Date: 24/9/2021

Q1. What are outside raw materials used by an organism?

Q2. What processes would you consider essential for maintaing life?

Q3. The autotrophic mode of nutrition requires

(a) carbon dioxide and water (b) chlorophyll

(c) Sunlight (d) All the above

Q4. Name the two stages of photosynthesis.

Q5. Why is nutrition necessary for an organism?

Q6. Name the main modes of nutrition.

Q7. What are the raw materials for photosynthesis?

Q8. What is the primary source of energy for all living beings?

Q9. Are there organisms that do not require water for photosynthesis?

Q10. What are enzymes?

Q11. Name the largest gland of the body.

Q12. Given two example of plant parasite.

Q13. Given two examples of animals parasites.

Q14. Give two examples of saprophytes.

Q15. What are nutrients?

Q16. Name two things mainly required to maintain living organisms provided by food.

Q17. Name the process which is responsible for conversion of solar energy into chemical energy.

Q18. What is the site of photosynthesis in a leaf?

Q19. Name the photosynthetic pigment present in a chloroplast.

Q20. What is the source of O_2. liberated during photosynthesis?

Q21. From where do the aquatic plants get CO_2 to manufacture food?

Q22. Can plant photosynthesise in artificial light also?

Q23. In the experiment to prove that starch is produced during photosynthesis why we boil the leaf in alcohol?

Q24. How do you test the presence of starch?

Q25. What is the end product and the by-product of photosynthesis?

Q26. In which cells of the leaves photosynthesis take place?

Q27. Name an organ which is part of two body systems.

Q28. Is chloroplast a non-living structure?

Q29. Name the mineral required for healthy growth of teeth.

Q30. Name the mode of nutrition in an organism that uses simple substances like CO_2 and water to prepare food inside its body?

Q31. How do villi enhance absorption of food in the intestine?

Q32. Name the vestigeal part of human alimentary canal?

Q33. What is the name given to rhythmic wave like manner occurring in alimentary canal?

Q34. Why bile juice is considered important even though it does not contain any digestive enzymes?

Q35. Which organs secrete the following enzymes:

(a) Trypsin (b) Pepsin

Q36. What is the function of thylakoid membranes in chloroplast?

Q37. How does Amoeba engulf its food?

Q38. Name any two types of pigments present in plants which can absorb sunlight energy.

Q39. How do autotrophs obtain CO_2 and N_2 to make their food?

Q40. Which component of stomatal apparatus regulates the opening and closing of stomatal pore?

Q41. Where does digestion of starch begin in human body?

Q42. Give one example each of saprophytic and parasitic nutrition.

Q43. What is the mode of nutrition in fungi and plasmodium?

Q44. What is glycolysis?

Q45. Explain the role of mouth in digestion of food.

Q46. What criteria do we use to decide whether something is alive?

Q47. What are outside raw materials used by an organism?

Q48. What processes would you consider essential for maintaining life?

Q49. What processes would you consider essential for maintaining life?

Q50. A parrot is given in colour yet it is not an autoroph like green plants. What is the reason?

Q51. What is common for cuscuta, ticks and leeches?

Q52. What is common for cuscuta, ticks and leeches?

Q53. What is the nature of Chyme? Acidic or Basic or Neutral?

Q54. What is breathing?

Q55. Name the respiratory organs of: (a) Fish, (b) Mosquito, (c) Earthworm.

Q56. Name the red pigment carrying oxygen in blood.

Q57. Why do fishes die when taken out of water?

Q58. Why the walls of trachea are supported by cartilaginous rings?

Q59. What is the role of diaphragm during inhalation and exhalation?

Q60. The xylem in plants are responsible for

(a) transport of water. (b) transport of food.

(c) trasport of amino acid. (d) transport of oxygen

Q61. What is the name of largest artery in our body?

Q62. What makes red blood corpuscles red?

Q63. State the term used for the transport of food from leaves to other parts of a plant.

Q64. Name two kinds of cells of xylem.

Q65. Name the type of blood vessels which carry blood from organs to the heart

Q66. What process in plants is known as transpiration?

Q67. Name the tissue which transports water and minerals in a plant.

Q68. What do mean by double circulation of blood?

Q69. What is the function of blood capillaries?

Q70. Give the components of lymphatic system.

Q71. Define Translocation.

Q72. Who discovered systemic blood circulation system in human body?

Q73. Which fluid is also know as tissue fluid?

Q74. 'Sweating in animals' is equivalent to what in plants?

Q75. What will happen if platelets were absent in the blood?

Q76. Why and how does water enter continuously into the root xylem?

Q77. What is the other term for "extra cellular fluid"?

Q78. The kidneys in human beings are a part of the system for

(a) nutrition (b) respiration (c) excretion (d) Transportation

Q79. Name the excretory unit of kidney.

Q80. What is osmoregulation?

Q81. Which substance is absorbed in large intestine?

Q82. Name excretory organ in amoeba and earthworm

Q83. Name the hormone which is responsible for reabsorption of water in nephrons.

Q84. Which of them contain less nitrogenous waste-renal vein or the renal artery?

Q85. What is the function of ureter?

Q86. Which organ of the plant body helps in osmo-regulation?

Q87. Which organelle of the cell in animals helps in osmo-regulation?

Q88. In what form excretion takes place in plants?

Q89. What in kidneys is analogous to alveloli in lungs?

Q90. What is the basic reason of urine production?

Q91. Why is diffusion insufficient to meet the oxygen requirements of multicellular organisms like humans?

Q92. What criteria do we use to decide whether something is alive?

Q93. What are the differences between autotrophic nutrition and heterotrophic nutrition?

Q94. Where do plants get each of the raw materials required for photosynthesis?

Q95. What is the function of digestive enzymes? Explain.

Q96. How is the small intestine designed to absorb digested food?

Q97. How are fats digested in our bodies? Where does this process take place?

Q98. What is the role of saliva in the digestion of food?

Q99. What are the necessary conditions for autotrophic nutrition and what are its by-products?

Q100 Which is the internal energy reserve in plants? Do the animals have the same energy reserve? Justify your answer.

Q101 Stomata of desert plants remain closed during day time. How do they take up carbon dioxide and perform photosynthesis?

Q102 In an experiment on photosynthesis, a student fixed a strip of black paper on the dorsal surface of a Bougainvillea leaf in the morning. In the evening she tested the leaf for starch.

(a) What will be the result? (b) Justify your answer

Q103 What are the basic materials used during photosynthesis? Write chemical equation for photosynthesis.

Q104 Read following statements from *A* to *E* and identify the relevant life process from the following word list.

Growth, Transport, Synthesis, Regulation, Nutrition

A. A butterfly sucking the nectar from the flowers in a garden.

B. A boy shouts with excitement when his school team wins the match on the last ball.

C. After finishing lunch, Mohan's blood distributes the food molecules to different cells of his body.

D. Green plants prepares starch (complex substance) from simpler chemicals.

E. Radha finds her height has increased by 4 cm since her last birthday.

Q105 Who has longer small-intestine tiger or cow? Why?

Q106 What is the role of saliva in the digestion of food?

Q107 Why is photosynthesis important to the global world?

Q108 Why does absorption of digested food occur mainly in the small intestine?

Q109 What causes movement of food inside the alimentary canal?

Q110 What is the significance of emulsification of fats?

Q111 What will happen if mucus is not secreted by the gastric glands?

Q112 Why is small intestine in herbivores longer than in carnivores?

Q113 What are the adaptations of leaf for photosynthesis?

Q114 Meat is easier to digest as compared to grass. Why?

Q115 How is opening and closing of stomata regulated?

Q116 What is villi? What are its functions?

Q117 Do all events during photosynthesis take place on after the other immediately? Give an example.

Q118 What is photosynthesis? Explain.

Q119 Given reasons for the following:

(a) Solar energy is available in plenty but animals cannot use it directly whereas the plants can.

(b) Life on earth depends on the sun.

Q120 Name the substrates for the following enzymes secreated.

(a) trypsin (b) amylase (c) pepsin (d) lipase

Q121 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

Q122 Is 'nutrition' a necessity for an organism? Discuss.

Q123 What would happen if green plants disappear from Earth?

Q124 Leaves of a healthy potted plant were coated with vaseline. Will this plant remain healthy for long? Give reasons for your answer.

Q125 Mention the major events during photosynthesis

Q126 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

Q127 Match the terms in Column (A) with those in Column (B)

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

Q128 What are the functions of gastric glands present in the wall of the stomach?

Q129 Name the correct substrates for the following enzymes

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

Q130 Plants have low energy needs as compared to animals. Explain.

Q131 What advantage over an aquatic organism does a terrestrial organism have with regard to obtaining oxygen for respiration?

Q132 (a) In plant, when stomata is opened in night, are called _____.

(b) Justify your answer.

Q133 What is role of skin, lungs and intestine in the process of excretion in man?

Q134 Dark reaction of photosynthesis does not need light. Do plants undergo dark reaction at night explain.

Q135 How is the small intestine designed to absorb digested food?

Q136 What is the function of digestive enzymes?

Q137 What is the role of the hydrochloric acid in our stomach?

Q138 Where do plants get each of the raw materials required for photosynthesis?

Q139 What are the differences between autotrophic nutrition and heterotrophic nutrition?

Q140 Why is diffusion insufficient to meet the oxygen requirements of multi-cellular organisms like humans?

Q141 How are the lungs designed in human beings to miximise the area for exchange of gases?

Q142 What are the differences between aerobic and anaerobic repiration? Name some organisms that use the anaerobic mode of respiration.

Q143 Outline inhalation-exhalation cycle.

Q144 After long running, you may experience cramps in your leg muscles. Whats the reason behind this?

Q145 What type of respiration takes place in human muscles during vigorous exercise and why?

Q146 What is meant by glycolysis? Where it takes place?

Q147 Write any two points of difference between respiration in plants and respiration in animals.

Q148 Why is it necessary to separate oxygenated and deoxygenated blood in mammals and birds?

Q149 Why is there extra air in our lungs after exhaling?

Q150 Why blood is necessary for oxygen delivery to all parts of the body in larger animals?

Q151 List the component of blood.

Q152 Write one function each of the following components of the transport system in human in human beings:

(a) Blood vessels (b) Blood platelets (c) Lymph (d) Heart

Q153 What is lymph? Write its important functions

Q154 What would be the consequences of a deficiency of haemoglobin in our bodies?

Q155 Why is it necessary to separate oxygenated and deoxygenated blood in mammals and birds?

Q156 Name the respiratory organs in the following:

(a) a fish (b) a bird (c) an earthworm

Q157 Name the energy currency in the living organisms. When and where is it produced?

Q158 Why is the rate of breathing in aquatic organisms much faster than in terrestrial organisms?

Q159 What are the components of the transport system in highly organised plants?

Q160 Differentiate between Blood and Lymph.

Q161 How does transpiration help plants?

Q162 During daytime transpiration and photosynthesis are interlinked. What do you mean by this statement?

Q163 What is pulmonary circulation and systemic circulation?

Q164 Match the words of Column (A) with that of Column (B)

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

Q165 Why is it essential to match the blood groups of donors and receiver person before arranging transfusion of blood?

Q166 Differentiate between transport of materials in xylem & phloem

Q167 What is the difference between arteries & veins?

Q168 Differentiate between single and double circulation found in vertebrates.

Q169 What factor contribute to rate of transpiration?

Q170. Why is blood circulation in human heart called double circulation?

Q171. What is the advantage of having four chambered heart?

Q172 What are the differences between the transport of materials in xylem and phloem?

Q173 What would be the consequences of a deficiency of haemoglobin in our bodies?

Q174. How is food transported in plants?

Q175. How are water and minerals transported in plants?

Q176. What are the components of the transport system in highly organised plants?

Q177. Why do veins have thin walls as compared to arteries?

Q178. Why is transpiration important for plants?

Q179. How is oxygen and carbon dioxide transported in human beings?

Q180. How is the amount of urine produced regulated?

Q181. What are the methods used by plants to get rid of excretory products?

Q182. How do leaves of plants help in excretion?

Q183. What is the role of glomerulus in kidney?

Q184. What is the function of blood capillaries surrounding the nephrons?

Q185. State the two vital functions of the human kidney. Name the procedure used in working of an artificial kidney.

Q186. How is the amount of urine produced regulated?

Q187. Why are white blood corpuscles called "soldiers" of the body?

Q188. State the role of kidneys in human transport system.

Q189. Write the functions of the following in the digestive process:

(a) Bile.

(b) Bicarbonate secreted by the duodenal wall.

(c) Pancreatic amylase.

Q190. What is tooth enamel chemically? State the condition when its starts corroding? What happens when food particles left in the mouth after eating degrade? Why do doctors suggest use of tooth powder/ tooth paste to prevent tooth decay.

Q191. Draw a diagram of human alimentary canal showing duodenum, small intestine, liver and pancreas.

Q192. State the part played by each of the following in photosynthesis:

(a) Water (b) Chlorophyll (c) Stomata.

Q193. How does photosynthesis occur? Explain.

Q194. How do each of the following factors affect the productivity in the process of photosynthesis?

(a) Temperature (b) Water (c) Carbon dioxide.

Q195. Explain the structure of chloroplast.

Q196. 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 stomach that acts on proteins.

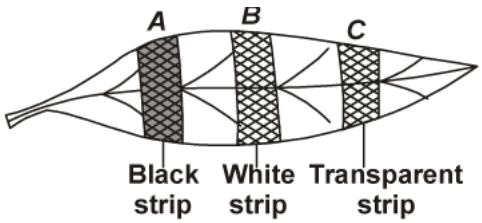
Q197. "All plants give out oxygen during day and carbon dioxide during night". Do you agree with this statement? Give reason.

Q198 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.

Q199 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.

Q200 Describe the alimentary canal of man.

Q201 A destarched leaf on a potted plant was covered with black (A), white (B) and transparent (C) strips of paper as shown in the figure.



After six hours to exposure to sunlight the leaf was removed from the plant and tested for starch.

(a) What changes will be observed? (b) Justify your answer.

Q202 Explain the mechanism of photosynthesis.

Q203 How do carbohydrates, proteins and fats get digested in human beings?

Q204 Explain the importance of soil for plant growth.

Q205 Draw the diagram of alimentary canal of man and label the following parts.

Mouth, Oesophagus, Stomach, Intestine

Q206 Discuss the major steps involved in process of nutrition in human beings.

Q207 Describe an experiment to prove that carbon – dioxide is essential for the process of photosynthesis.

Q208 What are the different ways in which glucose is oxidised to provide energy in various organisms?

Q209 How is oxygen and carbon dioxide transported in human beings?

Q210 Give reasons for the following:

(a) The glottis is guarded by epiglottis.

(b) The lung alveoli are covered with blood capillaries.

(c) The wall of trachea is supported by cartilage rings

Q211 What is the function of epiglottis in man? Draw a labelled diagram showing the human respiratory system.

Q212 Explain the process by which inhalation occurs during breathing in human beings.

Q213 Name the three kinds of cells present in blood. Write one function each of them.

Q214 How is foor transported in plants?

Q215 How are water and minerals transported in plants?

Q216 Describe double circulation in human beings. Why is it necessary?

Q217 What are the differences between the transport of materials in xylem and phloem?

Q218 What are the components of the transport system in highly organised plants?

Q219 Explain the process of breathing in man.

Q220 Differentiate inhalation and exhalation.

Q221 Leaves of a healthy potted plant are coated with Vaseline to block the stomata. Will this plant remain healthy for long? State three reasons to support your answer.

Q222 Compare the functioning of alveoli in the lungs and nephrons in the kidneys with respect to their structure and functioning.

Q223 What is the role of following in human digestive system:

(a) Mucus (b) Bicarbonate (c) Trypsin

Q224 How is transpiration pull responsible for upward movement of water?

Q225 How respiration does takes place in plants?

Q226 What is "translocation"? Why it is essential for plants.

Q227 How is haemoglobin associated with respiration explained?

Q228 With the help of diagram, show pulmonary circulation in man.

Q229 What do you mean by 'lymph'? Mention its function.

Q230 Compare the functioning of alveoli in the lungs and nephrons in the kidneys with respect to their structure and functioning.

Q231 What are the methods used by plants to get rid of excretory products?

Q232 (a) Draw a diagram of the human urinary system and label on it:

(i) Kidney (ii) Ureter (iii) Urinary bladder (iv) Urethra

(b) Name the two major components of normal human urine.

Q233 What happens to glucose which enters nephron along with filtrate during excretion in human beings. State two vital functions of kidney.

Q234 What are the modes of excretion in plants?

Q235 Describe the process of urine formation in kidneys.

Q236 Describe the structure and functioning of nephrons.

Q237 (a) Draw a diagram of human alimentary canal.

(b) Label oesophagus, Liver, Pancreas and Gall bladder on the diagram drawn.

(c) What is the function of enzyme 'pepsin' in the digestion process?

Q238 Explain the process of Photosynthesis in plants. List four factors which influence this process and describe how each of them affects the rate of the photosynthesis process.

Q239 (a) Write two differences between autotrophic and heterotrophic nutrition.

(b) Draw a diagram showing cross-section of a leaf and label on it

(i) Phloem (ii) Xylem (iii) Vascular bundle (iv) Lamina.

Q240 (a) Name the enzyme present in saliva. Why is it important?

(b) What is emulsification?

(c) Name the substance that is oxidized in the body during respiration.

(d) Why are lungs divided into very small sac-like structures?

Q241 Define the terms 'Nutrition' and 'Nutrients'. List two differences between 'Holozoic nutrition' and 'Saprophytic nutrition'. Give two examples of each of these two types of nutrition.

Q242. (a) Name the enzyme present in saliva. Why is it important?

(b) What is emulsification?

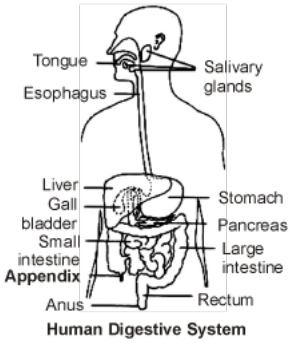
(c) Name the substance that is oxidized in the body during respiration.

(d) Why are lungs divided into very small sac-like structures?

Q243. (a) Draw a well labeled diagram of human digestive system

(b) Describe the role of following in digestion.

(i) Bile (ii) Salivary amylase (iii) HCl



Human Digestive System

Q244. (a) Explain why the rate of photosynthesis in plant is low both of lower and higher temperature.

(b) Is green light most or least useful in photosynthesis and why?

(c) Describe an activity to show that chlorophyll is necessary for photosynthesis in plants.

Q245. (a) Draw diagram to show the nutrition in amoeba and label the part used for this purpose. Mention any other purpose served by this part other than nutrition.

(b) Name the glands associated with digestion of starch in human digestive tract and mention their role.

(c) How is required pH maintained in the stomach and small intestine

Q246. (a) Name the blood vessel that brings oxygenated bloof to human heart.

(b) Which chamber of human heart receives oxygenated blood?

(c) Explain how oxygenated blood from this chamber is sent to all parts of the body.

Q247. What are the components of the transport system in human beings? What are the functions of these components?

Q248. (a) Draw a neat diagram of human respiratory system and label the parts and label 9 parts in it.

(b) What are the end products of digestion of fat and protein in human beings?

Q249. With the help of labeled diagram, Discuss the mechanism of respiration in human beings.

Q250. List three differences between respiration in plants and respiration in animals. Describe with a labelled diagram how gaseous exchange occurs through root hair in plants.

Q251. (a) Name the blood vessel that brings deoxygenated blood to human heart.

(b) Which chamber of human heart receives deoxygenated blood?

(c) Explain how deoxygenated blood from this chamber is sent to lungs for oxygenation.

Q252. (a) Draw a diagram of an excretory unit of a human kidney and label the following: Bowman's capsule, Glomerulus, Collecting Duct, Renal Artery.

(b) Write the important function of the structural and functional unit of kidney.

(c) Write any one function of an artificial kidney.

Q253. With the help of a labelled diagram of human excretory system, Mention its important part and explain them.

Q254 **(a) Draw a neat diagram of excretory system of human beings and label the following:**

(i) Kidney (ii) Ureter (iii) Urinary Bladder (iv) Urethra

(b) How is urine produced.

(c) Name two excretory products other than O_2 and CO_2 in plants.

Q255 **Describe the structure and functioning of nephrons. Draw the digram of nephron.**

Date: 24/9/2021

S1. Nutrients, water and oxygen are the raw materials obtained from an exterior source. These raw materials enable the organism to perform various life activities essential for their survival. Plants also use CO_2, light energy and water to carry out photosynthesis.

S2. Nutrition, respiration, transportation, excretion and reproduction are the five life processes that are essential for maintaining life.

S3. **(d)** All the above.

S4. Light reaction and Dark reaction.

S5. Nutrition is necessary for an organism because it serves as energy source which is utilized in all physiological activities like growth, development and maintenance of life.

S6. Autotrophic and heterotrophic.

S7. (a) CO_2 (b) Water (c) Light and (d) Chlorophyll.

S8. Sun.

S9. The green sulphur bacteria use H_2S (Hydrogen sulphide) instead of water.

S10. Enzymes are bio-catalysts and catalyse bio-chemical reactions.

S11. Liver, which does not secrete any digestive enzyme.

S12. Cuscuta and Loranthus.

S13. Ascaris and Tapeworm/Plasmodium.

S14. Rhizopus and Mushroom.

S15. Nutrients are substances which an organism obtains from its surroundings uses it either as an energy source or source of material required for growth and maintenance of the body.

S16. (a) Energy (b) Materials

S17. Photosynthesis.

S18. Chloroplast.

S19. Chlorophylls.

S20. Water.

S21. Aquatic plants utilize the carbon dioxide dissolved in water.

S22. Yes if light intensity is enough.

S23. We boil the leaf in alcohol to remove all the chlorophyll from the leaf.

S24. Starch can be tested by adding ioding iodine. The colour will change to blue black which proves the presence of starch.

S25. End product-starch.
By product-oxygen.

S26. Chorophyll containing cells like palisade and spongy cells.

S27. Pancreas which if part of Endocrine System, Digestive System and also releases hormone for control and coordination.

S28. No, chloroplast is a living organelle.

S29. Calcium.

S30. Autotrophic mode of nutrition.

S31. Increased surface area and highly vascular.

S32. Vermiform appendix or caecal.

S33. Peristalsis or Peristaltic movements.

S34. Bile juice is important for the following reasons:

- It contains bile salts and bile pigments that emulsify fats.
- Contains $NaHCO_3$ that neutralizes the acidic medium of the food in small intestine.

S35. (a) Trypsin – Pancreas. (b) Pepsin – Gastric lining of Stomach.

S36. Thylakoid membranes provide large surface area for light absorption.

S37. Amoeba engulfs its food through phagocytosis by forming pseudopodia.

S38. Chorophyll and carotenoids.

S39. CO_2 from the environment; N_2 from the soil and environment.

S40. Guard cells.

S41. Mouth

S42. Parasitic Nutrition – Plasmodium (Protozoa).
Saprophytic Nutrition – fungi.

S43. Fungi – Saprophytic
Plasmodium – parasitic

S44. Breakdown of Glucose into pyruvate is known as glycolysis.

S45. (a) Food is crushed into small pieces by the teeth.
(b) It mixes with saliva and the enzyme amylase (found in saliva) breaks down starch into sugars.
(c) Tongue helps in thorough mixing of food with saliva.

S46. Any visible movement such as walking, breathing, or growing is generally used to decide whether something is alive or not. However, a living organism can also have movements, which are not visible to the naked eye. Therefore, the presence of life processes is a fundamental criterion that can be used to decide whether something is alive or not.

S47. An organism uses outside raw materials mostly in the form of food and oxygen. The raw materials required by an organism can be quite varied depending on the complexity of the organism and its environment.

S48. Life processes such as nutrition, respiration, transportation, excretion, etc. are essential for maintaining life.

S49. Various life processes are essential for maintaining life. Some are:

(a) Nutrition (b) Respiration (c) Excretion (d) Transportation

S50. Like green plants, a parrot does not contain chlorophyll pigment which can absorb and convert light energy into chemical energy that can be used to prepare their own food.

S51. Cuscuta , ticks and leeches, all has parasitic mode of nutrition, they harm their host while taking nutrition.

S52. All are parasites, they derive nutrition from plants or animals without killing them.

S53. Acidic.

S54. The process of letting in oxygen from air into the lungs and carbon dioxide out of the lungs is called breathing.

S55. (a) Fish – Gills (b) Mosquito – Air tubes or trachea (c) Earthworm – skin

S56. Haemoglobin.

S57. Fishes respire with the help of gills. Gills are richly supplied with blood capillaries and can readily absorb oxygen dissolved in water. Since fishes cannot absorb gaseous oxygen they die soon after they are taken out of water.

S58. The trachea is supported by cartilaginous rings which prevent the collapsing even when there is not much air in it.

S59. Diaphragm changes its shape during inhalation and exhalation and increases and decreases volume of thoracic cavity respectively. This causes entry and expel of air from lungs.

S60. (a) Transport of water.

S61. Aorta.

S62. Red coloured pigment haemoglobin.

S63. Translocation.

S64. Vessel elements and tracheids.

S65. Veins.

S66. The loss of water in the form of vapour from the aerial parts of the plant.

S67. Xylem.

S68. During circulation of blood in the body, the blood is circulated through the heart twice. Once oxygenated blood from the right chambers of the heart to the lungs.

S69. Blood capillaries connect the arteries and veins. They perform the function of exchange of food materials, gases and metabolic wastes.

S70. (a) Lymph (b) Lymph capillaries (c) Lymph vessels (d) Lymph nodes.

S71. Transportation of food from photosynthetic parts of the plant to the non-green part of the plant through phloem is known as translocation.

S72. William Harvey in 1628.

Before that people believe, it is the same tubes carry the blood and blood is formed in liver.

S73. Lymph

S74. Transpiration.

S75. In the absence of platelets, the process of clotting will be affected.

S76. Cells of root are in close contact with soil and so actively take up ions. The ion-concentration, increases inside the root and hence osmotic pressure increases the movement of water from the soil into the root which occurs continuously.

S77. Lymph.

S78. **(c)** Excretion.

S79. Nephron.

S80. The process by which a cell in a plant or an animal controls the amount of water in its body and the concentration of various solutes and ions in the body fluid is known as osmoregulation.

S81. Water

S82. Amoeba – Cell membrane

Earthworm – Outer covering (skin)

S83. Anti – diuretic – hormone (ADH) or vasopressin.

S84. Renal vein.

S85. Transports urine from kidneys to bladder.

S86. Leaves

S87. Contractile Vacuole.

S88. Plants produce secondary metabolites like organic acids, tannin, resins, latex, gums etc.

S89. Nephrons.

S90. Blood carries nitrogenous waste in the form of urea or uric acid which needs to be removed. It is done by kidneys by filtering the blood and removing uric acid in the form of urine.

S91. Exchange of gases occurs through diffusion across the body surface from where it continues inwardly to every cell. However, diffusion is unable to meet the respiratory requirements of individual cells in large sized multicellular animals like humans. The body is covereed by dead cells. The living cells are not in direct contact with external environment. Moreover, air containing intercellular spaces are absent. Therefore, quick diffusion cannot occur as cell to cell diffusion is a slow process. It will take years for oxygen from lungs to reach the toes. Therefore there is a need for an additional mechanism to fulfil this requirement.

S92. The most important criterion to decide whether something is alive or not is the movement. All the living things which are alive move by themselves without any external help. Movement here does not mean physical movement only, it also includes movements at molecular level.

Secondly all living organisms perform certain life processes like respiration, excretion, transportation, reproduction which enables it to sustain itself.

S93. Distinction between autotrophic nutrition and heterotrophic nutrition:

Autotrophic Nutrition	*Heterotrophic Nutrition*
A mode of nutrition in which an organism makes (or synthesizes) its won food from the simple inorganic molecules like carbon dioxide and water present in the surroundings with the help of sunlight or solar energy and chlorophyll. Example: Majority of higher green plants.	A mode of nutrition in which an organism cannot make (or synthesize) its own food from simple inorganic molecules like carbon dioxide and water. It depends on other organisms for their food requirements. Example: Most of the animals.

S94. Photosynthesis in plants has four basic requirements — chlorophyll, carbon dioxide, water and light. Chlorophyll is a photosynthetic pigment that occurs in chloroplasts found in green aerial parts of plants. Terrestrial plants obtain CO_2 from atmosphere and auatic plants absorb the same from water. Water is absorbed by plants from soil through their roots. Natural source of light is sun but artificial light can also provide energy to plants to carry out the process of photossynthesis.

S95. Enzymes break-down the various complex organic molecules of food into simple, soluble, absorbable inorganic molecules without actually participating in the reaction. So they are also called as biocatalysts.

S96. The inner lining of the small intestine has numerous finger-like projections called villi which increases the surface area for absorption of digested food. The villi are richly supplied with blood vessels which transport the absorbed food to each and every cell of the body, where it is utilised for obtaining energy, building up new tissues and the repair of the old ones.

S97. Digestion of fats takes place in the small intestine.

Fats entering in intestine are in form of large globules. Bile juice breaks down these large glubules into small, fine globules by the process known as emulsification. Afterwards fat digesting enzyme lipase present in the pancreatic juice and intestinal juice converts it into fatty acids and glycerol.

S98. Saliva contains digestive enzyme called salivary amylase that breaks down complex starch into dixtrin and maltose.

S99. Autotrophic nutrition or photosynthesis is a process by which organic food is manufactured from inorganic raw materials. The basic requirements for the photosynthetic process are chlorophyll, carbon dioxide, water and light. During this process oxygen and water are produced as by-products.

S100. Plants have starch as the storage of carbohydrate which acts as internal energy reserve.

Yes. Animals have glycogen as internal energy reserve.

S101. Desert plants take up CO_2 at night and prepare an intermediate molecule. The intermediate molecule is acted upon by the energy absorbed by the chlorophyll during the day.

S102. (a) The entire leaf turned blue black.

(b) In the diffused light reaching the ventral surface, photosynthesis takes place and so the whole leaf responds to starch test.

S103. (a) Materials used photosynthesis are:

(i) carbon dioxide and (ii) water

(b) Chemical equation of photosynthesis.

$$6CO_2 + 12H_2O \xrightarrow[\text{Chlorophyll}]{\text{Sunlight}} C_6H_{12}O_6 + 6H_2O + 6CO_2$$

S104. A: Nutrition; B: Regulation; C: Transport; D: Synthesis; E: Growth

S105. Cow because it has to digest cellulose requiring an elaborate digestion. Most of the plant eaters (ruminants) have to undergo additional process of digestion *i.e.*, break the cellulose wall and digest it.

S106. Saliva is a fluid which is secreted by the salivary glands. It helps in digestion of food by following ways:

(a) Saliva contains a digestive enzyme called salivary amylase, which breaks down starch into sugars (maltose). It cleans the mouth cavity and tends to destroy germs that cause teeth decay.

(b) It contains lysozymes which help in destroying the bacteria.

(c) It moistens and lubricates food which again helps in swallowing.

(d) It acts as solvent, dissolving some food particles to stimulate taste buds of the tongue.

S107. In photosynthesis solar energy (sunlight) is converted to chemical energy and is stored in plants as starch. Plants also store excess sugar by synthesis of starch.
Heterotrophs, including humans, may completely or partially consume plants for fuel and raw materials. Photosynthesis is responsible for the presence of oxygen in our atmosphere.

Each year, photosynthesis synthesizes appox. 160 billion metric tons of carbohydrate.

S108. Maximum absorption occurs in small intestine because

(a) digestion is completed in small intestine

(b) inner lining of small intestine is provided with villi which increases the surface area for absorption.

(c) wall of intestine is richly supplied with blood vessels (which take the absorbed food to each and every cell of the body).

S109. The wall of alimentary canal contains muscle layers. Rhythmic contraction and relaxation of these muscles pushes the food forward. This is called peristalsis, which occurs all along the gut.

S110. Fats are present in food in the form of large globules which makes it difficult for enzymes to act on them. Bile salts present in bile break them down mechanically into smaller globules which increases the efficiency of fat digesting enzymes.

S111. Gastric glands in stomach release hydrochloric acid, enzyme pepsin and mucus. Mucus protects the inner lining of stomach from the action of hydrochloric acid and enzyme pepsin. If mucus is not released, it will lead to erosion of inner lining of stomach, leading to acidity and ulcers.

S112. Digestion of cellulose takes a longer time. Hence, herbivores eating grass need a longer small intestine to allow complete digestion of cellulose. Carnivorous animals cannot digest cellulose, hence they have a shorter intestine.

S113. (a) Leaves provide large surface area for maximum light absorption.

(b) Leaves are arranged at right angles to the light source in a way that causes overlapping.

(c) The extensive network of veins enables quick transport of substances to and from the mesophyll cells.

(d) Presence of numerous stomata for gaseous exchange.

(e) The chloroplasts are more in number on the upper surface of leaves.

S114. It is easier to digest meat because our digestive juices contain enzymes which can easily digest meat but our body does not digest cellulose which is a main component of grass.

S115. The closing and openings of the stomata is regulated by guard cells. When the guard cells swell or turgid due to entry of water, the stomata are opened. The guard cells shrink due to loss of water, the stomata get closed.

S116. Finger like projection present in the inner lining of small intestine are called villi. They increase the surface area for the absorption of digested food in the small intestine.

S117. Not necessarily. For example desert plants take up carbon dioxide at night and prepare an intermediate compound. This intermediate compound is acted upon by the energy absorbed during the day by the chlorophyll.

S118. The process by which green plants make their own food from carbon-dioxide and water in the presence of sunlight and chlorophyll is called photosynthesis.

During this process oxygen gas is released. This process can be represented as:

$$6CO_2 + 12H_2O \longrightarrow C_6H_{12}O_6 + 6H_2O + 6O_2$$

The green plants convert energy of sunlight into chemical energy by making glucose.

The extra glucose formed changes into starch which is stored in leaves.

The Oxygen released comes from the water.

S119. (a) Animals do not have chloroplasts in the cells of their body. So, they cannot convert solar energy into chemical energy (food).

(b) All living things constantly need energy to be alive. They get the energy in the form of food. The directly or indirectly comes from the green plants. The green plants trap light energy coming from the sun to product food during photosynthesis.

Green plants also prdouce O_2 during photosynthesis which is necessary for organisms for respiration.

S120. (a) Protein (b) Starch (c) Protein (d) Lipids

S121. (a) – (iv) (b) – (iii) (c) – (i) (d) – (ii)

S122. Food is required for the following purposes

(a) It provides energy for the various metabolic processes in the body.

(b) It is essential for the growth of new cells and repair or replacement of worn out cells.

(c) It is needed to develop resistance against various diseases.

S123. Green plants are the sources of energy for all organisms. If all green plants disappear from the Earth, all the herbivores will die due to starvation and so will the carnivores.

S124. This plant will not remain healthy for a long time because

(a) it will not get oxygen for respiration.

(b) it will not get carbon dioxide for photosynthesis.

(c) Upward movement of water and minerals would be hampered due to lack of transpiration.

S125. The major events during photosynthesis are:

(a) absorption of light energy by chlorophyll (b) conversion of light energy to chemical energy

(c) splitting of H_2O into H_2, O_2 and e^- (d) reduction of CO_2 to carbohydrates

S126. (a) Decreases (b) Decreases (c) Increases (d) Decreases

S127. (a) – i, (b) – iv, (c) – ii, (d) – iii

S128. (a) Production of pepsin enzyme that digests proteins

(b) Secretion of Mucus for protection of inner lining of stomach.

S129. (a) – Protein (b) – Starch (c) – Protein (d) – Fats

S130. Plants do not move. In a large plant body there are many dead cells like schlerenchyma as a result it requires less energy as compared to animals.

S131. The rate of breathing is slower in terrestrial organisms as compared to aquatic organisms. This is due to the fact that in water, the amount of O_2 is less as compared to air while in aquatic animals the rate of breathing is faster.

S132. (a) Scotoactive

(b) Due to deficiency of oxygen, in most plants, stomata opens at night, *e.g.*, Opuntia, Bryophyllum.

S133. **Skin:** Skin excrete excess salts and water in the form of sweat.

Lungs: Lungs expel carbon – dioxide during exhalation.

Intestine: Intestine throw out undigested food in the form of faeces through anus.

S134. Dark reaction does not mean that it occurs in the absence of light i.e., at night. Infact these reactions do not depend on light energy and occur simultaneously with light reaction.

S135. The small intestine has millions of tiny finger-like projections called villi. These villi increase the surface area for more efficient food absorption. Within these villi, many blood vessels are present that absorb the digested food and carry it to the blood stream. From the blood stream, the absorbed food is delivered to each and every cell of the body.

Enlarged view of a villus

S136. Digestive enzymes such as amylase, lipase, pepsin, trypsin, etc. help in the breaking down of complex food particles into simple ones. These simple particles can be easily absorbed by the blood and thus transported to all the cells of the body.

S137. The hydrochloric acid present in our stomach dissolves bits of food and creates an acidic medium. In this acidic medium, enzyme pepsinogen is converted to pepsin, which is a proteindigesting enzyme.

S138. The following raw materials are required for photosynthesis:

- The raw material CO_2 enters from the atmosphere through stomata.
- Water is absorbed from the soil by the plant roots.
- Sunlight, an important component to manufacture food, is absorbed by the chlorophyll and other green parts of the plants.

S139.

Autotrophic nutrition	Heterotrophic nutrition
(i) Food is synthesised from simple inorganic raw materials such as CO_2 and water.	(i) Food is obtained directly or indirectly from autotrophs. This food is broken down with the help of enzymes.
(ii) Presence of green pigment (chlorophyll) is necessary.	(ii) No pigment is required in this type of nutrition.
(iii) Food is generally prepared during day time.	(iii) Food can be prepared at all times.
(iv) All green plants and some bacteria have this type of nutrition.	(iv) All animals and fungi have this type of nutrition.

S140. Multicellular organisms such as humans possess complex body designs. They have specialised cells and tissues for performing various necessary functions of the body such as intake of food and oxygen. Unlike unicellular organisms, multicellular cells are not in direct contact with the outside environment. Therefore, diffusion cannot meet their oxygen requirements.

S141. In lungs, the bronchioles terminate in balloon-like structures called alveoli. The alveoli provide extensive surface where the exchange of gases can take place. The thin, moist, permeable walls of alveoli facilitate quick diffusion and exchange of gases. Moreover it is richly supplied with blood capillaries. [The alveolar area, if spread out, it covers abot 80 m^2 which is more than our body surface area].

S142. Differences between aerobic and anaerobic respiration:

Aerobic Respiration	*Anaerobic Respiration*
(i) A type of respiration that takes place in presence of oxygen.	(i) A type of respiration that takes place in absence of oxygen.
(ii) Complete oxidation of glucose takes place resulting in release of CO_2, energy and water.	(ii) Incomplete oxidation of glucose takes place resulting in release of ethanol or lactic acid, CO_2 and energy.
(iii) More energy is produced (36 ATP)	(iii) Less energy is produced (2 ATP)
(iv) It occurs partly in cytoplasm and mitochondria as well.	(iv) It takes place in cytoplasm.

Anaerobic respiration occurs in yeast, certain bacteria and internal parasites like tapeworm.

S143. **Inhalation:** Lowering of diaphragm ⟶ rising of rib cage ⟶ Gas (O_2) passes to Alveoli.

Exhalation: Air is forced out ⟶ Rising of diaphragm ⟶ lowering of ribcage.

S144. It is due to sudden build up of lactic acid (because of lack of oxygen) in our muscles after long exercise. It causes muscular cramps in our leg muscles.

S145. During vigorous exercise, anaerobic respiration takes place in human muscles. During exercise our energy requirement increase, so our striated muscles start respiring anaerobically in the lack of oxygen and producers ATP molecules.

S146. The breakdown of glucose (a six carbon molecule) into pyruvate (a three carbon molecule) is called glycolysis. It takes place in the cytoplasm.

S147.

Respiration in Plants	Respiration in Animals
1. Exchange of gases takes place through stomata, lenticels and cuticle.	1. Exchange of gases takes place through gills, lungs, trachea, etc. (They have specific organs for respiration).
2. It occurs at much lower rate.	2. It occurs at much faster rate.

S148. Warm-blooded animals like birds and mammals maintain a constant body temperature under different temperature conditions. They cool themselves in a hotter environment and warm their bodies in a cooler environment. Therefore, these animals need more energy to maintain their body temperature. This requires more cellular respiration which means more oxygen (O_2). Therefore it is more efficient if mammals and birds keep separate oxygenated and deoxygenated blood.

S149. This extra air is called residual volume of air. During the breathing cycle, when air is taken in and let out, the lungs always contain a residual volume of air so that there is sufficient time for oxygen to be absorbed and for the carbon dioxide to be released. Also we need to do extra work to empty and refill the lungs, if there is no residual volume of air inside the lungs

S150. Since the body size of animals is large, the diffusion pressure alone cannot take care of oxygen delivery to all parts of the body.

Instead, respiratory pigments take up oxygen from the air in the lungs and carry it to tissues which are deficient in oxygen before releasing it. In human beings, the respiratory pigment is haemoglobin which has a very high affinity for oxygen.

This pigment is present in the red blood corpuscles. Carbon dioxide is more soluble in water than oxygen is and hence is mostly transported in the dissolved form in our blood.

S151. Our blood consists of:

(a) **Solid elements:** Which include red blood corpuscles (RBCs), white blood corpuscles (WBCs), blood platelets, and

(b) **Liquid element:** The plasma.

S152. (a) **Blood vessels:** Transport of blood/channel for blood movement.

(b) **Blood platelets:** Clotting of blood/prevent excessive bleeding by blood clotting.

(c) **Lymph:** Carries digested fats/Drains excess fluid back to the blood/Fight germs/Gives immunity.

(d) **Heart:** Helps to circulate blood in the whole body by acting as a pump/To pump the blood to various body parts.

S153. Lymph is the extra cellular fluid of the body that is also involved in the transportation of body. It transports the digested and absorbed food fats from the intestines to the blood.

S154. Haemoglobin is a pigment present in RBC. It has a high affinity for oxygen. It carries O_2 from lungs to various tissues which are deficient in oxygen. Presence of less haemoglobin will result in less supply of O_2 to oxygen deficient tissues. A person having less haemoglobin will get tired soon and will have a pale look.

S155. The separation of the right side and left side of the heart is useful so as to prevent oxygenated and deoxygen to the body. This is useful in animals that have high energy needs, such as birds and mammals, which constantly use the energy to maintain their body temperature.

S156. (a) Fish – gills

(b) Bird – lungs

(c) Earthworm – moist skin.

S157. Adenosine triphosphate (ATP) produced during respiration in living organisms and also during photosynthesis in plants.

S158. Aquatic organisms like fishes obtain oxygen from water present in dissolved state through their gills. Since the amount of dissolved oxygen is fairly low compared to the amount of oxygen in the air, the rate of breathing in aquatic organisms is much faster than that seen in terrestrial organisms.

S159. The transport system of organised plants consist of xylem and phloem. Xylem which have vessels and tracheids which transport water and minerals from root to other parts of the plant. Phloem which consists of sieve tubes, sieve cells and companion cells transport food from leaves to storage organs and other parts of the plant. In xylem, the transport is unidirectional i.e. from root upward while in phloem, it is bidirectional.

S160.

Sr. N.	Blood	Lymph
1	Reddish in color	Pale Yellow in color
2	RBCs present	No RBCs
3	Flow is rapid	Flow is slow
4	Bidirectional Flow	Unidirectional
5	Leucocyte count is relatively less.	High leucocyte count
6	Platelets present	Platelets absent

S161. During transpiration the evaporating water carries away heat energy. Thus it cools the temperature of plants.

Due to water loss, the osmotic pressure inside leaves decreases. Due to which water and other mineral is able to reach leaves from roots and stem.

S162. During daytime, stomata is open to diffuse in Carbon Oxide gas for photosynthesis. In parallel, it also facilitates transpiration. Therefore, during daytime the process of transpiration and photosynthesis are interlinked.

S163. Humans have a double circulatory system. The right side of the four chambered heart pumps blood to the lungs only and is called the pulmonary circulation.

The left side of the heart pumps blood to the rest of the body is called the systemic circulation.

S164. (a) (ii) (b) (i) (c) (iv) (d) (iii)

S165. RBC's of blood carries antigen as well as antibody. If blood is not matched before transfusion then blood of receiver start producing antibodies against donor blood and destroys blood cells, this causes deficiency of blood and causes death.

S166.

Xylem	Phloem
(a) It transport water and minerals	(a) It transport food materials
(b) Transport of substances in upwards direction only.	(b) Transport of substances in both directions upward & downward

S167.

Arteries	Veins
1. It carries blood away from the heart.	It carries blood towards the heart.
2. They are thin walled.	They are thick walked
3. They have narrow lumen	They have wide lumen
4. Pressure is high	Pressures is low
5. It carries oxygenated blood.	It caries deoxygenated blood

S168.

Single Circulation	Double Circulation
1. In this, blood passes only once through the heart in one complete cycle.	Blood passes, twice through the heart in one complete.
2. Heart has only deoxygenated blood.	Heart has both oxygenated and deoxygenated blood.
3. It is less efficient.	It is more efficient.

S169.

- Number of leaves
- Number of stomata
- Temperature of Surroundings
- Wind
- Water supply
- Amount of Light

S170. The blood circulation in human heart is called double circulation because the blood passes through the heart twice in one complete cycle of the body – once through the right half in the form of deoxygenated blood and once through the left half in the form of oxygenated blood.

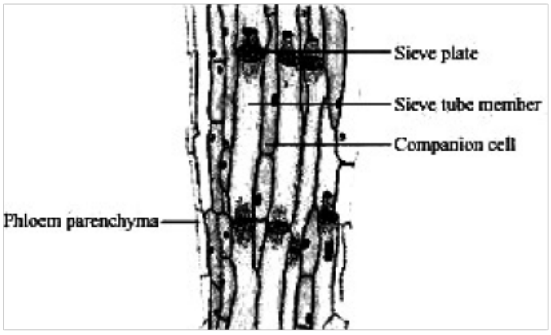
S171. In four chambered heart, left half is completely separated from right half by septa. This prevents oxygenated and deoxygenated blood from mixing. This allows a highly efficient supply of oxygenated blood to all parts of the body. This is useful in animals that have high energy needs, such as birds and mammals.

S172.

Transport of materials in xylem	Transport of materials in phloem
(i) Xylem tissue helps in the transport of water and minerals.	(i) Phloem tissue helps in the transport of food.
(ii) Water is transported upwards from roots to all other plant parts.	(ii) Food is transported in both upward and downward directions.
(iii) Transport in xylem occurs with the help of simple physical forces such as transpiration pull.	(iii) Transport of food in phloem requires energy in the form of ATP.

S173. Haemoglobin is the respiratory pigment that transports oxygen to the body cells for cellular respiration. Therefore, deficiency of haemoglobin in blood can affect the oxygen supplying capacity of blood. This can lead to deficiency of oxygen in the body cells. It can also lead to a disease called anaemia.

S174. Phloem transports food materials from the leaves to different parts of the plant body. The transportation of food in phloem is achieved by utilizing energy from ATP. As a result of this, the osmotic pressure in the tissue increases causing water to move into it. This pressure moves the material in the phloem to the tissues which have less pressure. This is helpful in moving materials according to the needs of the plant. For example, the food material, such as sucrose, is transported into the phloem tissue using ATP energy.



Components of phloem tissue

S175. The components of xylem tissue (tracheids and vessels) of roots, stems, and leaves are interconnected to form a continuous system of water-conducting channels that reaches all parts of the plant. Transpiration creates a suction pressure, as a result of which water is forced into the xylem cells of the roots. Then there is a steady movement of water from the root xylem to all the plant parts through the interconnected water-conducting channels.

S176. In highly organised plants, there are two different types of conducting tissues " xylem and phloem. Xylem conducts water and minerals obtained from the soil (via roots) to the rest of the plant. Phloem transports food materials from the leaves to different parts of the plant body.

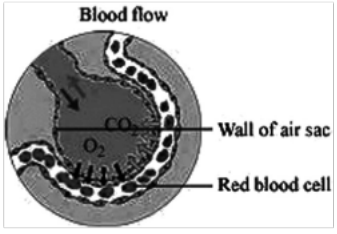
S177. Arteries carry blood from the heart to various organs of the body under high pressure so they have thick and elastic walls. Veins collect the blood from different organs and bring it back to the heart. The blood is no longer under pressure so the walls are thin with valves to ensure that blood flows only in one direction.

S178. Transpiration is important because

(a) it helps in absorption and upward movement of water and minerals from roots to leaves.

(b) it prevents the plant parts from heating up.

S179. Haemoglobin transports oxygen molecule to all the body cells for cellular respiration. The haemoglobin pigment present in the blood gets attached to four O_2 molecules that are obtained from breathing. It thus forms oxyhaemoglobin and the blood becomes oxygenated. This oxygenated blood is then distributed to all the body cells by the heart. After giving away O_2 to the body cells, blood takes away CO_2 which is the end product of cellular respiration. Now the blood becomes de-oxygenated.



Since haemoglobin pigment has less affinity for CO_2, CO_2 is mainly transported in the dissolved form. This de-oxygenated blood gives CO_2 to lung alveoli and takes O_2 in return.

Transportation of O_2 and CO_2 in blood

S180. The amount of urine produced depends on the amount of excess water and dissolved wastes present in the body. Some other factors such as habitat of an organism and hormone such as Anti-diuretic hormone (ADH) also regulates the amount of urine produced.

S181. Plants can get rid of excess of water by transpiration. Waste materials may be stored in the cell vacuoles or as gum and resin, especially in old xylem. It is also stored in the leaves that later fall off.

S182. Many plants store waste materials in the vacuoles of mesophyll cells and epidermal cells. When old leaves fall, the waste materials are excreted along with the leaves.

S183. Glomerulus is a group of capillaries present in the cup like Bowman's Capsule. It receives blood from renal artery which brings excretory wastes from body to the kidney. It filters water, salts, glucose, urea, the nitrogen containing end products of proteins and yellow bile compounds from the liver.

S184. Blood capillaries surrounding the nephrons absorb useful products, such as glucose, amino acids, water, etc. from the glomerular filtrate.

S185. Two vital functions of human kidney are:

(a) Excretion (removal) of nitrogenous wastes from the body in the form of urine.

(b) Osmoregulation of ions and water content inside the body organs.

The procedure used in the working of an artificial kidney is called dialysis.

S186. Total urine excreted per day is about 1.6 – 1.8 litres. The quantity increases with large intake of fluids and decreases with lesser intake of them. If the amount of water and dissolved wastes in body are more than prescried limit the amount of urine will be more and if water and dissolved wastes are less in body, the amount of urine will be less.

S187. White blood corpuscles protect the body from infections by destroying any foreign matter such as bacteria or viruses. They also manufacture antibodies that make the body immunity. Therefore, white blood corpuscles are called 'soldiers' of the body.

S188.

- Remove or excrete nitrogenous wastes
- Regulate water content of the body (osmo-regulation).
- Maintain mineral balance in blood.

S189. The functions of the following in the digestive process are:

(a) **Bile:** Bile in the duodenum emulsifies fat present in the food, *i.e.*, breaks fat molecules into small globules.

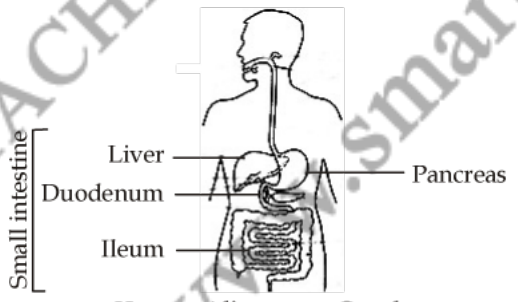
(b) **Bicarbonate secreted by the duodenal wall:** Bicarbonate ions secreted by the duodenal wall mke the medium alkaline because such a medium is required for the action of pancreatic enzymes. Also protect the duodenal wall from acidity of chyme.

(c) **Pancreatic amylase:** Pancreatic amylase acts on starch and hydrolyses it into maltose and isomaltose.

S190. White tooth enamel is calcium phosphate which is very hard. It gets effected when the pH of our mouth falls below 5.5. The bacteria present in our mouth breaks down the food particles into acids which damage our teeth by corroding them.

To prevent the tooth decay, cleaning of the mouth thoroughly after eating with tooth powder/paste, which is basic in nature and neutralises the excess of acid, is a must.

S191.



Human Alimentary Canal

S192. Part played in photosynthesis by

(a) **Water:** Water (H_2O) undergo photosynthesis in light reaction.

$$H_2O \longrightarrow 2H^+ + O + 2e^-$$

$$O + O \longrightarrow O_2\uparrow$$

As a result ATP and NADP are formed which are used in formation of carbohydrates from CO_2.

$$6CO_2 + 12H_2O \xrightarrow[\text{Chlorophyll}]{\text{Sunlight}} C_6H_{12}O_6 + 6H_2O + 6CO_2\uparrow$$

Water also releases O_2 which is given out during photosynthesis.

(b) **Chlorophyll:** It traps solar (light) energy an utilises it in fixing oxides of carbon (CO_2) and hydrogen (H_2O) as carbohydrates.

(c) **Stomata:** They help in exchange of gases. Carbon dioxide needed in photosynthesis is given out through stomata.

S193. The process of photosynthesis is completed in two steps:

- light reaction
- dark reaction

(a) **Light reaction:** The first step of photosynthesis occurs in the presence of light. During this step, chlorophyll contained in the chloroplast of plant cells absorbs light energy. This energy is converted into another form, which can be supplied for the completion of the dark reaction.

(b) **Dark reaction:** This second step of photosynthesis does not require light, and is called dark reaction. It can also carry on in the presence of light. During this step, energy generated during light reaction is used to combine carbon dioxide and water molecules to form energy rich compounds, such as glucose. Oxygen is also released in this process.

The following equation summarizes the raw materials and products of photosynthetic process:

Raw Materials Products:

Sunlight

$$\underset{\text{Carbon dioxide}}{6CO_2} + \underset{\text{Water}}{12H_2O} \xrightarrow[\text{Chlorophyll}]{} \underset{\text{glucose}}{C_6H_{12}O_6} + \underset{\text{water}}{6H_2O} + \underset{\text{oxygen}}{6O_2}$$

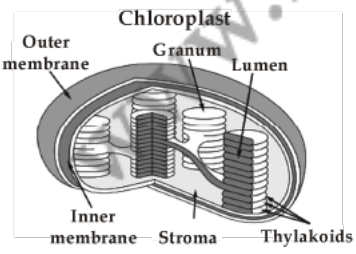
S194. Productivity is directly dependent upon the rate and amount of photosynthesis.

(a) **Temperature:** Photosynthesis decreases with the drop of temperature. It increases with the rise of temperature up to a limit called optimum temperature (20-30°C). Beyond optimum temperature it initially increases and then declines.

(b) **Water:** Though water is a raw material of photosynthesis, its major function is in maintaining turgidity of leaf. Optimisation of water availability increases photosynthesis and hence productivity.

(c) **Carbon Dioxide:** Increase in availability of 'carbon dioxide' will increase plant productivity.

S195. Structure of chloroplast.



S196. (a) Photosynthesis (b) Autotrophs (c) Chloroplast
(d) Guard Cells (e) Heterotrophs (f) Pepsin

S197. During day time, as the rate of photosynthesis is more than the rate of respiration, the net result is evolution of oxygen. At night there is no photosynthesis, so they give out carbon dioxide due to respiration.

S198. Plant kept in continuous light will live longer, because it will be able to produce oxygen required for its respiration by the process of photosynthesis.

S199. Release of CO_2 and intake of O_2 gives evidence that either photosynthesis is not taking place or its rate is too low. Normally during day time, the rate of photosynthesis is much more than the rate of respiration. So, CO_2 produced during respiration is used up for photosynthesis hence CO_2 is not released.

S200. Hints: Mouth cavity
Oesophagus
Stomach
Intestine

S201. (a) Only *A* and *B* portions remained colourless and the rest of the leaf turned blue-black.

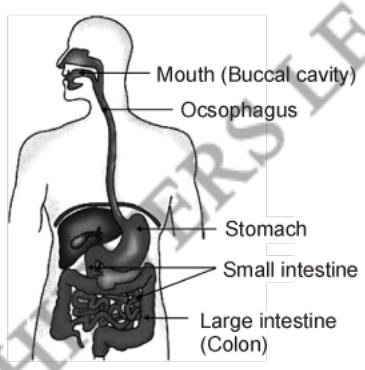
(b) Portion of leaf covered with opaque paper does not get sunlight.

S202. Hints: Absorption of light energy by chlorophyll
Conversion of light energy into chemical energy
Reduction of CO_2 into carbohydrates.

S203. Hints: Mouth cavity
Stomach
Intestine

S204. Hints:
1. Anchoring the plant
2. Source of water and minerals
3. Availability of oxygen for respiration of root cells
4. Symbiotic association with microbes

S205.



S206. Major steps involved in human nutrition are:

(a) **Ingestion:** Intake of food through mouth. Humans have holozoic mode of nutrition. They engulf solid particles.

(b) **Digestion:** The break down complex food material into simpler one in alimentary canal with the help of mechanical as well as chemical process.

(c) **Absorption:** Digested food is absorbed by the small finger like projections, villi present in the small intestine.

(d) **Assimilation:** Absorbed food reaches to all cells via blood, and utilized for energy, growth and development.

(e) **Excretion:** Undigested food from small intestine passed into large intestine, and then it is thrown out by Anus.

S207. Experiment showing CO_2 is essential for photosynthesis.

(a) Take a potted plant with elongated leaves

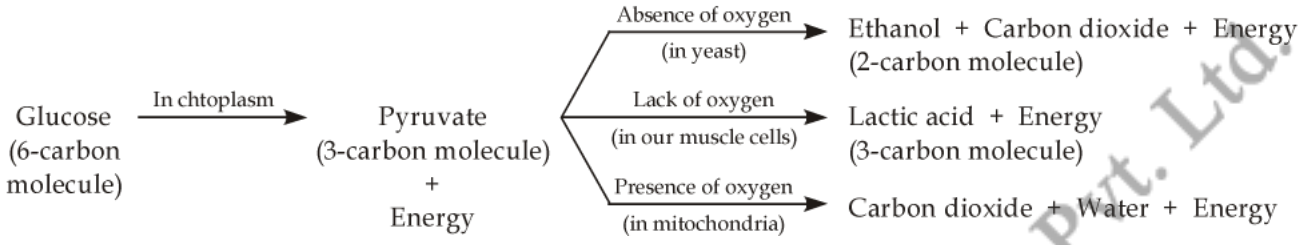
(b) Take an empty bottle and put a little amount of potassium hydroxide (KOH) in it.

(c) Now cut the cork of the bottle into two parts and place it on one of the leaves of the potted plant in between the two parts of the cork.

(d) Now put the bottle in the presence of sunlight 72–96 hours.

(e) Now test the leaf for the presence of starch.

S208. Some organisms use oxygen to break-down glucose completely into CO_2 and water. Such a type of oxidation of food is called as acerobic respiration. Certain bacteria, yeast do not involve oxygen and glucose is incompletely oxidised to form either ethyl alcohol or lactic acid and CO_2 releasing about 50 kcal of energy. Such a type of respiration is called as anaerobic respiration. Glycolysis is a common step in aerobic as well as anaerobic respiration which occurs in cell cytoplasm. In this the six carbon glucose molecule is broken into a 3 carbon pyruvic acid. The pathway of break-down of glucose in various organisms is depicted below:



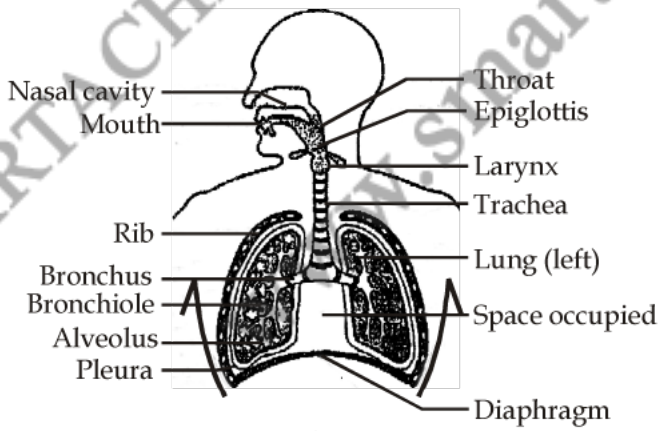
S209. Oxygen and carbon dioxide are two metabolic gases. Oxygen is required by every living cell for cellular respiration whereas CO_2 is formed as a by-product and has to be eliminated from the body. In human beings, a pigment haemoglobin is present in red blood corpuscles (RBC) which has a strong affinity for oxygen, takes up the oxygen from the air in the lungs and carry it to tissues which are defficient in oxygen. Some O_2 is transported in dissolved state in blood plasma. Carbon dioxide which is more soluble in water than oxygen is mostly transported in the dissolved state in our blood. Some CO_2 is transported by haemoglobin as carbaminohaemoglobin.

S210. (a) Glottis is guarded by epiglottis to prevent food from entering the windpipe at the time of swallowing.

(b) The lung alveoli are covered with blood capillaries for the easy diffusion of respiratory gases, since both alveoli and blood capillaries are thin-walled.

(c) The wall of trachea is supported by cartilage rings so that it does not collapse when there is not much air in it.

S211. The function of epiglottis in man is that at the time of swallowing food, the epiglottis closes the tracheal opening thereby preventing the food from entering the windpipe.



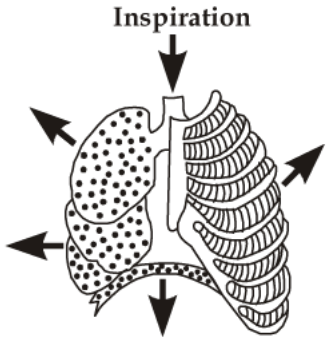
Human Respiratory System

S212. Inhalation or inspiration is the process by which air is brought into the lungs during breathing in human beings. It involves the following steps.

(i) The external intercostal muscles contract causing ribs to pull out and chest cavity to expand.

(ii) Diaphragm contracts and is brought down a little. This also expands the chest cavity.

(iii) There is a contraction of the abdominal muscles. The expansion of chest cavity creates a partial vacuum and atmospheric air rushes the lung.



Thoracic Cavity Enlarged

S213. The three kinds of cells present in blood are:

(a) Red blood corpuscles. (b) White blood corpuscles. (c) Blood platelests.

Functions of each of them are:

(a) Red blood corpuscles contain haemoglobin that combines with oxygen to form oxyhaemoglobin which is transported to the tissues of the body for the purpose of respiration.

(b) **White blood corpuscles** protect the body from infections. They manufacture antibodies which are responsible for immunity.

(c) **Blood platelests** help in the coagulation of blood, thus preventing the further loss of blood in case of injury.

S214. Food is transported in plants through phloem which consists of sieve tubes, sieve cells, phloem parenchyma and companion cells. The transport of soluble products of photosynthesis is called translocation. Besides the products of photosynthesis, the phloem transports amino acids and other substance. These substances are delivered to the storage organs of roots, fruits and seeds and to growing organs. The translocation of food and other substances takes place in the sieve tubes with the help of adjacent companion cells both in upward and downward directions.

The translocation in phloem is achieved by utillising energy. Material like sucrose is transferred into phloem tissue using energy from ATP. This increase the osmotic pressure of the tissue causing water to move into it. This pressure moves the materials in the phloem to tissues which have less pressure. This allows the phloem to move material according to the plant's needs. For example, in the spring, sugar stored in root or stem tissue would be transported to the buds which need energy to grow.

S215. Water and minerals are transported in plants through xylem which consists of tracheids, vessels, xylem parenchyma and xylem fibres. In xylem tissue, vessels and tracheids of the roots, stems and leaves are interconnected to form a continuous system of water-conducting channels reaching all parts of the plant. The root hair which are in contact with the soil actively take up mineral ions. This creates a difference in the concentration of these ions between the root and the soil. Water, therefore, moves into the root from the soil to eliminate this difference. This means that there is steady movement of water into root xylem, creating a column of water that is steadily pushed upwards.

However, this pressure by itself is unlikely to be enough to move water over the heights that we commonly see in plants. Plants use another strategy transpiration pull to move water in the xylem upwards to the highest points of the plant body.

Provided that the plant has an adequate supply of water, the water which is lost through the stomata during transpiration is replaced by water from the xylem vessels in the leaf. In fact, evaporation of water molecules from the cells of a leaf creates a suction which pulls water from the xylem cells of roots. This loss of water in the form of vapour from the aerial parts of the plant is known as transpiration. So transpiration is referred as a necessary evil. The process of transpiration helps in the absorption and upward movement of water and minerals from roots to the leaves. It alsohelps in temperature regulation. The effect of root pressure in transport of water is more important at night. During the day when the stomata are open, the transpiration pull becomes the major driving force in movement of water in the zylyem.

S216. In mammal and birds the blood goes through the heart twice during each cycle. This is known as double circulation.

Deoxygenated blood which enters right auricle and then it enters right ventricle from where it is pumped to lungs for oxygenation. From lungs after oxygenation it comes to left auricle and then enters left ventricle from where it is pumped to various parts of body.

Such system of circulation does not allow mixing of oxygenated and deoxygenated blood which allows efficient supply of oxygen to the body.

S217.

Ttransport in xylem	Ttransport in phloem
(i) Xylem transports mineral and water from root to leaves through stem.	(i) Phloem transports food from leaves to root and storage organs.
(ii) Xylem consists of tracheids and vessels.	(ii) Phloem consists of sieve tuves, sieve cells and companion cells.
(iii) Transport is unidirectional from root to leaves.	(iii) Transport is bidirectional.

S218. The transport system consists of xylem and phloem.

Xylem which have vessels and tracheids to transport water and mienrals from root to other parts of the plant.

Phloem which consists of sieve tubes, sieve cells and companion cells transport food from leaves to storage organs and other parts of the plant.

In xylem, the transport is unidirectional i.e., from root upward while in phloem. it is bidirectional.

S219. **Hints:**

1. Passage of air
2. Gaseous exchange
3. Role of diaphragm
4. Function of rib muscles and alveoli

S220.

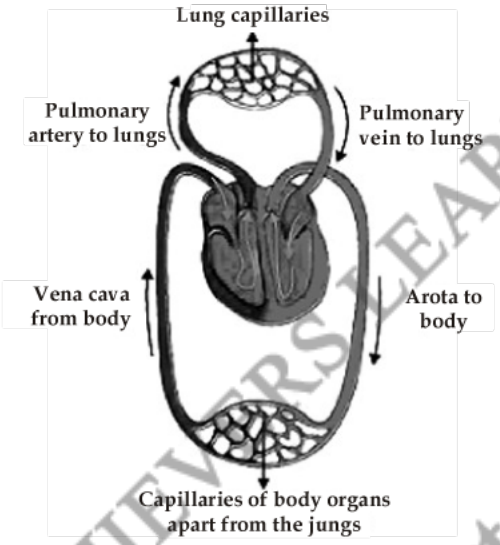
Inhalation	Exhalation
It is taking in of air from the atmosphere	It is expelling out of air from the lungs.
Diaphragm contract & flattens.	Diaphragm relaxes and becomes dome shaped.
Ribs movement is forward & outward.	Ribs movement is downward & inward
Volume of thoracic cavity increases	Volume of thoracic cavity decreases
Pressure of thoracic cavity decreases	Pressure of thoracic cavity increases

S221. No the plant will not remain healthy because no exchange of gases are taking place. It will lead to:

- low respiration.
- no photosynthesis occur.
- no transpiration.

Hence plant will not remain healthy and may die eventually.

Alveoli	Nephron
Structure: (i) Alveoli are tiny balloon-like structures present inside the lungs. (ii) The walls of the alveoli are one cell thick and it contains an extensive network of blood capillaries. **Function:** (i) The exchange of O_2 and CO_2 takes place between the blood of the capillaries that surround the alveoli and the gases present in the alveoli. (ii) Alveoli are the site of gaseous exchange.	**Structure:** (i) Nephrons are tubular structures present inside the kidneys. (ii) Nephrons are made of glomerulus, bowman's capsule, and a long renal tube. It also clntains a cluster of thin-walled capillaries. **Function:** (i) The blood enters the kidneys through the renal artery which branches into many capillaries in the glomerulus. The water and solute are transferred to the nephron at Bowman's capsule. Then the filtrate moves through the proximal tubule and then down into the loop of henle. From henle's loop, filtrate passes into the distal tubule and then to the collecting duct. The collecting duct collects the urine from many nephrons and passes it to the ureter. During the flow of filtrate, some substances such as glucose, amino acids, and water are selectively re-absorbed. (ii) Nephrons are the basic filtr



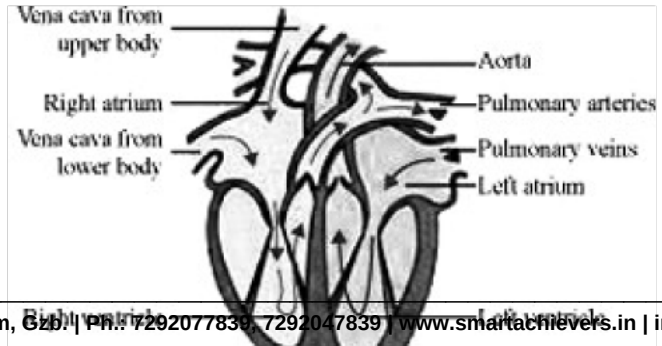
Schematic diagram of blood circulation in humans

Therefore, the blood goes twice through the heart. This is known as double circulation.

The human heart is divided into four chambers – the right atrium, the right ventricle, the left atrium, and the left ventricle.

Flow of blood in the heart:

- The heart has superior and inferior vena cava, which carries de-oxygenated blood from the upper and lower regions of the body respectively and supplies this de-oxygenated blood to the right atrium of the heart.



S223. (a) **Mucus:** It protects the inner living of stomach from HCl.

(b) **Bricarbonate:** It makes the acidic food alkaline so that pancreatic enzymes act on it.

(c) **Trypsin:** It digest proteins into amino acids.

S224. The leaves loose water in the form of water vapours through stomata by a process known as transpiration. Continuous transpiration creates a s suction in the water column of the xylem elements and it reaches upto the roots. This pull is called transpiration pull. Due to transpiration, the water column of the plant is pulled up from below to the top of the plant.

S225. There are three modes for the exchange of gases in plants:

(a) Some small plants can carry out gaseous exchange by simple diffusion over their whole surfaces.

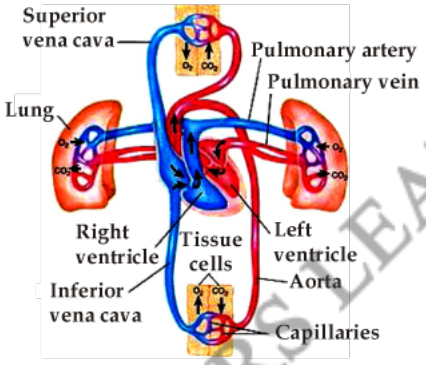
(b) Large flowering plants exchange gases through stomata on their leaves and green stem.

(c) In woody stems, exchange occurs through cracks in the bark or lenticels.

S226. Transportation of organic solutes in the plants is called translocation. It is necessary, because all the cells need food to carry out their vital functions. It occurs in upward as well as downward direction or to the storage organs of roots, fruits, seeds and to growing organs.

S227. Transportation of oxygen and carbon – dioxide occurs with the help of respiratory pigment haemoglobin. Haemoglobin is a red pigment having very high affinity for oxygen. Oxygen is transported from the lungs to the body cells in the form of oxyhemoglobin. Carbon – dioxide is transported from the body cells to the lungs in the form of carbamino – haemoglobin

S228. Diagram – Pulmonary circulation in man.



S229. **Lymph:** The fluid present in the spaces between the cells in the tissues is called tissue fluid or lymph.

Functions of lymph:

(a) It returns tissue fluid from the interstitial spaces into the blood.

(b) Lymph capillaries of intestinal villi called lacteals helps in absorption of fats.

(c) It collects carbondioxide, waste products and metabolites form tissues via tissue fluid.

S230. Distinction between alveoli and nephron:

Alveoli	*Nephron*
Alveoli have thin-walled balloon-like structure. The alveoli provide a large surface area extensively supplied with blood capillaries for exchange of gases in lungs. CO_2 is released in the cavity of alveoli and O_2 present in breathed air is taken by haemoglobin present in RBC of blood.	Nephron is a cluster of very thin-walled filtering units found in kidney. Each nephron comprises of cup-shaped structure called Bowmans capsule, convoluted tubles and collecting duct. Nephron collects the filtered urine, as well as at the same time the useful substanves presrent in the filtrate reabsorbed.

S231. Plants do not produce nitrogenous wastes like urea and uric acid. They produce waste products called secondary metabolities. Alkaloids, tannis, aromatic oils, resin, gums are a few examples of secondary metabolites. The other wastes of plant metabolism are mentioned below along with the mechanism in which they are eliminated:

(a) Plants produce carbon dioxide as wastes during respiration. Oxygen is released as a by product during photosynthesis. Both these are eliminated through minute openings called stomata.

(b) Excess amount of water is removed in the form of vapour by the process called transpiration.

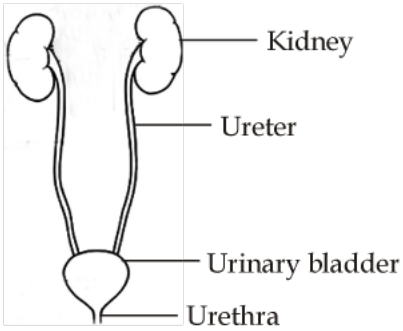
(c) Waste products stored in leaves is eliminated alongwith falling leaves.

(d) Some waste products like gums and resins are deposited in old xylem tissue which becomes non-functional.

(e) Plants also excrete some waste substances into the soil around them through roots.

(f) Bark consists of dead cells which is peeled off periodically. Tannins and other wastes are deposited in the bark.

S232. (a)



Human Urinary System

(b) The two major components of normal human urine are water and nitrogenous substances, most of which is urea.

S233. Glucose is reabsorbed in proximal convoluted tubule by peritubular capillaries.

Vital Function of Kidney.

(a) **Excretion:** Production of urine for elemination of waste products by separation of nitrogenous wastes.

(b) **Osmoregulation:** Maintenance of balance of water and salts in the body through elimination (if extra) or retention (if deficient).

S234. Modes of excretion in plants are:

(a) The plants get rid of excess water by transpiration.

(b) The only major gases excretory product of plants in oxygen. It is released from plants into the environment by diffusion.

(c) Organic wastes of plants are stored within dead permanent tissues such as wood or within leaves or bark which are periodically removed.

(d) The plants also excrete some wastes substances into the soil around them.

(e) Many wastes products of plants are stored in cellular vacuoles.

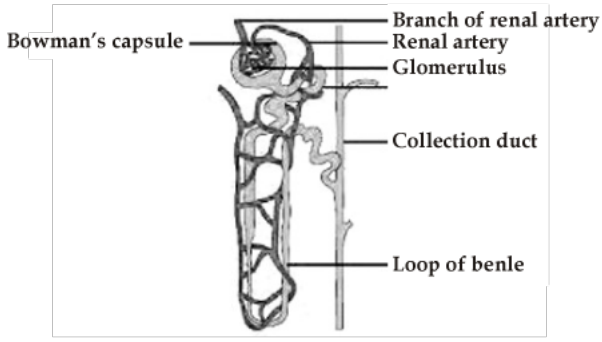
S235. Hints: Nephrons

Filtration

Selective reabsorption

Alimentary canal of man

S236. Nephrons are the basic filtering units of kidneys. Each kidney possesses large number of nephrons, approximately 1-1.5 million. The main components of the nephron are glomerulus, Bowman's capsule, and a long renal tubule.

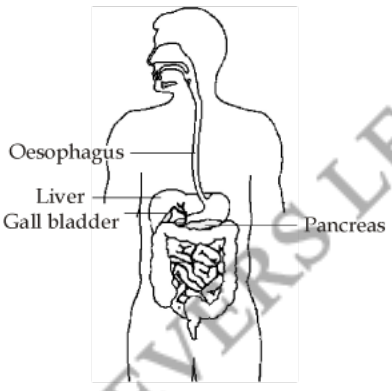


Structure of a nephron

Functioning of a nephron:

- The blood enters the kidney through the renal artery, which branches into many capillaries associated with glomerulus.
- The water and solute are transferred to the nephron at Bowman's capsule.
- In the proximal tubule, some substances such as amino acids, glucose, and salts are selectively reabsorbed and unwanted molecules are added in the urine.
- The filtrate then moves down into the loop of Henle, where more water is absorbed.
- From here, the filtrate moves upwards into the distal tubule and finally to the collecting duct. Collecting duct collects urine from many nephrons.
- The urine formed in each kidney enters a long tube called ureter. From ureter, it gets transported to the urinary bladder and then into the urethra.

S237. (a), (b)



Alimentary Canal of Man

(c) The function of the enzyme 'pepsin' in the digestion process is that it breaks down proteins into peptones in acidic medium of gastric juice.

S238. **Photosynthesis** is a process in which plants use sunlight, chlorophyll, Carbon di-oxide and water to synthesize food.

It occurs in two stages:

(a) **Light reaction:** During this reaction ATP and NADPH are generated. This step is light dependent.

(b) **Dark reaction:** It is not dependent on light. During this reaction, carbon di-oxide is produced to carbohydrate. Source of energy is ATP and NADPH.

Factors affecting rate of photosynthesis process:

(a) **Light:** Rate of photosynthesis increases at the low intensities and decreases at its higher intensities.

(b) **Temperature:** Low and high temperature has inhibitory effect on the rate of photosynthesis.

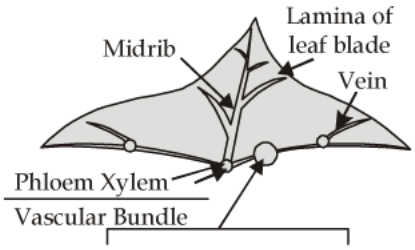
(c) **Water:** The rate of photosynthesis will become slow under water deficient conditions.

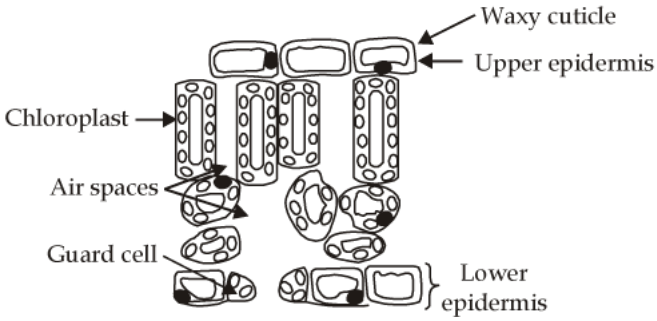
(d) **Carbon dioxide:** the rate of photosynthesis increases with an increase in CO_2 concentration up to a certain level beyond that it may prove inhibitory.

S239.(a)

Autotrophic	Heterotrophic
They can manufacture their own food by process of photosynthesis	They depend on other plants or other animals for food.
For food manufacture they require CO_2, H_2O and sunlight *e.g.*, green plants.	They consume complex food which gets digested into small soluble compounds by digestion *e.g.*, human beings, cow etc.

(b)





S240.(a) Salivary amylase.

Breaks down starch to give sugar.

(b) break down of large fat globules to smaller globules.

(c) Glucose.

(d) To increase the surface area for exchange of gases.

S241. **Nutrition:** It can be defined as the process by which the organism ingests, digests, absorbs, transports and utilizes nutrients and disposes off their end products. It can also be defined as 'Food at work in the body."

Nutrients: These are those substances which supply nourishment to living organisms from its surroundings and use it as an energy source or for biosynthesis of body constituents.

Difference between Holozoic Nutrients and Saprophytic Nutirtion:

Holozoic Nutrition	Saprophytic Nutrition
(a) In holozoic nutrition, solid food is broken into simpler soluble forms by the action of digestive enzymes.	(a) In saprophytic nutrition, the organisms obtain nutrients from the dead and decaying organic matter.
(b) This type of nutrition takes place in four steps namely, ingestion, digestion, absorption and egestion. **Examples:** Amoeba and Human beings	(b) This type of nutrition takes place by absorption of body surface. **Examples:** Fungi and Bacteria

S242.(a) Salivary amylase – Breaks down starch to give sugar.

(b) break down of large fat globules to smaller globules – emulsification.

(c) Glucose.

(d) To increase the surface area for exchange of gases.

S243.(i) **Bile:** Emulsification of fats.

(ii) **Salivary amylase:** Digest starch in mouth.

(iii) **HCl:** Activate pepsinogen by making medium acidic in stomata.

S244.(a) The process of photosynthesis involves the activities of a number of enzymes. These enzymes work more efficiently within a certain range of temperature which is neither very low nor very high. At low temperature the activity of enzymes is lowered due to which the rate of photosynthesis is also low. Again when the temperature is very high, the activity of enzymes decreases, which leads to low rate of photosynthesis.

(b) Green light is least useful in photosynthesis because the chlorophyll pigment reflects it back.

(c) Activity to show that chlorophyll is necessary for photosynthesis is plants:

(i) A potted plant is kept in dark continuously for 72 hours.

(ii) A leaf of this plant and also a leaf of a plant kept in the Sun for a long time is taken.

(iii) The leaves are dipped in boiling water for a few minutes to denature the enzyme.

(iv) Then the leaves are boiled in alcohol.

(v) The process will remove the chlorophyll and leaves will turn colourless.

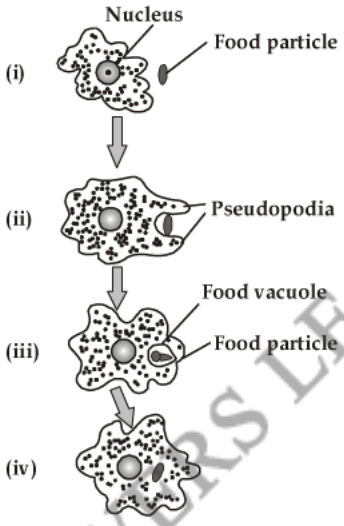
(vi) Again the leaves are put in hot water to make them soft.

(vii) A few drops of iodine solution is poured on both the leaves and the colour is observed.

(viii) The colour of the leaf kept in sunlight will turn blue, which shows the presence of starch. The leaf that was kept in dark becomes brown.

From his observation, it is shown that chlorophyll is necessary for photosynthesis in plants.

S245.(a) Nutrition in Amoeba



(b) Salivary glands – salivary amylase – break starch into sugar

Pancreas – pancreatic amylase (juice) – digest starch

Intestinal glands – intestinal amylase – digest starch

(c) Acidic pH in stomach – due to hydrochloric acid secreted by stomach & alkaline pH in small intestine – due to bile (liver)/ pancreatic juice (pancreas)

S246.(a) The pulmonary vein brings oxygenated blood to the human heart.

(b) The left auricle of human heart receives oxygenated blood.

(c) (i) When oxygenated blood comes into the left atrium it contracts and pours blood into left ventricle.

(ii) The left ventricle contracts and the oxygenated blood from here is distributed to all parts of the body though aorta.

S247. Human transport system has two components — blood vascular system and lymphatic system.

Blood vascular system comprises of blood, blood vessels and heart.

Heart is the pumping organ of blood vascular system.

The cellular component comprises of three types of cells — red blood cells, white blood cells and blood platelets.

Red blood cells — RBC plays an important role in transport of nutrients, excretory materials, hormones, gases etc. Oxygen is transported as oxyhaemoglobin and CO_2 as caraminohaemoglobin.

White blood cells — WBC are considered as the soliders of our body as they phagocytose germs/microbes. They combat foreign bodies by prodicung antibodies and histamine.

Blood platelets — Platelets play an important role in coagulation or clotting of blood.

Blood vessels are of three types amely arteries, veins and capillaries

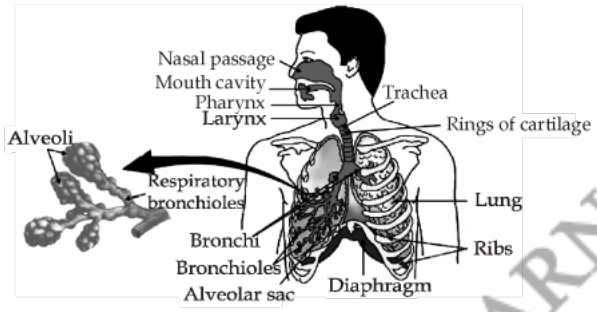
Arteries are blood vessels that take away blood from heart to different body parts.

Veins carry deoxygenated blood towards heart from various body parts.

Capillaries — Exchange of materials between blood and living cells through tissue fluid is facilitated by capillaries.

Lymphatic system which comprises of lymph, lymph vessels and lymph nodes help in picking up tissue secretion and passing into blood. it maintains the blood volume. it also acids in defence of our body.

S248. (a) Human respiratory system

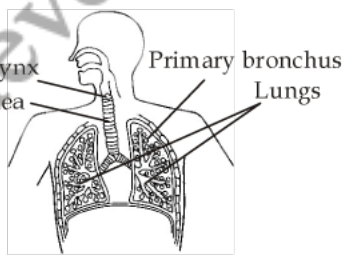


(b) **Fat:** fatty acid + glycerol

Protein: amino acids

S249. Mechanism of Respiration: It occurs in following steps:

(a) **Breathing:** Taking in oxygen and expelling carbon-dioxide out is called breathing. It involves following steps:



(i) **Inhalation:** It is taking in oxygen. It occurs due to contraction of muscles attached to ribs. This lifts ribs and flatter diaphragm, which increase the volume of thoracic cavity. Hence the pressure inside the thoracic cavity decreases and air rushes inside of the lungs.

(ii) **Exhalation:** It is expelling of carbon-dioxide. It occurs due to relaxation of muscles attached to ribs and diaphragm is done shaped. This decreases the volume of thoracic cavity and decreases air pressure and expels CO_2 out of the lung.

(b) **Exchange of gases:** It takes place between the alveoli of lungs and surrounding blood capillaries .

(c) **Transport of gases in blood:** Hemoglobin present in the blood transport. O_2 and CO_2 in blood. Oxygen is transport from the lungs to the body cells in the form of any hemoglobin.

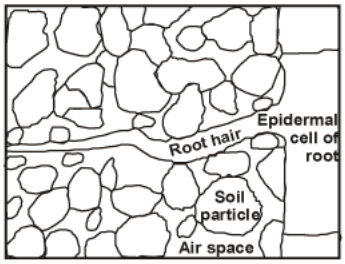
(d) **Oxidation of food:** Break down of glucose molecules which produce energy. It occurs is into chondria.

S250. **Difference between Respiration in plants and Respiration in animals:**

Respiration in plants	Respiration in animals
(i) Plants do not have respiratory system.	(i) Animals have respiratory system.
(ii) Direct diffusion of respiratory gas into the cells.	(ii) The respiratory gases are transported up to the tissue cells.
(iii) Plant respiration occurs at slower rate.	(iii) Animal respiration occurs at faster rate.

Gaseous exchange through root hair in plants:

Roots take up oxygen present in between the soil particles by the process of diffusion. Root hairs, the extension of epidermal cells of root are in contact with oxygen in the soil. Oxygen diffuses into root hairs and passes into other cells of the root. Carbon dioxide from root cells moves out into the soil. Thus, root hair provide increased surface area for gaseous exchange.



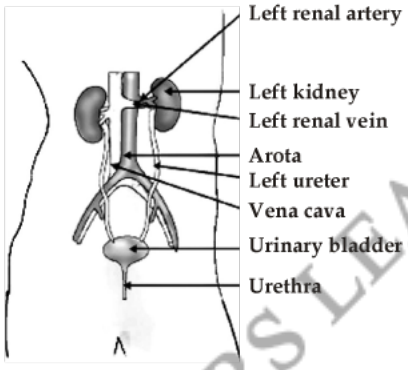
S251. (a) The pulmonary artery brings deoxygenated blood to the human heart.

(b) The right auricle of human heart receives deoxygenated blood.

(c) (i) Right auricle pours deoxygenated blood into right ventricle.

(ii) From right ventricle deoxygenated blood flows to the lungs through pulmonary artery for oxygenation.

S252. (a) Excretory system in human beings.



(b) Function of Nephron: Filtration; Reabsorption; Secretion.

(c) Function of artificial Kidney Helps to remove harmful waste extra salts and water.

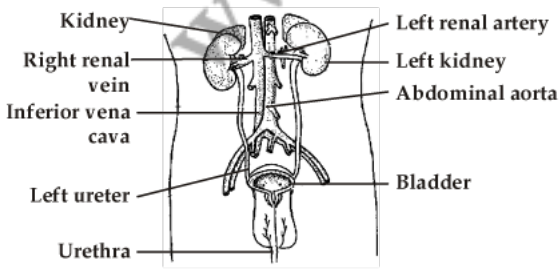
Control Blood Pressure. Maintain the balance of sodium and potassium salts in a patient whose kidneys have failed.

S253. (a) **Kidney:** It is the functional unit of excretory system. Each kidney is made up of about million microscopic coiled channels called nephrons. Nephrons are the basic filtration unit in the kidneys. It consists of – Glomerulus's, Bowman's capsule, convoluted tubule.

(b) **Ureter:** Wastes comes out of the kidney into the ureter.

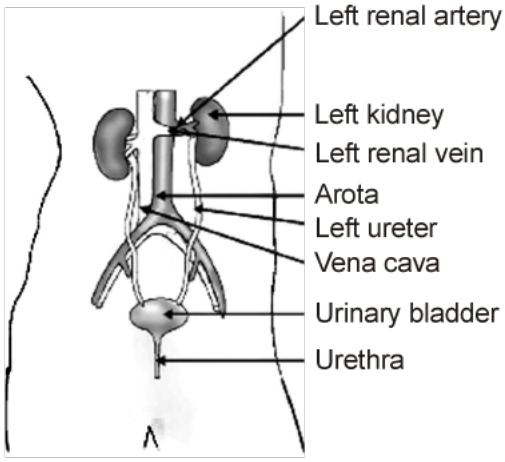
(c) **Urinary bladder:** Ureter pours its contents into a muscular sac called the urinary bladder.

(d) **Urethra:** Urine flows from bladder to the outside through the urethra.



Human Excretory System

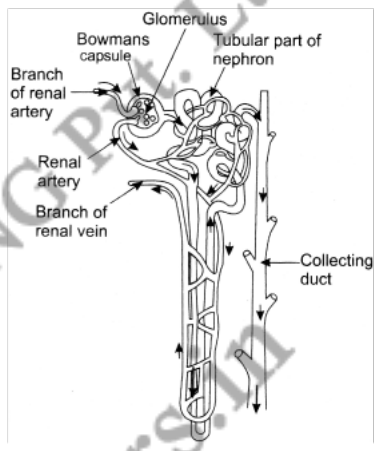
S254. (a) Excretory system in human beings



(b) Each kidney has large numbers of filtration units called nephrons packed close together. Some substances in the initial filtrate, such as glucose, amino acids, salts and a major amount of water, are selectively reabsorbed, leaving the urine as waste.

(c) Water, resins, gums

S255. Nephron is a structural and functional unit of kidney. A nephron has two prts — malpighian body and renal tubule.



Malpighian body or renal corpuscle comprises of Bowman's capsule (a cup chped structure) and glomerulus (a bunch of fine blood vessels in Bowman's capsule).

Renal tubule comprises of convoluted tubules which opens into a collecting tubule. Collecting tubules of different nephrons joins to form a collecting duct.

Nephrons filter the blood order to remove nitrogenous metabolic waste. They also absorb some useful usbstances such as glucose, amino acids, minerals and major amount of water from the filtrate.