

**Grade:9**

Biology

**First Exercise (6pts)**

A- The following table shows the composition (in %) of oxygen, carbon dioxide, nitrogen and water vapour in the inhaled and exhaled air, of a human being.

Gas	Composition (%)	
	Inhaled air	Exhaled air
Oxygen	20.71	14.60
Carbon dioxide	0.04	4.00
Nitrogen	78.00	78.00
Water vapour	1.25	5.90

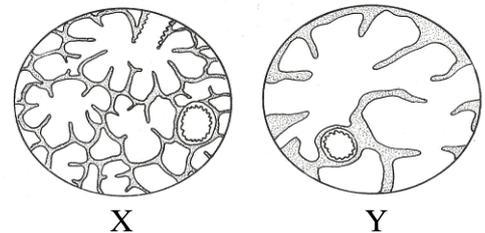
Use the information in the table above to answer the following questions:

- 1- a- Compare the composition of oxygen and carbon dioxide in the inhaled and exhaled air.  
b- Draw out a conclusion.
- 2- Calculate the percentage of water vapour released by the body.
- 3- “Nitrogen is a very important gas for the body.” Justify whether this statement is true or not.

B-The following figures (X&Y) represent two microscopic sections, one through the lung of a healthy person and another through the lung of a person having emphysema. (Emphysema is a pulmonary disease where parts of the alveolar walls are destroyed).

1-Identify the figure that belongs to the healthy person and the one that belongs to the person having emphysema. Justify your answer.

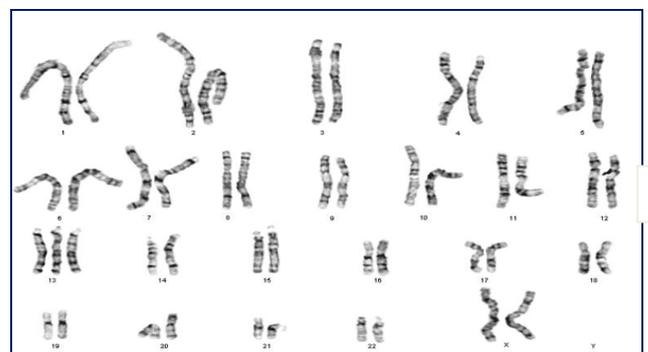
2- List the characteristics of the alveoli that make them good surfaces of gaseous exchange.



3- Explain the cause of the decrease in gaseous exchange in case of emphysema.

**Second Exercise (3pts)**

Observe the two figures A and B given below:

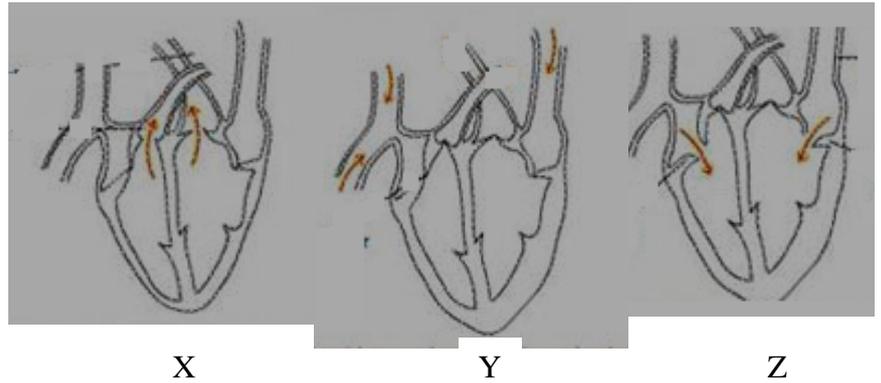


- 1- What do figures A and B represent?
- 2- Which of these figures (A or B) belongs to a man? Justify your answer.
- 3- Which one shows an anomaly (abnormality)?
- 4- Name this abnormality. Justify your answer.

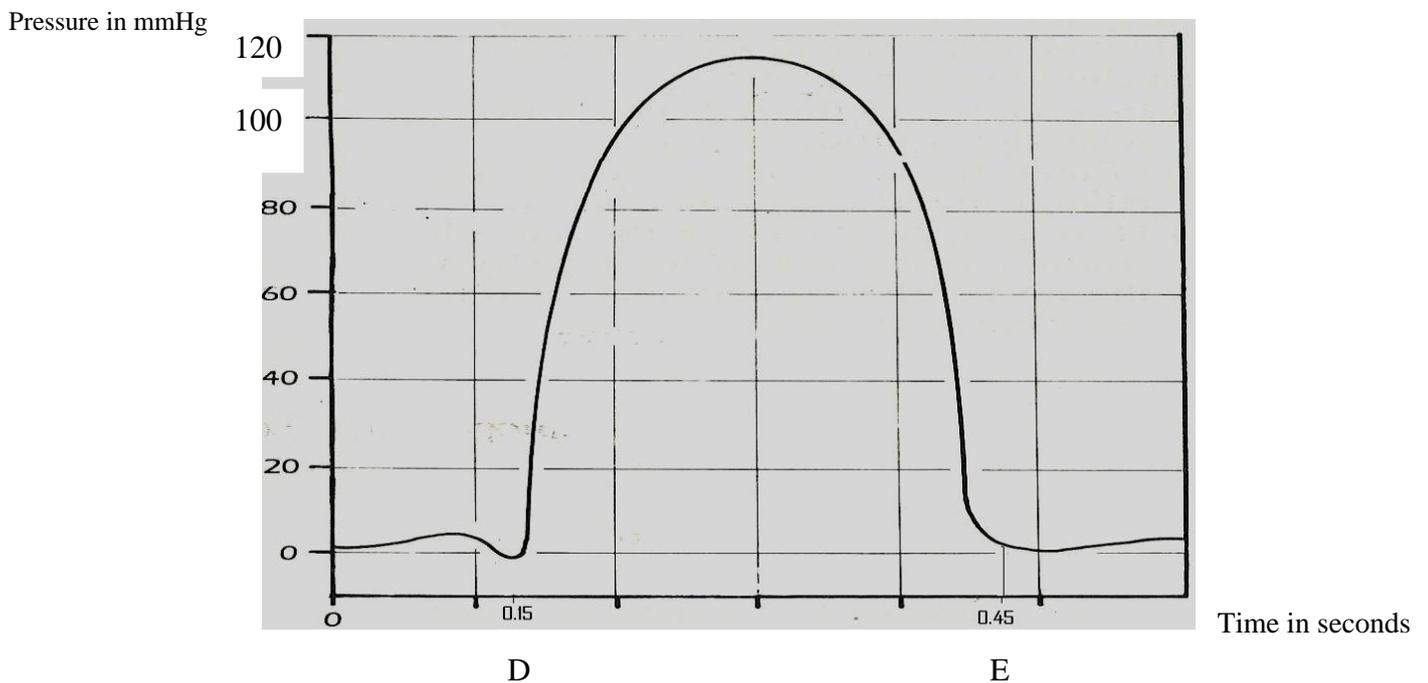
### Third Exercise (6.25pts)

A-The following figures (X, Y and Z) represent the three phases of the cardiac cycle. (The arrows show the direction of blood flow).

- 1- Give the name of each phase. Justify your answer.
- 2- Arrange these figures in the correct order.



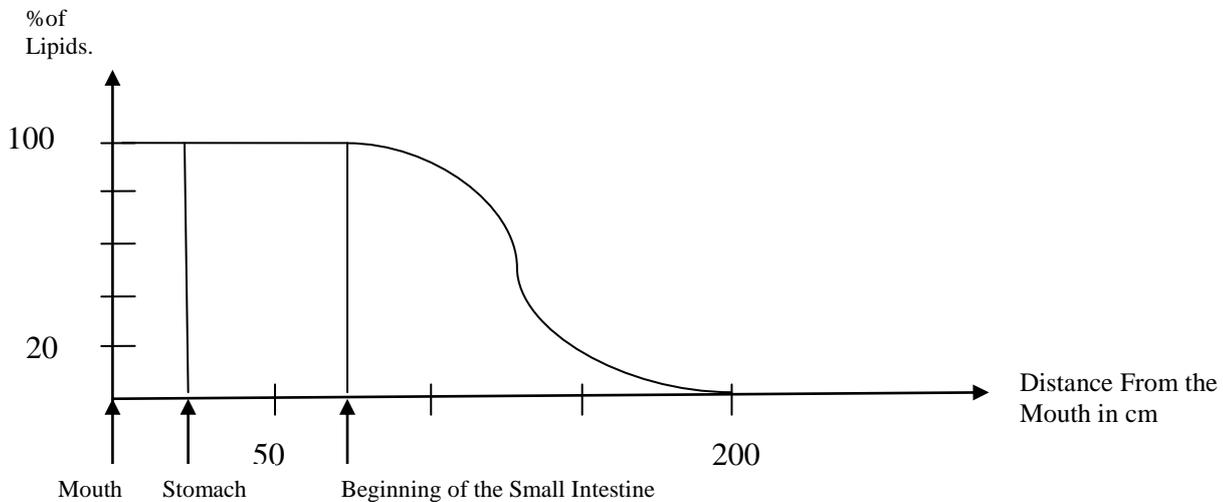
B- The graph below shows the pressure changes in the left ventricle during one phase of the cardiac cycle represented between points D and E.



- 1- What is the maximum pressure developed in the ventricle?
- 2- Formulate a hypothesis that explains the increase in pressure in the ventricle.
- 3-a- Calculate with reference to the graph the time taken to complete this phase.
  - b- Match the phase of this graph to the corresponding figure (X, Y or Z) in part A.

#### Fourth Exercise (4.75pts)

After eating a given amount of lipids by a healthy person, the percentage of these lipids is measured, in the mouth, the stomach and the small intestine respectively. The graph below shows the percentage of lipids at different distances from the mouth.



- 1- Analyse the above graph.
- 2- Answer the following questions:
  - a- Is there a specific enzyme in the mouth to digest lipids? Justify your answer based on your analysis.
  - b- Explain the decrease of the percentage of lipids in the small intestine.
  - c- The time needed to digest these lipids is 2 hours. Explain how this time would change if this digestion took place by the digestive system of a person who doesn't have a gall bladder. (the gall bladder accumulates the bile secreted by the liver).