March 31, 2021

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Chapter 10: Respiration in Organisms

Question + Answers

1) What is respiration?

Ans) Respiration is the process of taking in oxygen, using it for the release of energy by breakdown of food, and eliminating the waste products — carbon di oxide and water.

2) What are the two steps of respiration?

Ans) Two steps involved in respiration:
i) External Respiration (breathing)
ii) Internal Respiration (cellular respiration)

3) What is external respiration?

Ans) The process of taking in air, rich in oxygen and giving out air, rich in carbon dioxide by the living organisms with the help of their respiratory organs is known as external respiration (breathing)

4) What is Internal respiration?

Ans) The process of breakdown of food (glucose) in the cells with

the release of energy is called internal respiration or cellular respiration.

5) What is aerobic respiration? Represent with an equation.

Ans Breakdown of food (glucose) into carbon di-oxide and water to release energy using oxygen is called aerobic respiration. It can be represented by the following equation: (**)

6) What is anaerobic respiration? Represent with an equation.

Ans Breakdown of food (glucose) into alcohol and carbondioxide with the the release of energy without the use of oxygen is called anaerobic respiration. It can be represented by the following equation:

(7) What are the differences between aerobic and anaerobic respiration?

Ans

Aerobic Respiration	Anaerobic respiration
1) It takes place in the presence of oxygen.	1) It takes place in the absense of oxygen.
2) Complete breakdown of food (glucose)	2) Incomplete breakdown of food

5)

$C_6H_{12}O_6 + 6O_2 \xrightarrow{\text{anaerobic respiration}} 6CO_2 + 6HO_2 + \text{energy}$

glucose (food) — oxygen — carbon di oxide — water

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6) $C_6H_{12}O_6 \xrightarrow{\text{without the use of oxygen (anaerobic respiration)}} 2C_2H_5OH + 2CO_2 + \text{energy}$

glucose (food) — alcohol — carbon di oxide

takes place.	(glucose) takes place
3) The end products are carbon dioxide and water.	3) The end products are carbon dioxide and alcohol
4) A large amount of energy is released.	4) A very small amount of energy is released.

April 30, 2021

8) When do we have muscle cramps? How do we get relief of it?

Ans After a heavy exercise (very fast running, cycling etc), we sometimes get muscle cramps. The muscle cramps occur when muscle cells respire anaerobically. The partial breakdown of glucose produces lactic acid. The accumulation of lactic acid in the muscle cells causes muscle cramps.

We get relief from cramps after a hot water bath or a massage. A hot water bath or massage increases the circulation of blood in these muscles. As a result, the supply of oxygen to the muscle cells increases. The increase in the supply of oxygen results in the complete breakdown of lactic acids into carbon dioxide and water and hence, gives relief of cramps.

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9) What is breathing rate? What is the breathing rate of a adult human?

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

On an average, a healthy adult human being, at rest, breathes in and out 12-18 times per minute.

10) What are the organs ~~required~~ in the human respiratory system?

Ans The human respiratory system consists of the following organs nose, nostrils, nasal cavity, Trachea (windpipe), lungs, bronchi, bronchioles and alveoli.

11) Why should we breathe only through our nose?

Ans We should breathe only through our nose because dust and other particles present in the air get trapped by the mucus and hair present in the nasal cavity.

12) Describe the mechanism of exchange of gases in alveolus of the lungs.

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Ans Each lung contains millions of alveoli. The walls of alveoli are very thin and surrounded by very thin blood capillaries. The air from the trachea, through the bronchi and bronchioles, finally enters the alveoli. The oxygen of the air diffuses out from the thin walls of the alveoli into the blood capillaries. Oxygen combines with the haemoglobin in the blood to form oxyhaemoglobin and is carried to all the cells of the body. Simmilarly, carbon dioxide produced by the breakdown of food during internal respiration enters blood. Blood carries carbon dioxide to the alveoli in the lungs. From the lungs, carbon di oxide is removed along with the air we breathe out. In this way, exchange of gases takes place in the alveous.

May '6' 2021

13) What happens to the ribs and diaphgram during inhalation?

Ans) When we breathe in, the intercostal muscles contract. Two things happen at the same time:

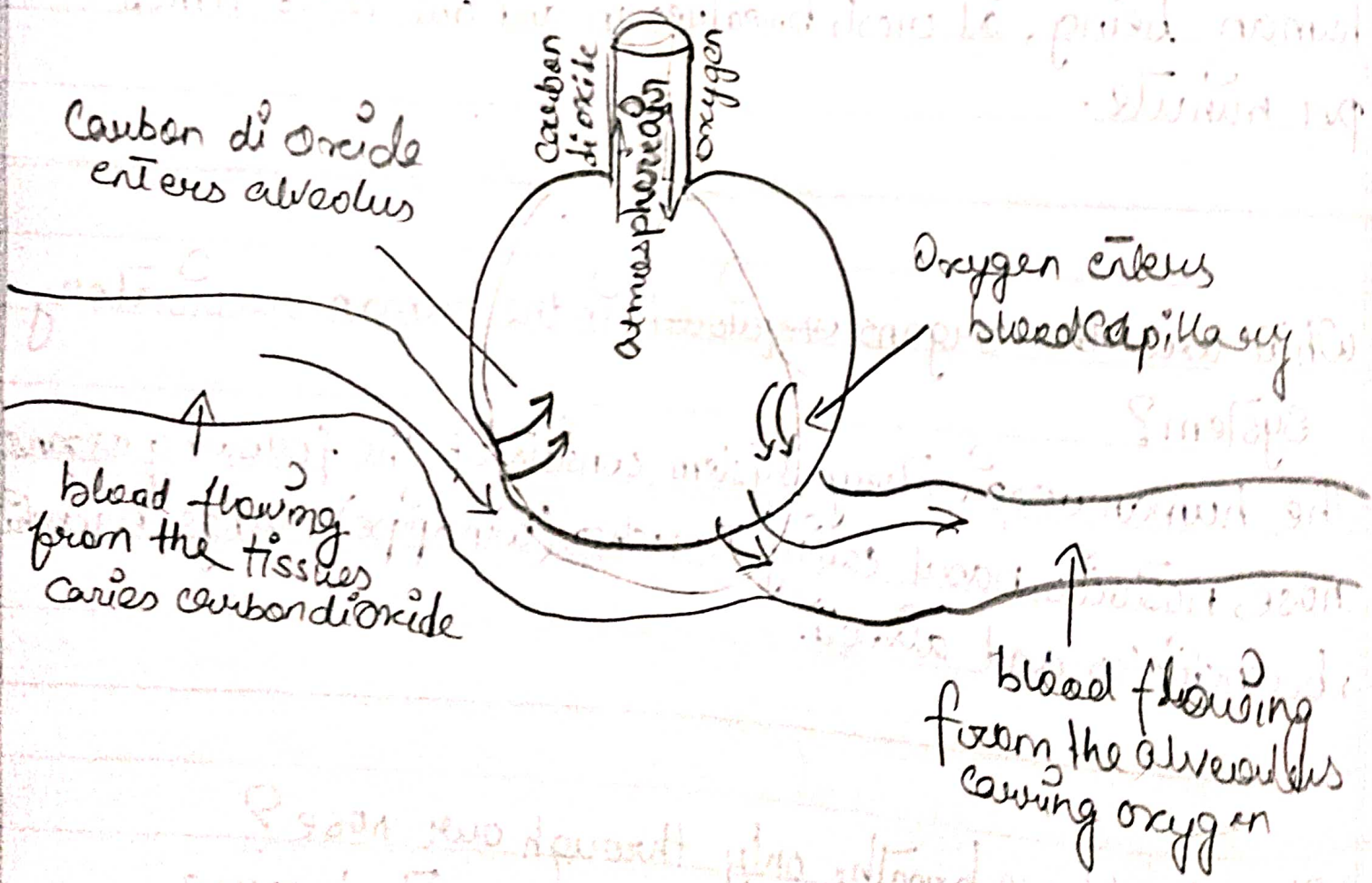
i) ribs are pushed upwards and outwards
ii) the diaphragm contracts and move downwards

Nose ⇌ Nasal Cavity ⇌ Larynx ⇌ Trachea

↑↓

Alveoli ⇌ Bronchioles ⇌ Bronchi

lungs



14) What happens to the ribs and diaphragm during exhalation?

Ans) When we breathe out, the intercostal muscles relax. Two things happen at the same time:

i) The ribs move downwards and inwards,

ii) the diaphragm relaxes and moves upwards to its original position.

15) Write 5 differences between inhalation and exhalation.

Ans	Inhalation	Exhalation.
i)	Air rich in oxygen flows into the lungs	i) Air rich in carbondioxide is forced out of the lungs.
ii)	Ribs move upwards and outwards	ii) Ribs move downwards and inwards.
iii)	Diaphragm contracts and moves downwards	iii) Diaphragm relaxes and ~~upto~~ moves upwards
iv)	Volume of chest cavity increases	iv) Volume of chest cavity decreases.

v)	Lungs expand, volume increases	v) Lungs contract, volume decreases.

16) What happens when we pass exhaled air in lime water? why?

Ans) When we pass exhaled air also in lime water, the lime water turns milky.

This happens because the exhaled contains carbon di oxide which turns lime water milky.

17) What percentage of oxygen and carbon di oxide is present in inhaled air and exhaled air?

Ans) Percentage of oxygen and carbon di oxide is present in inhaled air and exhaled air:

	Gas	Inhaled air	Exhaled air
1)	Oxygen	21%	16.4%.
2)	Carbon Di Oxide	0.04%	4.4%.

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18) Why do we sneeze?

Ans) When we inhale air, the unwanted particles present in the air usually get trapped in the hair of the nasal cavity. Sometimes these particles get past the hair in the nasal cavity, as a result of which we sneeze.

19) Write 4 differences between combustion and respiration?

Ans)

Combustion	Respiration
1) Energy is released in a single step in form of heat and light.	1) Energy is released in steps, and stored in chemical molecules ATP (Adenosine Triphosphate, energy-rich molecules) which can be used whenever needed.
2) It occurs at high temperature	2) It occurs at body temperature
3) It can occur anywhere	3) It occurs only in living cells
4) It is a fast process	4) It is a slow process.

20) Write 4 differences between breathing and cellular respiration?

Ans)

	Breathing	Cellular Respiration
1)	It is a physical process in which exchange of gases (oxygen and carbon dioxide) takes place. No chemical reaction takes place.	1) It is a ~~bicho~~ biochemical process in which the breakdown of food takes place.
2)	Energy is not released	2) Energy is released
3)	It occurs outside the cells	3) It occurs ~~outside~~ inside the cells.
4)	Enzymes are not involved.	4) Enzymes are involved at certain stages of respiration.

21) Describe the process of breathing and respiration in the following organisims:
a) insect b) earthworm c) frog d) fish

Ans) a) Insect → Oxygen-rich air enters the body through spiracles. This air now goes into tracheae, diffuses the body tissues and reaches every cell of the body. Here, oxygen is used to breakdown the food to produce energy and carbon dioxide. This carbon dioxide from the cells goes

into the tracheal tubes (tracheae) and moves out of the body through spiracles.

b) earthworms → The earthworms breathe through their thin and moist skin by diffusion.

c) Frogs → Frogs live both on land and in water. Frogs have a pair of lungs like human beings to breathe on land. In water, they breathe through their most skin

d) Fish → The fish breathes by taking in water through its mouth and sending it over the gills. Gills are well supplied with blood vessels. The blood vessels of the gills extract dissolved oxygen from this water and send it to all parts of the body. Carbon dioxide is brought back by the blood into the gills for expelling into the surrounding water.

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22) How can you prove experimently that the germinating seeds release carbon dioxide during respiration.

Ans) To show carbon di oxide is released during respiration:

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Things needed: Pea seeds, water, a suction pump, a conical flask, 3 test tubes and potassium hydroxide.

Process:

1) Take a conical flask and soak some pea seeds in water inside it overnight.

2) Next morning, drain the water and keep the seeds moist until they start germinating

3) Set up the apparatus as shown in the diagram.

4) Use a suction pump to suck in air through the apparatus.

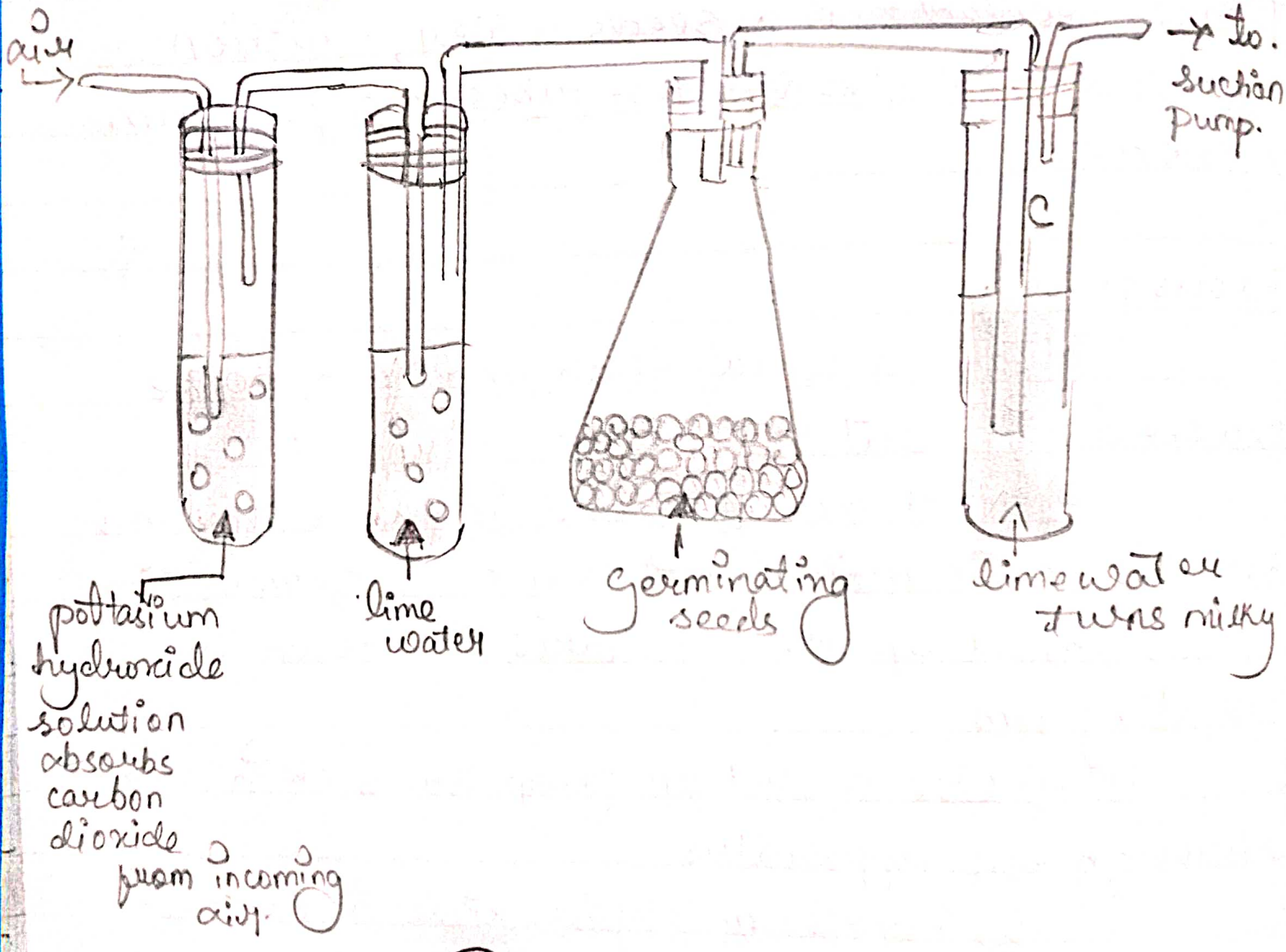
5) Potassium hydroxide in the test tube A absorbs carbon dioxide from the incoming air as the air passes through test tube A which can be tested by passing the air through lime water in test tube B.

6) The lime water in test tube B will not turn milky showing that the air does not contain carbon dioxide.

7) Observe the test tube C which also contains lime water.

Observation : After some time, the lime water in Test tube C turns milky.

Conclusion : We conclude that carbon dioxide is released during respiration by germinating seeds.



Carbon dioxide is released during respiration