Nutrition and Respiration

Question 1:

Select the proper choice from the given multiple choices :

Question 1.1:

Which of the following types has the longest small intestine ?

Solution :

c. Herbivores
Herbivores consume a large amount of cellulose which requires a longer time to digest as compared to meat consumed by carnivores and omnivores. Thus, for proper and complete digestion of cellulose, herbivores have the longest small intestine.

Question 1.2:

The process of obtaining food by Amoeba is known as ……..

Solution :

c. Phagocytosis
Amoeba is a unicellular organism. It obtains food through its entire body through phagocytosis i.e. cell feeding.

Question 1.3:

Which organism possesses parasitic mode of nutrition ?

Solution :

b. Plasmodium

Plasmodium obtains it nutrition from its host, human being, for its survival; thus, showing parasitic mode of nutrition.

Question 1.4:

Which one of the following organisms has a saprophytic mode of nutrition.

Solution :

a. Mushroom
Mushroom obtains nutrition from dead and decaying substances; thus, it exhibits saprophytic mode of nutrition.

Question 1.5:

The length of small intestine in an adult human being is about:

Solution :

d. 6.5m
The small intestine in an adult human being is 6.5m long. It is the longest organ of the human digestive system.

Question 1.6:

Where the process of digestion of food starts in human being ?

Solution :

c. Mouth
As food is ingested, the salivary glands release the saliva in the mouth. Saliva contains amylase which digests the starch in the food to maltose.

Question 1.7:

In which organ the process of digestion in human is completed ?

Solution :

b. small intestine
The small intestine receives various secretions from different associated glands which help in complete digestion of the food.

Question 1.8:

By which of the following bile is secreted in human digestive system ?

Solution :

b. Liver
Liver secretes a greenish yellow fluid called bile in the small intestine which helps in the digestion of fats.

Question 1.9:

The autotrophic mode of nutrition requires……..

Solution :

d. All of the above
In autotrophic nutrition, organisms synthesise their own food by the process of photosynthesis. The process of photosynthesis takes place in the presence of sunlight and chlorophyll. Organisms use carbon dioxide and water to produce carbohydrates as a source of energy.

Question 1.10:

In human digestive system, the enzymes pepsin and trypsin are secreted respectively by which organs ?

Solution :

d. Stomach and Pancreas
The enzymes pepsin and trypsin secreted by the stomach and the pancreas respectively, help in the digestion of proteins present in the food.

Question 1.11:

Which one of the following organisms can live without oxygen of air.

Solution :

c. Yeast
Yeast respires anaerobically i.e. in the absence of oxygen. It breaks down glucose into ethanol and carbon dioxide and releases energy.

Question 1.12:

During respiration, the exchange of gases takes place in:

Solution :

b. Alveoli
The walls of the alveoli are one cell thicker and are surrounded by blood capillaries to facilitate the exchange of gases.

Question 1.13:

In which of the following organisms, the gaseous exchange during respiration does not take place through cell membrane or skin.

Solution :

a. Electric ray
Electric ray is a type of cartilaginous fish. It uses gills for the exchange of gases in water.

Question 2:

Answer the following questions in brief :

Question 2.1:

Which inorganic sustances are used as food by autotrophic organisms ?

Solution :

Autotrophic organisms use water and carbon dioxide to prepare their own food in the form of carbohydrates.

Question 2.2:

What is the mode of nutrition in fungi ?

Solution :

Fungi show saprophytic mode of nutrition.

Question 2.3:

Name one organism each having saprophytic, parasitic and holozoic modes of nutrition.

Solution :

Organisms showing different modes of heterotrophic nutrition are:
Saprophytic nutrition – mushroom
Parasitic nutrition – tapeworm
Holozoic nutrition – cat

Question 2.4:

Name the process by which plants make food.

Solution :

Plants make food by the process of photosynthesis.

Question 2.5:

In addition to carbon dioxide and water, state two other conditions necessary for the process of photosynthesis to take place.

Solution :

In addition to carbon dioxide and water, the conditions necessary for the process of photosynthesis are the presence of sunlight and chlorophyll.

Question 2.6:

Name the pigment which can absorb solar energy.

Solution :

Chlorophyll is the pigment which absorbs solar energy during the process of photosynthesis.

Question 2.7:

Where is chlorophyll mainly present in a plant?

Solution :

Chlorophyll is present in the chloroplast of cells, mainly in the leaves.

Question 2.8:

Which structure of the food vacuole in Amoeba to break down the food ?

Solution :

Digestive enzymes present in the food vacuole in Amoeba, help to breakdown ingested food.

Question 2.9:

From which part of the body, undigested food is egested in Amoeba ?

Solution :

In Amoeba, the undigested food is egested by rupturing the cell membranes.

Question 2.10:

Name one organism which can live without oxygen.

Solution :

Yeast can live without oxygen.

Question 2.11:

In which type of respiration more energy is released?

Solution :

More energy is released in aerobic respiration.

Question 2.12:

Which part of root is involved in the exchange of respiratory gases ?

Solution :

Root hairs, which are extensions of epidermal cells of the roots, are involved in the exchange of respiratory gases.

Question 2.13:

Name the respiratory organ of fish.

Solution :

Gills are the respiratory organs of fish.

Question 3:

Write answers of the following questions :

Question 3.1:

(a) What is autotrophic nutrition ? Give one example of autotrophs.
(b) What are the conditions necessary for autotrophic nutrition ?

Solution :

a. Autotrophic nutrition is the mode of nutrition where the organisms synthesise their own food from carbon dioxide and water in the presence of sunlight and chlorophyll. This process is called photosynthesis. Carbohydrates produced during photosynthesis serve as a source of energy for these organisms.

Plants are autotrophs.

b. Conditions necessary for autotrophic nutrition are

- Carbon dioxide
- Water
- Chlorophyll
- Sunlight

Question 3.2:

(a) What is heterotrophic nutrition ? Give one example of heterotroph.
(b) What is the difference between autotrophic nutrition and heterotrophic nutrition ?

Solution :

a. Heterotrophic nutrition is a mode of nutrition where the organisms obtain nutrients from the food which is obtained from plants or other animals. Heterotrophic organisms cannot synthesise their own food.

All animals, bacteria and fungi are heterotrophs.

b.

Autotrophic Nutrition	Heterotrophic Nutrition

Food is prepared from inorganic materials like carbon dioxide and water.	Food is obtained from other organisms.
Presence of the pigment of chlorophyll and sunlight is necessary.	Chlorophyll and sunlight are not essential.
Plants show autotrophic nutrition.	Animals, bacteria and fungi show heterotrophic nutrition.

Question 3.3:

(a) Define nutrition. Name four important nutrients present in food.
(b) What are the various types of heterotrophic nutritions ?

Solution :

a. Nutrition is defined as the process of the intake of nutrients which provide the organisms with energy to work. Important nutrients present in the food include carbohydrates, proteins, fats, vitamins, minerals and water.

b. Various types of heterotrophic nutrition are

- Saprophytic nutrition
- Parasitic nutrition
- Holozoic nutrition

Question 3.4.1:

Define (i) saprophytic nutrition (ii) parasitic nutrition, and (iii) holozoic nutrition. Give one example of each type.

Solution :

1. Saprophytic nutrition – The mode of nutrition where the organisms obtain nutrients from dead and decaying organic materials is called saprophytic nutrition.
   Example – Mushroom shows saprophytic nutrition.
2. Parasitic nutrition – The mode of nutrition where the organisms obtain nutrients from another living organism by causing harm to it is called parasitic nutrition.
   Example – Tapeworm shows parasitic nutrition.
3. Holozoic nutrition – It is a mode of nutrition in which the organism takes in parts of the plants or animals or the whole plant or animal as a source of food.
   Example – Amoeba shows holozoic mode of nutrition.

Question 3.4.2:

Define (i) saprophyte, and (ii) parasite. Name two saprophytes and two parasites.

Solution :

i. Saprophyte – an organism which derives its nutrition from dead and decaying organic

materials is called a saprophyte. **Example** – Bacteria and Fungi

ii. Parasite – an organism which derives its nutrition from another living organism thereby causing harm to it is called a parasite.
Example – Cuscuta, Ascaris etc.

Question 3.5:

(a) What is the role of hydrochloric acid in our stomach?
(b) What is the function of enzymes in the human digestive system?

Solution :

i. Role of hydrochloric acid in human stomach:

- Makes acidic medium in the stomach.
- Helps in the digestion of food.
- Kills bacteria wenter the stomach with the food.

ii. Enzymes in the human digestive system function to breakdown the complex food material into simpler forms which can be easily absorbed in the bloodstream.

Question 3.6:

Describe the process of respiration in the following parts of a plant:
(a) Root (b) Stem (c) Leaves

Solution :

Respiration in different parts of the plant is as follows:

a. Roots:

- Roots of the plants respire by using oxygen from the air present between the soil particles.
- Intake of oxygen takes place by diffusion.
- Oxygen diffuses into root hairs, which are extensions of the epidermal hairs of the root.
- From the root hairs, it passes to the cells of the roots for respiration.
- The carbon dioxide produced as a result of respiration in the root cells is then passed to the root hairs and eventually diffused into the surrounding medium.

b. Stem:

- The stems of herbs have minute openings called stomata for the exchange of gases during respiration.
- The hard and woody stems of trees have minute openings called lenticels for the exchange of gases during respiration.
- The oxygen from the air diffuses into the stem of the plants through these openings and reaches the cells of the stem for respiration.
- Carbon dioxide produced as a result of respiration is then diffused back into the air through these openings.

c. Leaves:

- In leaves, exchange of respiratory gases takes place through a small opening called stomata, present on the surface of the leaves.
- During night time, in the absence of photosynthetic activity, oxygen enters through the stomata by diffusion and reaches the cells of the leaves.
- Carbon dioxide produced as a result of respiration is then diffused back through stomata into the air.

Question 4:

Answer the following questions in detail :

Question 4.1:

(a) Describe the process of nutrition in Amoeba. Draw labelled diagram to show various steps of the nutrition in Amoeba.
(b) What is the mode of nutrition in Amoeba known as?

Solution :

a. Amoeba is a unicellular organism. The process of nutrition in Amoeba can be described in the following steps.

- Ingestion:

Amoeba uses its entire body for obtaining food from the surrounding. It forms temporary finger-like projections called pseudopodia for ingestion of food. Pseudopodia surround the food particle and capture it along with lysosome into a bag like structure called food vacuole.

- Digestion:

Digestion of food in Amoeba is brought about by the digestive enzymes present in the food vacuole.

- Absorption

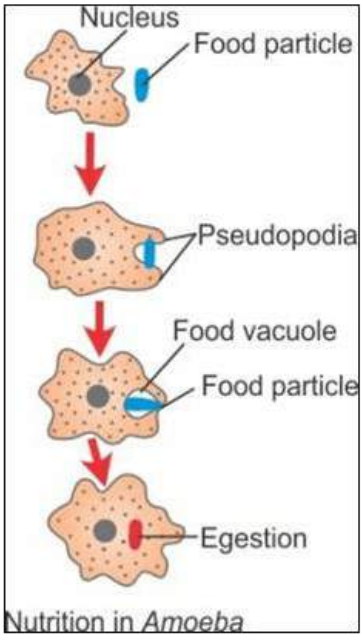
The digested food diffuses into the cytoplasm and gets absorbed.

- Assimilation:

The absorbed food is used by the cell for dual purposes. A part of the absorbed food helps in the growth of the cell and a part helps to obtain energy through respiration.

- Egestion:

Undigested food which remains in the food vacuole after absorption of digested food is thrown out of the cell body by rupturing the cell membrane.

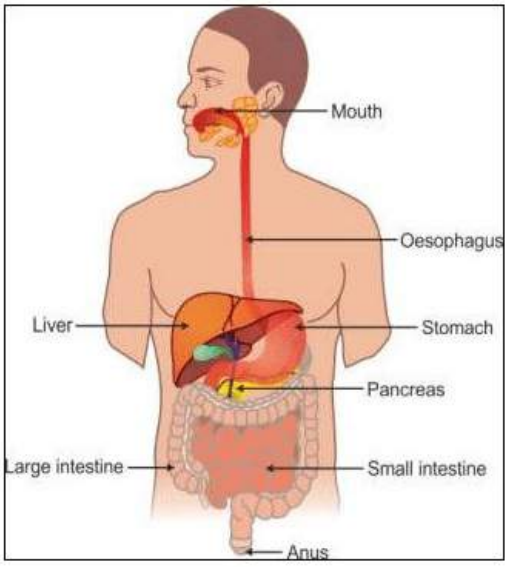


b. Amoeba shows holozoic mode of nutrition.

Question 4.2:

Draw a labelled diagram of the human digestive system. With the help of this diagram, describe the process of digestion of food in man (human).

Solution :



The human digestive system consists of the alimentary canal and its associated glands. The alimentary canal starts at the mouth and ends at the anus. Other organs of the alimentary canal are oesophagus, stomach, small intestine, and large intestine. The associated glands include salivary gland, liver and pancreas.

- Digestion of food starts in the mouth with the ingestion of food.
- Teeth present in the mouth help to cut and grind the food.
- Salivary glands secrete saliva in the mouth. Saliva contains amylase which breaks starch present in the food to maltose
- Tongue mixes the food evenly with the saliva and forms a soft mass of food.
- This soft mass of food is swallowed and reaches the stomach through the oesophagus.

- In the stomach, food is churned for almost three hours.
- Stomach contains dilute hydrochloric acid which helps in the digestion of food.
- Gastric juice, secreted by the glands present in the stomach also contains the enzyme pepsinogen which gets converted to pepsin in the acidic medium of the stomach.
- Pepsin helps in the digestion of proteins present in the food.
- The partly digested food then enters the small intestine.
- Small intestine receives secretions from the liver and the pancreas which help in complete digestion of food.
- Liver secretes bile, which is alkaline in nature and contains salts. It helps in the digestion of fats.
- Pancreas secretes pancreatic juice which contains the enzymes – amylase, trypsin and lipase. These enzymes help in the digestion of starch, proteins and fats respectively.
- Intestinal juice secreted by the walls of the small intestine contains various enzymes which help in the complete digestion of food.
- The digested food is absorbed into the blood stream from the small intestine. The inner walls of the small intestine contain finger-like projections called villi which help in the absorption of food.
- The undigested food is passed to the large intestine where it is stored till it is removed from the body through the anus.

Question 4.3:

(a) Give the main points of difference between respiration in plants and respiration in animals.
(b) Describe the exchange of gases which takes place in the leaves of a plant (i) during daytime, and (ii) at night.
(c) What type of respiration takes place (i) in yeast and (ii) in human being ?

Solution :

a.

Respiration in Plants	Respiration in Animals
Plants do not have a specialised respiratory tract for respiration.	Animals have a specialised respiratory tract for respiration.
Exchange of gases takes place through stomata, lenticels or root hairs.	Exchange of gases takes place in the alveoli.
Respiration in plants is a simple process.	Respiration in animals is a complex process.

b. Leaves contain a small pore like opening called stomata. Exchange of gases in the leaves takes place through the stomata.

1. During daytime, photosynthesis occurs in plants. Thus, during daytime, carbon dioxide diffuses in and oxygen diffuses out through the stomata.
2. At night, no photosynthesis occurs in plants. Thus, at night, carbon dioxide diffuses out and oxygen diffuses in through the stomata.

c. In yeast, anaerobic respiration takes place.

1. In human beings, aerobic respiration takes place.