



SCIENCE CLASS X

CHAPTER- 4 LIFE PROCESSES

Q.1. State one similarity between lungs and gills.

Ans. Both lungs and gills are respiratory organs of terrestrial and aquatic organisms respectively.

Q.2. If a cell is given adequate supply of oxygen, which respiration process will it follow?

Ans. A cell will follow aerobic respiration as there is assurance of sufficient supply of oxygen.

Q.3. How do plants utilise the carbon dioxide produced during respiration?

Ans. Plants utilise carbon dioxide produced during respiration to perform photosynthesis.

Q.4. What is the haemoglobin? Where is it found?

Ans. Haemoglobin is a respiratory pigment in human beings. It is present in the Red Blood Corpuscles (RBCs).

Q.5. Why carbon dioxide is always transported in dissolved form?

Ans. Carbon dioxide is always transported in dissolved form because it is more soluble in water.

Q.6. Define breathing.



Ans. A physical process by which oxygen is taken in and carbon dioxide is given out called breathing.

Q.7. What is the principle of exchange of gases?

Ans. Diffusion is the principle of exchange of gases.

Q.8. What are the maximum number of oxygen molecules, which one haemoglobin molecule can carry?

Ans. One haemoglobin molecule can carry maximum four oxygen molecules.

Q.9. In which organelle of cell does respiration occur?

Ans. In mitochondria of cell respiration occurs.

Q.10. What changes occur in diaphragm and intercostals muscle when a person breathes out?

Ans. When a person breathes out the diaphragm and intercostals muscles relax.

Q.11. Name the respiratory pigment in human beings.

Ans. Haemoglobin is the respiratory pigment in human beings.

Q.12. Write role of haemoglobin.

Ans. Haemoglobin is the carrier of oxygen from lungs to tissues and carbon dioxide from tissues to lungs.

Q.13. Name the gas lacking of which results in the production of lactic acid in muscles.

Ans. Oxygen is the gas whose lacking results in the production of lactic acid in muscles.



Q.14. Write the end product of anaerobic respiration in yeast cells.

Ans. Carbon dioxide and ethanol are the end products of anaerobic respiration in yeast cells.

Q.15. Write the path travelled by the molecule of oxygen when it enters the body.

Ans. The following pathway is travelled by a molecule of oxygen when it enters the body

Nostril → trachea → bronchus → bronchiole → alveolus.

Q.16. What changes occur in diaphragm and intercostal muscle when a person breathes in deeply?

Ans. When a person breathes in deeply the diaphragm and intercostals muscles contract.

Q.17. What are the end products formed during fermentation in yeast? Under what condition a similar process takes place in our body that leads to muscle cramps?

Ans. The end products formed during fermentation in yeast cell are carbon dioxide and ethanol. When there is lack of oxygen, a similar process takes place in our body that leads to muscle cramps.

Q.18. What do you mean by respiration? Name two types of respiration occurring in a cell.



Ans. Respiration is the breakdown of complex high energy food molecule into simple low energy food molecules (carbon dioxide + water) in the presence of oxygen with release of energy.

Two types of respiration are

(i) Aerobic respiration (ii) Anaerobic respiration

Q.19. Plants have low energy needs as compared to animals. Explain.

Ans. Plants neither have complex body structure nor performing any complex processes like animals. Plants do not move, but animals move in search of food and shelter. Thus, plants have low energy needs as compared to animals.

Q.20. What happens to the breathing rate during rigorous exercise?

Ans. During rigorous exercise, the breathing rate increases to supply more and more oxygen to the cells as lot of energy is being used up during exercising.

Q.21. State the structures responsible for gaseous exchange in

(a) plants

(b) human beings

Ans. (a) Stomata is responsible for gaseous exchange in plants.

(b) Alveoli is responsible for gaseous exchange in human beings.

Q.22. Give reasons

(a) Rings of cartilage are present in trachea.

(b) Lungs always contain a residual volume in air.



Ans. (a) Rings of cartilage are present in trachea to prevent it from collapsing when less air is present in it.

(b) Lungs always contain a residual volume of air to absorb maximum amount of oxygen and to release carbon dioxide.

Q.23. List four common features of the respiratory organs in aquatic and terrestrial animals.

Ans. Respiratory organs in both aquatic and terrestrial animals

- (i) Have large surface area.
- (ii) Are thin walled
- (iii) Are richly supplied with blood.
- (iv) Are well- protected.

Q.24. State in brief the role of lungs in the exchange of gases.

Ans. Lungs are the main respiratory organs where exchange of gases takes place. Oxygen is taken in while carbon dioxide is given out through nostrils. Alveoli present in the lungs, which provides a large surface area for exchange of gases.

Q.25. State basic difference in the processes of respiration and photosynthesis.

Ans. Respiration is a catabolic process in which glucose is broken down to release energy, while photosynthesis is an anabolic process in which glucose and other organic substances are manufactured from raw materials with help of solar radiations.



Q.26. What is the role of respiratory pigment in respiration? Give one example.

Ans. In animals having large body size, the diffusion pressure alone cannot help in delivering oxygen to all parts of the body. Therefore, respiratory pigments take up oxygen from the air in the lungs and carry it to tissue, which are deficient in oxygen before releasing it.

Haemoglobin is one such respiratory pigment found in the Red Blood Cells (RBCs) in human beings.

Q.27. What are alveoli? Mention their role in respiration.

Ans. Within the lungs the passage divides into smaller and smaller tubes which finally terminate in balloon-like structure called alveoli.

The walls of the alveoli contain an extensive network of blood vessels.

The alveoli have thin and delicate surface where the exchange of gases takes place.

Q.28. List three characteristics of lungs which make them an efficient respiratory surface.

Ans. The three characteristics of lungs, which make them an efficient respiratory surface are

- (i) Lungs contain alveoli which have large surface area.
- (ii) They contain an extensive network of blood vessels.
- (iii) Alveoli's surface are thin, delicate and fine.



Q.29. State one word for the following

(a) Mechanism for moving the air in and out of the body.

(b) Structure in plants to facilitate gaseous exchange.

(c) Respiratory organ in aquatic organism.

Ans. (a) Breathing (b) Stomata (c) Gills

Q.30. Nisha is going through the science notebook of her new brother. She suddenly came across the question stating, what is the reason behind regular formation of cramps in cricketers? Her brother stated the answer as cramps are developed due to tear in ligament.

Read the above passage and answer the following questions

(a) Is this answer correct? State reasons for your answer.

(b) What values were shown by Nisha?

Ans. (a) No, the answer is not correct. Sometimes during rigorous physical work or exercise the amount of oxygen declines in our muscle cells. At this time when the oxygen is less in amount, pyruvate breaks down due to insufficient oxygen and forms lactic acid instead of carbon dioxide and water.

Cramps are formed in the body of cricketers due to the sudden formation of lactic acid.

(b) The values shown by Nisha are attentiveness and carefulness.

Q.31. State reason for the following



(a) Trachea does not collapse when it has insufficient air.

(b) Aquatic animals breathe rapidly.

(c) Haemoglobin is present in RBC in humans.

Ans. (a) The wall of trachea are lined by the cartilaginous rings that helps in maintaining the rigidity of the trachea. Hence, the trachea do not collapse in insufficient air.

(b) Aquatic animals utilise the oxygen dissolved in water for respiration. Since, the amount of dissolved oxygen is fairly low compared to the amount of oxygen in air, the rate of breathing is faster in aquatic organisms.

(c) Haemoglobin is present in RBC in human beings. It is a respiratory pigment, that helps in easy and faster transport of oxygen all through the body.

Q.32. State the role of the following in human respiratory system.

(a) Nasal Hairs

(b) Diaphragm

(c) Alveoli

Ans. (a) Nasal Hairs These are fine hairs present in the lining of the nasal passage. These hair helps in filtering the air passes through it so that germ free air could reach the lungs.

(b) Diaphragm It is a muscular partition between the thoracic and abdominal region in our body. Movement of diaphragm helps in the breathing process.

(c) Alveoli These are balloon-like structures, which increase the surface area for the gaseous exchange to takes place in the lungs.



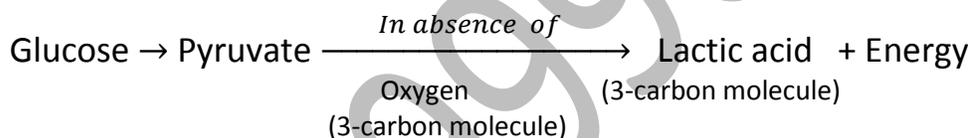
Q.33. Aashima participated in the zonal relay race competition. During the practice session, she got cramps in her muscles

Based on the above text answer the following questions

- (i) Why Aashima got cramps in her muscles?
- (ii) Write the pathway involved in this reaction.
- (iii) What values were shown by Ashima?

Ans. (a) Aashima muscles got cramps because of the formation of lactic acid due to the lack of oxygen in the muscles.

(b) The equation is



Q.34. (a) What is the difference between

Respiration in plants and in animals

Ans. The difference between respiration in plants and animals are

S.No.	Respiration in Plants	Respiration in Animals
(i)	No breathing is involved in plants.	Animals breathe.
(ii)	Absence of respiratory organs.	Animals have respiratory organs like gills and lungs.
(iii)	Respiration occurs at much lower rate.	Respiration occurs at faster rate.



Q.35. How does respiration occur in the stem of the plant?

Ans. Respiration requires gaseous exchange for equal distribution of gas molecule in the cell. Gaseous exchange in plants having herbaceous stem is achieved through stomata by the process of diffusion.

In wood and hard stems of big plants, the exchange of gases takes place through lenticels, which are present on the bark of the stem.

Q.36. What are the differences between aerobic and anaerobic respiration?

Name some organisms that use the anaerobic mode of respiration.

Ans. The differences between aerobic and anaerobic respiration are

S.No.	Aerobic Respiration	Anaerobic Respiration
(i)	Aerobic respiration takes place in the presence of oxygen.	Anaerobic respiration takes place in the absence of oxygen.
(ii)	Complete breakdown of food occurs in this process.	Partial or incomplete breakdown of food occurs in this process.
(iii)	The end products are carbon dioxide (CO ₂) and water (H ₂ O).	The end products may be ethyl alcohol, carbon dioxide or lactic acid.
(iv)	It produces a considerable amount of energy due to complete oxidation of food molecules.	Much less energy is produced due to incomplete oxidation of food.



Organism that use the anaerobic mode of respiration are yeast, some bacteria and some parasites.

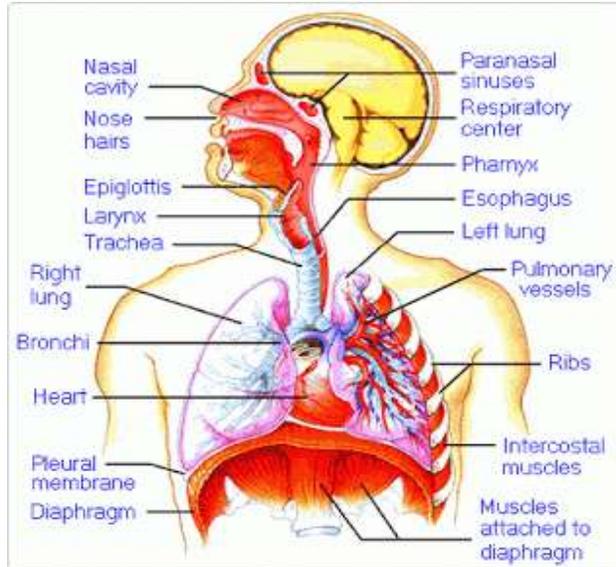
Q.37. Describe the process of respiration in human beings.

Ans. The human respiratory system begins from nostrils. The air enters through nostrils into the pharynx and then trachea (or wind pipe). The trachea runs down and divides into two tube-like structure called bronchi. Each bronchi then enters into a lung where it divides into small bronchioles. They finally terminate into balloon-like structure called alveoli where gaseous exchange takes place.

Breathing in human involves three steps

- (i) **Inspiration** When we breathe in, we lift out ribs and flatten our diaphragm and the chest cavity becomes larger. Air is sucked into the lungs and fills the expanded alveoli.
- (ii) **Gaseous Exchange** Haemoglobin binds with oxygen and carries it along the body in blood. As blood passes through the tissues of the body, the oxygen from the blood diffuses into the cell, whereas carbon dioxide which is produced during respiration diffuses into the blood and is carried to the lungs.
- (iii) **Expiration** Ribs move down and diaphragm becomes dome-shaped decreasing the chest cavity and air comes out.

The diagram showing human respiratory system is given below



Q.38. Why multicellular organisms require special organs for exchange of gases between their body and their environment?

Ans. Multicellular organisms have complex body structure and require more oxygen to perform various body functions. Thus, they require special organs for exchange of gases between their body and environment.

Q.40. Name the green dot-like structures in some cells observed by a student when a leaf-peel was viewed under a microscope. What is this green colour due to?

Ans. The green dot-like structures are chloroplasts. This green colour due to the presence of a green pigment called chlorophyll. Chlorophyll is present in cell organelles called chloroplast.