Biology Worksheet

Chapter 10: Respiration

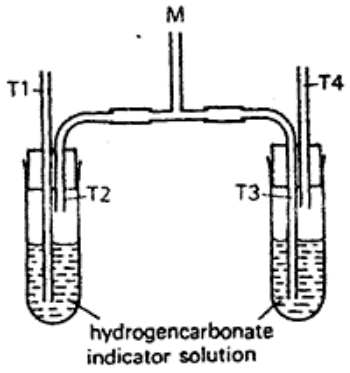
Name: _____ ( ) Class : _____ Date : _____

Section A Multiple Choice Questions

Choose the **most appropriate** answer and write it in the corresponding box below.

Qsn	1	2	3	4	5	6	7	8	9	10
Ans										
Qsn	11	12	13	14	15	16	17			
Ans										

1 The apparatus shown below is used to investigate whether a person breathes out more carbon dioxide gas than he breathes in.



When the person places tube M in his mouth and breathes out, air flows steadily through

A T1 and T2
B T1 and T3
C T2 and T3
D T2 and T4

2 Breathing movements are necessary in mammals to maintain in the alveoli

A a low concentration of carbon dioxide gas and a low concentration of water vapour.
B a low concentration of carbon dioxide gas and a high concentration of oxygen gas.
C a high concentration of carbon dioxide gas and a low concentration of oxygen gas.
D a high concentration of carbon dioxide gas and a low concentration of water vapour.

3 Which of the following causes a flow of air into the lungs during normal breathing in a mammal?

A decreased volume inside the thorax
B flattening of the diaphragm
C increased pressure inside the thorax
D inward movement of the ribcage

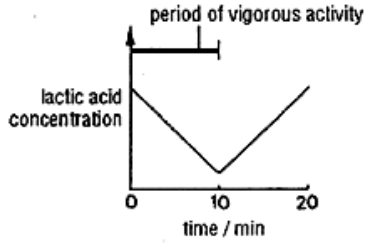
4 Five processes which take place in living organisms are listed below.

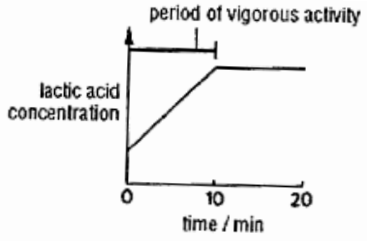
1 release of carbon dioxide
2 release of energy
3 release of oxygen
4 uptake of oxygen
5 uptake of water

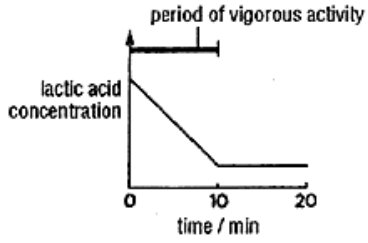
Which three processes are carried out during aerobic respiration?

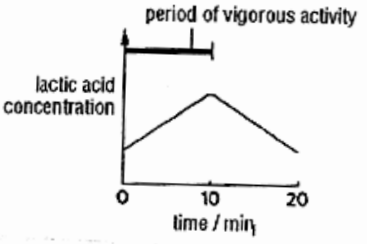
A 1, 2 and 3
B 1, 2 and 4
C 1, 3 and 5
D 2, 3 and 5

5 Which graph shows the change in lactic acid concentration in a muscle during and after a 10 minute period of vigorous activity.

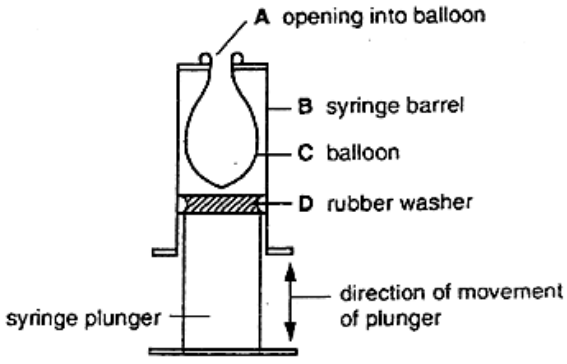
A


C


B


D


6 The apparatus in the diagram shows how air enters the lungs during breathing.

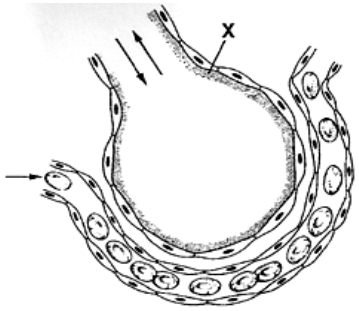


Which structure represents the diaphragm?

7 Which path does a molecule of oxygen take as it enters the body?

A alveolus → bronchiole → bronchus → larynx → trachea
B alveolus → bronchiole → bronchus → trachea → larynx
C larynx → trachea → bronchus → bronchiole → alveolus
D trachea → larynx → bronchus → bronchiole → alveolus

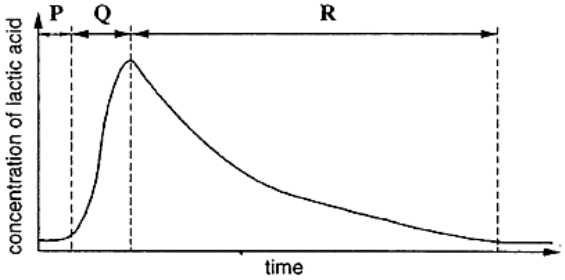
8 The diagram represents an alveolus and its blood supply in the lung of a mammal.



What is the region labelled **X** on the diagram?

A a capillary
B a layer of moisture
C a pleural membrane
D a zone of cilia

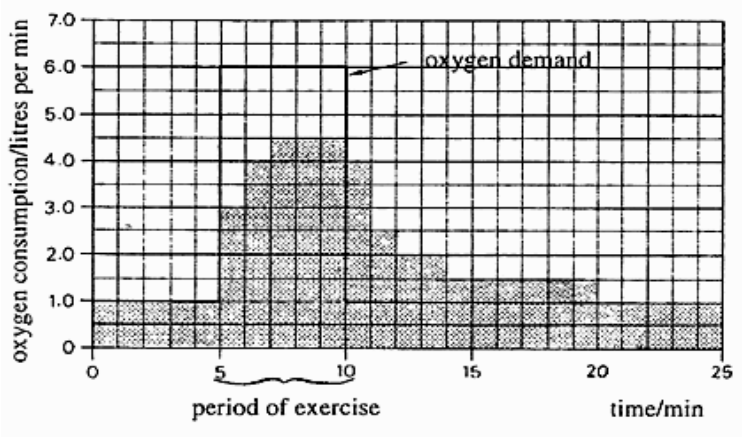
9 The graph shows the concentration of lactic acid in the blood of an athlete.



During which period of time was the athlete exercising?

A period P
B period Q
C period Q + R
D period P + Q

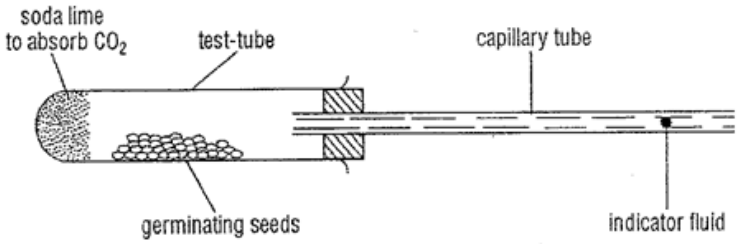
10 The shaded area on the graph shows an athlete's rate of oxygen uptake before, during and after a five-minute period of exercise.
An oxygen debt is built up because the maximum rate of oxygen uptake is less than the oxygen demand.



What is the total volume of oxygen required to repay this oxygen debt?

A 1.0 litre
B 3.0 litres
C 4.5 litres
D 9.5 litres

11 The apparatus shown was set up for a respiration experiment.



The indicator fluid in the capillary tube will

A move away from the test-tube because of oxygen out-put by the seeds.
B move towards the test-tube because of carbon dioxide intake by the seeds.
C move towards the test-tube because of oxygen intake by the seeds.
D not move, because carbon dioxide intake and oxygen output are equal.

12 The amount of lactic acid in muscles increases when they are lacking in

A carbon dioxide.
B glucose.
C hydrogen carbonate ions.
D oxygen.

13 In the human breathing system, which features maintain the carbon dioxide gradient between the alveoli and the outside air?

1 blood continually pumped to the alveoli

2 breathing in and out

3 moist alveolar surfaces

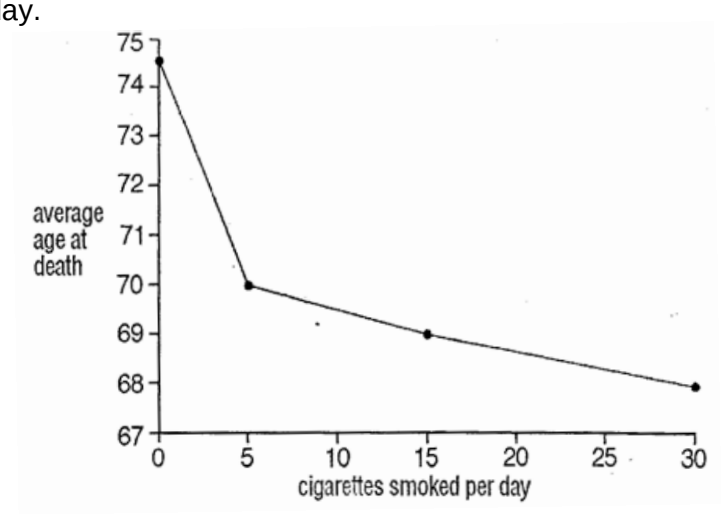
4 thin alveolar walls

A 1 and 2 **B** 1 and 4 **C** 2 and 3 **D** 3 and 4

14 Respiration in living organisms **always** involves

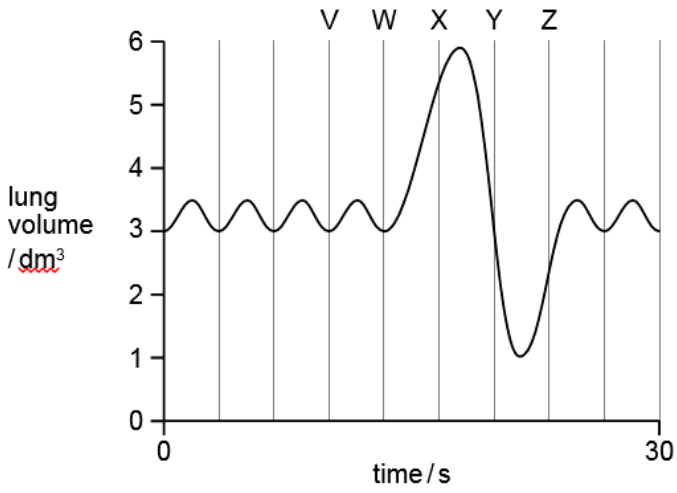
A carbon dioxide production.
B energy release.
C gaseous exchange.
D oxygen consumption.

15 The graph shows the relationship between the average age at death and the number of cigarettes smoked per day.



A Most people living longer than 74 years are non-smokers.
B Most people smoking 30 cigarettes a day die from lung cancer.
C Non-smokers live at least 4.5 years longer than people who smoke.
D People smoking five cigarettes a day live longer than those smoking 15 cigarettes a day.

16 The graph shows changes in the amount of air in a person's lungs over a period of 30 seconds.



Between which time periods is the rate of breathing fastest?

A V to W **B** W to X **C** X to Y **D** Y to Z

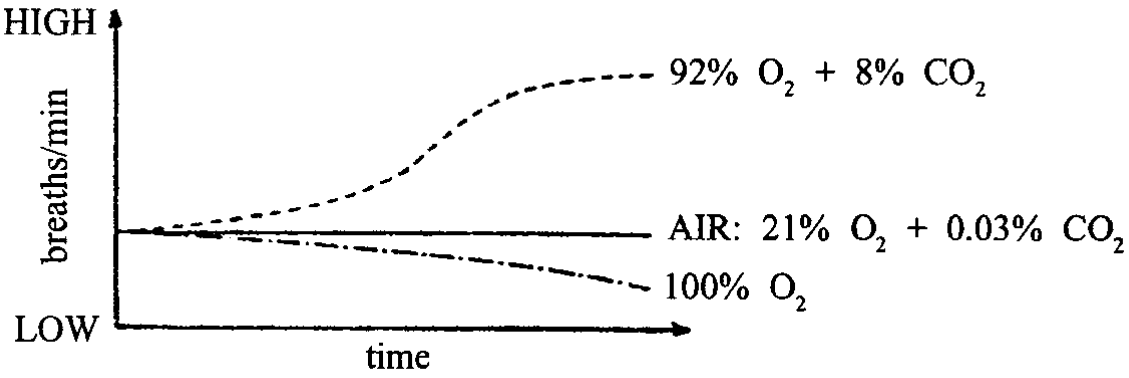
17 Chemicals in tobacco smoke lead to the breakdown of the elastic tissue in the walls of the alveoli.

What is the name of this condition?

A bronchitis
B emphysema
C heart disease
D lung cancer

Section B Structured Questions

1 The figure below shows three curves drawn from data which was obtained in the following manner. At the beginning of the experiment, a human subject is breathing in atmospheric air and the breaths per minute are plotted over a period of time. The experiment is repeated using 100% pure oxygen and then a mixture of gases, 92% oxygen and 8% carbon dioxide.



(a) (i) What happens to the breathing rate when the subject is breathing100% oxygen?

_____

(ii) Suggest what happens in the lungs and the blood of the subject to account for your answer in (i) above.

_____

_____

(b) When the breathing rate increases in a confined space, it is sometimes suggested that this is due to a lack of oxygen. By reference to the data shown in the figure, explain why this is an incorrect hypothesis.

_____

_____

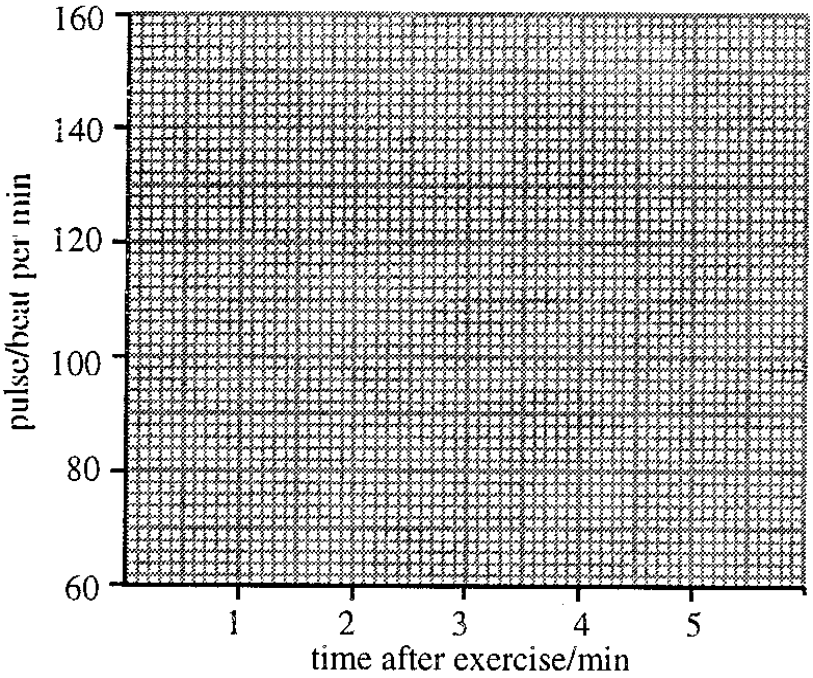
_____

2 Two students carried out an investigation to determine the effect of exercise on their pulse and breathing rates. They each performed five minutes of vigorous exercise. Table 1 below shows the effects, after exercise, on their pulse rates.

Student	Pulse rates/beats per minute					
	Before exercise	At minute intervals after exercise				
		1	2	3	4	5
One	80	155	145	130	110	80
Two	64	109	80	65	64	64

Table 1

(a) Using the data from **Table 1**, plot the pulse rates of the two students, on the graph paper below. You are given the axes and units.

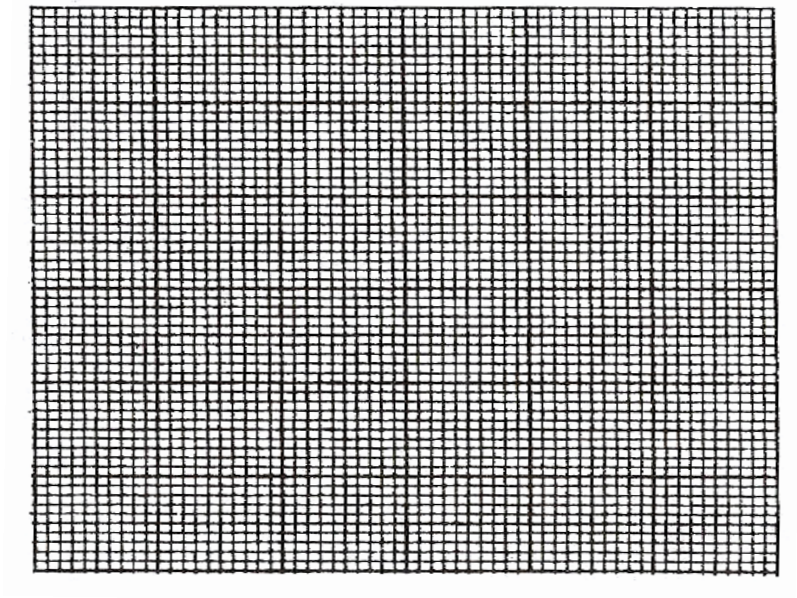


(b) In **Table 2** below, you are given the breathing rates per minute for the two students before and after their exercise.

Student	Breathing rates/breaths per minute					
	Before exercise	At minute intervals after exercise				
		1	2	3	4	5
One	15	42	36	30	20	15
Two	12	31	22	14	12	12

Table 2

Using the data from the table, draw a graph to show breathing rates of the two students on the grid below.



(c) State one reason, in each case, why exercise caused an increase in

(i) Pulse rate,

_____

(ii) Breathing rate.

_____

(d) Which student made the quicker recovery from exercise?

_____

State two reasons for your answer above, one in terms of pulse rate and one in terms of breathing rate.

_____

_____

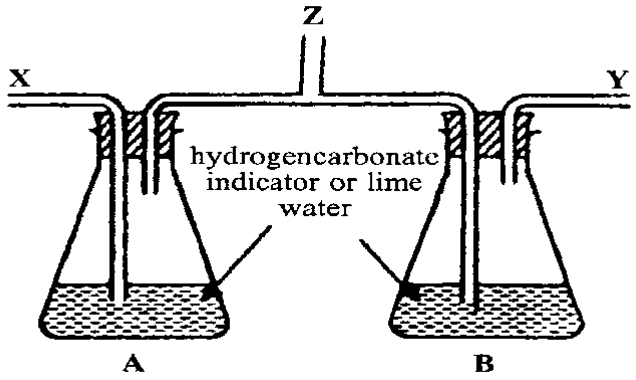
(e) From the results obtained, which student do you think is likely to be the better athlete? State your reasons.

_____

_____

_____

3 (a) The figure below shows the apparatus used to investigate the air that we breathe in and out.



A person breathed in and out through the tube **Z**.

(i) Draw arrows at point **X** and **Y** to show the direction of air flow when breathing in and out.

(ii) What would be observed in flasks **A** and **B** as the air was flowing? Complete **Table 1** below.

	Breathing in	**Breathing out**
Flask **A**		
Flask **B**		

Table 1

(b) **Table 2** below shows the results of an experimental investigation into the difference between the air breathed in and out during normal breathing and after exercise.

	Time for indicator or lime water to change	
	During quiet normal breathing	**After Exercise**
Flask **A**	25 min	12 min
Flask **B**	4 min	2 min

Table 2

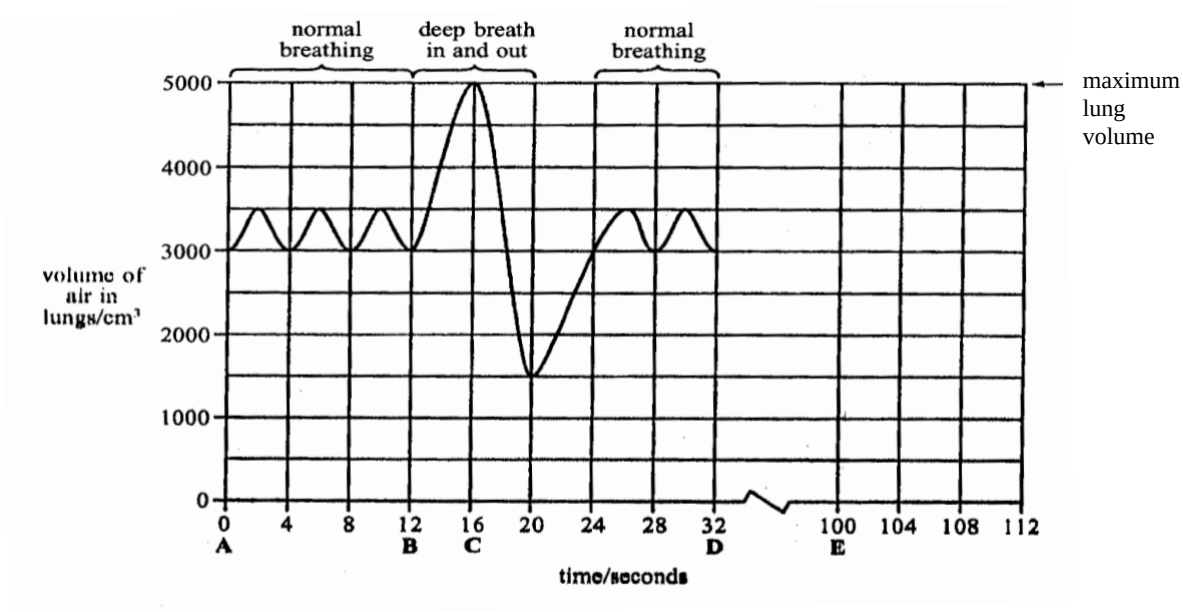
(i) Explain why the time for change is shorter in **B** than in **A**.

_____

(ii) Explain why the changes in **both** flasks are shorter after exercise.

_____

4 Figure 3 below shows the volume of air in the lungs of a person measured over a period of time.



(a) (i) With reference to the figure, calculate, in breaths per minute, the rate of normal breathing between **A** and **B**.

_____breaths per minute

(ii) State the volume of air remaining in the lungs after the deep breath out.

_____

(iii) Explain how the intercostal muscles are involved in breathing from time **B** to time **C**.

_____

_____

At time **D**, the person performed one minute of vigorous exercise.

(b) (i) On Fig. 3, starting at time **E**, continue he graph to show the person's breathing pattern after this exercise.

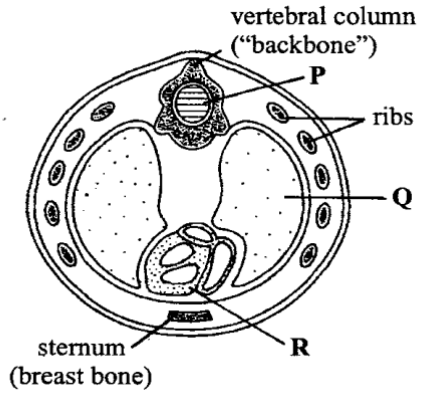
(ii) Explain why the breathing pattern changes after a period of exercise.

_____

_____

_____

5 The figure below shows a section through a human thorax (chest). It shows some of the structures that are found inside the thorax.



(a) Identify structures **P** _____

Q _____

R _____

(b) Name **three** structures, **not shown in the figure**, which pass through or into the thorax.

1. _____
2. _____
3. _____

(c) (i) Which of the organs shown has a large surface area?

_____

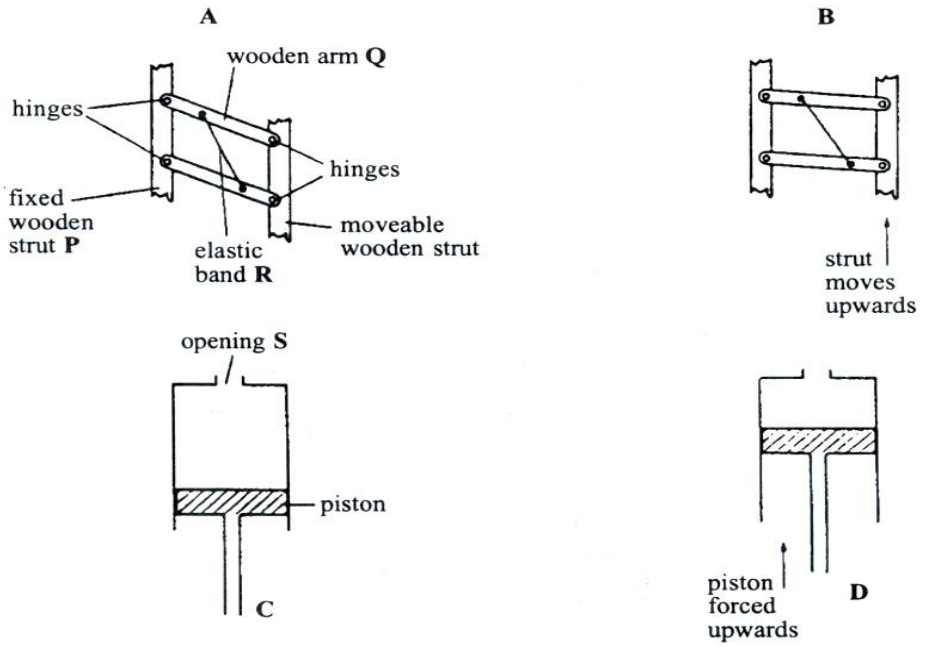
(ii) Explain the significance of a large surface area.

_____

_____

_____

6 The following figure shows models which demonstrate the actions of **two** different sets of muscles used during breathing in a mammal.



(a) Which **two** diagrams represent the thorax after breathing **in**?

_____

(b) Which structures in the human thorax are represented by the following parts labelled on the models?

P _____ **R** _____

Q _____ **S** _____

(c) State **three** ways in which the model shown in **C**/**D** does not accurately represent the process of breathing in a mammal.

1 _____

_____

_____

2 _____

_____

_____

3 _____

_____

_____

7 Fig. 7.1 shows a 'heart-lung' machine being used during an operation on the heart.
Fig. 7.2 shows details of the internal structure of the exchanger unit.

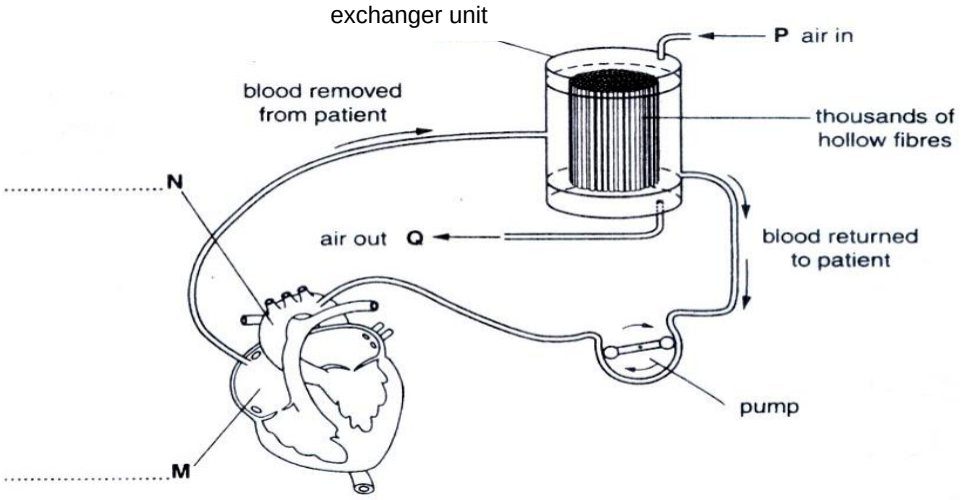


Fig. 7.1

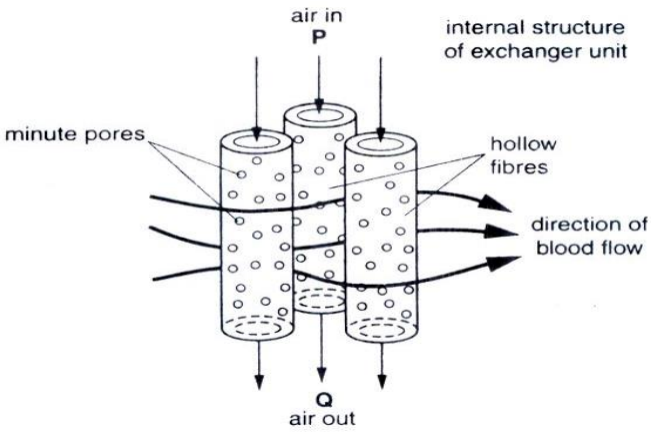


Fig. 7.2

(a) On Fig. 7.1, label structures **M** and **N**.

(b) State two ways in which the air entering the machine at **P** differs from the air leaving it at **Q**.

1. _____

_____

2. _____

_____

(c) Which part of the structure of the lungs is represented by the hollow fibres?

_____

(d) With reference to Fig. 7.2, suggest why the pores in the fibres must be

(i) very large in numbers;

_____

_____

(ii) very small in diameter.

_____

_____