Life Processes

Assess Yourself

Q. 1. What is normal breathing rate in an adult man at rest?

Answer: In an adult man at rest the normal breathing rate is 12 to 15 times per minute.

Q. 2. Why do the divers carry oxygen for artificial respiration?

Answer: The amount of dissolved oxygen in the water is quite low as compared to air which cannot fulfill the requirement of oxygen for breathing and hence affect the respiration process.

Specifically, underwater oxygen is available in dissolved form and humans cannot take in dissolved oxygen.

Therefore, in order to fulfil the requirement of oxygen for respiration process divers carry oxygen with them.

Q. 3. Which cartilage of larynx forms "Adam's apple" in man?

Answer: Thyroid cartilage of larynx forms Adam's apple in man.

Q. 4. Why is blood called a 'liquid connective tissue'?

Answer: Blood is called a liquid connective tissue because blood consists of a liquid medium which is known as plasma and since it transports different gases, hormones, nutrients, enzymes to different parts of our body, blood establishes a connection between each cell of body.

Therefore, blood is called a liquid connective tissue.

Q. 5. Give one functional difference between RBC and WBC.

Answer:

Function of RBC	Function of WBC
Red blood cells help in transportation of respiratory gases.	White blood cells help in giving immune response against any foreign particle entering our body.

Q. 6. Arrange the terms in correct sequence:

Glomerulus, renal vein, efferent arterioles, renal artery, afferent arterioles, secondary capillaries.

Answer: The correct sequence is as follows:

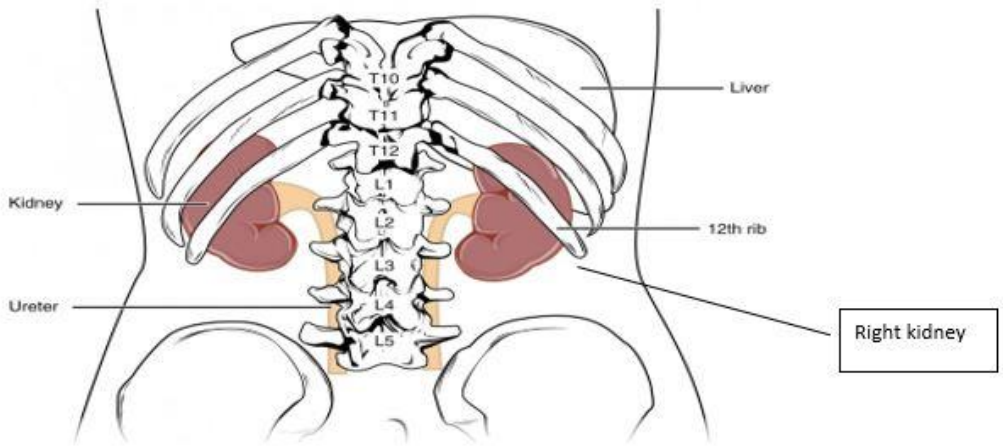
Afferent arteriole, Glomerulus, Efferent arteriole, Renal artery, Secondary capillaries, Renal vein

Q. 7. Why is right kidney slightly lower in position compared to the left kidney?

Answer: Two kidneys are present in our body- one in left side and other on the right side respectively.

But the position of right kidney is slightly lower than the left kidney due to the presence of liver and large size of liver on the right side. To accommodate the size of liver the position of right kidney is slightly lower than the left kidney.

Following picture depicts the same thing explained above:



Q. 8. Why leaves become yellow in the absence of light?

Answer: Presence of light is quite necessary for plants because in presence of light plants by the process of photosynthesis synthesizes their food. In the absence of light the process of photosynthesis is not possible.

For synthesis of food presence of a pigment called chlorophyll is also necessary which absorbs the sunlight and helps in photosynthesis process. The colour of this pigment is green and therefore most of the plants exhibit green colour.

But when there will be no sunlight, no photosynthesis takes place and as plant will not get energy there will be no chlorophyll in the plant after some time and thus plant start becoming yellow in the absence of light.

Q. 9. Bile juice does not contain any digestive enzymes, yet it is essential for digestion, why so? Explain.

Answer: Given statement is true that bile juice does not contain any digestive enzymes, yet it is essential for digestion.

Bile juice helps in the digestion of fats and lipids in an indirect way. When fats reach the small intestine, digestive enzymes are not able to act upon them because of their large globular size. So, the role of bile juice comes into existence over here. They break those large globular fat molecules into small molecules and this process is known as emulsification of fats. As, the large globular fat molecules are converted into small fat molecules digestive enzymes can now act on the fat globules and digestion of fats take place.

Therefore, bile juice helps in the digestion by the process of emulsification.

Q. 10. Name two proteases in pancreatic juice. What are their specific roles?

Answer: Following are the two proteases in pancreatic juice:

•Trypsin: It helps in the digestion of proteins.

•Chymotrypsin: It helps in the breakdown of proteins into smaller molecules.

Q. 11. Name two animals having cutaneous respiration. What special features of the skin make cutaneous respiration effective?

Answer: Frogs, snakes have cutaneous respiration.

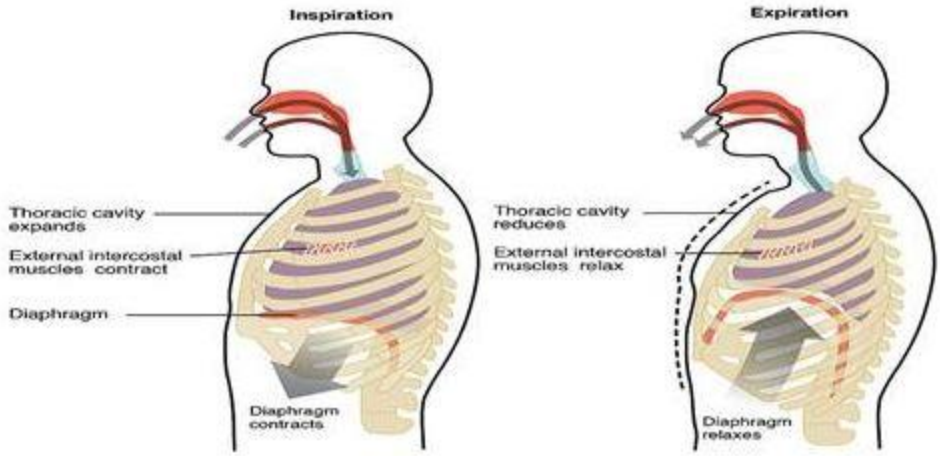
Following are the special features of the skin that make cutaneous respiration effective:

•Moist and delicate nature of the skin makes the cutaneous respiration effective.

Q. 12. How are inspiration and expiration brought about in human beings?

Answer: Inspiration in human beings: Inspiration is the process in which we take the air inside the lungs. During this process the lifting of ribs and flattening of the diaphragm takes place. Due to this size of the thoracic cavity increases and pressure inside the lungs remain low as compared to atmospheric pressure and we inhale the air. This process is called inspiration.

Expiration in human beings: Expiration is the process in which we exhale the air outside our lungs. During this process relaxation of the lungs and diaphragm takes place. Due to this the size of thoracic cavity decreases and pressure inside the lungs is high as compared to atmospheric pressure and as a result we exhale the air outside the lungs. This process is called expiration.



Q. 13. If one hold his breath after expiration for about 30 sec., would there still be occurring any exchange of respiratory gases in the lung during this period? Explain.

Answer: Yes, if someone holds his breath after expiration for about 30 sec there would still be occurring exchange of respiratory gases in the lungs during this period because after a normal expiration some amount of air remains in our lungs which we call as residual volume which is 1100-1200 ml. When we uphold our breath the exchange of this residual volume gases will continue in our lungs.

Q. 14. Name the water and minerals conducting element of non-flowering plants. Mention how conduction takes place in it.

Answer: Xylem is the water and minerals conducting element of non- flowering plants. Xylem tracheids remain present in non-flowering plants and xylem vessels are absent.

Conduction takes place in the following manner:

To form a continuous system for water and mineral transportation, element of xylem-tracheids (Another element vessel is absent in non-flowering plants) remain interconnected in roots, stem and leaves.

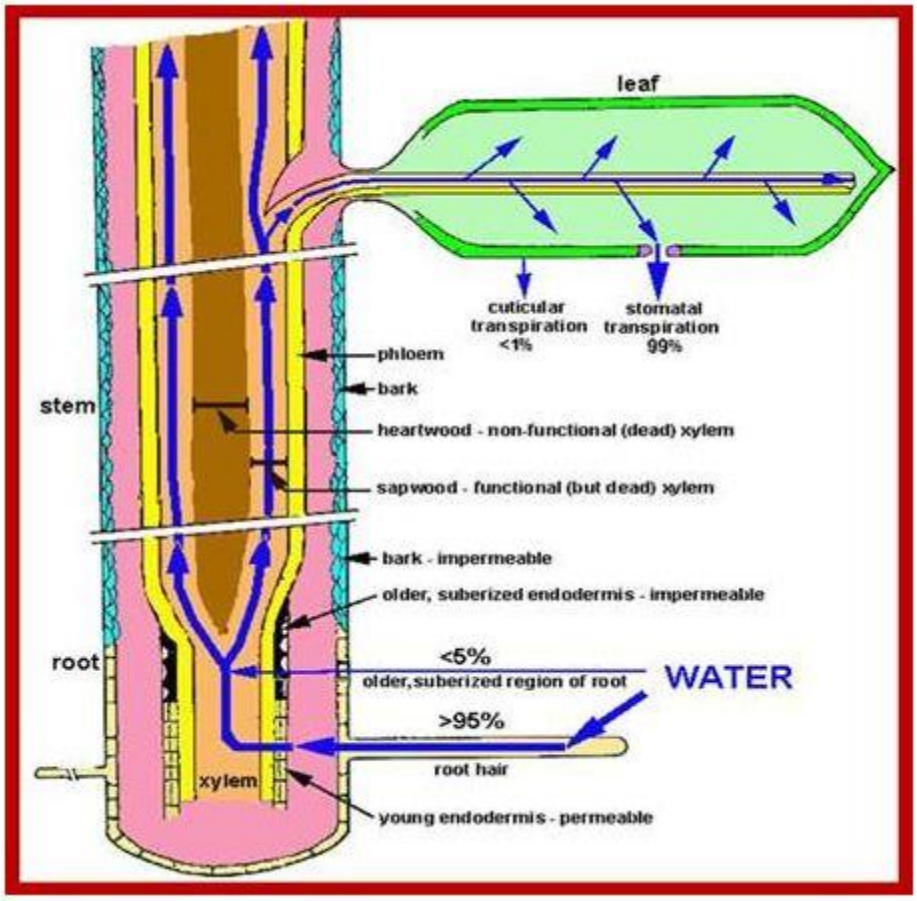
Root cells always remain in contact with the soil and take different ions from it, due to which a concentration gradient arises between root and soil. To overcome this concentration gradient water from the soil moves to the root cells. So, water in the root

xylem creates a column and water is pushed upwards. But in plants with great height this pressure is not sufficient to move the water.

Other phenomenon comes over here. Whenever there is excess water in plants evaporation occurs from the stomata which are on the leave surface and this process is called Transpiration. This process creates a negative pressure due to which water is pulled upwards and in this way water is transported in plants with great height.

Q. 15. Give a schematic diagram to show absorption of water through root hairs.

Answer: A schematic diagram showing absorption of water through roots is presented below:

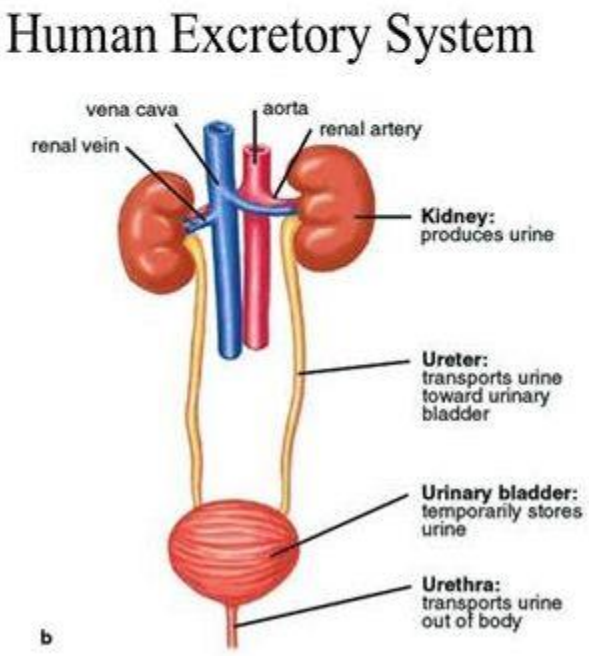


Q. 16. Differentiate between ureter and urethra.

Answer:

Ureter	Urethra
Ureters are tube-like structure which arises from each kidney.	Urethra is a tube-like structure which arises from urinary bladder.
Ureters carry urine from kidney to the urinary bladder.	Urethra excretes out the urine from the urinary bladder.
Ureters are two in number and are long tubes.	Urethra is single and is small.

Following picture of excretory system depicts ureters and urethra:



Q. 17. Distinguish between photosynthesis and respiration.

Answer:

Photosynthesis	Respiration
This process takes place only in autotrophic organisms like plants.	This process takes place in both autotrophs and heterotrophs like plants and animals.
In this process, plants synthesise their food in the presence of sunlight, carbon dioxide and water.	During this process exchange of gases takes place in which carbon dioxide is removed from the body and oxygen is taken inside.
Presence of sunlight is an important requirement for photosynthesis to take place.	Respiration has nothing to do with the sunlight.
In this process, carbon dioxide is taken inside while oxygen is released out.	In this process, oxygen is taken inside and carbon dioxide is released out.
Glucose (food) is formed in this process as a product.	No glucose formation takes place while respiration

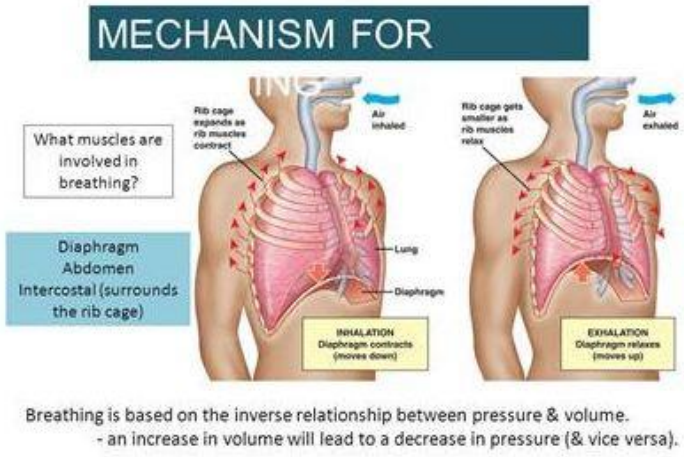
Q. 18. With a schematic diagram, explain the overall process of respiration.

Answer:

Overall process of respiration comprises of two steps: Inspiration and expiration.

Inspiration: During this process we inhale the oxygen-rich air through the nostrils which passes through the trachea and then through bronchioles finally reaches the alveoli. What happens during this process is that diaphragm becomes flattened and rib cage expands. Due to this the size of the thoracic cavity increases. The pressure during this process is low inside and is high outside and as a result we inhale the oxygen-rich air and this process is called inhalation.

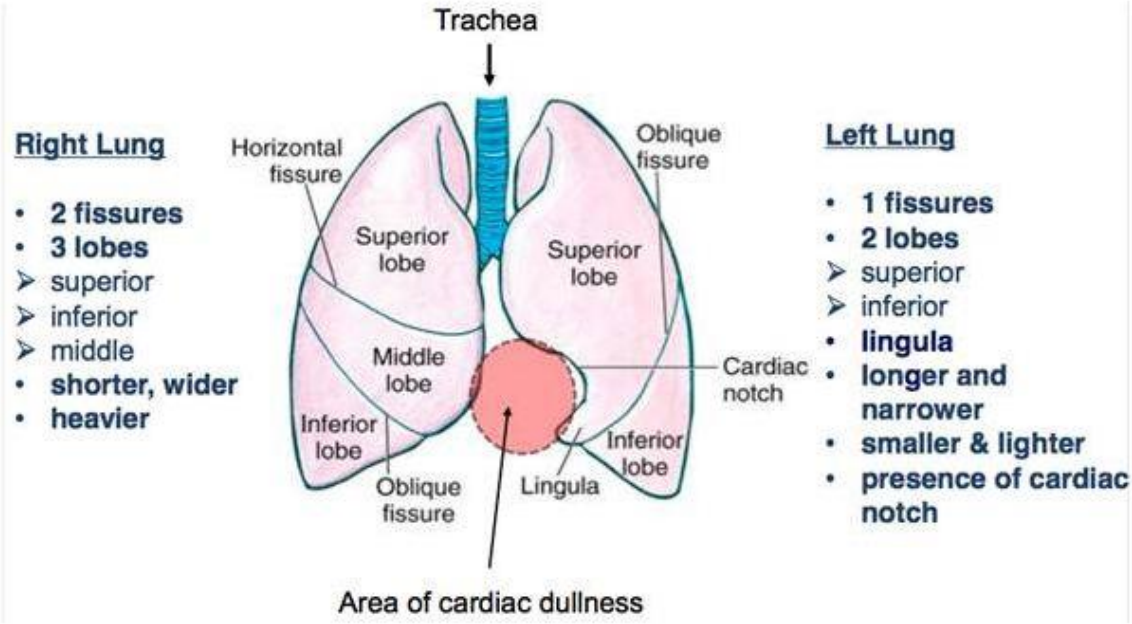
Expiration: During this process we exhale the CO_2 rich air outside the body. The diaphragm becomes flattened and the size of the thoracic cavity decreases. Due to this the pressure inside the lungs is high as compared to atmospheric pressure and as a result the air is exhaled outside the lungs.



Q. 19. Differentiate between left lung and right lung of humans.

Answer:

Left Lung	Right Lung
It is greater in size as compared to right lung.	It is shorter in size as compared to left lung due to presence of liver.
It is less wide as compared to right lung due to tilting of heart towards left lung.	It is wider as compared to left lung.
It is divided into two lobes.	It is divided into three lobes.



Following picture also depict the difference of the right and left lung:

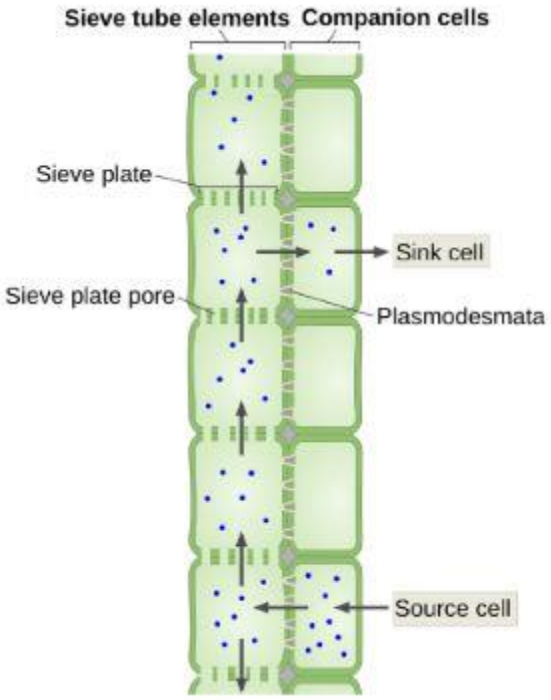
Q. 20. Differentiate between lymphatic capillaries and blood capillaries.

Answer:

Lymphatic capillaries	Blood capillaries
They are related to transportation of lymph.	They are related to transportation of blood.
Lymph flows with very little pressure in lymphatic capillaries.	Blood flows with more pressure in blood capillaries as compared to lymph capillaries.
They are not visible due to colourless nature of lymph.	They are visible due to red colour of blood.

Q. 21. Draw a sieve tube and label the various parts. Name the dead elements of the phloem.

Answer: Following is the labelled diagram of sieve tube:



Dead element of phloem is: Phloem fibers

Q. 22. Name the main organs of the human digestive system in the order they participate in the process of digestion. Describe how digestion of carbohydrates and proteins take place in our body.

Answer: Main organs of the human digestive system participate in the following order in process of digestion:

Mouth, oesophagus, stomach, small intestine, large intestine, rectum and anus.

Digestion of carbohydrates takes place in following manner: Major carbohydrates that we take are starch, sucrose, lactose.

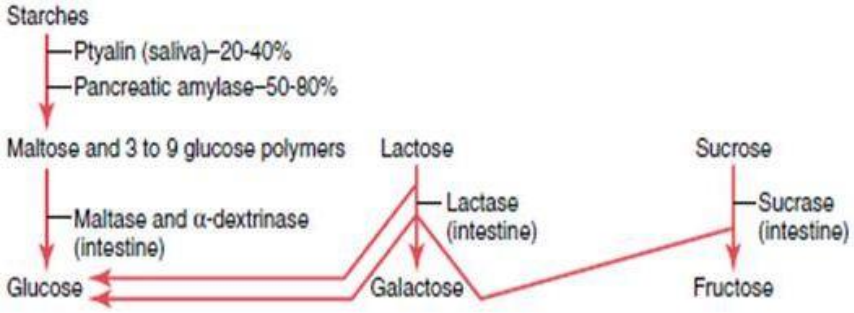
Digestion of carbohydrates takes place in mouth and stomach and in following steps:

•When food is chewed it is mixed with the ptyalin secreted in mouth and break down carbohydrates in small products. Only 5% of digestion takes place here.

•Then digestion continues in stomach where gastric and acidic secretions of stomach cause 30 to 40% of digestion.

•As partially digested food empties from stomach to duodenum further digestion is caused by pancreatic amylase which converts them into small polymers.

•Final digestion is caused by small intestine where villi contain enzymes like sucrase, lactase, maltase and dextrinase which cause their final digestion by converting them into constituent monosaccharides.



Digestion of proteins takes place in the following manner:

Digestion of proteins begins in stomach and takes place in following manner:

Pepsin enzyme is responsible for the protein digestion in stomach. It is activated at acidic pH and cause little bit digestion of proteins thereby converting them into small molecules.

Further digestion takes place by pancreatic juices. Pancreatic enzymes like trypsin, chemotrypsin are release by pancreas in small intestine where these enzymes broke down protein further into very small molecules.

Further peptidase of small intestine break down small molecules of protein further and absorption takes place and digestion of proteins gets completed.

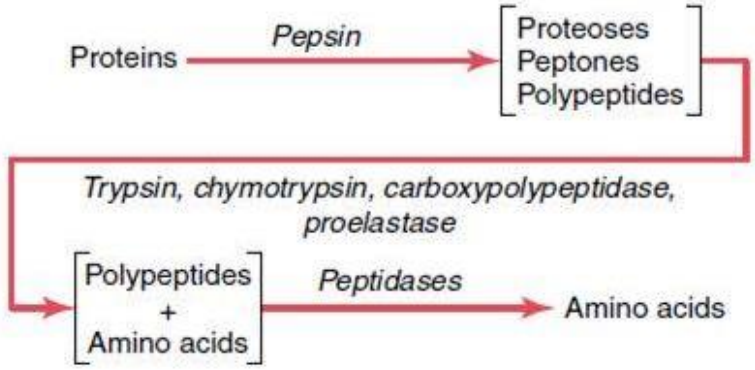


Figure 65-2 Digestion of proteins.

Q. 23 A. What is meant by breathing? What happens to the rate of breathing during vigorous exercise and why?

Answer: Breathing: Breathing refers to the process of taking outer oxygen-rich air inside and exhaling inner carbon dioxide rich air outside or we can say it is the process of exchange of gases.

The rate of breathing increases during vigorous exercise because during vigorous exercise our body consumes more amounts of energy and our body needs more amount of oxygen and need to remove CO_2. So, in order to fulfill this requirement of the body breathing rate increases during vigorous exercise.

Q. 23 B. Define translocation with respect to transport in plants. What is it essential for plants? Where in plants are the following synthesized?

(i) Sugar

(ii) Hormone

Answer: Translocation refers to the transport of the soluble products formed due to photosynthesis to different parts of the plant.

Whereas, transport in plants refers to the transport of water and minerals to different parts of plant.

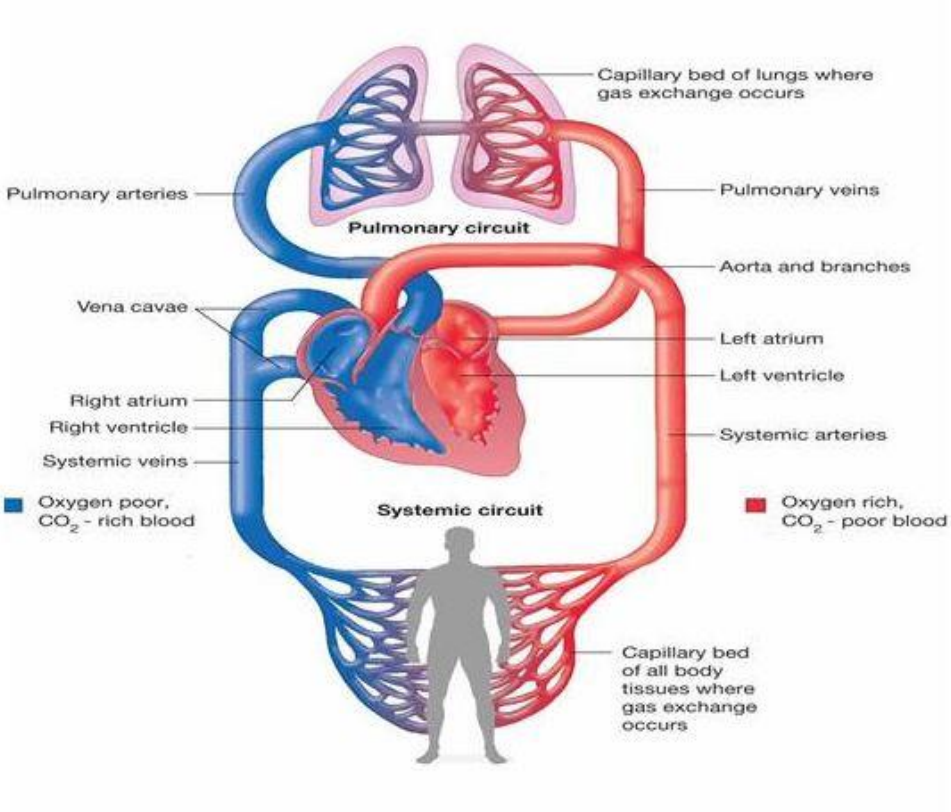
It is essential for plants because this process helps all parts of plant to receive the synthesised food, water and minerals and is essential for the survival of plant.

(i) Sugar is synthesised in leaves of the plant.

(ii) Hormones: There are various hormones secreted by plants. Therefore, there are various parts of plants which are associated with hormone synthesis like- Root tips, stems, young fruits, ripe fruits etc.

Q. 24. Explain with a schematic representation the exchange of gases in tissues.

Answer: Following is the schematic representation of exchange of gases in tissues:



cardiopulmonary-system-diagram-diagram-of-the-cardiovascular-system-human-circulatory-system.jpg

First of all the gaseous exchange takes place between the alveoli and blood. Here the alveoli have great partial pressure of oxygen and less partial pressure of CO_2 while in blood the partial pressure of CO_2 is more and partial pressure of O_2 is less. So, exchange of gas takes place between blood and alveoli. The oxygen is transferred to blood and CO_2 is transferred to alveoli.

Same thing happens between blood and cells or other body tissues. Here the partial pressure of oxygen is more in blood and less in tissues while the partial pressure of CO_2 is more in tissues and less in blood. So, exchange of gases takes place and tissues receive oxygen from blood and transfer CO_2 to blood.

In this way tissue receives oxygen.

Q. 25. Explain the various functions of blood.

Answer: Following are the functions associated with the blood:

•There is fluid portion in the blood which we call as plasma. It helps in the transportation of CO_2, food, nitrogenous wastes, hormones as they remain dissolved in the blood.

•Red blood cells remain present in blood and have great affinity for oxygen. It helps in the transportation of oxygen which remains bounded to Red blood cells.

•Blood also consists of White blood cells which helps person to fight against various diseases.

Q. 26. (a) Name the blood vessel that brings deoxygenated blood to the human heart.

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

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

Answer:

(a) Vena cava brings the deoxygenated blood to the human heart.

(b) Right atrium receives the deoxygenated blood from vena cava which it further transfers to right ventricle.

(c) Firstly, right atrium receives deoxygenated blood from the vena cava which brings deoxygenated blood from all over the body. Then, from right atrium this blood is transferred to right ventricle. Right ventricle transfers this blood to pulmonary artery which carries this deoxygenated blood to the lungs for oxygenation.

Q. 27. You were traveling with your family in your car. The car was driven by your father. On your way, you saw a biker on the road who met an accident is bleeding profusely. Your mother wanted to stop and help the accident victim. Your father however did not want to stop as he felt police may harass them if they stop?

(a) What values were shown by your mother?

(b) What happens if a person bleeds profusely?

(c) What will you do if the hospital refuses to provide treatment unless the accident case is registered by police?

Answer: (a) These are moral values which every human must show. Helping and saving life of any person is a great deed and we always do such kind of job because our little help can save someone's life.

(b) If a person bleeds profusely then he/ she will get die after some time because blood plays very important function n our body. It circulates oxygen in our complete body which each cell require in order to survive. When bleeding will continue, there will be no connective tissue in the body which will provide oxygen to all parts of body for sustaining the life. So, after some time person will die.

(c) We will firstly give the primary treatment or first- aid by our self in order to stop the bleeding. Then, we will try to convince the doctor as it is the matter of someone's life or should try to contact the police as soon as possible in order to save the life of the person.