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SCIENCE

BIOLOGY

CHAPTER-13 OUR ENVIRONMENT

PRACTICE WORKSHEET SOLVED

I. MULTILE CHOICE QUESTIONS

1. In a given food chain if the amount of energy at the fourth trophic level is 6 kJ, what will be the energy available at the producer level?

(a) 6000 kJ (b) 20 kJ (c) 60 kJ (d) 600 kJ

2. Which of the following is biodegradable waste ?

(a) DDT (b) Aluminium can (c) Plastic bag (d) Cow dung

3. Which of the following is the best way for disposal of vegetable and fruit peels?

(a) Landfill (b) Recycling (c) Composting (d) Burning

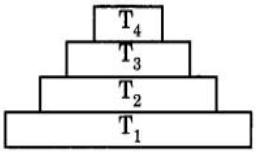
4. Accumulation of non-biodegradable pesticides in the food chain in increasing amount at each higher trophic level is known as:

(a) Eutrophication (b) Pollution
(c) Biomagnifications (d) Accumulation

5. 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

6. In the given Figure the various trophic levels are shown in a pyramid. At which trophic level is maximum energy available?



(a) T_4 (b) T_2 (c) T_1 (d) T_3

7. Which of the statements is incorrect?
(a) All green plants and blue green algae are producers
(b) Green plants get their food from organic compounds
(c) Producers prepare their own food from inorganic compounds
(d) Plants convert solar energy into chemical energy

8. What will happen if Deer is missing in the food chain given below?
Grass → Deer → Tiger
(a) The population of tiger increases
(b) The population of grass decreases
(c) Tiger will start eating grass
(d) The population of tiger decreases and the population of grass increases

9. When is the World Environment Day celebrated?
(a) 16 June (b) 5 December (c) 5 June (d) 5 July

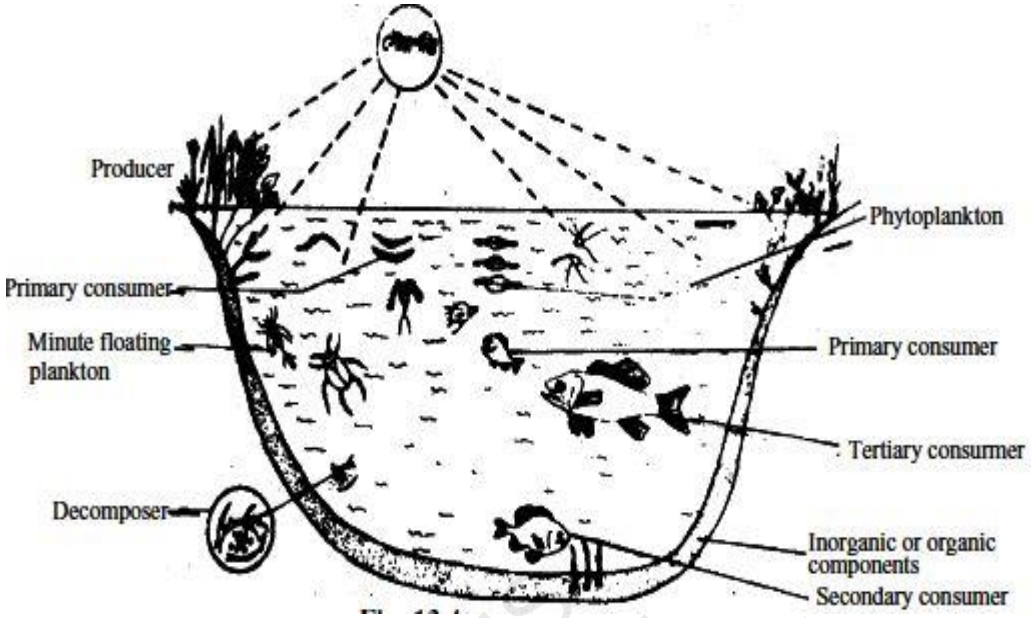
10. Which of these is a greenhouse gas?
(a) Hydrogen Sulphide (b) Methane
(c) Ozone (d) Carbon monoxide

11. The transfer of Energy in a food chain is always:
(a) Unidirectional (b) Methane
(c) Bi-directional (d) Random

12. **If a grasshopper is eaten by frog, then the energy transfer will be from:**
(a) producers to decomposers
(b) producer to primary consumer
(c) primary consumer to secondary consumer
(d) secondary consumer to primary consumer

13. **The % of solar radiation absorbed by all green plants for photosynthesis is about ————.**
(a) 1% (b) 5% (c) 8% (d) 10%

14. Study the image given below and answer the following questions.



A. Which among the following are the Primary Producers?

(a) Algae
(b) Phytoplankton
(c) Algae and phytoplankton
(d) Green plants

B. Which group of organisms may have higher Bio-magnification?

(a)Producers
(b) Primary consumers
(c) Secondary Consumer
(d) Tertiary consumers

C. Which is the Primary source of energy in an ecosystem?

(a) Soil
(b) Water
(c) Sun
(d) Carbon dioxide

D. The image given above is an example of

(a) Aquatic ecosystem

(a) Terrestrial ecosystem
(b) Land ecosystem
(c) Natural aquatic ecosystem

15. In 1987 the ---------- Succeeded in forging an agreement to freeze CFC Production

(a) UNESCO
(b) UNEP
(c) UNCTED
(d) UNICEF

16. O2---------UV---------→O+O

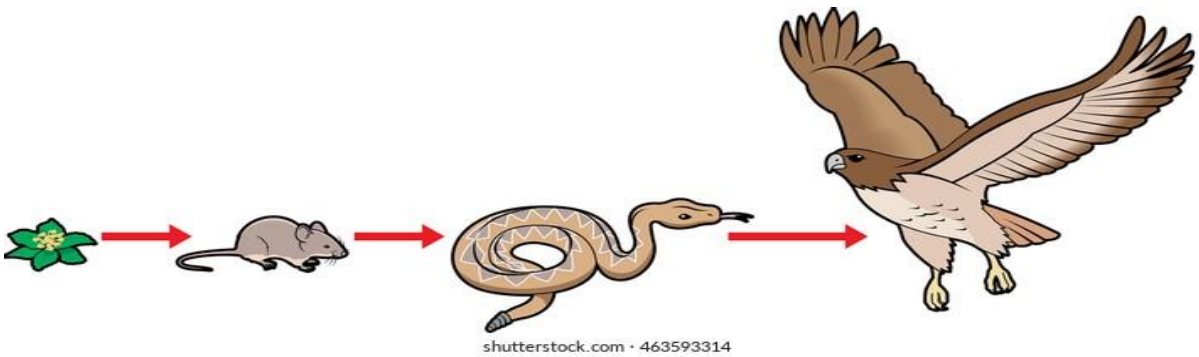
O+O2---------→O3 (Ozone) The role of UV rays in this reaction is ----------

(a) To Split Oxygen molecule
(b) To unite oxygen molecule
(c) To Destroy Ozone
(d) None

17. O3---------???---------→ O2 + (O+O) which substance catalyzes the reaction?

(a) Chlorine
(b) Sulphurdioxide
(c) Hydrogen sulphide
(d) Neon

18. Study the image and answer the questions given below.



(10000 KJ) **(1000 KJ)** --------- **????**

A. Find out the energy available to the bird :

(a) 100KJ

(b) 10 KJ
(c) 1KJ
(d) . 5KJ

B. Which trophic level may have higher Biological Magnification :
(a) Grass
(b) Snake
(c) Bird
(d) Rabbit

C. What may happen if all the Rabbits disappear from the ecosystem :
(a) Bird population declines
(b) Snake population declines
(c) Bird and snake population declines
(d) Bird and snake population declines and grass grow abundant

D. Which of the following chemicals cause Biological Magnification :
(a) DDT
(b) BHC
(c) All non biodegradable pesticides and chemicals
(d) Plastics

19. **Which group of waste materials can be classified as non-biodegradable ?**
(a) Plant waste, used tea bags
(b) Polyethene bags, plastic toys
(c) Used tea bags, paper straw
(d) Old clothes, broken footwear

20. **Environment includes:**
(a) Land, air, water
(b) Light, temperature, rainfall
(c) Plants, animals, microbes
(d) All of these

II. ASSERTION REASON TYPE OF QUESTIONS

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

(b) If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion

(c) If Assertion is true but the Reason is false

(d) If both Assertion and Reason are false

1. **Assertion:** Polythene bags and plastic containers are non-biodegradable substances.

Reason: They can be broken down by microorganisms in natural simple harmless substances

2. Assertion - Each step or level of the food chain forms a trophic level

Reason - Autotrophs or producers are the first trophic level in the ecosystem

3. Assertion - Green plants harvest the solar energy directly and convert light energy into chemical energy

Reason - Food transfer in the ecosystem takes place through food chain and food web

4. Assertion - The length and complexity of food chain vary greatly in an ecosystem

Reason - There is a reduction of energy when it transfers from one trophic level to other by eating and being eaten

5. Assertion - There is generally greater number of individuals at the lower trophic levels of an ecosystem

Reason - Green plants are the producers in an ecosystem

6. Assertion - Ozone is formed by three atoms of oxygen

Reason - UV rays are needed to form ozone molecule

7. Assertion – Substances that are broken down by biological process are said to be Biodegradable

Reason- Some Pesticides and chemicals are Non- biodegradable

8. Assertion - More and more things we use becoming disposable, changes in packaging have resulted in much of our waste becoming Non-biodegradable

Reason - Biodegradable materials are environment friendly and easily degraded by the microbes in nature

9. Assertion-Enzymes are very essential for digestion of food materials in our body. Specific enzymes are needed for the breakdown of a particular substance

Reason - We will not get energy if we try to eat coal

10. Assertion - Water, soil, temperature, light, minerals are the abiotic factors in the ecosystem

Reason - Biotic factors interact with abiotic factors in an ecosystem to sustain

11. Assertion - Ozone layer is seen at the Stratosphere of atmosphere, which is harmful to plants and animals.

Reason - The Ozone layer that is found in the troposphere of atmosphere is good to the plants and animals

12. Assertion - A sparrow when feeds on seeds, it is a primary consumer, but when it feeds on an insect, it belongs to secondary consumer.

Reason - The ecological pyramids (trophic levels) are not always reliable

13. Assertion - Only the green plants can prepare their own food by means of photosynthesis

Reason - Some Bacteria derive their nutrition by autotrophic means

14. Assertion - Forests, Grass lands, Rivers, Meadows, Estuaries are natural ecosystems

Reason - Artificial ecosystems are manmade ecosystems

15. Assertion - In Sea waters the number of Primary Producers is more than that of Primary consumers

Reason - In Sea water the Primary consumers are more than that of Primary Producers

III. CASE STUDY QUESTIONS

POLLUTION OF RIVER GANGA

The belief the Ganga River is "holy" has not, however, prevented over-use, abuse and pollution of the river. All the towns along its length contribute to the pollution load. It has been assessed that more than 80 per cent of the total pollution load (in terms of organic pollution expressed as biochemical oxygen demand (BOD)) arises from domestic sources, i.e., from the settlements along the river course. Due to over-abstraction of water for irrigation in the upper regions of the river, the dry weather flow has been reduced to a trickle.

Rampant deforestation in the last few decades, resulting in topsoil erosion in the catchment area, has increased silt deposits which, in turn, raise the river bed and lead to devastating floods in the rainy season and stagnant flow in the dry season. Along the main river course there are 25 towns with a population of more than 100,000 and about another 23 towns with populations above 50,000. In addition, there are 50 smaller towns with populations above 20,000. There are also about 100 identified major industries located directly on the river, of which 68 are considered as grossly polluting. Fifty-five of these industrial units have complied with the regulations and installed effluent treatment plants (ETPs) and legal proceedings are in progress for the remaining units. The natural assimilative capacity of the river is severely stressed. The principal sources of pollution of the Ganga River can be characterized as follows:

• Domestic and industrial wastes. It has been estimated that about 1.4 × 106 m3 d-1 of domestic wastewater and 0.26 × 106 m3 d-1 of industrial sewage are going into the river.

• Solid garbage thrown directly into the river.

• Non-point sources of pollution from agricultural run-off containing residues of harmful pesticides and fertilizers.

• Animal carcasses and half-burned and unburned human corpses thrown into the river. • Defecation on the banks by the low-income people.

• Mass bathing and ritualistic practices.

1. Accumulation of toxic substances at higher trophic levels of an ecosystem through the food chain in water bodies affects which of the following organisms more?
    (a) Phytoplankton
    (b) Zooplankton

(c) Small fishes
(d) Large fishes

2. When toxic chemicals and nutrients get deposited in the water bodies, which of the following gases get depleted in the water bodies?
   (a) Oxygen
   (b) Carbon dioxide
   (c) Both oxygen and carbon dioxide
   (d) Nitrogen
3. Which of the following activities may pollute the river water more?
   (a) Bathing using detergent and soap
   (b) Discharging animals excreta
   (c) Deposit flowers and leaves as the part of puja
   (d) Bathing without soap and detergent
   (e)

4. Which of the following organisms grow abundant in water when the water get mixed with nutrients like sulphates, phosphates etc.?

(a) Algae
(b) Zooplankton
(c) Small fishes
(d) Large fishes

5 .Green Algae and Diatoms are the major producers of Aquatic ecosystem .Which of the following will be more in the aquatic ecosystem:

(a) Small fishes
(b) Large fishes
(c) Algae and phytoplankton
(d) Tadpole

6. Phyto plankton (60000kj) ----------→ Zooplankton (6000kj)---→Small fishes (600kj)---→Large fish(----------?????-----). Find out the energy available to large fish.

(a) 60Kj
(b) 6kj
(c) 0.6 Kj
(d) 61Kj

7. The source of Primary energy source to the aquatic organisms is ----------

(a) Algae
(b) Zooplankton
(c) Sun
(d) Moon

8. The harmful metals that get mixed with the water bodies from the industrial units' are :

(a) Iron and copper
(b) Mercury and lead
(c) Sodium and potassium
(d) Magnesium and cobalt

9. The Ganga Action Plan is to ----------

(a) Make Ganga water free from garbage
(b) Minimise the use of soap and detergents in water bodies like Ganga
(c) Make awareness among the people to save Ganga
(d) All the above

10. This will be the best method to protect our River water bodies-

(a) Grow trees along the bank of Rivers
(b) Grow small fishes in River water
(c) Permitted level of sand mining
(d) Making Flats or Malls near the River

IV. Descriptive questions

Short Questions (2M)

1. What is natural and artificial ecosystem? Give one example each
2. Define ecosystem and name its components.
3. What is the full form of CFCs and UNEP?
4. What is the ultimate source of energy in an ecosystem? Which process helps to trap this energy in producers?

5. Define trophic level in a food chain? The first trophic level in a food chain is always a green plant. Why?
6. Food web increases the stability of an ecosystem. Justify.
7. What is food chain? Construct an aquatic food chain showing four trophic levels.
8. List two causes of depletion of ozone layer. Mention any two harmful effects of depletion of this layer.
9. What are decomposers? Write any two consequences of decomposers are removed from the ecosystem?
10. Pesticides like DDT which are sprayed to kill pests on crops are found to be present in the soil, ground water, water bodies etc. Explain. How do they reach these places?
11. List two environment friendly practices or habits which need to be followed by every member of a family or community. Explain how these practices will support the "save the environment" mission.
12. What are the by-products of fertilizer industries? How do they affect the environment?
13. Make a diagrammatic representation showing various trophic levels.

V. Short Questions (3M)

14. Differentiate between biodegradable and non-biodegradable substances with the help of one example each. List two changes in habit that people must adapt to dispose non-biodegradable waste for saving the environment.
15. How is ozone formed in the higher level of the atmosphere? "Damage to ozone layer is a cause of concern". Justify this statement.

16. Explain phenomenon of "biological magnification". How does it affect organisms belonging to different trophic levels particularly the tertiary consumers?

VI. Long answer Questions (5M)

17. Explain some harmful effects of agricultural practices on the environment.
18. In a food chain, if 10000 Joules of energy is available to the producer, how much energy will be available to the secondary consumer to transfer it to the tertiary consumer?
19. Suggest any four activities in daily life which are eco-friendly.
20. "Energy flow in a food chain is unidirectional". Justify this statement. Explain how the pesticides enter a food chain and subsequently get into our body.

SOLUTIONS

I. MCQ - ANSWER KEY

1	A	11	A	18-A	B
2	D	12	C	18-B	B
3	C	13	A	18-C	D
4	C	14-A	C	18-D	C
5	C	14-B	D	19	B
6	C	14-C	C	20	D
7	B	14-D	D		

8	D	15	B		
9	C	16	A		
10	B	17	A		

II. ASSERTION AND REASON- ANSWER KEY

1	B	6	A	11	D
2	A	7	A	12	A
3	A	8	A	13	B
4	A	9	A	14	A
5	B	10	A	15	B

III. CASE SUDY QUESTIONS - ANSWER KEY

1	D	6	A
2	C	7	C
3	A	8	B
4	A	9	D
5	A	10	A

IV. DESCRIPTIVE QUESTIONS – ANSWER KEY

1) Natural ecosystem: Self-sustaining ecosystem formed by the interaction of living and non living things in an area. Eg: Forest or pond

   Artificial ecosystem: An ecosystem which is formed or modified by human intervention. Crop field or aquarium.

2) The living and non-living components of an area interact with each other to form an ecosystem. Components of ecosystem are: Biotic (living) and abiotic (non-living)

3) CFC=Chlorofluorocarbons

   UNEP = United Nations Environment Programme

4) Sun is the ultimate source of energy in an ecosystem. Photosynthesis helps to trap this energy in producers.

5) Each step or level of the food chain forms a trophic level. The autotrophs or the producers are the first trophic level. They fix up the solar energy and make it available for the heterotrophs or consumers. The first tropic level in a food chain is always a green plant because only plants can utilize the radiant energy of the sun and transform it to chemical form during photosynthesis.

6) Food web shows food relationship in an ecological community. It consists of many food chains. Thus, if any one organism becomes endangered or extinct, the one dependent in it has an alternative option available to him for survival. In this way food web increases stability in the ecosystem.

7) Food chain is formed by a series of organisms feeding on one another.

Phytoplankton → Zooplankton → Small fish → Bird.

8) Two causes of depletion of ozone layer are as follows:
   a. Use of CFC's
   b. Use of Halogens

   Harmful effects of ozone depletion:
   a. Due to depletion of ozone UV radiation reaches the earth. This UV radiation causes skin cancer, damage to eyes and immune system.
   b. Ozone depletion may also lead to variation in global rainfall, ecological disturbances and wildling of global food supplies.

9) Decomposers are organisms that live on dead and decaying matter. They convert complex organic material into simple materials and mix with soil. Eg: fungi, bacteria

Some of the consequences if decomposers are removed from soil are

a. Dead organisms will pile up.
b. There will be no replenishment of soil.

10) **Soil:** Pesticides are used to protect plants from insects. They consequently get settled into soil particles, when used on plants.

Groundwater: Through irrigation in the fields, these pesticides present in soil pass into lower layers of soil and reach ground water.

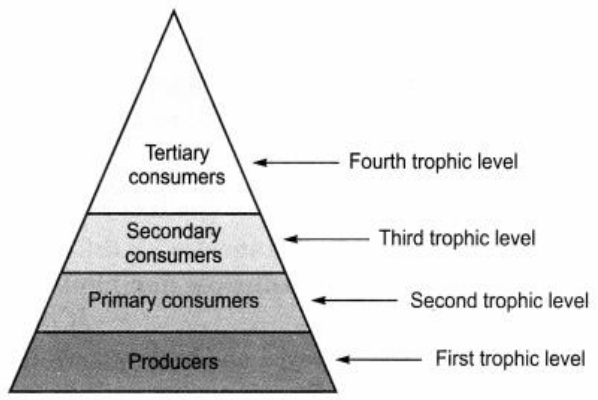
11) The below practices will support "Save the environment mission"

a. Use of paper bags or jute bags instead of plastic bags
b. Segregate biodegradable and non-biodegradable wastes in separate dustbins.
c. Use fuels like CNG, unleaded petrol or other ecofriendly fuels in vehicles.

Due to uses of environment friendly practices or habits we can save our environment

12) The harmful by-products of fertiliser industries are the harmful gases like sulphur dioxide and Nitrogen oxides. They cause air pollution and combine with the water vapour in the atmosphere to cause harmful acid rain

13)



14) A. Biodegradable substances: Substances that can be slowly destroyed and broken down into very small parts by natural processes i.e., by bacteria, fungi, etc. For example, organic wastes like vegetables and fruit peels.

B. Non-biodegradable substances: Substances that cannot be broken down or decomposed into the soil by natural agents are called as non-biodegradable.For example, plastic.

a. Segregating and treating the non-biodegradable waste before putting in dustbins.
b. Recycle the plastics or glass present in non-biodegradable wastes.
c. Motivate people to use paper or jute bags instead of plastic bags.

15) Ozone is formed due to action of UV rays on oxygen molecules to form free oxygen atom which subsequently combines with another molecule of oxygen to form ozone. The reaction is:

$$O_2 \xrightarrow{UV} O + O$$

$O + O_2 \rightarrow O_3$ (Ozone)

Ozone depletion is a cause of concern because it protects us from the harmful

ultraviolet radiations of the Sun by absorbing them. The UV rays can cause skin cancer, ageing, cataract, etc. to human beings if they are not absorbed by ozone due to ozone depletion.

16) The levels of harmful toxicants/pesticides like DDT get increased at successive trophic levels as they are neither metabolized nor excreted by the organism. They get accumulated in organism's body with their higher concentrations at higher trophic levels. This is called as biological magnification

Since, the tertiary consumers are at the top of the food chain, so a higher amount of these toxicants is present in them compared to the lower trophic levels.

17) Harmful effects of agricultural practices on the environment are

a. Change in the chemistry of soil and killing of useful microbes due to excessive use of fertilizers.
b. Biological magnification occurs due to excessive use of chemical pesticides.
c. Water table gets lowered due to the excess use of ground water.
d. Soil fertility is lost due to extensive cropping.
e. The natural ecosystems are harmed due to ploughing during agriculture.

18) Energy which will be available to the secondary consumer to transfer it to the tertiary consumer are

a. Energy available to producers = 10,000 Joules. Energy transfer to producer = 1% of 10,000 Joules = 100 Joules.

b. According to Ten per cent law, Energy transfer to primary consumer = 10100 × 100 = 10 Joules.

c. Energy transfer to secondary consumer = 10100 × 10 = 1 Joule.

d. Energy transfer to tertiary consumer = 10100 × 1 = 0.1 Joule

19) The eco-friendly activities in life are

a. Planting of trees

b. Segregating biodegradable and non-biodegradable wastes

c. Using cloth bags, jute bags or paper bags instead of plastic bags

d. Creating awareness on environment protection through initiatives and campaigns

e. Using of manures and organic agricultural methods Using less of chemical fertilizers and pesticides

f. Controlling pollution by using fuels like CNG.

20) Because the energy moves progressively through the various trophic levels and is no longer available to the previous trophic level. The energy captured by autotrophs does not revert to the solar input.

a. Pesticides, used for crop protection when washed down into the soil/ water body, are absorbed by the plant along with water and minerals

b. Plants are consumed by animals and these chemicals get into animal body
c. Being non-biodegradable, these chemicals get accumulated progressively in the food chain and into our body
d. As we go into higher levels of food chain amount of harmful substances will increase in the body of organisms as a result of biomagnification.

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