

Very Short Answer Questions

Q.1. What is tidal volume?

Ans. Tidal volume is the amount of air inhaled and exhaled in a single stroke.

Q.2. What is the difference between cellular respiration and internal respiration?

Ans. Both cellular and internal respirations are the same processes.

Q.3. How does exchange of gases take place in the plants?

Ans. Exchange of gases in plants takes place through the pores in the leaves called stomata.

Q.4. Write the path of the air from the nasal cavity to the lungs.

Ans. Nasal cavity → Trachea or wind pipe → Bronchi → Bronchioles → Alveoli

Q.5. Define breathing rate.

Ans. The number of times a person breathes in one minute is called its breathing rate.

Q.6. What happens during increased physical activity?

Ans. Increased physical activity increases the rate of oxidations of food, which in turn needs more oxygen. This further results in increase of the breathing rate.

Q.7. What are the products of anaerobic respiration?

Ans. Ethyl alcohol and carbon dioxide.

Short Answer Questions

Q.1. Which gas present in air is essential for aerobic respiration? What is the role of oxygen during respiration?

[NCERT Exemplar]

Ans. Oxygen present in air is responsible for respiration. The oxygen breaks down food and releases energy.

Q.2. On an average, an adult human being at rest breathes 15-18 times per minute. The breathing rate, however, may differ under different conditions. Arrange the following activities given in the box in order of increasing breathing rates and give reason for your answer.

[NCERT Exemplar]

Sleeping, cycling, brisk walk, watching T.V

Ans. Sleeping < watching T.V. < brisk walk < cycling.

Whenever a person does an activity, the breathing rate becomes faster. It further increases with strenuous work to provide more oxygen to the cells to get more energy.

Q.3. On a very cold morning, Boojho and Paheli were talking with each other as they walked down to their school. They observed that the air coming out of their mouth looked like smoke. They were amused and wondered how it happened. Help them find the answer.

[NCERT Exemplar]

Ans. On a cold day, the warm and moist air exhaled by us condenses into mist when it comes in contact with the cold air of the atmosphere. This looks like white smoke.

Q.4. Whenever we feel drowsy or sleepy we start yawning. Does yawning help us in anyway?

[NCERT Exemplar]

Ans. During drowsiness, our breathing rate slows down. The lungs do not get enough oxygen from the air resulting in yawning. Yawning brings extra oxygen into the lungs and helps us to keep awake.

Q.5. Insects and leaves of a plant have pores through which they exchange gases with the atmosphere. Can you write two points of differences between these pores with respect to their position, number and extension into the body?

Ans. (a) Spiracles are present on the sides of insects' body while stomata are present on the lower surface of leaves.

(b) Spiracles are fewer in number as compared to stomata.

(c) Spiracles lead to an extensive network of tracheal system which is absent in the leaves.

Q.6. Explain the role of the diaphragm in the process of breathing.

Ans. When diaphragm contracts and moves downwards, the chest cavity enlarges and the pressure in lungs decreases. The air is breathed in to equalise pressure. When diaphragm relaxes and moves upwards, the lungs push out the air.

Q.7. Write the difference in the composition of inhaled and exhaled air.

Ans. The inhaled air has larger concentration of oxygen and lesser concentration of carbon dioxide, whereas exhaled air has larger concentration of carbon dioxide and lesser amount of oxygen.

Q.8. What happens to the air we breathe in, once it reaches the lungs?

Ans. When the air breathed in reaches the lungs it enters the alveoli. The alveoli are lined with blood capillaries and exchange of gases occurs. The oxygen from the alveoli is taken up by the capillaries and carbon dioxide from the blood is transferred to alveoli.

Q.9. How do frogs breathe on land and in water?

Ans. In water, frogs exchange gases through its thin, moist and smooth skin which is richly supplied with blood capillaries. On land, frogs breathe through lungs.

Q.10. Explain the process of breathing in fish.

Ans. Fish gulps water through mouth and forces it between the gills. The oxygen in it gets diffused into the blood circulating in gills and carbon dioxide in the bloodstream diffuses into the water which is carried out through a gap between fish's body and the gill cover.

Q.11. Why should you breathe through your nose and not your mouth?

Ans. When we breathe through the nose, the dust particles, smoke, etc. get stuck in the hair present in the nose, which act as filters. But if we breathe through the mouth, all the dust will enter our body system.

Q.12. What facilitates opening and closing of stomatal pores?

Ans. The stomatal pores are enclosed by two guard cells, which are surrounded by several subsidiary cells. All these three, namely stomatal pores, guard cells and subsidiary cells together constitute stomatal apparatus. The flow of the water into and out of guard cells facilitates closing and opening of stomatal pores. This results in the exchange of gases.

Q.13. Explain respiration in plants.

Ans. In plants, air from the atmosphere is taken in through stomata. The carbon dioxide in the air is utilised in the process of photosynthesis by the chloroplasts and oxygen is released out through stomata.

Long Answer Questions

Q.1. Paheli participated in a 400 m race competition held at her school and won the race. When she came home she had mixed feelings of joy and pain as she had cramps in her leg muscles. After a massage she was relieved of the pain. Answer the following questions related to the situation.

Q. What can be the possible reasons for the pain in her legs?

Ans. The pain in her legs could be because of the accumulation of lactic acid in the muscles. During heavy exercise or running, etc., the muscle cells respire anaerobically and produce lactic acid.

Q. Why did she feel comfortable after a massage?

[NCERT Exemplar]

Ans. The massage gave her relief because it improves the circulation of blood leading to increased supply of oxygen to the muscle cells which helps in complete breakdown of lactic acid into CO₂ and water.

Q.2. Observe the figure given below carefully and answer the following questions.



[NCERT Exemplar]

Q. In which jar, will the amount of CO₂ be the highest and why?

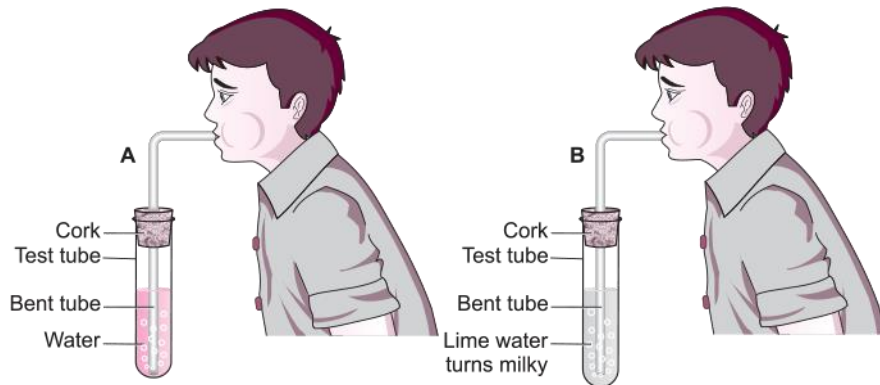
Ans. 'C'. The mice kept under the jar will breathe out CO₂ continuously increasing its amount in the bell jar.

Q. In which jar, will the amount of CO₂ be the lowest and why?

Ans. 'A'. In jar 'A', the CO₂ released during respiration is used by the plants during photosynthesis.

Q.3. Observe the figure given below carefully and answer the following questions.

Ans.



[NCERT Exemplar]

Q. Which process is being tested in the activity?

Ans. Exhalation process during respiration.

Q. What is the result of the activity? Give reasons.

Ans. The lime water in test tube 'B' turns milky but water in tube 'A' remains unchanged. Because CO_2 is present in the exhaled air, it mixes with lime water in 'B' and turns it milky.

Q.4. A food stall owner was preparing dough for making bhaturas. He added a pinch of yeast and sugar to the dough and left it in a warm place. After few hours, the dough had risen. There was a sour smell too.

Q. Why did the dough rise?

Ans. The CO_2 released during respiration by the yeast results in the rise of dough.

Q. Why did the dough smell sour?

Ans. During anaerobic respiration, yeast produces alcohol resulting in sour smell.

Q. Why was sugar added to the dough?

Ans. Sugar acts as food for yeast.

Q. What would have happened if the dough was kept in the refrigerator, soon after it was prepared?

[NCERT Exemplar]

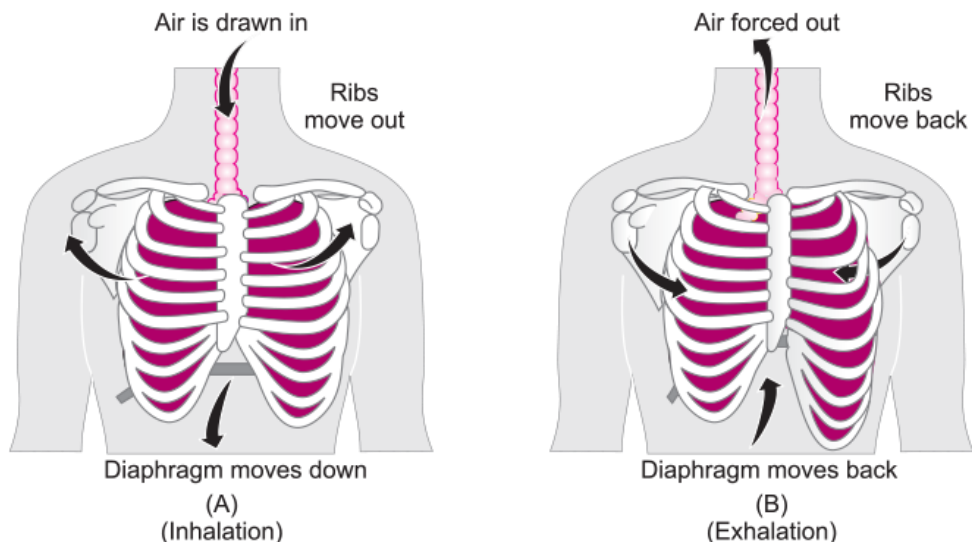
Ans. At low temperatures, yeasts will not multiply and respire because of which the dough will not rise or become sour.

Q.5. In the figure, label the arrows and indicate the direction of

1. movement of air.
2. movement of diaphragm.

3. movement of ribs.

Ans.



Q.6. Distinguish between the following.

Q. Breathing and Respiration

Ans.

S.No.	Breathing	Respiration
i.	It is a physical process.	It is a chemical process.
ii.	There is no release of energy.	Energy is released.
iii.	Enzymes are not involved.	Enzymes are involved.
iv.	Modes of breathing differ among organisms.	Process of respiration is same in all.

Q. Respiration in plants and Respiration in animals

Ans.

S.No.	Respiration in plants	Respiration in animals
i.	Transport of air occurs through stomata	Transport of air occurs through nose.
ii.	Carbon dioxide is absorbed and oxygen is released out.	Oxygen is absorbed and carbon dioxide is released out.

Q.7. How does gaseous exchange take place in (a) earthworms (b) fish?

Ans. Earthworm: The earthworm inhabits burrows in damp soil and emerges to feed in the darkness. Gaseous exchange occurs through its skin. The thin, moist skin is supplied with a network of capillaries which absorb oxygen from the atmosphere and deliver it to the rest of the body. The absorbing surface or the network of capillaries also gets rid of carbon dioxide from the body.

Fish: Fish absorbs dissolved oxygen from the water by means of gills. Gills are projection of the skin. These are well supplied with blood vessels for exchange of gases.

Q.8. Explain the mechanism of breathing in human beings.

Ans. In human beings, as in most vertebrates and mammals, gaseous exchange occurs in a pair of lungs. They are enclosed in an air-tight compartment called thorax (or chest). This region is bound by the ribs and the diaphragm. Several organs participate in the process of respiration in human beings. They are the nasal cavity, larynx, trachea, bronchi, alveoli and lungs. Air is inhaled or exhaled by the body as lungs are expanded or contracted by the simultaneous contraction and expansion of muscles attached to the ribs and diaphragm. The air containing oxygen is taken in through the nose where it is filtered and cleaned from dust particles, bacteria and other foreign substances by the mucus (stick liquid) and hair present in the nostrils. This air then passes through the larynx, the voice-box chamber situated in the neck region, to reach the tracheal tube or the windpipe. The trachea is a tube that runs from the larynx down the neck region into the thorax. From the thorax air reach the alveoli through bronchioles.

HOTS (Higher Order Thinking Skills)

Q.1. Why does a fish die when kept outside water, even though there is oxygen in the surrounding air?

Ans. When fish is kept outside water, the gills become dry and stick to each other. Thus, gas exchange cannot occur.