

Chap 13 (Gaseous Exchange) F.Sc 1st Year Biology Notes

Chapter 13: Gaseous Exchange (Short Questions Answers)

In human being what is the total inside capacity of lungs when fully inflated?

In an adult human being when the lungs are fully inflated the total inside capacity of lung is about 5 litres.

What is the residual volume of lungs?

There is a residual volume of 1.5 litres even during exercise which can be expelled.

What are two properties of a respiratory surface? or Write four properties of respiratory surface.

- The respiratory surface should be wet
- It should be thin
- It should be well ventilated
- It should have large number of blood capillaries in which blood flows

How does gaseous exchange occur in frog?

In frog, the gaseous exchange occurs through the lungs but these structures are not very efficient. Therefore, the lungs are supplemented by skin and buccal chamber which are richly supplied with blood vessels. These blood carrying sites are exposed to water carrying oxygen for the exchange of gases.

What is diving reflex in cetaceans?

Aquatic mammals, especially cetaceans (whales, dolphins) can stay in the depth of the ocean for about two hours without coming up for air. Diving mammals have almost twice the volume of blood in relation to their body weight as compared to non-divers. Most of the diving mammals have high concentration of myoglobin in their muscles. Myoglobin binds extra oxygen.

Differentiate between respiration and breathing.

Breathing is the physical process where you inhale and exhale air in and out of your lungs. Respiration is a chemical reaction where Oxygen is used to breakdown Glucose in order to generate energy which is then used by the cell to function.

Write gaseous exchange in plants.

Plants also get their energy from respiration. No special organ or system is present for gaseous exchange in plants. Every cell of every part of plant carries out exchange of gases according to its needs through stomata.

What is rubisco? Give its function.

Rubisco (Ribulose biphosphate carboxylase/oxygenase) is an enzyme which during photorespiration fixes oxygen instead of carbon dioxide in Calvin cycle and results in lowering the overall rate of carbon dioxide fixation and plant growth.

What products are produced during photorespiration?

Glycolate, glycine and serine are produced during photorespiration.

Differentiate between respiration and photorespiration.

Respiration is a chemical reaction where Oxygen is used to breakdown Glucose in order to generate energy which is then used by the cell to function. Respiratory activity which occurs in plants during daytime is called photorespiration. Rubisco fixes oxygen instead of carbon dioxide during photorespiration.

How expiration occur in man?

During expiration the muscles of ribs become relaxed, the ribs move downward and inward. In this way from the side of chest cavity the space becomes less. At the same time the muscles of the diaphragm becomes more domelike, the space in the chest cavity is also reduced from the floor as well. This reduction in space of the chest cavity exerts pressure on the lungs and the inside air moves out.

Write down three factors which affect the capacity of haemoglobin to combine with oxygen.

concentration of CO₂ pH and temperature.

Name respiratory pigment of muscle. Give its role.

Myoglobin is iron containing protein pigment occurring in muscle fibres, it serves as an intermediate compound for the transfer of oxygen from haemoglobin to aerobic metabolic processes of the muscle cells. Myoglobin can also store some oxygen.

Define residual volume of lung. What is residual volume of human?

The residual volume is the difference between the functional residual capacity, which is the amount of air left in the lungs after a natural exhalation, and the expiratory reserve volume, which is the maximum amount of air a person can still let out after natural exhalation. Residual volume of human is 1.5 litre.

What changes occur in an animal during diving reflex?

When a mammal dives to its limit the diving reflex is activated. The breathing stops, the rate of heart beat slows down to one tenth of the normal rate, the consumption of oxygen and energy is reduced. The blood is redistributed but most of the blood goes to the brain and heart which can least withstand to anoxia. Skin muscles and digestive organs and other internal organs receive very little blood while an animal is submerged

because these areas can survive with less oxygen, Muscles shift from aerobic to anaerobic respiration.

How respiration takes place through cork tissue.

In the older parts of the plant i.e., both stems and roots, there is present cork tissue which is formed of dead cells and has special pores called lenticels which are involved in gaseous exchange.

How haemoglobin help in the transport of oxygen?

Hemoglobin readily combines with oxygen to form oxyhemoglobin in the condition of high oxygen concentration and atmospheric pressure. At tissue it lets back to its Haemoglobin giving out most of its oxygen to surrounding cells which have low oxygen concentration and less pressure.

What are causes of lung cancer?

The chances of lung cancer are ten times more in those persons who smoke or live in smoky and congested (crowded) areas as compared to those who do not smoke. It is now estimated that 90% of lung cancer is caused by smoking. Recent research indicates that more than ten compounds of tobacco smoke are involved to cause cancer.

How do spiracles differ from tracheoles?

The main tracheal trunk of cockroach communicates with exterior by paired apertures called spiracles present in the sides of the body. The main tracheae divide and subdivide forming very fine tubules called tracheoles.

How is carbon dioxide absorbed by the cell walls of mesophyll cells?

It is absorbed by simple diffusion because its concentration in mesophyll cells is lower than air spaces of leaf.

How does respiration occurs in earthworm?

Skin is richly supplied with blood capillaries. Oxygen dissolved on the wet surface passes through the cuticle and epidermal cells into the blood. Blood carries oxygen to various tissues. Carbon dioxide is removed from the tissues by the blood and carried in the plasma to skin, from where it is excreted.

Enlist types or ways of respiration in frog.

- buccal respiration
- cutaneous respiration
- pulmonary respiration

Write two factors which affect the transport of oxygen in blood.

- When carbon dioxide pressure increases, the oxygen tension decreases, the capacity of haemoglobin to hold oxygen becomes less.
- Rise in temperature also causes a decrease in the oxygen-carrying capacity of blood, e.g., in the increased muscular activity.
- As the pH of the blood declines, the amount of oxygen bound to haemoglobin also declines.

Differentiate between photorespiration and photosynthesis.

In photorespiration, oxygen is fixed while in photosynthesis carbon dioxide is used.

How exchange of gases takes place in Hydra?

Exchange of gases i.e., intake of oxygen and removal of carbon dioxide, occurs through the entire general body surface wherever it is in contact with water. Diffusion of oxygen in and carbon dioxide out also occurs in cells lining the digestive cavity.

What factors keep the skin of earthworm moist?

Skin is always kept moist by the secretion of epidermal mucous gland cells and also by coelomic fluid passing through the dorsal pores.

How exhalation (expiration) and inhalation (inspiration) occur in Cockroach?

When abdomen expands the first four pairs of spiracles are open. Air enters these spiracles. Then abdomen contracts, the anterior four pairs of spiracles close and posterior six pairs of spiracles open. This forces air through the tubes and eventually out of the body. In this way exhalation and inhalation takes place at the same time in different regions of the body.

Name the structures involved in the gaseous exchange in frog.

Lungs, skin, buccal cavity or chamber.

What is the role of diaphragm in inspiration and expiration?

The shape of the diaphragm is more domelike when its muscles are relaxed and inspiration occurs. On the other hand when the muscles of the diaphragm contract its shape becomes less domelike and expiration occurs.

Write at least two different states of Co, transportation in blood.

- About 70% carbon dioxide is carried as bicarbonate ion combined with sodium in the plasma.
- Some of carbon dioxide (about 20%) is carried as carboxyhaemoglobin.

Give two symptoms of emphysema.

- Constant coughing reduces the absorbing surface of the lung
- Least exertion makes him breathless and exhausted
- Lips or fingernails turn blue or gray with exertion