosystem of a pond?** *(Knowledge)* *[DB '19]*
ⓐ Frog ⓑ Tortoise
ⓐ ⓒ Mussels ⓓ Small fish

19. **Which is the seceondary consumer in the Sundarbans?** *(Knowledge)* *[CB '19]*
ⓐ Monkey, Crain ⓑ Deer, Hen
ⓒ ⓒ Tiger, Crocodile ⓓ Insect, Bird

20. **Which one is the tertiary consumer of Sundarbans?** *(Comprehension)* *[BB '19]*
ⓐ Pig ⓑ Deer
ⓐ ⓒ Monkey ⓓ Ben

21. **Which one of the following is primary consumer of land ecology?** *(Comprehension)* *[CtgB '18]*
ⓐ Man ⓑ Frog
ⓒ ⓒ Goat ⓓ Bird

22. **In a pond ecosystem, what type of consumer are the medium sized fishes?** *(Knowledge)* *[SB '18]*
ⓐ Primary cosumer
ⓑ Secondary consumer
ⓒ Tertiary consumer
ⓑ ⓓ Highest consumer

23. **Which one is tertiary consumer of Sundarbans?** *(Comprehension)* *[Rajuk Uttara Model College, Dhaka]*
ⓐ Hogs ⓑ Cranes
ⓐ ⓒ Tortoise ⓓ Jackals

24. **Which one is Macrophyte?** *(Knowledge)* *[Ideal School & College, Dhaka]*
ⓐ Aquatic insects ⓑ mussels
ⓓ ⓒ Snails ⓓ Eichhomia

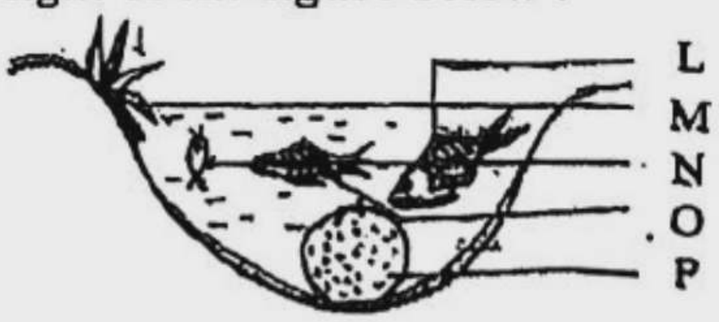
25. **Which one is the tertiary consumer in the Sundarbans?** *(Comprehension)* *[JB '18]*
ⓐ Bird ⓑ Deer
ⓒ ⓒ Tiger ⓓ Monkey

Lesson 6-7: Food chain and Food web

▸ Textbook Page 151

26. **Which one is the correct food chain?** *(Comprehension)* *[RB'19]*
ⓐ Grass→Phytoplankton→Zooplankton
ⓑ Zooplankton→Phytoplankton→Small fish
ⓒ Phytoplankton→Zooplankton→Small fish
ⓒ ⓓ Grass→Frog→Tiger

Answer the questions no. 27 and 28 in the light of the figure below :



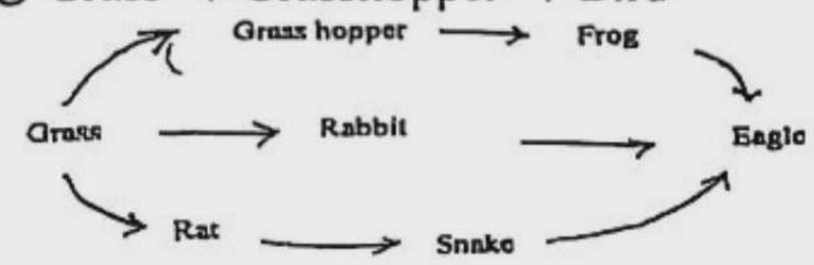
[BB '19]

Science

27. **Which one is the correct food chain in the light of above stem?** *(Application)*
ⓐ L→M→N→O ⓑ L→N→M→O
ⓒ M→N→O→L ⓓ N→M→O→L

28. **The part 'P' is—.** *(Comprehension)*
i. one kind of organic material
ii. the food of micro-organism
iii. the food of producer
Which one is correct?
ⓐ i & ii ⓑ i & iii ⓒ ii & iii ⓓ i, ii & iii

29. **Which one is correct?** *(Comprehension) [JB '18]*
ⓐ Grasshopper → Grass → Mosquito
ⓑ Grass → Grasshopper → Small fish
ⓒ Wagtail → Fly → Cat
ⓓ Grass → Grasshopper → Bird



30. **Which one indicates the above stem?** *(Comprehension) [SB '18]*
ⓐ Energy flow ⓑ Nutrition flow
ⓒ Food chain ⓓ Food web

31. **Which one of the following food chain is correct?** *(Application) [SB '17]*
ⓐ Grass → Rat → Snake → Eagle
ⓑ Grass → Frog → Snake → Eagle
ⓒ Grass → Rabbit → Snake → Rate
ⓓ Grass → Man → Tiger → Deer

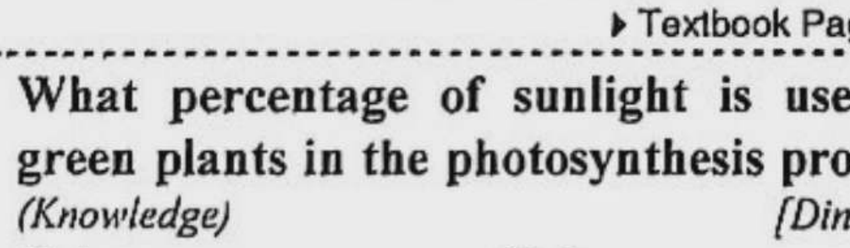
Lesson 8 - 9 : Energy How in the ecosystem

▸ Textbook Page 151

32. **What percentage of sunlight is used by green plants in the photosynthesis process?** *(Knowledge) [DinB '19]*
ⓐ 1 ⓑ 2
ⓒ 3 ⓓ 4

33. **By green plants, the solar energy transforms into which energy?** *(Knowledge) [MB '19]*
ⓐ Chemical energy ⓑ Heat energy
ⓒ Mechanical energy ⓓ Light energy

Observe the figure and answer to the questions No. 34 and 35 :

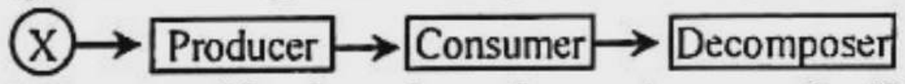


[BB '18]

34. **What is the animal in the place 'A' of the flowchart?** *(Comprehension)*
ⓐ Man ⓑ Deer
ⓒ Monkey ⓓ Pig

35. **In the place of 'B' it can be said —.** *(Comprehension)*
i. they are parasite
ii. they live on dead animals
iii. they work on decomposed organism
Which one of the following is correct?
ⓐ i & ii ⓑ i & iii
ⓒ ii & iii ⓓ i. ii & iii

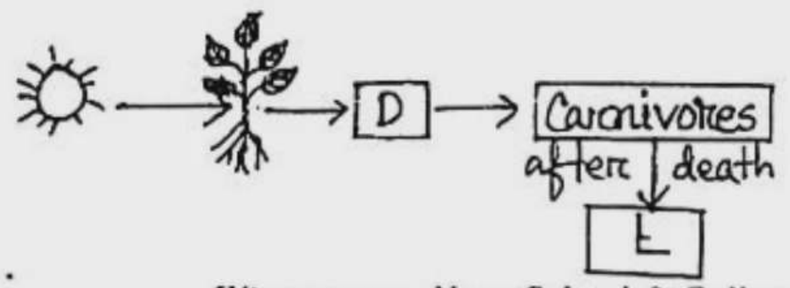
36. **Green plants trap only what percentage of the total energy reached on earth?** *(Knowledge) [Rajuk Uttara Model College, Dhaka]*
ⓐ 1% ⓑ 2% ⓒ 4% ⓓ 8%

37. 

What will be in the place of 'X'? *(Comprehension) [Ideal School & College, Dhaka]*
ⓐ Chemical energy ⓑ Solar energy
ⓒ Power energy ⓓ Photosynthesis

38. **How many percentage of the light of the Sun is used by green plants in photosynthesis?** *(Knowledge) [Viqarunnesa Noon School & College, Dhaka]*
ⓐ 1 ⓑ 2
ⓒ 3 ⓓ 4

Observe the figure below and answer the question No. 39 and 40 :



[Viqarunnesa Noon School & College, Dhaka]

39. **If D animal is extinct —.** *(Application)*
i. carnivores will extinct
ii. carnivores will go another place
iii. Ecosystem will be unbalanced
Which one is correct?
ⓐ i & ii ⓑ i & iii ⓒ ii & iii ⓓ i, ii & iii

40. **Which one is correct?** *(Comprehension)*
ⓐ D is primary consumers.
ⓑ Carnivores animal may be tiger
ⓒ Organic and inorganic elements become free in the environment of L
ⓓ All are correct.

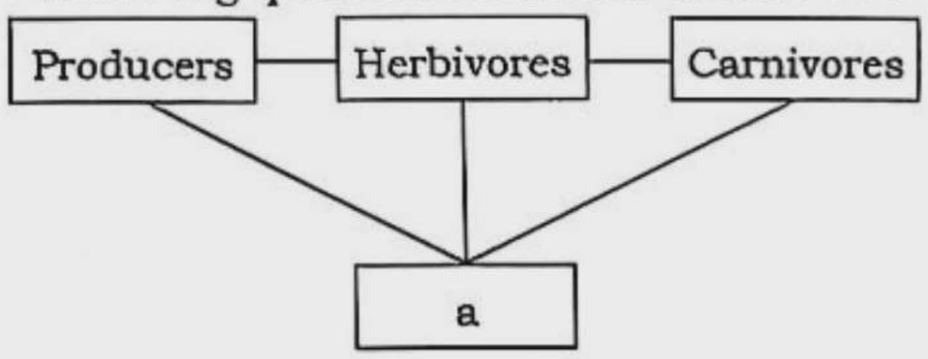
41. **What kind of flow of nutritive substances of ecosystem is?** *(Knowledge)*
ⓐ One way ⓑ Both ways
ⓒ Cyclic ⓓ Straight line

Lesson 10: Role of ecosystem in maintaining balance of nature

▸ Textbook Page 151

42. **Ecosystem is a —.** *(Knowledge)*
i. self-conditioning unit ii. self-regulating unit
iii. self-sufficient unit
Which one of the following is correct?
ⓐ i & ii ⓑ ii & iii ⓒ i & iii ⓓ i, ii & iii

Look at the chart and answer to the following question numbers 43 and 44 :



43. Lower number of producers will cause —. *(Application)*

i. deficiency of food for herbivores
ii. deficiency of food for omnivores
iii. higher rate of global warming

Which one of the following is correct?

ⓓ ⓐ i & ii ⓑ ii & iii ⓒ i & iii ⓓ i, ii & iii

44. What does 'a' represent? *(Comprehension)*

ⓐ Decomposers ⓑ Primary consumers
ⓐ ⓒ Secondary consumers ⓓ Tertiary consumers

Short Q/A Designed as per topic

Lesson 1 : Ecosystem ▸ Textbcok Page 154

Question 1. What is the reason for the settlement of different types of organisms in different places around the world?

Ans. There are different types of living organisms in different environment of the world. In different regions of each habitat, there exists a vast dissimilarity in their climatic condition, weather and other abiotic and biotic factors. For these dissimilarity, the earth is inhabited by different types of organisms.

Lesson 2 : Components of ecosystem ▸ Textbook Page 154

Question 2. How many and what are the components of ecosystem?

Ans. There are two main components of ecosystem. Namely-1. abiotic (non-living) and 2. Biotic (living) components.

Question 3. What is meant by abiotic components of ecosystem?

Ans. All non-living components of an ecosystem is abiotic components. These are classified into two categories: (a) Inorganic or physical components and (b) Organic substances.

Question 4. Mention the inorganic components.

Ans. Inorganic component of an ecosystem consists of minerals, soil, light, water, air, temperature, humidity, etc.

Question 5. Mention the types of living components in ecosystems.

Ans. To keep ecosystem functional, these living organisms play certain role and on the basis of their contribution biotic components are of three types. Namely - (a) Producer (b) Consumer and (c) Decomposer.

Question 6. Write two properties of producer.

Ans. Two characteristics of producer are-

1. Producers can produce their own food.
2. All the animals of an ecosystem are directly or indirectly dependent on the producer.

Question 7. How many types of consumers are there in an ecosystem?

Ans. There are three types of consumers in an ecosystem. Namely-

1. Primary consumers, 2. Secondary consumers and 3. Tertiary consumers.

Question 8. What do you mean by primary consumers?

Ans. All animals which consume plants or plant parts are known as primary consumers. They are also called herbivores. From minute insect to many large animals are included in the group of herbivores. For example- cow, goats etc.

Question 9. Which consumers are called carnivores?

Ans. Those which live on eating primary consumers that is secondary consumers of an ecosystem are called carnivores. For example: frog, bird, man etc.

Question 10. Why are decomposers important in ecosystem?

Ans. Decomposers are one of the most important components of ecosystem. These elements decompose the various organisms in the ecosystem when they die. As a result of this decomposition, the corpses easily mix with the soil that helps the environment keep beautiful. This is why decomposers are important in ecosystems.

Question 11. What does phytoplankton mean?

Ans. Phytoplankton is a variety of floating microscopic plants living in aquatic ecosystems. Such as – Water hyacinths, Water Lily etc.

Question 12. Write two differences between producer and consumer.

Ans. Two differences between producer and consumer are as follows-

Producer	Consumer
1. They can prepare their own food.	1. They cannot prepare their own food.
2. They are autotroph.	2. They are herbivores or carnivores.

Question 13. Write two differences between consumer and decomposer.
Ans. Two differences between consumer and decomposer are-

Consumer	Decomposer
1. Dependent on producers for food.	1. Collects food from dead organisms.
2. Example- Primary consumers, Secondary consumers and Tertiary consumers.	2. Example- Fungi, Bacteria.

Question 14. Write two differences between producer and decomposer.
Ans. Two differences between producer and decomposer are-

Producer	Decomposer
1. They are autotroph.	1. They are Saprophyte.
2. Produces carbohydrates in photosynthesis process.	2. Lives on dead or decaying organic matter.

Question 15. Why are microorganisms called decomposers?
Ans. Microorganisms such as bacteria, fungi, etc. take their food from the waste materials and dead bodies of plants and animals and decompose these wastes into soil or water. This digested material can then be taken up again by the plant as food. That is why microorganisms are called decomposers.

Lesson 3-5 : Types of ecosystem

▸ Textbook Page 155

Question 16. What are the types of ecosystems in the natural environment?
Ans. In natural environment, there are two types of ecosystem. They are –
1. Ecosystem of land and 2. Ecosystem of water.

Question 17. Write the types of forest areas in Bangladesh.
Ans. The forest of Bangladesh is divided into two main regions. Namely –
(a) The forest of Sylhet and Chittagong hill tracts and (b) The Sundarbans forest of coastal region of Khulna.

Question 18. Write two characteristics of Sundarban region.
Ans. Two characteristics of Sundarban region are-
1. The salinity of the soil in this region is high due to ebb-tide.
2. The branch roots of the plants of this region grow erect and spread along the upper layer of the soil instead of inward.

Question 19. Name five producers of mangrove forests.
Ans. Five producers of mangrove forest are-
1. Sundari, 2. Garan, 3. Kewra, 4. Golpata, 5. Gewa

Question 20. Name two primary consumers of Sundarban.
Ans. Two primary consumers of Sundarban are-
1. Birds and 2. insects

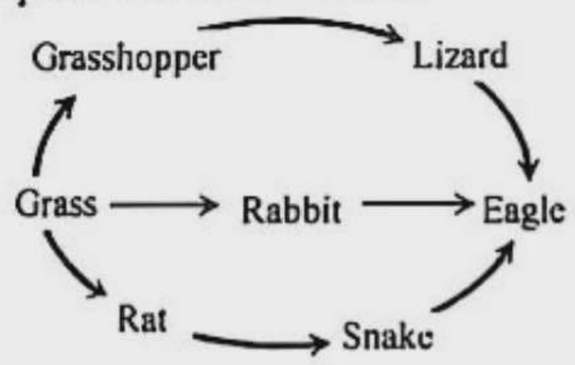
Question 21. Mention the types of aquatic ecosystems.
Ans. Aquatic ecosystem is divided into three main types-
1. Ecosystem of ponds
2. Ecosystem of rivers
3. Marine ecosystem.

Lesson 6-7: Food chain and Food web

▸ Textbook Page 156

Question 22. Write two examples of food chain.
Ans. Two examples of food chain are-
1. Grass → Insect → Frog → Snake → Eagle
2. Green plants → small fish → human

Question 23. Write and present an sample of food web.
Ans. A sample of a food web is-



Question 24. How are all organisms in an ecosystem connected consistently?
Ans. Ecosystem's producers are green plants. Primary consumers depend on these producers for food. Secondary consumers are dependent on the primary consumers. Thus, all organisms in an ecosystem are connected consistently in terms of nutrient requirements.

Question 25. How is food chain formed?
Ans. An ecosystem consists of food producing elements or producers and food consuming elements or consumers. The interaction of these producers and consumers forms a food chain.

Question 26. Write two differences between food chain and food web.
Ans. Two differences between food chain and food web are as follows-

Food chain	Food web
1. The continuous process of energy flow from plants to animals in an ecosystem is the food chain.	1. Food webs are formed by connecting multiple food chains in the ecosystem.
2. It is a short process.	2. It's a long process.

Question 27. Mention two characteristics of food webs.
Ans. Two characteristics of food web are-
1. As one food chain is connected to another in a food web, so the damage of one affects the other.
2. A consumer has many food sources.

Lesson 8 - 9 : Energy flow in the ecosystem

▸ Textbook Page 157

Question 28. Give an idea about energy flow.

Ans. The one-way movement of energy through an ecosystem is called energy flow. Energy is decreased at each step during energy conversion, starting from the producer to the highest consumer. Energy goes from the producer to the body of the herbivore. From there the energy transfers to secondary consumer and then to the tertiary consumer or the highest level. Thus the flow of energy continues.

Question 29. How does energy flow connect the non-living and living components?

Ans. Sun is the main source of all energy in the living world. Green plants use only 2 percent of the sunlight that reaches the earth through photosynthesis to produce carbohydrates.

Solar energy is converted into chemical energy in the natural process of photosynthesis. Green plants use a variety of natural compounds during this process. In this way, the connection between the non-living and the living components is created through the flow of energy.

Question 30. How does energy flow continue in ecosystem?

Ans. Solar energy is converted into chemical energy by green plants. This chemical energy is transferred through the food chain to different organisms. That is, energy goes from the producer to the body of the herbivore. From there the energy transfers to secondary consumer and then to the tertiary consumer or the highest level. Thus the flow of energy continues.

Question 31. Write two characteristics of energy flow in ecosystem.

Ans. Two characteristics of energy flow in ecosystems are-

1. Energy flow is always unidirectional.
2. The amount of energy gradually decreases.

Question 32. Why is the flow of energy in the ecosystem one-way?

Ans. Energy flow in an ecosystem refers to the transfer of energy from producers to consumers. In ecosystem, solar energy is converted into chemical energy by green plants and stored in the body of the producer. It is then transferred to different consumers through the food chain. But the energy captured by the producers can never return to the solar system. Again, the energy stored in the body of the consumer cannot in any way return to the producer. Therefore, the flow of energy in the ecosystem is unidirectional.

Question 33. Nutrient flow in an ecosystem is cyclical – explain.

Ans. Green plants convert solar energy into chemical energy. This chemical energy is transferred through the food chain to different organisms. However, energy is decreased at each step during energy conversion, starting from the producer to the highest consumer. But even the decrease in energy, when decomposers react with various dead organisms, waste materials, inorganic nutrient flow are released into the environment and accumulate in nutrient storehouse, which are again used by green plants. Thus, nutrient flow in ecosystem is cyclical.

Science

Creative Q/A Designed as per learning outcomes

Ques. 01 Austin and Blackmore work for National Geographic Channel. They have come to Bangladesh to make a one hour long documentary film on the ecosystem of the Sundarbans. They are now in the Sundarbans. Austin is driving the 4WD jeep and Blackmore is operating the video camera. After a while, they see that two tigers are eating a deer. Austin says, "My God! kill all the tigers". Blackmore replies," It would be best if all the animals could make food like the plants."

a. Name two omnivores. 1
b. In what sense man is the greatest consumer? 2
c. State the ecosystem of the Sundarbans. 3
d. Do you agree with Blackmore? Give reasons. 4

Answer to Question No. 01 :

a Two omnivores : Man and hog.

b Man is the greatest consumer in the sense that he is at the same time a primary consumer, a secondary consumer and a tertiary consumer. He is an omnivore. Wherever the producer be — in the sky, in the sea bed or on the earth's crust, it cannot escape man's target. He eats not only the milk of a cow/goat/ram but also the animal, even five minutes after taking its milk.

c The soil of the Sundarbans is of high salt density. As salinity increases coastward in the tidal and sub-tidal areas, there is a transition of dense mangrove vegetation. The soil of the Sundarbans is very muddy. So, it is not suitable for air passing.

So the branch roots of the plants of this region grow erect and spread along the upper layer of the soil instead of inward. Root tip of these plants bear numerous spores through which atmospheric oxygen enters into the plant body for respiration. The sundari, garan, gewa, kewra, golpata, etc. are the major plants of the forest. They are the producers of the ecosystem. Insects, birds, deer, etc are primary consumers. Jackals, tortoises, cranes, etc. are secondary consumers. Tiger, hogs, etc. are among the tertiary consumers. Among them hogs are omnivorous.The Royal Bengal Tiger, chita, monkey, spotted deer, wild hogs, crocodiles, different types of snakes, birds and insects are the major animals of the Sundarbans.

d Yes, I wholeheartedly agree with Blackmore. It is not only a heart rending sight but also an experience of extreme violence that the ferocious tigers kill and eat innocent deer. Even man is not free from their sharp teeth and paw.

The deer feed on plants. There are thousands of animals that feed on plants. That they do not eat other animals does not cause any harm to them. That frogs eat grasshoppers and snakes eat frogs, small fishes eat aquatic plants and big fishes eat small ones, cows eat grass and man eats cows and so forth is, in the deeper sense, a chain of killing. What's more, it is beyond judgement. It is not that a vegetarian lives shorter than a meat-eater. Again, plants also feel pain when man cuts them. So, it would be the best if all the animals could make food in the way what the plants do.

Ques. 02 On Eid vacation, Dipti went to the Sunderbans with her uncle. In the forest she saw plants such as sundari, garan, kewra and golpata. Though she did not see any tiger, wild cock, monkey, deer have attracted her attention.

a. What is food chain? 1
b. Why is fungi called decomposer? 2
c. Classify the plants and animals observed by Dipti into ecological element. 3
d. The plants and animals mentioned in the stem are related to ecosystem.—Justify. 4

• *Dhaka Board 2019*

Answer to Question No. 02 :

a The food chain is a feeding relationship in which a carnivore eats a herbivore which eats plant;

b After the death of plants and animals, various micro-organisms acts on their bodies and decompose. They are called decomposers. Fungi are micro-organisms which decompose body and forms into different organic and inorganic components. Some of the nutrients are used by them and the rest are mixed up with the soil and air. The green plant again consumes those as a natural process. Decomposers are wide range of micro-organisms including bacteria and fungi.

c The plants and animals observed by Dipti are sundari, garan, kewra, golpata, wild cock, monkey, deer. They are classified following according to ecological element–

Sundari, garan, kewra, golpata etc. are green plants. They can produce their food carbohydrate in presence of sunlight by the process of photosynthesis. Hence, they are called producers of the ecosystem.

Monkey, deer etc. are primary consumers. They consume plants or plant parts. That's why they are also called herbivore. Wild cock is secondary consumer. They live on eating primary consumers. They are also called carnivore.

d The living component of a particular environment is functioning and interacting with the abiotic components to form a relatively stable system, called ecosystem. Sundarban is an example of land ecosystem.

In the ecosystem of the Sundarbans the soil is of high salt density. As salinity increases coastward in the tidal and sub-tidal areas, there is a transition of dense mangrove vegetation. The soil of the Sundarbans is very muddy. So, it is not suitable for air passing. So the branch roots of the plants of this region grow erect and spread along the upper layer of the soil instead of inward. Root tip of these plants bear numerous spores through which atmospheric oxygen enters into the plant body for respiration. The sundari, garan, gewa, kewra, golpata, etc. are the major plants of the forest. They are the producers of the ecosystem. Insects, birds, deer, etc. are primary consumers. Jackals, tortoises, cranes etc. are secondary consumers. Tiger, hogs, etc. are among the tertiary consumers. Among them hogs are omnivorous. The Royal Bengal Tiger, chita, monkey, spotted deer, wild hogs, crocodiles, different types o f snakes, birds and insects are the major animals of the Sundarbans.

So, the plants and animals mentioned in the stem are related to the ecosystem.

Ques. 03

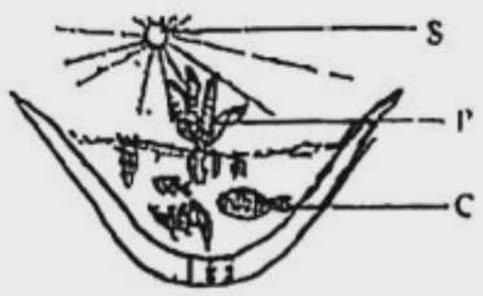


Fig-(i)

(ii) Eichhomia, Zooplankton, Big fish.

(iii) Sundari, Deer, Tiger

a. What is called producer? 1

b. Explain which level consumer the man is? 2

c. How can the energy reached from the 'S' to C in fig-(i)? Describe it. 3

d. If (ii) and (iii) are situated in different places both have a role in maintaining balance of nature—Analyze logically. 4

• *Rajshahi Board 2019*

Answer to Question No. 03 :

a The green plants can produce their food through photosynthesis process, hence they are called producers of the ecosystem.

b Man is a tertiary level consumer. Animals which feed on secondary consumers are called tertiary consumer. They are called omnivores. When man takes pulse, rice, potato etc, they are primary consumers or herbivore. But when they eat fish and meat, they are secondary or tertiary consumers.

c A pond ecosystem is shown in the stem in which 'S' is sun and 'C' is big fish which is a tertiary consumer.

Energy flow from sun to the tertiany consumer :

The sun is the main source of energy in any ecosystem. From the amount of light and heat energy that reaches the planet earth, the green plants store only 2% of the received energy through photosynthesis. Heat and chemical energy produced by photosynthesis, are primarily stored as carbohydrate for the requirements of the next stages of ecosystem. This energy, stored in plants, reaches different trophic levels through different kinds of food chains. The energy again comes back to the environment through the terminal acts of the decomposers.

The herbivorous animals, consumers of first level, maintain life by eating leaves, stems, flowers, fruits, seeds or roots of green plants. The way the chemical energy produced in green plants reaches herbivorous animals. The carnivorous animals, who live by eating the consumers of first level (herbivorous animals) are the consumers of the second level. The chemical energy, from the consumers of the first level, is transferred this way to the bodies of consumers of the second level. The chemical energy from the consumers of second level reaches the consumers of third level in the form of food.

d (ii) of the stem are Eichhomia, zooptankton and big fish. There are the components of ecosystem. The elements that constitute the biotic components of a pond ecosystem are producers, primary consumers, secondary consumers, tertiary consumers and decomposers of different types. In a pond ecosystem producers are minute floating or suspended small plants, known as phytoplankton. Water lily (Shapla), Eichhomia etc. are among floating macrophytes. Like minute floating plants, there are also some microscopic animals known as zooplankton. Aquatic insects, small fish, mussels, snails etc. feed on producer and is known as primary consumers. Medium sized fishes those live on eating the primary consumers, are called secondary consumers. Again, big fish, stork etc. who eat secondary consumers are tertiary consumers. Bacteria, fungi decompose dead organisms. The decomposed substances are again used by the producer of the pond ecosystem.

On the other hand, (iii) of the stem are sundari, deer, tiger, which are the components of a land ecosystem. Here, sundari plant is producer, deer is primary consumer and tiger is tertiary consumer.

So, it can be said that, if (ii) and (iii) are situated in different places, both have a role in maintaining balance of nature.

Ques. 04

a. What is producer? 1

b. What do you mean by ecosystem? 2

c. Make a food chain with the help of the stem's figure and explain it. 3

d. Justify the influence of 'D' in the given ecosystem. 4

• *Jashore Board 2019*

Answer to Question No. 04 :

a The green plants can produce their food through photosynthesis process, hence they are called producers of the ecosystem.

Science

b The system under which the biotic components of a particular environment is functioning and reacting with the abiotic components of that environment to set up a relatively stable system is called ecosystem.

c In the stem, an aquatic ecosystem is shown (pond ecosystem).

Food chain of a pond ecosystem :

Sunlight is the source of all energy on the earth. Green plants are the producer of the ecosystem. Primary consumer depends on producer for food. Again, secondary consumer depends on primary consumers. Tertiary consumers live on eating secondary consumers. In this way, all organisms (both plants and animals) of an ecosystem, are interconnected serially. Consequently, there develops a food chain. The transfer of food energy from producers through a series of food levels i.e. herbivores(primary consumers) to carnivores (secondary and tertiary consumers) to decomposers in the ecosystem is called food chain. Thus, the food chain is a feeding relationship in which a carnivore eats a herbivore which has been eating plants.

A diagram of food chain formed by the organisms of a pond is given below—

Green Plants (algae)	: →	Small fish primary consumer	: →	Frog secondary consumer	: →	Big fish Tertiary consumer	: →	hawk Top consumer
Producer								

d 'D' of the stem is sun.

All organisms living on earth are dependent on solar energy (sunlight). So, the sun is the main source of energy for the living world. Green plants trap only 2% of the total energy reached on earth and produce carbohydrate food through photosynthesis. Green plants through photosynthesis process convert solar energy to chemical energy, naturally. During this process, green plants use natural compounds like-water, nitrogen, carbon dioxide, iron, sulphur, etc. By this process, a bridge between living and non-living world is established. The green plants receive the solar energy and transform it into chemical energy and initiates food chain. The flow of energy in the ecosystem takes place in this food chain. The energy content at successive trophic levels, from producers to tertiary consumers, gradually decreases. So, it is evident that energy flows from producers to herbivores; herbivores to secondary consumers and from secondary consumers to tertiary consumers.

Ques. 05 Algae → Small aquatic being → Puti fish → Big fish

a. What is consumer? 1
b. Why is a bacteria called decomposer? 2
c. Using the living being mentioned in the stem, draw a figure of aquatic ecosystems. 3
d. How would the increase in number of small fishes mentioned in the stem influence the ecosystem? Analyze. 4

Cumilla Board 2019

Answer to Question No. 05 :

a The animals which live on eating organic matters obtained from plants or on other animals are known as consumers.

b After the death of plants and animals. Various micro0organisms acts on their bodies and decompose. They are called decomposers. Bacteria are micro-organisms which decompose body forms into different organic and inorganic components. Some of the nutrients are used by them and the rest are mixed up with the soil and air. The green plant again consumes those as a natural process. Decomposers are wide range of micro-organisms including bacteria and fungi.

c A food chain of a pond ecosystem is shown in the stem. A label diagram of an aquatic ecosystem (pond) is drawn below–

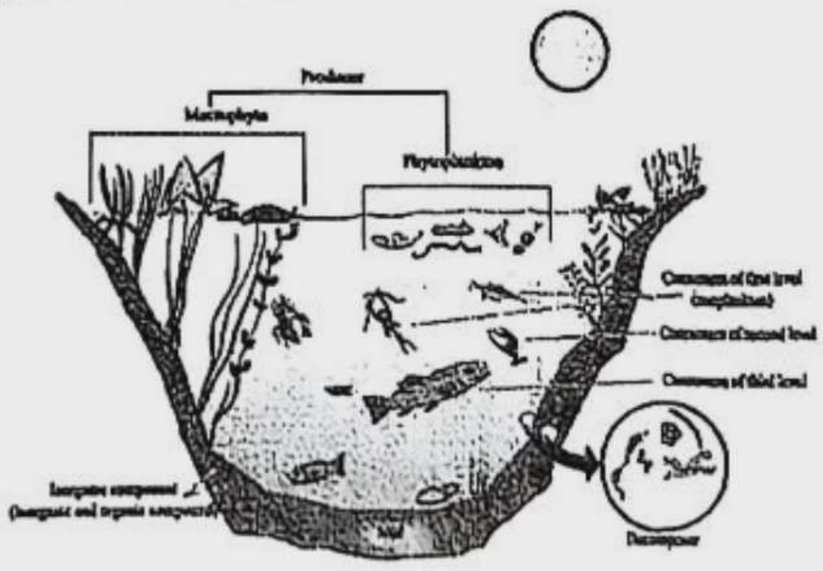


Fig. A pond ecosystem

d Ecosystem is a self-sufficient and self-regulating unit. The living organisms depend on one another. One living being binds another in the one another. One living being binds another in the food chain. One living organism cannot get increased in number, nor can it become extinct easily. Consequently, the number of living organisms at different tropic levels remains more or less constant. Different changes may occur in nature, still the balance of nature is maintained for longtime. The ecosystem shown in the stem is a pond ecosystem. In this ecosystem. algae or phytoplankton is producer small aquatic being or insects live on phytoplankton small fishes eat insects and big size eats small fishes. If due to any

reason the number of small fish is increased in pond, the number of big fishes will increase. The reason is big fishes get enough food. Again, if the number of big fishes get increased, the number of small fish will be decreased. Thus the number of big fishes will be decreased due to inadequate food supply. Further, if the number of big fishes is decreased, the number of small fish will be increased. So, it is clear that the number of increased organisms will be reduced soon and it returns to the previous condition. In this way natural balanced of an ecosystem is maintained naturally. So, it can be said that, ecological balance will be controlled naturally even if the number of small fish increases in the ecosystem.

Ques. 06

Fig : X

(i) Grass→Insect→Toad→Snake→Eagle

(ii) Grass Eagle Rabbit | Rat Grass Snake

a. What is called biotic components? 1
b. What level consumer's the man is? Explain. 2
c. Describe the Fig : X of the stem. 3
d. To make food web both (i) and (ii) are needed—Analyze with flowchart. 4

• *Chattogram Board 2019*

Answer to Question No. 06 :

a Living components of an ecosystem are called biotic components. Biotic components include plants, animals and micro-organisms.

b Man is a tertiary level consumer. Animals which feed on secondary consumers are called tertiary consumer. They are called omnivores. When man takes pulse, rice, potato etc, they are primary consumers or herbivore. But when they eat fish and meat, they are secondary or tertiary consumers.

c Fix 'X' of the stem is of a pond ecosystem.
In a pond there exists abiotic and biotic components. The abiotic components are water, dissolved oxygen, carbon dioxide and some organic matters. Organisms can use these elements directly. The elements that constitute the biotic components of a pond ecosystem are producers, primary consumers, secondary consumers, tertiary consumers and decomposers of different types. In a pond ecosystem producers are minute floating or suspended small plants, these are known as phytoplankton. Water lily (Shapla), Eichhomia, etc. are among floating macrophytes. Like minute floating plants, there are also some microscopic animals too. Those are known as zooplankton. Aquatic insects, small fish, mussels, snails, etc. feed on producer and is known as primary consumers. Medium sized fishes those live on eating the primary consumers, are called secondary consumers. Again, big fish, stork, etc. who eat secondary consumers are tertiary consumers. Bacteria, fungi decompose dead organisms. The decomposed substances again used by the producer of the pond ecosystem.

d (i) of the stem is a food chain and (ii) is some biotic components of a terrestrial ecosystem.
Sunlight is the source of all energy of the earth. Green plants are the producer o f the ecosystem. Primary consumer depends on producer for food. Again, secondary consumer depends on primary consumers. Tertiary consumers live on eating secondary consumers. In this way, all organisms (both plants and animals) of an ecosystem, are interconnected serially. Consequently, there develops a food chain. The transfer of food energy from producers through a series of food levels i.e. herbivores (primary consumers) to carnivores, carnivores (secondary and tertiary consumers) to decomposers in the ecosystem is called food chain. Thus, the food chain is a feeding relationship in which a carnivore eats a herbivore which eats plants.
For example : Grass → insect → frog → snake → eagle.
Food chain does not work in isolation. Rather most food chains connect other chains. Food chains are linked together to form a food web. Naturally in any ecosystem more than one food chain remain attached to each other and this complex food chain of more than one is known as food web.
From the above discussions, it can be said that, to make food web both (i) and (ii) are needed.

Ques. 07

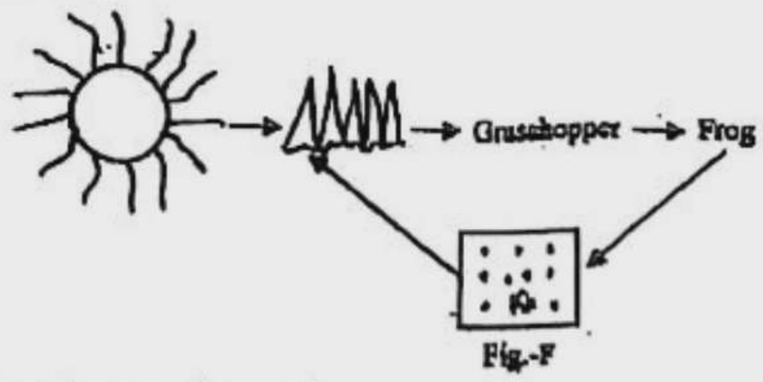


Fig.-F

a. What is producer? 1
b. Explain the reason behind fungi being called decomposer. 2
c. Explain the food chain of above figure. 3
d. Why the energy flow of figure-'F' is unidirectional? Analyze. 4

• *Sylhet Board 2019*

Science

Answer to Question No. 07 :

a The green plants can produce their food through photosynthesis process, hence they are called producers of the ecosystem.

b After the death of plants and animals. Various micro-organisms acts on their bodies and decompose. They are called decomposers. Fungi are micro-organisms which decompose body forms into different organic and inorganic components. Some of the nutrients are used by them and the rest are mixed up with the soil and air. The green plant again consumes those as a natural process. Decomposers are wide range of micro-organisms including bacteria and fungi.

c Food chain of an ecosystem is shown in the stem.
Sunlight is the source of all energy of the earth. Green plants are the producer of the ecosystem. primary consumer depends on producer for food. Again, secondary consumer depends on primary consumers. Tertiary consumers live on eating secondary consumers. In this way, all organisms (both plants and animals) of an ecosystem, are interconnected serially. Consequently, there develops a food chain. The transfer of food energy from producers through a series of food levels i.e. herbivores (primary consumers) to carnivores, carnivores (secondary and tertiary consumers) to decomposers in the ecosystem is called food chain. Thus, the food chain is a feeding relationship in which a carnivore eats a herbivore which eats plants.
For example : Grass → insect → frog → snake → eagle.
In the food chain of the stem, grass is producer, grasshopper is the primary consumer which live on grass and frog is the secondary consumer which eats grasshopper.

d All organisms living on earth are dependent on solar energy (sunlight). So, the sun is the main source of energy for the living world. Green plants trap only 2% of the total energy reached on earth and produce carbohydrate food through photosynthesis. Green plants through photosynthesis process convert solar energy to chemical energy, naturally. During this process, green plants use natural compounds like-water, nitrogen, carbon dioxide, iron, sulphur, etc. By this process, a bridge between living and non-living world is established. The green plants receive the solar energy and transform it into chemical energy and initiates food chain. The flow of energy in the ecosystem takes place in this food chain. The energy content at successive tropic levels, from producers to tertiary consumers, gradually decreases. So, it is evident that energy flows from producers to herbivores; herbivores to secondary consumers and from secondary consumers to tertiary consumers. This is how the energy flows. When decomposers act on dead bodies or on garbage, different non-living nutritive substances of ecosystem are produced. The green plants again consume them. It is understood from the fact that, the energy flow of a food chain is unidirectional.

Ques. 08

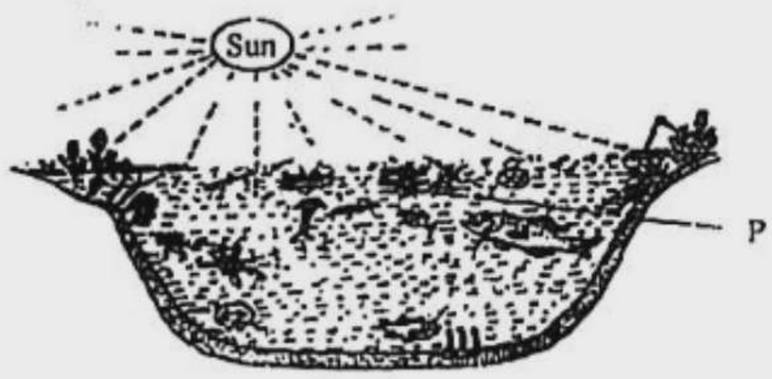


Fig.-X

a. What is called food chain? 1
b. Why is bacteria called decomposer? — Explain. 2
c. What will be the impact on the ecosystem if the component P increase or decrease? Explain. 3
d. Analyze a diagram of energy flow using the components of figure-X with figure. 4

• *Mymensingh Board 2019*

Answer to Question No. 08 :

a The food chain is a feeding relationship between a carnivore which eats a herbivore which eats plants.

b After the death of plants and animals. Various micro-organisms acts on their bodies and decompose. They are called decomposers. Bacteria are micro-organisms which decompose body forms into different organic and inorganic components. Some of the nutrients are used by them and the rest are mixed up with the soil and air. The green plant again consumes those as a natural process. Decomposers are wide range of micro-organisms including bacteria.

c Component 'P' of the stem is zooplankton which is a primary consumer of a pond ecosystem. In this ecosystem, phytoplankton is producer. Like minute floating plants, there are also some microscopic animals. These are known as zooplankton. They live on phytoplankton, fishes eats insects and zooplanktons. so, fishes are secondary consumer. If, due to any reason, the number of zooplankton is increased in pond, the number of fish will increase.
The reason is fishes get enough food. Again, If the fishes get increased, the number of zooplankton will be decreased. Thus the number of fishes will be decreased due to inadequate food supply. So, if the zooplankton is decreased, the number of fish is decreased. Further if the number of fishes is decreased, the number of zooplankton will be increased. So, it is clear that the number of

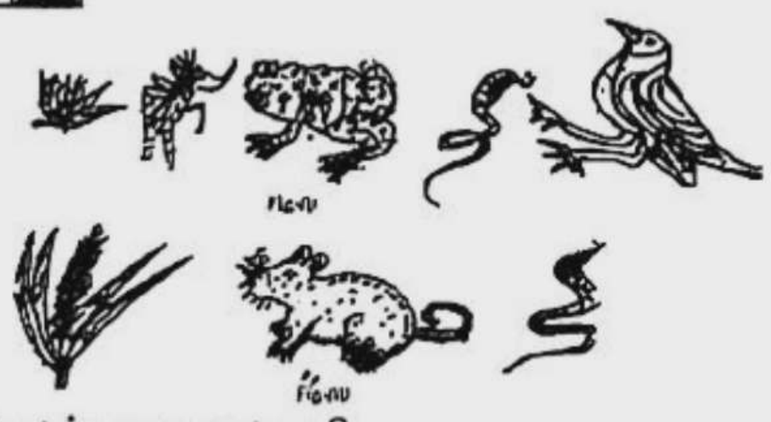
increased organism will be reduced soon and it returns to the previous condition. In this way natural balance of an ecosystem is maintained naturally. So, it can be said that, ecological balance will be controlled naturally even if the number of zooplankton increases or decreases in the ecosystem.

d All organisms living on earth are dependent on solar energy (sunlight). So, the sun is the main source of energy for the living world. Green plants trap only 2% of the total energy reached on earth and produce carbohydrate food through photosynthesis. Green plants through photosynthesis process convert solar energy to chemical energy naturally. During this process, green plants use natural compounds like - water, nitrogen, carbon dioxide, iron, sulphur etc. By this process, a bridge between living and non-living world is established.

In a pond ecosystem, green plants or phytoplankton receive solar energy and transform it into chemical energy and initiates food chain. The flow of energy in the ecosystem takes place in this food chain.

The energy content at successive tropic levels, from producers to tertiary consumers, gradually decreases. So, it is evident that energy flows from phytoplankton's (producer) to herbivores (zooplanktons); herbivores to secondary consumers (fish, frog) and from secondary consumers to tertiary consumers (big fish). The energy flows in this way.

Ques. 09



a. What is ecosystem? 1
b. Grass is an ideal producer. — Explain. 2
c. Explain the flow-chart no. (i) of the stem. 3
d. The flow-chart (i) and (ii) are interrelated.– Analyze. 4

● *Dhaka Board 2018*

Answer to Question No. 09 :

a The system in which the biotic components of a particular environment is functioning and reacting with the abiotic components of that environment to set up a relatively stable system is called ecosystem.

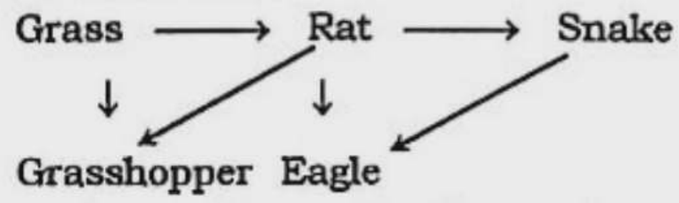
b The green plants can produce their food through photosynthesis and us they are called producers of the ecosystem. Grass can produce their own food as well as for living beings of an ecosystem. This is why grass is an ideal producer.

c The flow chart shown in fig-(i) represents a food chain of an ecosystem. Here we see green plants, grasshopper, frog, snake and bird. Here the bird is an eagle. Green plant is producer. grasshopper lives on green plants, frog eats grass hopper, snake eats frog and eagle eats snake. So, grasshoppers are primary consumers, frog falls under secondary consumers, snakes are tertiary consumers and eagle is top consumer. In this way, all organisms of an ecosystem are interconnected serially. Consequently there develops a food chain. This food chain is a component of ecosystem which plays much more importance for keeping a balance environment.

Grass → Grasshopper → Frog → Snake → Eagle

d The flow chart (i) and flow chart (ii) represent food chain of an ecosystem. The transfer of food energy from producers through a series of food levels i.e. herbivores (primary consumers) to carnivores (secondary and tertiary consumers) to decomposers in the ecosystem is called food chain. Thus, the food chain is a feeding relationship in which a carnivore eats a herbivore which has been eating plants. Naturally in any ecosystem more than one food chain remain attached to each other and formed food web. Food chain does not work in isolation. Rather food chains are linked together to form a food web.

Food chain of fig- (ii) contains grass, rat and snake. Thus flow chart (i) and flow chart (ii) form a food web as follows :



So, flow chart (i) and flow chart (ii) are interrelated.

Ques. 10

Green Plant → Grasshopper → Toad → Snake → Eagle

a. What is ecosystem? 1
b. Why man is called omnivorous animal? 2
c. Explain the energy flow of mentioned food chain of the stem. 3
d. If the number of snakes is increased, the balance of environment will be protected or not. Give your opinion. 4

● *Rajshahi Board 2018*

Answer to Question No. 10 :

a The system under which the biotic components of a particular environment is functioning and reacting with the abiotic components of that environment to set up a relatively stable system is called ecosystem.

b Some animals take food from more than one food level (trophic level). They are called omnivores. Man is called omnivorous animal because at the same time man is a primary consumer, a secondary consumer and a tertiary consumer. He eats not only the grass (plants such as leafy vegetables) but also milk, fish, animals etc.

c Food chain of an ecosystem is shown in the stem.
The green plants receive the solar energy and transform it into chemical energy and initiates food chain. The flow of energy in the ecosystem takes place in this food chain. The energy content at successive trophic levels, from producers to tertiary consumers, gradually decreases. So, it is evident that energy flows from producers to herbivores; herbivores to secondary consumers and from secondary consumers to tertiary consumers. The energy flows in this way.
In the ecosystem mentioned in the stem, green plants are producer, grasshopper is primary consumer, toad is secondary consumer, snake is tertiary consumer and eagle is top consumer. So, here, energy flows from green plants to grasshopper, grasshopper to toad, and from toad to snake and finally to eagle. When decomposers act on dead bodies, different non-living nutritive substances of ecosystem are produced. The green plants again consume them.

d Ecosystem is a self-sufficient and self-regulating unit. The living organisms depend on one another. One living being binds another in the food chair. One living organsim cannot get increased in number, nor can it become extinct easily. Consequently, the number of living organisms at different trophic levels remains more or less constant. Different changes may occur in nature, still the balance of nature is maintained for longtime.
In the ecosystem shown in the stem, green plant is producer, grasshopper lives on green plants, toad eats grasshoppers, snakes live on toad and eagle eats snakes.
So, grasshoper is primary consumer, toad is secondary consumer, snake is tertiary consumer and eagle is top consumer.
If due to any reason, the number of snakes is increased in nature, the number of eagles will increase. The reasons is eagles get enough food. Again, if the number of eagles get increased, the number of snakes will be decrease. Thus the number of eagles will be decreased due to inadequate food supply. Further, if the of eagles are decreased, the number of snakes will be increased. So, it is clear that the number of increased organisms will be reduced soon and it returns to the previous condition. In this way natural balance of an ecossytem is maintained naturally.
So, it can be said that ecological balance will be protected naturally even if the number of snake increases in the ecosystem.

Ques. 11 (i) Phytoplankton → Zooplankton → Small fish → Frog → Snake → Eagle.
(ii) Grass → Deer → Tiger.

a. What is zooplankton? 1
b. What do you mean by ecosystem? Explain it. 2
c. Explain the no. (i) ecosystem. 3
d. Ecosystem (ii) plays an important role in maintaining balance of nature. – Give your opinion logically. 4

• *Sylhet Board 2018*

Answer to Question No. 11 :

a Zooplanktons are like minute floating plants, there are also some microscopic floating macrophytes.

b There are different types of living organisms in different environment of the world. In different regions of each habitat, there exists a vast dissimilarity in their climatic condition, weather and other abiotic and biotic factors. For these dissimilarity, the earth is inhabitated by various different types of organisms. The organisms you see in the forest are different from those inhabitated in the pond. There is a close relationship between biotic and abiotic components of these environments. Further, the animals, plants of an environment are dependent on one another for their survival. In this way, the living component of a particular environment is functioning and interacting with the abiotic components to form a relatively stable system, called ecosystem.

c Ecosystem (i) refers to the ecosystem of ponds.
A classic example of an aquatic ecosystem is the ecosystem of a small pond. In fact, a pond is an ecologically independent and self-regulating unit. In a pond there exist abiotic and biotic components. The abiotic components are water, dissolved oxygen, carbon dioxide and some organic matters. Organisms can use these elements directly. The elements that constitute the biotic components of a pond ecosystem are producers, primary consumers, secondary consumers, tertiary consumers and decomposers of different types. In a pond ecosystem producers are minute floating or suspended small plants, these are known as phytoplankton. Water lily (Shapla), Eichhomia etc. are among floating macrophytes. Like minute

floating plants, there are also some microscopic animals too. Those are known as zooplankton. Aquatic insects, small fish, mussels, snails etc. feed on producer and is known as primary consumers. Medium sized fishes those live on eating the primary consumers, are called secondary consumers. Again, big fish, stork etc. who eat secondary consumers are tertiary consumers. Bacteria, fungi decompose dead organisms. The decomposed substances again used by the producer of the pond ecosystem.

d Ecosystem (ii) plays an important role in maintain balance of nature. It is explained below :
Ecosystem is a self-sufficient and self-regulating unit. The living organisms depend on one another. One living being binds another in the food chain. One living organism cannot get increased in number, nor can it become extinct easily. Consequently, the number of living organisms at different trophic levels remains more or less constant. Different changes may occur in nature, still the balance of nature is maintained for a long time. Let us suppose, there lives tigers, deer and hogs in a forest. Tigers eat deer and hogs as their food. If due to any reason, the number of deer and hogs get increased in nature, the number of tigers will increase. The reason is, tigers get enough food. Again, if the number of tigers get increased, the number of deer and hogs will be decreased. Thus, the number of tigers will be decreased due to inadequate food supply. Further, if the number of tigers is decreased, the number of deer and hogs will be increased. From the example it is clear that the number of increased organisms (tiger) will be reduced soon and it returns to the previous condition. In this way, natural balance of an ecosystem is maintained naturally.

Ques. 12

a. What is consumer? 1
b. What do you mean by decomposer? 2
c. Make a food chain by the help of the stem. 3
d. The figure play role to keep balance of its respective environment. — Explain. 4

• *Dinajpur Board 2018*

Answer to Question No. 12 :

a The animals which live on eating organic matters obtained from plants or on other animals are known as consumers.

b After the death of plants and animals the micro-organisms act on their bodies and decompose. These types of micro-organisms and bacteria existing in the ecosystem are decomposers.
Finally, the decomposed body forms different organic and inorganic components. Some of the nutrients thus produced are used by them and the rest are mixed up with the soil and air. The green plant again consumes those through the natural process.

c In the stem, an aquatic ecosystem is shown (pond ecosystem).

Food chain of a pond ecosystem :
Sunlight is the source of all energy on earth. Green plants are the producer of the ecosystem. Primary consumer depends on producer for food. Again, secondary consumer depends on primary consumers. Tertiary consumers live on eating secondary consumers. In this way, all organisms (both plants and animals) of an ecosystem, are interconnected serially. Consequently, there develops a food chain. The transfer of food energy from producers through a series of food levels i.e. herbivores(primary consumers) to carnivores (secondary and tertiary consumers) to decomposers in the ecosystem is called food chain. Thus, the food chain is a feeding relationship in which a carnivore eats a herbivore which has been eating plants.
A diagram of food chain formed by the animals of a pond is given below—

Green Plants (algae) Producer	: →	Small fish primary consumer	: →	Frog secondary consumer	: →	Big fish Tertiary consumer	: →	hawk Top consumer

d A pond ecosystem is shown in the stem.
A pond is an ecologically independent and self-regulating unit. In a pond there exist abiotic and biotic components. The abiotic components are water, dissolved oxygen, carbon dioxide and some organic matters. Organisms can use these elements directly. The elements that constitute the biotic components of a pond ecosystem are producers, primary consumers, secondary consumers, tertiary consumers and decomposers of different types. In a pond ecosystem producers are minute floating or suspended small plants, these are known as phytoplankton. Water lily (Shapla), Eichhomia etc. are among floating macrophytes. Like minute floating plants, there are also some microscopic

animals too. Those are known as zooplankton. Aquatic insects, small fish, mussels, snails etc. feed on producer and is known as primary consumers. Medium sized fishes those live on earing the primary consumers, are called secondary consumers. Again, big fish, stork etc. who eat secondary consumers are tertiary consumers. Bacteria, fungi decompose dead organisms. The decomposed substances again used by the producer of the pond ecosystem.

Thus a pond ecosystem is created which plays role in keeping balance of the environment.

Ques. 13 Elements of an ecosystem of an area are as follows–

i. Sun ii. Grass iii. Rat iv. Snake v. Eagle

a. What is selfpollination? 1

b. Why the roots of the plants of the Sundarbans spread along the upper layer of the soil? 2

c. Explain the food chain making it with the components of the stem. 3

d. If grass in the ecosystem formed with the components of the stem increases, will there be any change of the number of components of the latest sphere? Analyze. 4

• Ideal School & College, Dhaka

Answer to Question No. 13 :

a Self pollination is the transfer of pollens from anthers to stigmas in the same flower or between flowers on the same plant. Example- Mustard, Pumpkin, datura etc.

b The soil of the Sundarbans is very muddy. So, it is not suitable for air passing. So the branch roots of the plants of this region grow erect and spread along the upper layer of the soil instead of inward. Root tip of these plants bear numerous spores through which atmospheric oxygen enters into the plant body for respiration.

This is why the roots of the plants of the Sundarbans spread along the upper layer of the soil.

c Sunlight is the source of all energy of the earth. Green plants are the producer of the ecosystem. You know primary consumer depends on producer for food. Again, secondary consumer depends on primary consumers. Tertiary consumers live on eating secondary consumers. In this way, all organisms (both plants and animals) of an ecosystem, are interconnected serially. Consequently, there develops a food chain. The transfer of food energy from producers through a series of food levels i.e. herbivores (primary consumers) to carnivores, carnivores (secondary and tertiary consumers) to decomposers in the ecosystem is called food chain. Thus, the food chain is a feeding relationship in which a carnivore eats a herbivore which eats plants.

A food chain with the components of the stem will be as below :

Sun → Grass → Rat → Snake → Eagle.

In the food chain of the above, sun is the source of energy, grass is the producer, rat is the primary consumer which lives on grass and snake is the secondary consumer. In the food chain, eagle is the tertiary consumer.

d Ecosystem is a self-sufficient and self-regulating unit. The living organisms depend on one another. One living being binds another in the food chain. One living organism cannot get increased in number, nor can it become extinct easily. Consequently, the number of living organisms at different trophic levels remains more or less constant. Different changes may occur in nature, still the balance of nature is maintained for longtime.

Grass, rat, snake and eagle are the components of an ecosystem. If for any reason grass increases then the number of rat will increase because rat eats grass and gets enough food. If the number of rat increases, the number of snake and eagle will also increase. The reason is that they get enough food. Again, if eagle and snake increase, the number of snake and rat will decrease respectfully due to the inadequate food supply. Thus the number eagle will also decrease. Further the number of rat and snake will increase if the number of eagle decrease. It is clear that the number of increased organisms will be reduced soon and it returns to the previous condition. In this way, natural balance of an ecosystem is maintained naturally.

Knowledge & Comprehension-based Q/A Designed as per topic

Preparatory Knowledge-based Q/A

Question 1. What are the constituents of an environment?
Ans. Living organisms and non-living matters are the constituents of an environment.

Question 2. What are the different types of environment on earth?
Ans. Fresh water, marine water and land are three different types of environment on earth.

Question 3. Why are plants called producer?
Ans. Green plants can produce carbohydrate food in presence of sunlight by the process of photosynthesis and hence they are called producer.

Question 4. Where is Sundarbans situated?
Ans. Sundarbans is situated in the southern region of Khulna district skirting the coastal belt of the Bay of Bangal.

Question 5. What are the major plants of Sundarbans?
Ans. The sundari, garan, gewa, kewra, golpata, etc. are the major plants of Sundarbans.

Question 6. What is phytoplankton?
Ans. Minute floating or suspended small plants existing in a water body are known as phytoplankton.

Question 7. What is zooplankton?
Ans. The floating microscopic animals that exist in water body are known as zooplankton.

Question 8. Which is the source of all energy of the earth?
Ans. Sunlight is the source of all energy of the earth.

Question 9. What percent out of total solar energy reached on earth do green plants trap?
Ans. Green plants trap only 2% out of total solar energy reached on earth.

Preparatory Comprehension-based Q/A

Question 1. Why is the earth inhabited by various different types of organisms?
Ans. The climatic condition, weather and other abiotic and biotic factors are different for different regions of the earth. For such dissimilarities, the earth is inhabited by various types of organisms.

Question 2. Mention the names of some primary consumers, secondary consumers and tertiary consumers.
Ans. The Sundarbans is a single large forest of Bangladesh where there are many different kinds of plants and animals. Insects, birds, deer, etc. are primary consumers where as jackals, tortoises, cranes, etc. are secondary consumers and the Royal Bengal Tiger, chita, monkey, spotted deer, wild hogs, crocodiles, different types of snakes are tertiary consumers.

Question 3. How can be showed that nutritive substances show circular movement?
Ans. Different non-living nutritive substances of ecosystem are produced when decomposers act on dead bodies or on garbage. The green plants again consume the produced nutritive substances. The above phenomena shows that nutritive substances have circular movement.

Super Suggestions

Super Suggestions with 100% preparatory questions selected by the Master Trainer Panel

Dear learners, important multiple choice, short, creative, knowledge & comprehension-based questions of this chapter selected by Master Trainer Panel for Half-Yearly and Annual Exams are presented below. Learn the answers to the mentioned questions well to ensure 100% preparation.

Question Pattern	7★	5★
○ MCQs with Answers	Learn each MCQs in this chapter thoroughly.	
○ Short Q/A	1, 5, 8, 13, 17, 20, 25, 28, 30	2, 4, 7, 12, 15, 18, 22, 26, 32
○ Creative Q/A	2, 6, 9, 12	1, 3, 5, 7, 11
○ Knowledge-based Q/A	1, 3, 4, 7	2, 5, 6, 8
○ Comprehension-based Q/A	2	1, 3

Exclusive Tips ▸▸ Master the solutions to all the activities in this chapter along with exercise and other Q/A to develop the creative thinking and assess your talent.

Assessment & Evaluation

A question bank presented in the form of a class test to assess the preparation

Class Test Time : 3 hours

Science

Class : Eight

Full marks : 100

Multiple Choice Questions (Each question carries 1 mark) $1 \times 30 = 30$

[N.B. : Answer all the questions. Each question carries one mark. Block fully, with a ball-point pen, the circle of the letter that stands for the correct/best answer in the "Answer Sheet" for Multiple Choice Question Type Examination.]

1. Which one of the following is a consumer?
ⓐ cow ⓑ crow
ⓒ crane ⓓ all the above

2. Which one of the following is a primary consumer?
ⓐ frog ⓑ sheep ⓒ leopard ⓓ lizard

3. Which one is the lifeless element?
ⓐ Producers ⓑ Decomposers
ⓒ Organic element ⓓ Consumer

4. Which one is secondary consumer?
ⓐ Spotted deer ⓑ Hogs
ⓒ Jackal ⓓ Crocodile

5. Which one is the physical element of ecosystem?
ⓐ khudepana ⓑ light
ⓒ bird ⓓ fungi

6. Primary consumer is —.
i. man ii. cow iii. goat
Which one is correct?
ⓐ i & ii ⓑ i & iii ⓒ ii & iii ⓓ i, ii & iii

7. Which one is tertiary consumer of Sundarbans?
ⓐ Hogs ⓑ Cranes ⓒ Tortoise ⓓ Jackals

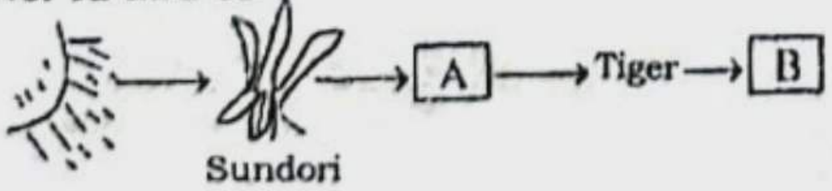
8. Which one is Macrophyte?
ⓐ Aquatic insects ⓑ mussels
ⓒ Snails ⓓ Eichhomia

9. Which one is the tertiary consumer in the Sundarbans?
ⓐ Bird ⓑ Deer ⓒ Tiger ⓓ Monkey

10. Which one is the correct food chain in the light of above stem?
ⓐ L→M→N→O ⓑ L→N→M→O
ⓒ M→N→O→L ⓓ N→M→O→L

11. What kind of flow of nutritive substances of ecosystem is?
ⓐ One way ⓑ Both ways
ⓒ Cyclic ⓓ Straight line

Observe the figure and answer to the questions No. 12 and 13 :



12. What is the animal in the place 'A' of the flowchart?
ⓐ Man ⓑ Deer ⓒ Monkey ⓓ Pig

13. In the place of 'B' it can be said —.
i. they are parasite
ii. they live on dead animals
iii. they work on decomposed organism
Which one of the following is correct?
ⓐ i & ii ⓑ i & iii ⓒ ii & iii ⓓ i, ii & iii

14. Green plants trap only what percentage of the total energy reached on earth?
ⓐ 1% ⓑ 2% ⓒ 4% ⓓ 8%

15. How many percentage of the light of the Sun is used by green plants in photosynthesis?
ⓐ 1 ⓑ 2 ⓒ 3 ⓓ 4

16. The part 'P' is—.
i. one kind of organic material
ii. the food of micro-organism
iii. the food of producer
Which one is correct?
ⓐ i & ii ⓑ i & iii ⓒ ii & iii ⓓ i, ii & iii

17. Which level of consumers the deer belongs to?
ⓐ First ⓑ Second
ⓒ Third ⓓ Omnivorous

18. Which one is the primary consumer?
ⓐ Tortoise ⓑ Frog ⓒ Goat ⓓ Eagle

19. Which one is the primary consumer?
ⓐ Frog ⓑ Man ⓒ Bird ⓓ Goat

20. Which is the seceondary consumer in the Sundarbans?
ⓐ Monkey, Crain ⓑ Deer, Hen
ⓒ Tiger, Crocodile ⓓ Insect, Bird

21. Which one is the tertiary consumer of Sundarbans?
ⓐ Pig ⓑ Deer ⓒ Monkey ⓓ Ben

22. Which one of the following is primary consumer of land ecology?
ⓐ Man ⓑ Frog ⓒ Goat ⓓ Bird

23. What is the organic element of ecosystem?
ⓐ Soil ⓑ Water
ⓒ Wind ⓓ Dead organism

24. Which omnivore can you find in the Sundarbans?
ⓐ tiger ⓑ hog ⓒ jackal ⓓ crane

25. What percentage of sunlight is used by green plants in the photosynthesis process?
ⓐ 1 ⓑ 2 ⓒ 3 ⓓ 4

26. By green plants, the solar energy transforms into which energy?
ⓐ Chemical energy ⓑ Heat energy
ⓒ Mechanical energy ⓓ Light energy

27. Which one of the following is at the same time a primary, secondary and tertiary consumer?
ⓐ hog ⓑ porcupine ⓒ man ⓓ tortoise

28. Ecosystem is a —.
i. self-conditioning unit ii. self-regulating unit
iii. self-sufficient unit
Which one of the following is correct?
ⓐ i & ii ⓑ ii & iii ⓒ i & iii ⓓ i, ii & iii

29. Carnivores except tigers in the Sundarbans —.
i. reindeer ii. crocodiles iii. leopard
Which one of the following is correct?
ⓐ i & ii ⓑ ii & iii ⓒ i & iii ⓓ i, ii & iii

30. The word 'trophic' relates to —.
ⓐ primary consumers ⓑ secondary consumers
ⓒ tertiary consumers ⓓ decomposers

Answer Sheet ▸ Multiple Choice Questions

1	ⓓ	2	ⓑ	3	ⓒ	4	ⓒ	5	ⓑ	6	ⓒ	7	ⓐ	8	ⓓ	9	ⓒ	10	ⓒ	11	ⓓ	12	ⓑ	13	ⓒ	14	ⓑ	15	ⓐ
16	ⓑ	17	ⓐ	18	ⓒ	19	ⓓ	20	ⓒ	21	ⓐ	22	ⓒ	23	ⓓ	24	ⓑ	25	ⓑ	26	ⓐ	27	ⓒ	28	ⓓ	29	ⓑ	30	ⓒ

Short-Answer Question (Each question carries 2 marks)

Answer any 10 of the following questions : 2 × 10 = 20

1. How many and what are the components of ecosystem?
2. What is meant by abiotic components of ecosystem?
3. Mention the types of living components in ecosystems.
4. What do you mean by primary consumers?
5. Why are decomposers important in ecosystem?
6. What does phytoplankton mean?
7. Write two differences between producer and consumer.
8. What are the types of ecosystems in the natural environment?
9. Name five producers of mangrove forests.
10. Write two differences between food chain and food web.
11. How does energy flow connect the non-living and living components?
12. How does energy flow continue in ecosystem?
13. Write two characteristics of energy flow in ecosystem.
14. Why is the flow of energy in the ecosystem one-way?
15. Nutrient flow in an ecosystem is cyclical – explain.

Creative Question (Each question carries 10 marks)

Answer any 5 of the following questions : 10 × 5 = 50

1. On Eid vacation, Dipti went to the Sunderbans with her uncle. In the forest she saw plants such as sundari, garan, kewra and golpata. Though she did not see any tiger, wild cock, monkey, deer have attracted her attention.
   a. What is food chain? 1
   b. Why is fungi called decomposer? 2
   c. Classify the plants and animals observed by Dipti into ecological element. 3
   d. The plants and animals mentioned in the stem are related to ecosystem.—Justify. 4

2. 

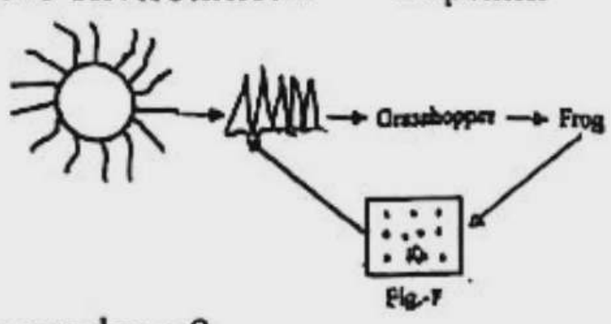
   a. What is producer? 1
   b. What do you mean by ecosystem? 2
   c. Make a food chain with the help of the stem's figure and explain it. 3
   d. Justify the influence of 'D' in the given ecosystem. 4

3. Algae → Small aquatic being → Puti fish → Big fish
   a. What is consumer? 1
   b. Why is a bacteria called decomposer? 2
   c. Using the living being mentioned in the stem, draw a figure of aquatic ecosystems. 3
   d. How would the increase in number of small fishes mentioned in the stem influence the ecosystem? Analyze. 4

4. Green Plant → Grasshopper → Toad → Snake → Eagle
   a. What is ecosystem? 1
   b. Why man is called omnivorous animal? 2
   c. Explain the energy flow of mentioned food chain of the stem. 3
   d. If the number of snakes is increased, the balance of environment will be protected or not. Give your opinion. 4

5. (i) Phytoplankton → Zooplankton → Small fish → Frog → Snake → Eagle.
   (ii) Grass → Deer → Tiger.
   a. What is zooplankton? 1
   b. What do you mean by ecosystem? Explain it. 2
   c. Explain the no. (i) ecosystem. 3
   d. Ecosystem (ii) plays an important role in maintaining balance of nature. – Give your opinion logically. 4

6. 
   a. What is consumer? 1
   b. What do you mean by decomposer? 2
   c. Make a food chain by the help of the stem. 3
   d. The figure play role to keep balance of its respective environment. — Explain. 4

7. 

   a. What is producer? 1
   b. Explain the reason behind fungi being called decomposer. 2
   c. Explain the food chain of above figure. 3
   d. Why the energy flow of figure-'F' is unidirectional? Analyze. 4

8. 
   a. What is ecosystem? 1
   b. Grass is an ideal producer. — Explain. 2
   c. Explain the flow-chart no. (i) of the stem. 3
   d. The flow-chart (i) and (ii) are interrelated.– Analyze. 4

Answering Reference ▸ Short-Answer Questions

1 ▸ See this Chapter, Ques. 02	5 ▸ See this Chapter, Ques. 10	9 ▸ See this Chapter, Ques. 19	13 ▸ See this Chapter, Ques. 31
2 ▸ See this Chapter, Ques. 03	6 ▸ See this Chapter, Ques. 11	10 ▸ See this Chapter, Ques. 26	14 ▸ See this Chapter, Ques. 32
3 ▸ See this Chapter, Ques. 05	7 ▸ See this Chapter, Ques. 12	11 ▸ See this Chapter, Ques. 29	15 ▸ See this Chapter, Ques. 33
4 ▸ See this Chapter, Ques. 08	8 ▸ See this Chapter, Ques. 16	12 ▸ See this Chapter, Ques. 30	

Answering Reference ▸ Creative Questions

1 ▸ See this Chapter, Ques. 02	3 ▸ See this Chapter, Ques. 05	5 ▸ See this Chapter, Ques. 11	7 ▸ See this Chapter, Ques. 07
2 ▸ See this Chapter, Ques. 04	4 ▸ See this Chapter, Ques. 10	6 ▸ See this Chapter, Ques. 12	8 ▸ See this Chapter, Ques. 09