

(Q & A) Life Processes

Q - 1. What are enzymes? Name any one enzyme of our digestive system and write its function.

Answer. Enzymes are biological catalysts. Catalysts are proteins that increase the rate of chemical reactions without being used up. For example: Amylase catalyses the breakdown of starch into sugars in the mouth and small intestine

Q - 2. Name the acid presents in the following:

(i) Tomato (ii) Vinegar (iii) Tamarind

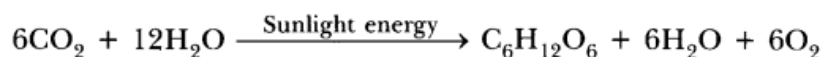
Answer.

(i) Oxalic acid (ii) citric acid (iii) Tartaric acid.

**Q - 3. (i) Write the balanced chemical equation for the process of photosynthesis,
(ii) When do the desert plants take up carbon dioxide and perform photosynthesis ?**

Answer.

(i) Photosynthesis can be represented using a chemical equation. The overall balanced equation is



(ii) Desert plants open up their stomata during night and take in CO_2 . Stomata remains close during the day time to prevent the loss of water by i transpiration. They store the CO_2 in their cells until the sun comes out and they can carry on with photosynthesis during the day time.

Q - 4. List in tabular form three differences between arteries and veins.

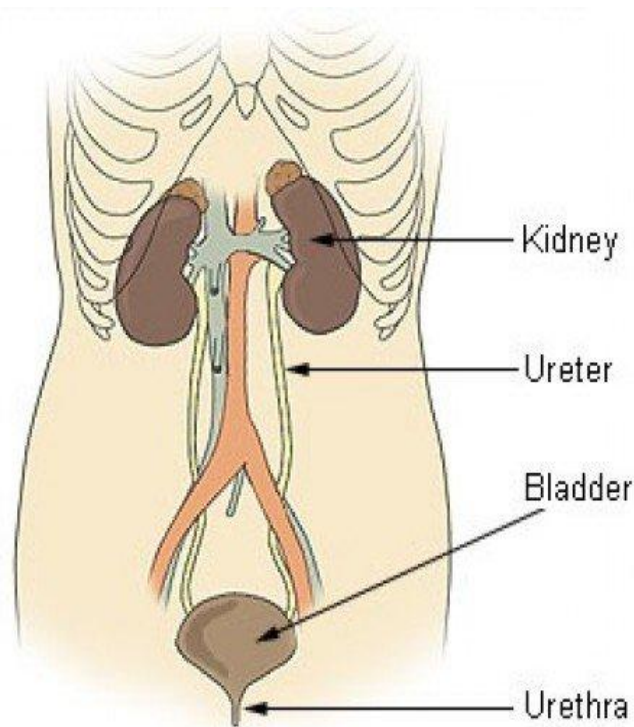
Answer.

Arteries	Veins
(i) Arteries carry oxygenated blood, away from the heart except pulmonary artery.	(i) Veins carry deoxygenated blood, towards the heart except pulmonary veins.
(ii) These are mostly deeply situated in the body.	(ii) These are superficial and deep in location.
(iii) These are thick-walled, highly muscular except arteries of cranium and vertebral column.	(iii) These are thin-walled.

Q - 5. (a) Draw a diagram of excretory system in human beings and label the following parts. Aorta, kidney, urinary bladder and urethra.

(b) How is urine produced and eliminated?

Answer - (a)



1. **Renal artery:** The renal artery carries blood to the kidneys from the abdominal aorta. This blood comes directly from the heart and is sent to the kidneys to be filtered before it passes through the rest of the body. Up to one-third of the total cardiac output per heartbeat is sent to the renal arteries to be filtered by the kidneys. Each kidney has one renal artery that supplies it with blood. The filtered blood then can exit the renal vein.
2. **Kidney:** The kidneys perform the essential function of removing waste products from the blood and regulating the water fluid levels. The kidneys regulate the body's fluid volume, mineral composition and acidity by excreting and reabsorbing water and inorganic electrolytes.
3. **Ureter:** The ureter is a tube that carries urine from the kidney to the urinary bladder. There are two ureters, one attached to each kidney.
4. **Urinary bladder:** The urinary bladder is an expandable muscular sac that stores urine before it is excreted out of the body through the urethra.

Answer – (b)

Blood from the heart comes into the kidneys afferent and efferent arterioles from the renal arteries where it enters about 2-3 million nephrons per kidney. Then, it goes through the glomerulus a tuft or bunch of blood capillaries and get rid of some of the unwanted substances like urea, uric acid, creatinine in the blood and then continues through the renal tubules. The loop of Henley, reabsorb certain substances such as water (actually if body is dehydrated, body will send anti-diuretic hormone (ADH) to kidneys to prevent extra water from going into urine and thus saving water for body and get rid of anything else that isn't wanted, then the urine goes through ureters to bladder and then to urethra where it is excreted out of body as urine.

Q - 6 . In mammals and birds why is it necessary to separate oxygenated and de-oxygenated blood ?

Answer. Mammals and birds are warm blooded animals. This means they can control their body temperature and do not have to depend on environment for their body temperature regulation. Because of this birds and mammals require optimum oxidization of glucose which would be possible with good supply of oxygen. So it is required to have separate oxygenated and de-oxygenated blood to supply the required amount of oxygen.

Q - 7. (a) What is the role of HCl in our stomach ?

(b) What is emulsification of fats ?

(c) Which protein digesting enzyme is present in pancreatic juice ?

Answer.

(a)(i) It sterilises food by killing pathogens and other microbes.

(ii) It has a pH of 2, which is perfect for enzymes such as pepsin to break down proteins as effectively as possible.

(iii) Helps emulsify food (digestion of protein and stimulates the pancreas to produce digestive enzymes and bile) and protects against harmful ' bacteria

(b) Breakdown of large globule fats into smaller fats droplets is known as emulsification.

(c) Trypsin is the enzyme secreted by the pancreas which aids in digestion of proteins.

Q - 8. In human alimentary canal, name the site of complete digestion of various components of food. Explain the process of digestion.

Answer.

In small intestine, complete digestion of various components of food take place. The process of digestion of food in mouth, stomach and small intestine in human body are as follows:

Mouth: Digestion of food begins in the mouth. Saliva present in mouth contains a digestive enzyme, called salivary amylase, maltose and dextrins, which breaks down starch into sugar.

Stomach: Stomach stores and mixes the food received from the oesophagus with gastric juices. The main components of gastric juice are hydrochloric acid, mucus and pepsinogen. Hydrochloric acid dissolves bits of food and creates an acidic medium. In this medium, pepsinogen is converted to pepsin which is a protein-digesting enzyme. Mucus protects the inner lining of the stomach from the action of HCl.

Small Intestine: Small intestine is the site of complete digestion of carbohydrates, proteins and fats. Small intestine produces intestinal juice from the glands present in its wall. The intestinal juice helps in further digestion of food. Small intestine also obtains digestive juices from liver and pancreas. The liver produces bile juice that causes emulsification of fats and the pancreas produces pancreatic juice for digesting proteins and emulsified fats. This digested food is finally absorbed through the intestinal walls.

Q - 9.

(a) Draw a diagram to show open stomatal pore and label on it:

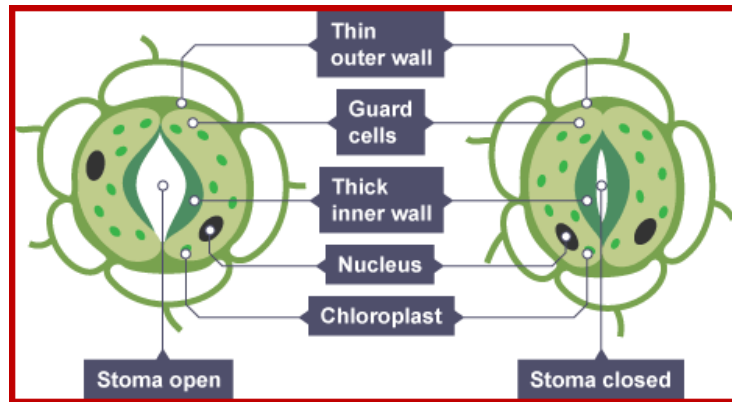
(i) guard cells

(ii) chloroplast

(b) State two functions of stomata.

(c) How do guard cells regulate the opening and closing of stomatal pore?

Answer.(a)



Answer. (b)

Two functions of stomata are:

- (i) Exchange of gases between the plant and the atmosphere takes place through stomata.
- (ii) Transpiration in plants takes place through stomata.

Answer. (c)

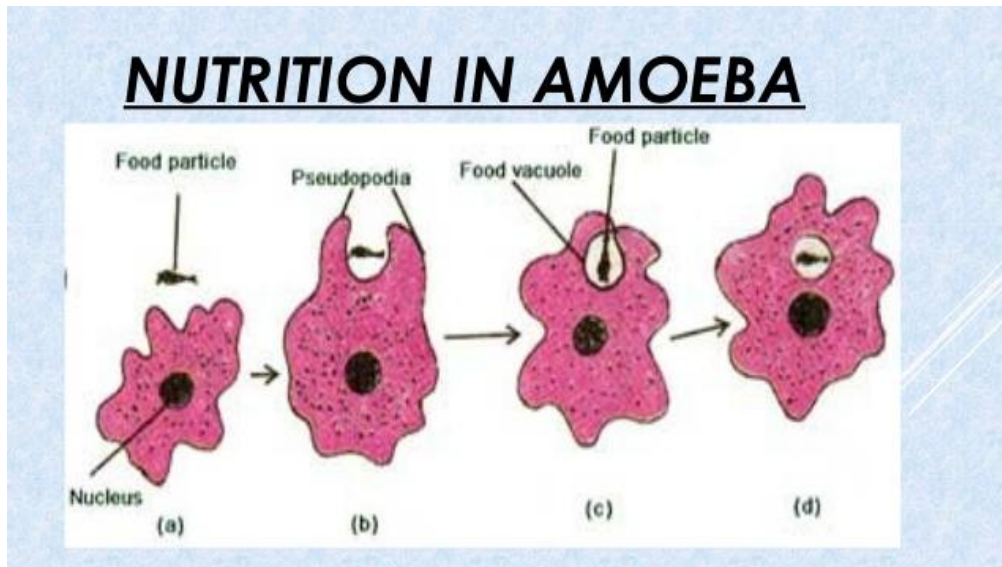
Opening and Closing of Stomatal Pore: The opening and closing of the pore is a function of the guard cells. The guard cells swell when water flows into them causing the stomatal pore to open. Similarly, the pore closes if the guard cells shrink. As large amount of water is lost through these stomata, the plant closes these pores when it does not require carbon dioxide for photosynthesis.

Q – 10. What is saliva? State its role in the digestion of food.

Answer. Saliva is a watery fluid secreted by the salivary glands in the mouth. The digestive functions of saliva include moistening food, and helping to create a food bolus, so it can be swallowed easily. Saliva contains the enzyme amylase that breaks some starches down into maltose and dextrin.

Q – 11. Explain the process of nutrition in Amoeba.

Answer. Amoeba is an important protozoa found in fresh water. It feeds on microscopic plants and animals present in water. The mode of nutrition in amoeba is Holozoic. And the process of obtaining food by amoeba is called phagocytosis. The different processes involved in the nutrition of amoeba are:



1. **Ingestion:** Ingestion is the process of taking food in the body. Amoeba is a unicellular animal, so it doesn't have a mouth for ingestion of food. Amoeba ingests the food by encircling it by forming pseudopodia. When the food is completely encircled, the food is engulfed in the form of a bag called food vacuole.
2. **Digestion:** Digestion is the process of breaking the large and insoluble molecules in small and water soluble molecules. In amoeba, several digestive enzymes react on the food present in the food vacuoles and break it down into simple and soluble molecules.
3. **Absorption:** The food digested by digestive enzymes is then absorbed in the cytoplasm by the process of diffusion. While the undigested food remains in the food vacuole. If a large amount of food is absorbed by amoeba, the excess food is stored in the cytoplasm in the form of glycogen and lipids.
4. **Assimilation:** During this step the food absorbed by the cytoplasm is used to obtain energy, growth and repair. This process of utilizing absorbed food for obtaining energy, repair and growth is called assimilation.
5. **Egestion:** When a sufficient amount of undigested food gets collected in the food vacuole, it is thrown out of the body by rupturing cell membrane. The process of removal of undigested food from the body is called egestion.

Q – 12. State any two differences between autotrophic nutrition and heterotrophic nutrition.

Answer.

Autotrophic nutrition	Heterotrophic nutrition
(i) In this nutrition, the organisms make their food from carbon dioxide and water in the presence of sunlight and chlorophyll.	(i) In this nutrition, the organisms derive their food or nutrients from other living organisms.
(ii) All green plants are autotrophic and use light as a source of energy for photosynthesis.	(ii) The energy is derived from the intake and digestion of the organic substances.

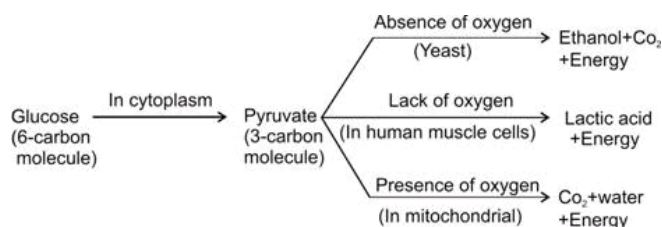
Q – 13. State the basic difference between the process of respiration and photosynthesis.

Answer.

Respiration	Photosynthesis
(i) It takes place in all living cells.	(i) Takes place only in green plant cells.
(ii) Respiration uses O_2 and releases CO_2 .	(ii) In photosynthesis, CO_2 is used and O_2 is released.

Q – 14. Explain the process of breakdown of glucose in a cell (ii) in the absence of oxygen.

Answer. The process of breakdown of glucose in a cell are as follows:



(Break down of glucose by various pathways)

The first step in the breakdown of glucose both in presence of O_2 and in absence of O_2 is same. In this step, glucose is broken down into pyruvate.

Second step which involves further breakdown of pyruvate into simple compounds can take place in two different ways:

(i) In presence of O_2 : In the presence of O_2 , pyruvate is converted into CO_2 and water. Energy released during aerobic respiration is much greater than that released during an anaerobic respiration.

(ii) In absence of O_2 : In the absence of O_2 in yeast, pyruvate is converted into ethanol and CO_2 and the process is called fermentation. In absence of O_2 , in our muscle cells, pyruvate is converted into lactic acid. The buildup of lactic acid in muscle cells causes cramps.

Q – 15 Name the acid presents in the following:

(i) Tomato (ii) Vinegar (iii) Tamarind

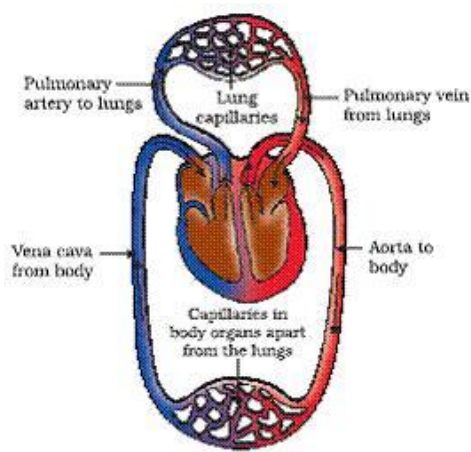
Answer.

(i) Oxalic acid (ii) citric acid (iii) Tartaric acid.

Q - 16 (a) Draw a schematic representation of transport and exchange of oxygen and carbon dioxide during transportation of blood in human beings and label on it: Lung capillaries, Pulmonary artery to lungs, Aorta to body, Pulmonary veins from lungs.

(b) What is the advantage of separate channels in mammals and birds for oxygenated and deoxygenated blood?

Answer.(a) A schematic representation of transportation and exchange of oxygen and carbon dioxide during transportation of blood in human beings



Schematic representation of transport and exchange of oxygen and carbon dioxide

Answer - (b) It is necessary to separate oxygenated and deoxygenated blood in mammals and birds because they need high energy and large amount of oxygen. The separation of oxygenated and deoxygenated blood provides high oxygen supply to the organs.

Q -17. State the functions of the following components of transport system:

(i) Blood (ii) Lymph

Answer.

(i) Blood

- Oxygen is transported by the blood to the tissues of the body for the breakdown of digested food.
- Carbon dioxide is transported to the lungs by the blood plasma.
- The digested and absorbed nutrients are transported by blood to the tissues. Nitrogenous wastes are transported to the kidneys.

- It regulates the body temperature and maintains the pH of the body tissues.
- It transports various hormones from one region to another and bring about the coordination.
- It maintains water balance to constant level.
- The lymphocytes produce antibodies against the invading antigens and protect from diseases.
- It helps in rapid healing of wounds by forming a clot at the site of injury.

(ii) Lymph

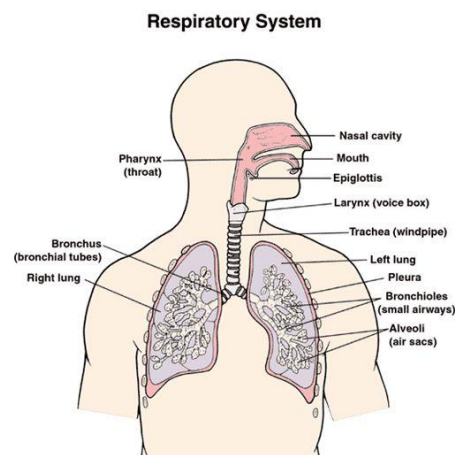
- It cleans the cellular environment.
- It returns proteins and tissue fluids to the blood (drainage)
- It provides a pathway for the absorption of fats and fat-soluble vitamins into the bloodstream.
- It defends the body against disease.

Q – 18. (a) Draw a labeled diagram of the respiratory system of human beings with diaphragm at the end of expiration.

(b) List four conditions required for efficient gas exchange in an organism.

Answer - (a)

Human Respiratory System



Our own pathway, in order:

Mouth/Nasal Cavity

Pharynx

Larynx

Trachea

Bronchi

Bronchioles

Alveoli (tiny air sacs)

Answer - (b) (i) A large surface area over which exchange can take place.

(ii) A concentration gradient without which nothing will diffuse.

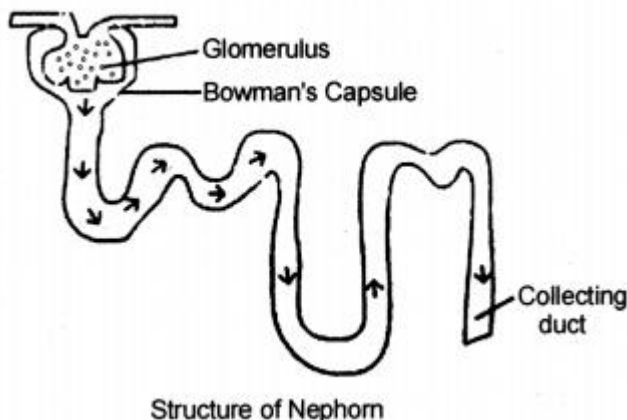
(iii) A thin surface across which gases diffuse.

(iv) Warm conditions.

Q - 19. (a) Draw the structure of a nephron and label the following on it: Glomerulus, Bowman's capsule, Renal artery, Collecting duct.

(b) What happens to glucose that enters the nephron along with filtrate?

Answer - (a)



Answer - (b) During excretion in human beings, glucose which enters the nephron along with filtrate gets reabsorbed by blood capillaries surrounding the nephron.

Q - 20. Describe an experiment to show that "sunlight is essential for photosynthesis."

Answer.

Procedure:

- (i) Place a healthy green potted plant in a dark room for 1-2 days. This is done to ensure that the plant consumes all its reserve food and the leaves do not contain any starch.
- (ii) Then, cover a portion of a leaf of this plant on both sides with two uniform pieces of black paper, fixed in position with two paper clips.
- (iii) Now, expose this plant to bright light. After a few hours, remove the leaf and decolorize it with alcohol and test the presence of food (starch) with iodine solution.

Observation: It can be observed that the portion of the leaf covered with black paper does not (food),

Conclusion: This is because the food prepared by plants through the process of photosynthesis is stored as starch. Starch reacts with the iodine solution to give blue-black colour. Only those portions of the leaf that were exposed to sunlight could photosynthesize. Hence, gives blue-black colour when tested with iodine. The portion of the leaf covered with black paper did not receive sunlight. Hence, starch was not produced. Thus, it can be concluded that the sunlight is essential for photosynthesis.

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Best of Luck