Biology

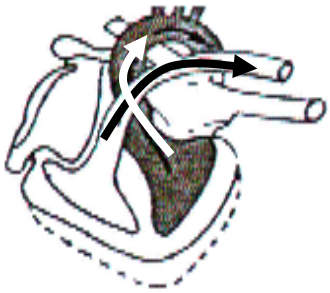
Grade:9

First Exercise (4.5 pts)

A- Indicate the true statement(s) and correct the false one(s).

1- The blood reaches the left auricle through the vena cava.
2- The bicuspid valve is the left auricular-ventricular valve.
3- The aorta delivers oxygenated blood, which has a dark red color, from the heart to organs.
4- During assimilation, cell produces energy.

B- The adjacent figure represents a cardiac phase:



1- Identify this phase. Justify the answer.
2- Give the letters of the part of the electrocardiogram that corresponds to this phase and specify the duration of this phase.

Second Exercise (6 pts)

A- Milk has a light sugar taste due to the presence of a sugar: the lactose.
In the digestive tract lactose is decomposed by an enzyme (the lactase) into glucose and galactose.
In certain persons, lactase is synthesized in insufficient quantity. In such cases, the persons do not tolerate milk and suffer from intestinal troubles.

1- Represent by a schema the digestion of lactose by lactase.
2- To treat the non tolerance of milk in some persons, its enough to add a few drops of substance (X) to milk.

Formulate a hypothesis on the nature of substance (X).

B- In order to identify the place of lactose digestion, a fasting cat was fed 250g of lactose. The following table shows the quantity of lactose, glucose, and galactose measured in different parts of its digestive tract.

Part of digestive tube	**Mouth**	**Stomach**	**Small Intestine**
Quantity of lactose (g)	**250**	**250**	**0**
Quantity of glucose and galactose (g)	**0**	**0**	**250**

1- Interpret the results obtained, and give a conclusion concerning the place of lactose digestion in the digestive tube.
2- Give the name of the identification test done to verify that glucose is a final product of the digestion of lactose.
3- After a while the quantity of glucose and galactose in the small intestine was measured. The result of this measurement indicates a decrease in this quantity. Explain this decrease.

Third Exercise (9.5 pts)

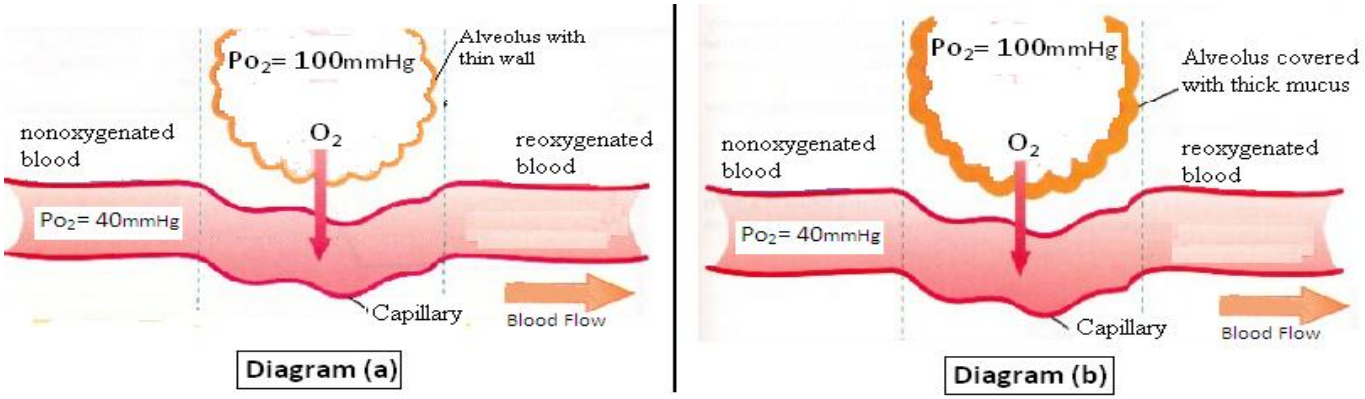
A- Read the paragraph below then answer the questions that follow:

Asthma is a common health complication among adults and children that causes the restriction of bronchioles; it could be the result of certain environmental factors. Asthmatic persons suffer from an increase in mucus production in the lungs, coughing, wheezing, chest tightness, shortness of breath, and a muscle fatigue (tiredness).

1- Define asthma.

2- Give two symptoms of asthma.

B- The following two diagrams illustrate a normal alveolus and an alveolus of an asthmaticperson:

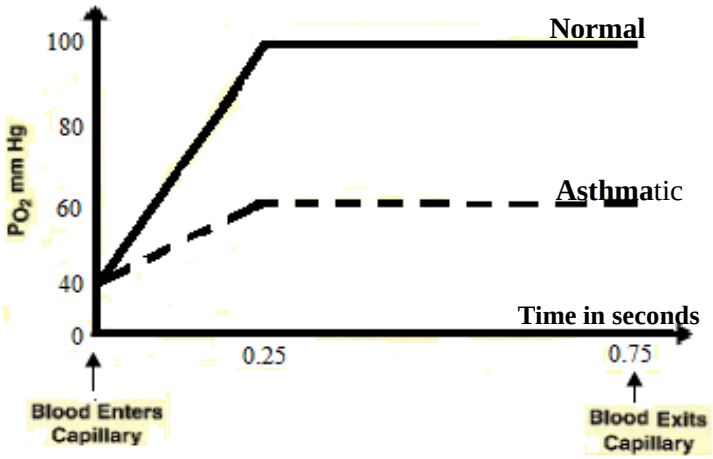


1- Based on the acquired knowledge, state the characteristics of alveoli that make them an efficient surface of gaseous exchange.

2- Compare the state of the alveolar wall of the two diagrams. Indicate then the one that corresponds to an asthmatic person.

3- Oxygen gas is directed from the alveolar medium towards the blood. Explain why.

C- The following graph shows the variation of the pressure of oxygen gas in the blood capillary of an alveolus (in normal person and in asthmatic one) as a function of time.



1- a- Compare the maximal pressure of oxygen gas at 0.25s in normal person and asthmatic person.

b- Draw out a conclusion concerning the effect of asthma on oxygen intake.

2- "Muscle fatigue is due to weak oxidation reaction of glucose found in the muscle cells." Explain the weakness of muscles in an asthmatic person.

3- Referring to the graph, choose from the following the correct answer:

i- At time 0 seconds the amount of HbO_2 is:

a- minimum | b- maximum | c- greater than that of $HbCO_2$ | d- a and c are correct

ii- At time 0.5 seconds the amount of HbO_2 is:

a- minimum | b- maximum | c- identical to $HbCO_2$ | d- less than $HbCO_2$

iii- At time 0.25 seconds the blood color is:

a- more bright red than that at 0.75 sec. | b- less bright red than that at 0.75 sec. | c- identical to that at 0.75sec. | d- identical to that at 0sec.

Good Work