



# Life Processes Exemplar Solutions

## Multiple Choice Questions

1. Which of the following statements about the autotrophs is incorrect?

- (a) They synthesise carbohydrates from carbon dioxide and water in the presence of sunlight and chlorophyll
- (b) They store carbohydrates in the form of starch
- (c) They convert carbon dioxide and water into carbohydrates in the absence of sunlight
- (d) They constitute the first trophic level in food chains

- **Soln:** They convert carbon dioxide and water into carbohydrates in the absence of sunlight
- **Explanation:** They need sunlight to convert carbon dioxide and water into carbohydrates.

2. In which of the following groups of organisms, food material is broken down outside the body and absorbed?

- (a) Mushroom, green plants, Amoeba
- (b) Yeast, mushroom, bread mould
- (c) Paramecium, Amoeba, Cuscuta
- (d) Cuscuta, lice, tapeworm

- **Soln:** Answer is (b) Yeast, mushroom, bread mould
- **Explanation:** Yeast, mushroom and bread moulds are saprophytes and Saprophytes break the food material outside their body and absorb it.

3. Select the correct statement

- (a) Heterotrophs do not synthesise their own food
- (b) Heterotrophs utilise solar energy for photosynthesis
- (c) Heterotrophs synthesise their own food
- (d) Heterotrophs are capable of converting carbon dioxide and water into carbohydrates

- **Soln:** The answer is (a) Heterotrophs do not synthesise their own food
- **Explanation:** Heterotrophs are either dependent on phototrophs or other organisms for their food.

4. Which is the correct sequence of parts in the human alimentary canal?

- (a) Mouth → stomach → small intestine → oesophagus → large intestine
- (b) Mouth → oesophagus → stomach → large intestine → small intestine
- (c) Mouth → stomach → oesophagus → small intestine → large intestine
- (d) Mouth → oesophagus → stomach → small intestine → large intestine

**Soln:** Answer is (d) Mouth → oesophagus → stomach → small intestine → large intestine



**5. If salivary amylase is lacking in the saliva, which of the following events in the mouth cavity will be affected?**

- (a) Proteins breaking down into amino acids**
- (b) Starch breaking down into sugars**
- (c) Fats breaking down into fatty acids and glycerol**
- (d) Absorption of vitamins**

- Soln: The answer is (b) Starch breaking down into sugars
- Explanation: The salivary amylase enzyme present in the saliva breaks down Starch into simpler sugar and helps in digesting it. Hence the breakdown of starch will be affected if salivary amylase is lacking in the saliva.

**6. The inner lining of the stomach is protected by one of the following from hydrochloric acid. Choose the correct one**

- (a) Pepsin**
- (b) Mucus**
- (c) Salivary amylase**
- (d) Bile**

- Soln: Answer is (b) Mucus

**7. Which part of the alimentary canal receives bile from the liver?**

- (a) Stomach**
- (b) Small intestine**
- (c) Large intestine**
- (d) Oesophagus**

- Soln: The answer is (b) Small intestine
- Explanation: Bile goes to the small intestine from the gall bladder through the hepta pancreatic duct.

**8. A few drops of iodine solution were added to rice water. The solution turned blue-black in colour. This indicates that rice water contains**

- (a) complex proteins**
- (b) simple proteins**
- (c) fats**
- (d) starch**

- Soln: The answer is (d) starch
- Explanation Starch is made up of two components Amylose and Amylo pectin. When we add iodine to starch-containing water Amylose reacts with iodine to form a blue colour complex. Here solution gives a blue-black colour by adding Iodine which confirms the presence of starch in the rice water.

**9. In which part of the alimentary canal food is finally digested?**

- (a) Stomach**
- (b) Mouth cavity**
- (c) Large intestine**
- (d) Small intestine**

- Soln: Answer is (d) Small intestine
- Explanation: Although the primary digestion process is conducted in the mouth and stomach most of the digestion process occurs in the small intestine and in the large intestine digestion process will not take place.





10. Choose the function of the pancreatic juice from the following

- (a) trypsin digests proteins and lipase carbohydrates
- (b) trypsin digests emulsified fats and lipase proteins
- (c) trypsin and lipase digest fats
- (d) trypsin digests proteins and lipase-emulsified fats

- Soln: Answer is (d) trypsin digests proteins and lipase-emulsified fats
- Explanation: Trypsin breaks down proteins into polypeptides and Lipase digest emulsified fat molecules into fatty acids and glycerol.

11. When air is blown from the mouth into a test tube containing lime water, the lime water turns milky due to the presence of

- (a) oxygen
- (b) carbon dioxide
- (c) nitrogen
- (d) water vapour

- Soln: The answer is (b) carbon dioxide
- Explanation: Carbon dioxide reacts with lime water to convert it to milky.

12. The correct sequence of anaerobic reactions in yeast is

- (a) Glucose  $\xrightarrow{\text{Cytoplasm}}$  Pyruvate  $\xrightarrow{\text{Mitochondria}}$  Ethanol + Carbon dioxide
- (b) Glucose  $\xrightarrow{\text{Cytoplasm}}$  Pyruvate  $\xrightarrow{\text{Cytoplasm}}$  Lactic acid
- (c) Glucose  $\xrightarrow{\text{Cytoplasm}}$  Pyruvate  $\xrightarrow{\text{Mitochondria}}$  Lactic acid
- (d) Glucose  $\xrightarrow{\text{Cytoplasm}}$  Pyruvate  $\xrightarrow{\text{Cytoplasm}}$  Ethanol + Carbon dioxide

**Soln:** Answer is d) Glucose Cytoplasm Pyruvate Cytoplasm Ethanol+ Carbon dioxide

**Explanation:**

In yeast cytoplasm glucose is broken down in anaerobic conditions to produce Pyruvate which is further broken down into Ethanol and carbon dioxide.

13. Which of the following is most appropriate for aerobic respiration?

- (a) Glucose  $\xrightarrow{\text{Mitochondria}}$  Pyruvate  $\xrightarrow{\text{Cytoplasm}}$  CO<sub>2</sub>+H<sub>2</sub>O+ Energy
- (b) Glucose  $\xrightarrow{\text{Cytoplasm}}$  Pyruvate  $\xrightarrow{\text{Mitochondria}}$  CO<sub>2</sub>+H<sub>2</sub>O+ Energy
- (c) Glucose  $\xrightarrow{\text{Cytoplasm}}$  Pyruvate + Energy  $\xrightarrow{\text{Mitochondria}}$  CO<sub>2</sub>+H<sub>2</sub>O
- (d) Glucose  $\xrightarrow{\text{Cytoplasm}}$  Pyruvate+ Energy  $\xrightarrow{\text{Mitochondria}}$  CO<sub>2</sub>+H<sub>2</sub>O+ Energy

- **Soln:** Answer is d) Glucose Cytoplasm Pyruvate+Energy Mitochondria CO<sub>2</sub>+H<sub>2</sub>O+ Energy
- **Explanation:** In aerobic respiration breakdown of pyruvate takes place in mitochondria. CO<sub>2</sub>, H<sub>2</sub>O and energy are released in the reaction.



**14. Which of the following statement(s) is (are) true about respiration?**

- (i) During inhalation, ribs move inward and the diaphragm is raised**
- (ii) In the alveoli, an exchange of gases takes place i.e., oxygen from alveolar air diffuses into the blood and carbon dioxide from the blood into the alveolar air**
- (iii) Haemoglobin has a greater affinity for carbon dioxide than oxygen**
- (iv) Alveoli increase surface area for exchange of gases**

- (a) (i) and (iv)**
- (b) (ii) and (iii)**
- (c) (i) and (iii)**
- (d) (ii) and (iv)**

- Soln: Answer is (d) (ii) and (iv)
- Explanation: Statement i) is wrong because ribs move outward and the diaphragm is lowered during inhalation. Similarly Option iii) is wrong because Hemoglobin has a greater affinity for Oxygen than CO<sub>2</sub>.

**15. Which is the correct sequence of air passage during inhalation?**

- (a) Nostrils → larynx → pharynx → trachea → lungs**
- (b) Nasal passage → trachea → pharynx → larynx → alveoli**
- (c) larynx → nostrils → pharynx → lungs**
- (d) Nostrils → pharynx → larynx → trachea → alveoli**

- Soln: Answer is (d) Nostrils → pharynx → larynx → trachea → alveoli
- Explanation: Air enters the respiratory system through nostrils, passes to the pharynx, larynx, trachea and then to alveoli. After inhalation diaphragm and intercostal muscles contract along with the expansion of thoracic muscles which creates enough space for the air to enter into the lungs.

**16. During respiration exchange of gases takes place in**

- (a) trachea and larynx**
- (b) alveoli of lungs**
- (c) alveoli and throat**
- (d) throat and larynx**

- Soln: Answer is (b) alveoli of lungs
- Explanation: Trachea and larynx provide a passage for the movement of air. Gas exchange takes place in the alveoli of the lungs. From alveoli oxygen diffuses into blood and Carbon dioxide is exhaled out of blood.

**17. Which of the following statement (s) is (are) true about the heart?**

- (i) Left atrium receives oxygenated blood from different parts of the body while the right atrium receives deoxygenated blood from the lungs**
- (ii) The left ventricle pumps oxygenated blood to different body parts while the right ventricle pumps deoxygenated blood to the lungs**
- (iii) Left atrium transfers oxygenated blood to the right ventricle which sends it to different body parts**
- (iv) Right atrium receives deoxygenated blood from different parts of the body while the left ventricle pumps oxygenated blood to different parts of the body**

- (a) (i)**
- (b) (ii)**
- (c) (ii) and (iv)**
- (d) (i) and (iii)**

- Soln: Answer is (c) (ii) and (iv)
- Explanation: Oxygenated blood circulates through the left part of the heart whereas deoxygenated blood circulates through the right part of the heart. The atrium receives blood and the ventricle pumps the blood out of the heart.





**18. What prevents the backflow of blood inside the heart during contraction?**

- (a) Valves in the heart**
- (b) Thick muscular walls of ventricles**
- (c) Thin walls of atria**
- (d) All of the above**

- Soln: The answer is (a) Valves in the heart
- Explanation:
- Walls in the heart are responsible for only pumping the blood and they are not responsible for blocking backflow of blood inside the heart during contraction.

**19. Single circulation i.e., blood flows through the heart only once during one cycle of passage through the body, is exhibited by**

- (a) Labeo, Chameleon, Salamander**
- (b) Hippocampus, Exocoetus, Anabas**
- (c) Hyla, Rana, Draco**
- (d) Whale, Dolphin, Turtle**

- Soln: Answer is (b) Hippocampus, Exocoetus, Anabas
- Explanation: In Option a) Chameleon is a reptile and Salamander is an amphibian which has 3 chambered hearts and shows partial double circulation. In Option c) all are Amphibians and they show partial double circulation. In option d) the Whale is a mammal but the turtle is a reptile hence option d) is wrong.

**20. In which of the following vertebrate groups/groups, the heart does not pump oxygenated blood to different parts of the body?**

- (a) Pisces and amphibians**
- (b) Amphibians and reptiles**
- (c) Amphibians only**
- (d) Pisces only**

- Soln: Answer is (d) Pisces only
- Explanation: This is because of single circulation where deoxygenated blood from all parts of the body is pumped into the heart. From the heart, it is pumped to the gills where it gets oxygenated and gets transferred to all parts of the body. Hence it proves Pisces will not receive oxygenated blood.

**21. Choose the correct statement that describes arteries.**

- (a) They have thick elastic walls, blood flows under high pressure; collect blood from different organs and bring it back to the heart**
- (b) They have thin walls with valves inside, blood flows under low pressure and carries blood away from the heart to various organs of the body**
- (c) They have thick elastic walls, blood flows under low pressure, and carry blood from the heart to various organs of the body**
- (d) They have thick elastic walls without valves inside, blood flows under high pressure and carries blood away from the heart to different parts of the body.**

- Soln: Answer is (d) They have thick elastic walls without valves inside, blood flows under high pressure and carries blood away from the heart to different parts of the body.



**22. The filtration units of kidneys are called**

- (a) ureter
- (b) urethra
- (c) neurons
- (d) nephrons

- Soln: The answer is (d) nephrons
- Explanation: Nephron is called as the functional unit of kidney. It helps in removing waste products and excess substances from our bodies.

**23. Oxygen liberated during photosynthesis comes from**

- (a) water
- (b) chlorophyll
- (c) carbon dioxide
- (d) glucose

- Soln: The answer is (a) water
- Explanation: During photosynthesis, water molecule splits to produce Oxygen and Hydrogen Ions. Oxygen is expelled out of plants and Hydrogen is used to reduce Carbon dioxide to produce carbohydrates.

**24. The blood leaving the tissues becomes richer in**

- (a) carbon dioxide
- (b) water
- (c) haemoglobin
- (d) oxygen

- Soln: The answer is (a) carbon dioxide
- Explanation: Because of respiration carbon dioxide gets accumulated in tissues. Hence blood leaving the tissues becomes richer in carbon dioxide.

**25. Which of the following is an incorrect statement?**

- (a) Organisms grow with time
- (b) Organisms must repair and maintain their structure
- (c) Movement of molecules does not take place among cells
- (d) Energy is essential for life processes

- Soln: Answer is (c) Movement of molecules does not take place among cells
- Explanation: The movement of molecules is a vital process. The movement of molecules in cells takes place in active and passive modes such as Diffusion, osmosis, facilitated diffusion etc.

**26. The internal (cellular) energy reserve in autotrophs is**

- (a) glycogen
- (b) protein
- (c) starch
- (d) fatty acid

- Soln: The answer is (c) starch
- Explanation: Glycogen is the stored energy in animals, Plants store energy in the form of Starch.





**28. Choose the event that does not occur in photosynthesis**

- (a) Absorption of light energy by chlorophyll
- (b) Reduction of carbon dioxide to carbohydrates
- (c) Oxidation of carbon to carbon dioxide
- (d) Conversion of light energy to chemical energy

- Soln: Answer is (c) Oxidation of carbon to carbon dioxide

**29. The opening and closing of the stomatal pore depends upon**

- (a) oxygen
- (b) temperature
- (c) water in guard cells
- (d) concentration of CO<sub>2</sub> in stomata

- Soln: The answer is (c) water in guard cells
- Explanation: The opening of guard cells is facilitated by the entry of water inside guard cells. This makes the guard cell become turgid. Closing of guard cells is facilitated by water coming out of guard cells. This will make the guard cells flaccid.

**30. Choose the forms in which most plants absorb nitrogen**

- (i) Proteins
- (ii) Nitrates and Nitrites
- (iii) Urea
- (iv) Atmospheric nitrogen

- (a) (i) and (ii)
- (b) (ii) and (iii)
- (c) (iii) and (iv)
- (d) (i) and (iv)

- Soln: Answer is (b) (ii) and (iii)
- Explanation: Plants cannot absorb atmospheric nitrogen. They can absorb the nitrogen in the form of nitrates, nitrites and urea present in the soil.

**31. Which is the first enzyme to mix with food in the digestive tract?**

- (a) Pepsin (b) Cellulase
- (c) Amylase (d) Trypsin

- Soln: The answer is (c) Amylase
- Explanation: Amylase is secreted in the mouth and acts on the starch to convert into simpler molecules. Hence amylase is the first enzyme to mix with food in the digestive tract.

**32. Which of the following statement(s) is (are) correct?**

- (i) Pyruvate can be converted into ethanol and carbon dioxide by yeast
- (ii) Fermentation takes place in aerobic bacteria
- (iii) Fermentation takes place in mitochondria
- (iv) Fermentation is a form of anaerobic respiration

- (a) (i) and (iii)
- (b) (ii) and (iv)
- (c) (i) and (iv)
- (d) (ii) and (iii)

- Soln: Answer is (c) (i) and (iv)
- Explanation: Fermentation is carried out by anaerobes in the cytoplasm. Hence options (ii) and (iii) are wrong.



**34. Choose the correct path of urine in our body**

- (a) kidney → ureter → urethra → urinary bladder**
- (b) kidney → urinary bladder → urethra → ureter**
- (c) kidney → ureters → urinary bladder → urethra**
- (d) urinary bladder → kidney → ureter → urethra**

- Soln: Answer is (c) kidney → ureters → urinary bladder → urethra
- Explanation: Urine from the nephron is brought to the collecting duct of the kidneys where the urine enters the ureters. There are 2 ureters, each opening from one kidney into the urinary bladder. The urinary bladder stores urine and its size increases as the amount of urine collected increases. When the CNS gives a voluntary message the muscles of the bladder contract and the bladder sphincter relaxes thus excreting urine out through the urethra.

**35. During deficiency of oxygen in tissues of human beings, pyruvic acid is converted into lactic acid in the**

- (a) cytoplasm**
- (b) chloroplast**
- (c) mitochondria**
- (d) Golgi body**

- Soln: The answer is (a) cytoplasm
- Explanation: When there is a lack of oxygen breakdown of pyruvate takes place in the cytoplasm of muscle cells leading to the formation of lactic acid.

## Short Answer Questions

**36. Name the following**

- (a) The process in plants that links light energy with chemical energy**
- (b) Organisms that can prepare their own food**
- (c) The cell organelle where photosynthesis occurs**
- (d) Cells that surround a stomatal pore**
- (e) Organisms that cannot prepare their own food**
- (f) An enzyme secreted from gastric glands in the stomach that acts on proteins.**

**Soln:**

- a) Photosynthesis   b) Autotrophs   c) Chloroplasts
- d) Guard cells   e) Heterotrophs   f) Pepsin

**37. "All plants give out oxygen during the day and carbon dioxide during the night". Do you agree with this statement? Give reason.**

**Soln:**

The statement is wrong because plants respire every time and expel carbon dioxide every time but they give out oxygen only in the daytime as the photosynthesis process can take place only in the presence of sunlight.





**38. How do the guard cells regulate the opening and closing of stomatal pores?**

**Soln:**

- Opening of guard cells is facilitated by the entry of water inside guard cells.
- This makes the guard cell turgid.
- Closing of guard cells is facilitated by water coming out of guard cells. This will make the guard cells flaccid.
- Entry of water inside guard cells will make the cell turgid leading to the opening of stomata.
- Similarly, cells become flaccid when water comes out of guard cells, this leads to the closing of the stomata.

**39. Two green plants are kept separately in oxygen-free containers, one in the dark and the other in continuous light. Which one will live longer? Give reasons.**

**Soln:** Plants kept in continuous light live longer because plants release CO<sub>2</sub> during respiration. In the case of plants kept in the dark CO<sub>2</sub> results in a lack of oxygen and the plant will die earlier.

**40. If a plant is releasing carbon dioxide and taking in oxygen during the day, does it mean that there is no photosynthesis occurring? Justify your answer.**

**Soln:** If a plant is releasing carbon dioxide and taking in oxygen during the day means the plant is respiring; it does not mean that there is no photosynthesis occurring in the plant. This is because Photosynthesis and respiration are two independent processes.

**41. Why do fishes die when taken out of water?**

**Soln:** Fishes can respire only by using dissolved oxygen. When we take fish out of water it cannot respire due to lack of dissolved oxygen and they die.

**42. Differentiate between an autotroph and a heterotroph**

**Soln:**

AUTOTROPHS	HETEROTROPHS
They can make their own food	They cannot make their own food
Ex: Plants and certain bacteria	Ex: Animals, Fungi and protozoans



**43. Is 'nutrition' a necessity for an organism? Discuss.**

**Soln:** Nutrition is an absolute necessity for organisms because nutrition provides energy for carrying out metabolic activities.

**44. How does aerobic respiration differ from anaerobic respiration?**

**Soln:**

Aerobic Respiration	Anaerobic respiration
Takes place in the presence of Oxygen	Takes place in the absence of Oxygen
Carbon dioxide and water are the end products	CO <sub>2</sub> and lactic acid/ethanol are the end products
More efficient in energy production	Less efficient in energy production
Takes Place in animals and plants	Takes place in unicellular organisms

**45. Leaves of a healthy potted plant were coated with Vaseline. Will this plant remain healthy for long? Give reasons for your answer.**

**Soln:** Coating Vaseline to the leaves of a healthy plant will clog its stomata pores and stop the respiration of plants and the plants die.

**46. What would happen if green plants disappeared from the earth?**

**Soln:** Green plants are the sources of energy for all the heterotrophs on Earth. Plants convert solar and chemical energy into viable food sources. If plants disappear from the earth it leads to an imbalance in the ecosystem and heterotrophs may die without food.

**47. Match the words of Column (A) with that of Column (B)**

**Soln:**

Column A	Column B
Phloem	(i) Excretion
Nephron	(ii) Translocation of food
Veins	(iii) Clotting of blood
Platelets	(iv) Deoxygenated blood

Column A	Column B
Phloem	(ii) Translocation of food
Nephron	(i) Excretion
Veins	(iv) Deoxygenated blood
Platelets	(iii) Clotting of blood

**48. What is the significance of the emulsification of fats?**

**Soln:** Emulsification is a process of breakage of larger fat molecules into digestible fat globules. Emulsification aids the action of enzymes on fats by breaking larger fat molecules.





**49. Differentiate between an artery and a vein.**

**Soln:** Artery has thick walls whereas Veins have thin walls.

Arteries carry blood away from the heart but veins carry blood to the heart.

In arteries valves are absent and in veins they are present

In arteries, blood flows under pressure but in veins, there will be no pressure.

**50. What are the adaptations of leaves for photosynthesis?**

**Soln:** Adaptation of the leaf for photosynthesis are as follows

a) The Surface of the leaf is flat to allow greater exposure to light.

b) Presence of chlorophyll to trap sunlight

c) Presence of stomata on the lower surface for easy transpiration

**51. Why does absorption of digested food occur mainly in the small intestine?**

**Soln:** The small intestine has specialized structures that facilitate the absorption of digested food. The small intestine has several folds that increase the area of absorption. The small intestine also has fingerlike projections called microvilli which are richly supplied by blood vessels.

**52. Why is the small intestine in herbivores longer than in carnivores?**

**Soln:** Food of herbivores contains mostly cellulose. To digest cellulose herbivores need the help of certain bacteria. To accommodate the microbes and to facilitate digestion of food herbivores have longer small intestines than carnivores.

**53. What will happen if mucus is not secreted by the gastric glands?**

**Soln:** Mucus prevent the inner lining of the stomach from HCL. Mucus prevents drying of the inner lining of the stomach. The mucus helps in the easy movement of food particles through the digestive system. If the mucus is not secreted food will not easily be moved through the digestive system. HCL will damage the stomach lining and the digestion process will not take place.

**54. Why is the rate of breathing in aquatic organisms much faster than in terrestrial organisms?**

**Soln:** The rate of breathing in aquatic organisms is much faster than in terrestrial organisms because the availability of oxygen is less in water than on land, hence to obtain the required oxygen aquatic organisms have to work hard.

**55. What causes the movement of food inside the alimentary canal?**

**Soln:** Peristalsis is the process that causes the movement of food inside the alimentary canal.



## 56. Match Group (A) with Group (B)

Group A	Group B
(a) Autotrophic nutrition	(i) Leech
(b) Heterotrophic nutrition	(ii) Paramecium
(c) Parasitic nutrition	(iii) Deer
(d) Digestion in food vacuoles	(iv) Green plant

**Soln:**

Group A	Group B
(a) Autotrophic nutrition	(iv) Green plant
(b) Heterotrophic nutrition	(iii) Deer
(c) Parasitic nutrition	(i) Leech
(d) Digestion in food vacuoles	(ii) Paramecium

## 57. Why is blood circulation in the human heart called double circulation?

**Soln:** In Humans, blood flows in two directions simultaneously in one cardiac cycle. Oxygenated blood comes to the heart from the lungs and at the same time, de-oxygenated blood goes from the Heart towards the lungs. Because of this double movement is blood circulation in the human heart called double circulation.

## 58. What is the advantage of having a chambered heart?

**Soln:** A four-chambered heart has the following advantages

- Clear-cut division of labour among different chambers
- Segregation of oxygenated and deoxygenated blood in the heart.
- The efficiency of the heart will increase.

## 59. Mention the major events during photosynthesis

**Soln:** Major events of Photosynthesis are

- a) Absorption of light energy by chlorophyll
- b) Conversion of light energy into chemical energy
- c) Splitting of water molecules into Hydrogen and Oxygen
- d) Reduction of CO<sub>2</sub> from carbohydrates.

## 60. In each of the following situations what happens to the rate of photosynthesis?

(a) Cloudy days (b) No rainfall in the area

(c) Good manuring in the area (d) Stomata get blocked due to dust

**Soln:**

- a) The rate of photosynthesis will reduce due to the availability of sunlight.
- b) Rainfall will not affect the rate of photosynthesis
- c) Manuring will not affect the rate of photosynthesis
- d) Blockage of stomata will reduce the rate of photosynthesis because blockage will affect the availability of carbon dioxide.





**62. What is common for cuscuta, ticks and leeches?**

**Soln:** These all are parasites. They live on or inside another body to obtain food from the host. In obtaining food parasites always harm their host.

**63. Explain the role of the mouth in the digestion of food.**

**Soln:**

Role of mouth in the digestion of food.

- a) Ingestion of food
- b) Breakage of food by mastication
- c) Saliva aids easy swallowing of food
- d) Salivary amylase breaks starch into simpler carbohydrates.

**64. What are the functions of gastric glands present in the wall of the stomach?**

**Soln:** Hydrochloric acid, pepsin and mucus are secreted by gastric glands present in the stomach. They have the following functions.

- HCL kills germs present in the food and it decreases the pH of the stomach which is essential for the working of digestive enzymes.
- Pepsin digests protein.
- The mucus protects the stomach's inner lining from HCL.

**65. Match the terms in Column (A) with those in Column (B)**

Column (A)	Column (B)
(a) Trypsin	(i) Pancreas
(b) Amylase	(ii) Liver
(c) Bile	(iii) Gastric glands
(d) Pepsin	(iv) Saliva

**Soln:**

Column (A)	Column (B)
(a) Trypsin	(i) Pancreas
(b) Amylase	(iv) Saliva
(c) Bile	(ii) Liver
(d) Pepsin	(iii) Gastric glands

**66. Name the correct substrates for the following enzymes**

(a) Trypsin (b) Amylase (c) Pepsin (d) Lipase

**Soln:** a) Trypsin- Protein

b) Amylase- Starch

c) Pepsin- Protein

d) Lipase- Lipid

**67. Why do veins have thin walls as compared to arteries?**

**Soln:** Blood flow through veins does not exert pressure on the walls of veins hence they have thin walls. Blood flow in arteries exerts high pressure on arterial walls hence they need thick walls.



**69. Plants have low energy needs as compared to animals. Explain.**

**Soln:** Most of the transport in plants occurs through passive transport which does not require energy and plants stand still in one place and will not travel in search of food. Hence Plants require less energy compared to animals.

**70. Why and how does water enter continuously into the root xylem?**

**Soln:** Water should enter the root xylem continuously to assist the various processes such as photosynthesis. The continuous flow of water into the root xylem is due to transpiration pull.

**71. Why is transpiration important for plants?**

**Soln:** Transpiration is important for plants because of the following reasons.

- (a) It creates transpiration pull to facilitate the ascent of sap.
- (b) Ascent of sap is necessary to make water available for photosynthesis.
- (c) It helps a plant to get rid of excess water.

**72. How do the leaves of plants help in excretion?**

**Soln:** Leaves play an important role in excretion in plants because CO<sub>2</sub> is expelled out through pores of stomata present in the leaf. Plants shed leaves to get rid of excretory products deposited on them.

## Long Answer Questions

**73. Explain the process of nutrition in Amoeba.**

**Soln:** Amoeba shows holozoic nutrition which is comprised of Ingestion, Digestion, Absorption, Assimilation and Egestion.

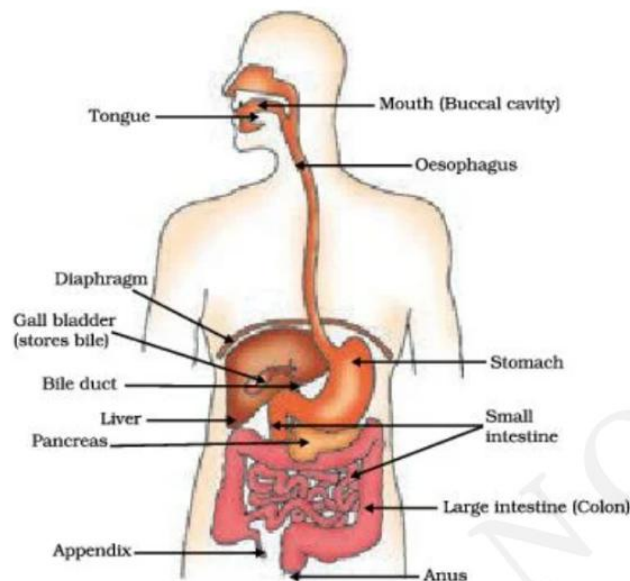
- Ingestion: Amoeba traps food particles through fingerlike projections called pseudopodia. Pseudopodia is present outside its body and helps in taking food along with water.
- Digestion: Food vacuoles are made after ingesting the food. Enzymes are released in the food vacuole for digestion.
- Absorption: After digestion, nutrients enter the cytoplasm through osmosis.
- Assimilation: Nutrients are utilized by the cell for various purposes.
- Egestion: The food vacuole goes near the cell membrane to empty its contents outside the cell.
- This results in the expulsion of waste materials from the cell.





## 74. Describe the alimentary canal of man.

**Soln:**



The Human Alimentary canal has the following parts

- **Buccal Cavity:** Also called mouth, the buccal cavity consists of tongue, teeth and salivary glands. At this entry site, the carbohydrates in the food are broken down into simpler molecules with the help of salivary amylase.
- **Oesophagus:** It's the long tube-like structure that connects the buccal cavity to the stomach. The oesophagus has a valve to prevent the backflow of food particles.
- **Stomach:** The J-shaped organ has gastric glands that secrete hydrochloric acid, pepsin and mucus that help digest the food.
- **Small Intestine:** A highly coiled long structure. The villi on the walls of the small intestine facilitate the absorption of digested food.
- **Large Intestine:** The major function of the large intestine is to absorb water from the remaining indigestible food matter and transmit the useless waste material from the body.
- **Rectum:** The large intestine opens into the rectum. Waste materials and undigested food are stored in the rectum.
- **Anus:** It is the opening at the end of the alimentary canal. Solid waste materials leave the body through the anus.

## 75. Explain the process of breathing in man

**Soln:**

Breathing in humans has two processes

1) Inhalation and 2) Exhalation

**Inhalation:** Inhalation is the process of taking oxygen. During this process, ribs come out and the diaphragm moves down. This increases the volume of the lungs and decreases the pressure. This will make the air move towards the lungs.



**Exhalation:** Exhalation is a process of throwing out carbon dioxide. During this process, ribs go down and the diaphragm moves up. This decreases the volume of the lungs and increases the pressure. As a result, air moves out of the lungs.

## 76. Explain the importance of soil for plant growth.

**Soln:**

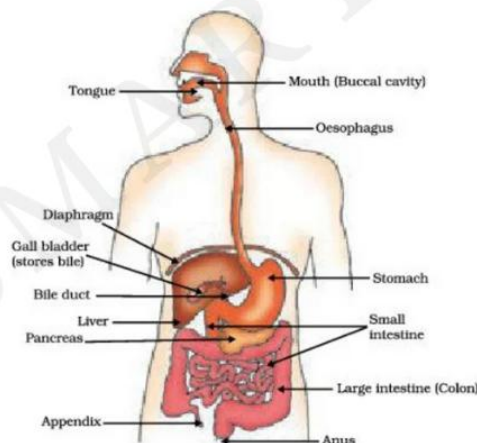
Soil is very important for the growth of the plant for the following reasons.

- 1) Soil provides the base for the growth of the plants and provides a platform for the penetration of roots.
- 2) It acts as a reservoir of the water.
- 3) Soil has different minerals essential for the growth of the plant. Soil is the only medium from which soil obtains nutrients.
- 4) Soil has organic materials essential for the growth of the plants.
- 5) Soil has microorganisms that have symbiotic relationships with the plant and these microbes assist plants in their growth and life processes.

## 77. Draw the diagram of the alimentary canal of man and label the following parts.

**Mouth, Oesophagus, Stomach, Intestine**

**Soln:**



## 78. How do carbohydrates, proteins and fats get digested in human beings?

**Soln:**

### **Carbohydrate Digestion**

Digestion of carbohydrates starts with the buccal cavity where salivary enzymes break down the starch into simple sugar molecules. Other sugar molecules break breakdown to glucose in the small intestine.

### **Protein digestion**

Proteins are partially digested by pepsin secreted by gastric glands present in the stomach. Then Pancreatic juice secretes trypsin and chymotrypsin enzymes in the small intestine where complete digestion of proteins takes place.

### **Fat Digestion**

Fats are digested in the small intestine. Bile juice present in the liver emulsifies the fat which breaks fats into small globules. These small fat globules are converted into glycerol and fatty acids by the Lipase enzyme.

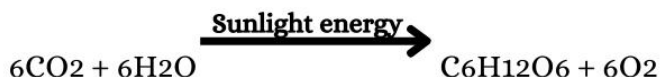


# Life Processes Exemplar Solutions

## 79. Explain the mechanism of photosynthesis

**Soln:**

Photosynthesis is a process by which plants produce their own food by utilizing sunlight, CO<sub>2</sub> and water. CO<sub>2</sub> and water are converted to carbohydrates with the evolution of oxygen. Photosynthesis reaction can be given by the following reaction.

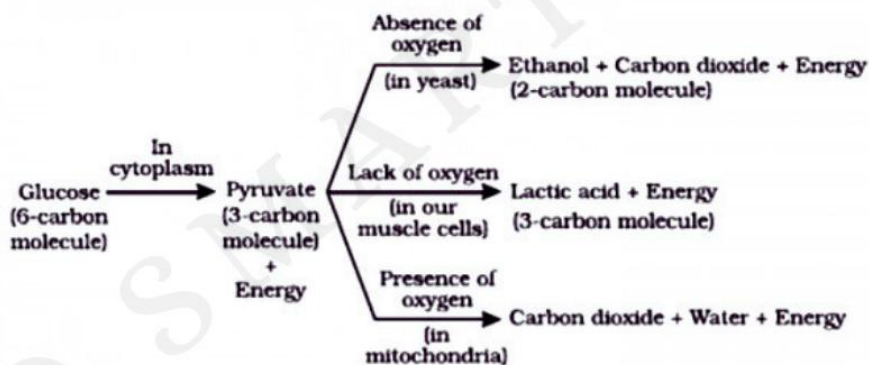


The process of photosynthesis is divided into 4 processes

- 1. Absorption of light energy by chlorophyll
- 2. Conversion of light energy into chemical energy
- 3. Splitting of water molecules into hydrogen and oxygen
- 4. Reduction of CO<sub>2</sub> to produce carbohydrates

## 80. Explain the three pathways of breakdown in living organisms.

**Soln:**



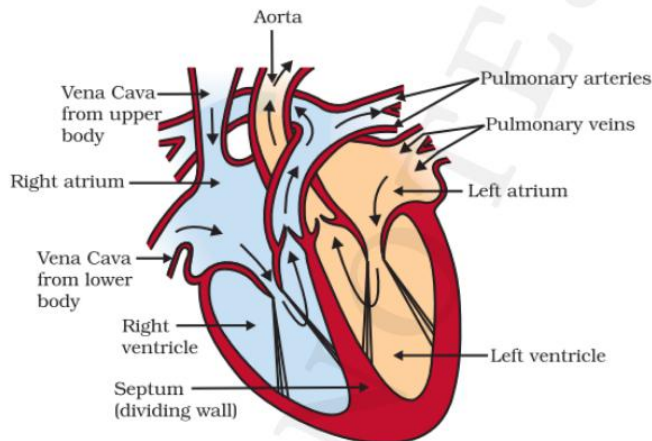
Glucose is first broken down into 3 carbon molecules called pyruvate. This process takes place in the cytoplasm of all organisms. Pyruvate is further broken down by the following steps.

- In yeast: Pyruvate is broken down in the absence of oxygen and the process is called anaerobic respiration. In yeasts, pyruvate is broken down to produce CO<sub>2</sub> and ethanol.
- In Muscle Cells: During rigorous physical activity energy demand of our muscle cells increases rapidly. This is compensated by anaerobic respiration in muscle cells. In muscle cells, pyruvate is broken down into lactic acid.
- In Mitochondria: In the case of aerobic respiration( in the presence of oxygen), pyruvate is broken down in mitochondria. Here Pyruvate is broken down to produce H<sub>2</sub>O and CO<sub>2</sub>. Aerobic respiration is most common in most of the organisms.

# Life Processes Exemplar Solutions

## 81. Describe the flow of blood through the heart of human beings

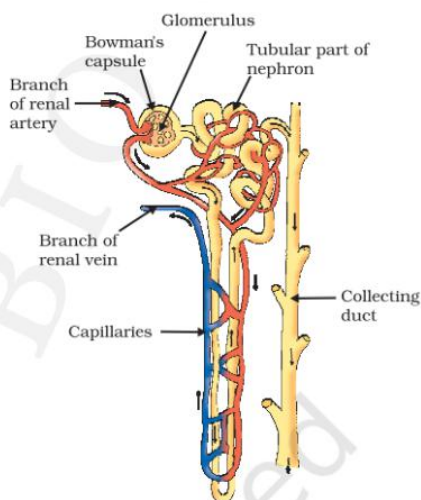
**Soln:**



- Deoxygenated blood from different organs comes to the right atrium through the vena cava.
- From the right atrium, blood goes to the right ventricle. The tricuspid valve between the right atrium and right ventricle prevents the backflow of blood.
- From the right ventricle, blood goes to the lungs through the pulmonary artery. Inside the lungs, carbon dioxide is removed from the blood and oxygen enters the blood.
- From the lungs, blood goes to the left atrium through the pulmonary vein.
- From the left atrium, blood goes to the left ventricle.
- From the left ventricle, blood is pumped into the aorta so that it can be supplied to different organs.

## 82. Describe the process of urine formation in kidneys

**Soln:**



- The basic filtration unit in the kidneys is a cluster of very thin-walled blood capillaries. Each capillary cluster in the kidney is associated with the cup-shaped end of a coiled tube called Bowman's capsule that collects the filtrate (Fig. 6.14). Each kidney has large numbers of these filtration units called nephrons packed close together.
- Glucose, amino acids, salts and a major amount of water, are selectively re-absorbed as the urine flows along the tube. Water reabsorption depends on the amount of excess water and dissolved waste in the body.
- The urine forming in each kidney eventually enters a long tube, the ureter, which connects the kidneys with the urinary bladder.
- Urine is stored in the urinary bladder until the pressure of the expanded bladder leads to the urge to pass it out through the urethra. The bladder is muscular, so it is under nervous control.