

Gas Exchange in Humans

Question Paper 1

Level	IGCSE
Subject	Biology (0610/0970)
Exam Board	Cambridge International Examinations (CIE)
Topic	Gas Exchange in Humans
Sub-Topic	
Booklet	Question Paper 1

Time Allowed: 24 minutes

Score: /20

Percentage: /100

Grade Boundaries:

9	8	7	6	5	4	3	2	1
>85%	75%	68%	60%	53%	48%	40%	33%	<25%

- 1 What is the approximate percentage of oxygen in expired air?
A 0.04% **B** 4% **C** 16% **D** 21%
- 2 Compared with atmospheric air, air breathed out by a human contains
A less water vapour, less carbon dioxide.
B less water vapour, more carbon dioxide.
C more water vapour, less carbon dioxide.
D more water vapour, more carbon dioxide.
- 3 What is the path of carbon dioxide as it leaves the lungs?
A alveolus → bronchiole → bronchus → trachea
B alveolus → bronchus → bronchiole → trachea
C trachea → bronchiole → bronchus → alveolus
D trachea → bronchus → bronchiole → alveolus

- 4 In some amphibians, gas exchange occurs through the whole skin surface.

What are the most likely characteristics of the skin surface?

	surface area	type of skin
A	large	thick
B	large	thin
C	small	thick
D	small	thin

5 What describes the actions of the intercostal muscles and the diaphragm when we breathe out?

	external intercostal muscles	internal intercostal muscles	diaphragm
A	contract	relax	falls
B	contract	relax	rises
C	relax	contract	falls
D	relax	contract	rises

6 What are the approximate percentages of oxygen and carbon dioxide in atmospheric air?

	oxygen / %	carbon dioxide / %
A	16	4.00
B	16	8.00
C	20	0.04
D	20	4.00

7 When the external intercostal muscles contract, how do the pressure and the volume inside the lungs change?

	pressure	volume
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

8 The table shows the approximate composition of air breathed out by a mammal.

gas	air breathed out / %
nitrogen	80
oxygen	16
carbon dioxide	4

Where does the nitrogen in the air breathed out come from?

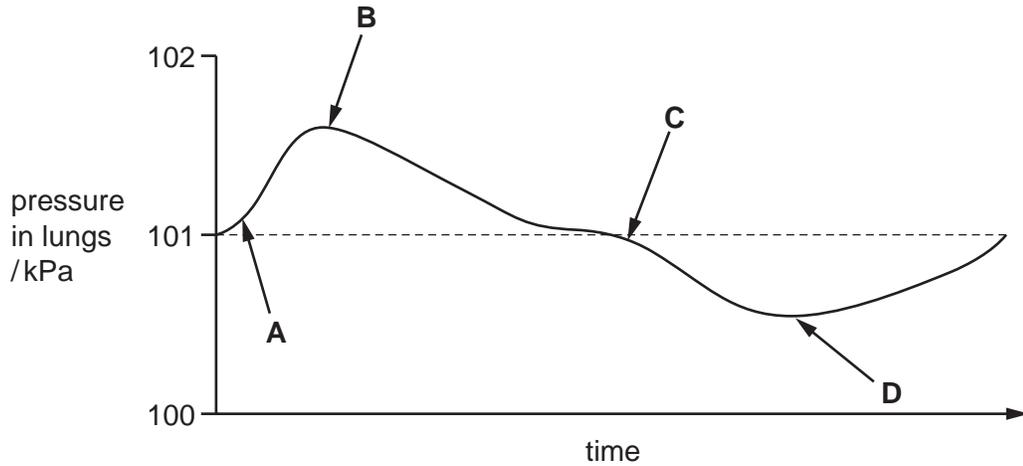
- A** It is a product of proteins broken down in the mammal.
- B** It is a product of respiration.
- C** It is exchanged for oxygen which is taken into the blood.
- D** It is in the air that was breathed in.

9 What helps oxygen to be absorbed rapidly into the blood in the lungs?

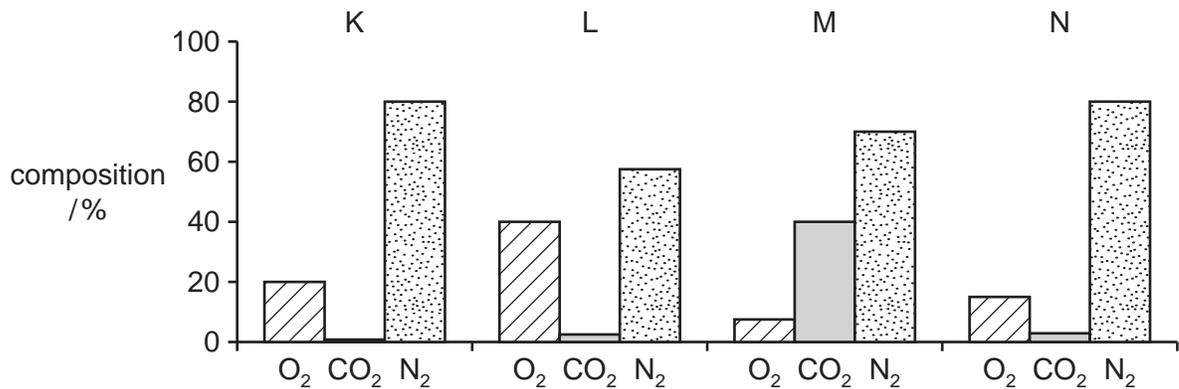
- A** Air breathed in has less oxygen than air breathed out.
- B** Alveoli have thick walls and a large surface area.
- C** Alveoli have thin walls and a large surface area.
- D** The concentration of oxygen in the blood is higher than in the alveoli.

- 10** The diagram illustrates changes in air pressure taking place inside the lungs during a complete cycle of breathing. Atmospheric pressure is 101 kPa.

At which point on the diagram are the ribs beginning to be lowered?



- 11** The diagram shows the composition of four samples of air (O_2 = oxygen, CO_2 = carbon dioxide, N_2 = nitrogen).

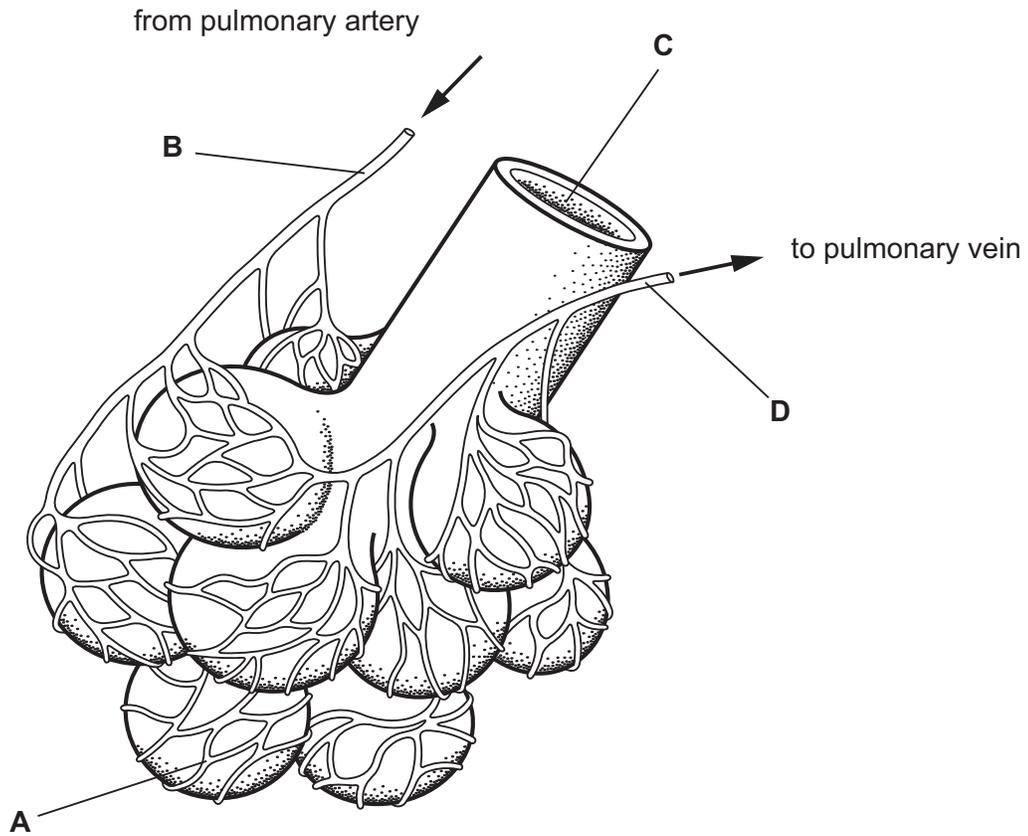


Which sample is inspired air and which sample is expired air?

	inspired air	expired air
A	K	N
B	L	K
C	M	L
D	N	M

12 The diagram shows some of the structures in a human lung.

Where is the carbon dioxide concentration highest?



13 The table shows the composition of four samples of air.

air sample	percentage of oxygen	percentage of carbon dioxide	percentage humidity
P	21	0.04	20
Q	16	4.04	100
R	4	0.40	80
S	20	4.00	60

Which sample is inspired air and which sample is expired air?

	sample breathed in	sample breathed out
A	P	Q
B	P	S
C	Q	R
D	Q	S

14 A girl holds her breath for 30 seconds, breathes out, and then breathes in.

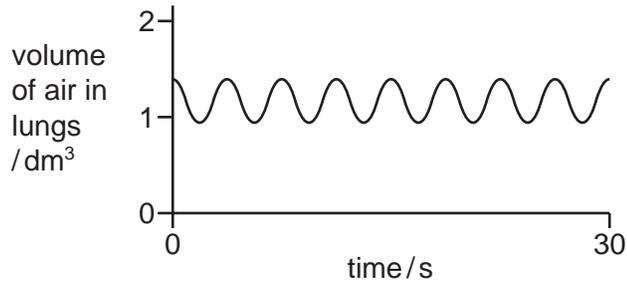
Compared with the air she breathes out, the air she breathes in contains less

- A** carbon dioxide and water vapour.
- B** nitrogen and water vapour.
- C** oxygen and carbon dioxide.
- D** oxygen and nitrogen.

15 What makes alveoli suitable as a gas exchange surface?

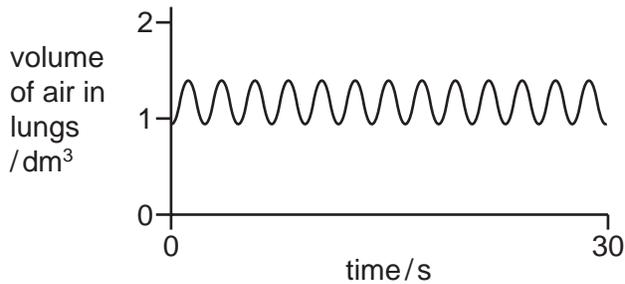
	large total surface area	well-supplied with blood vessels
A	✓	✓
B	✓	x
C	x	✓
D	x	x

- 16 The graph shows changes in the volume of air in the lungs of a person at rest, over a period of 30 seconds.

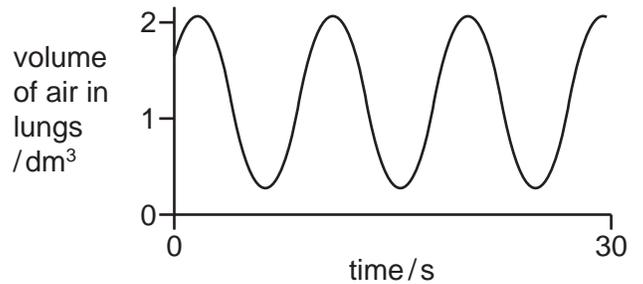


Which graph shows changes in the volume of air in the lungs of the same person immediately after they have done five minutes of vigorous exercise?

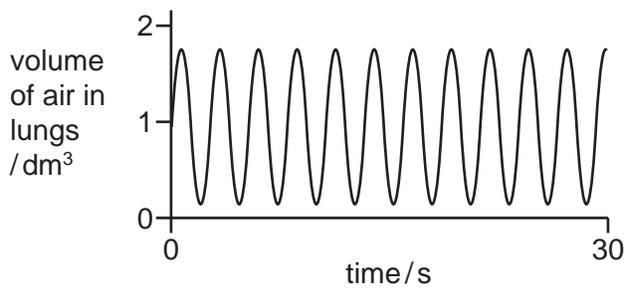
A



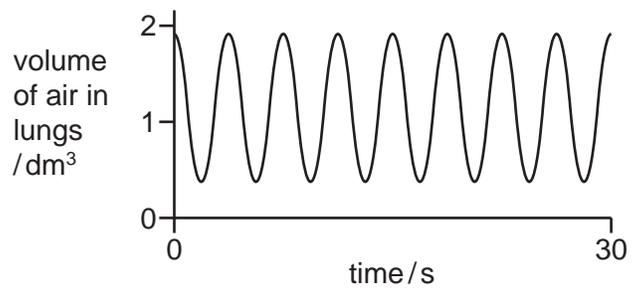
B



C

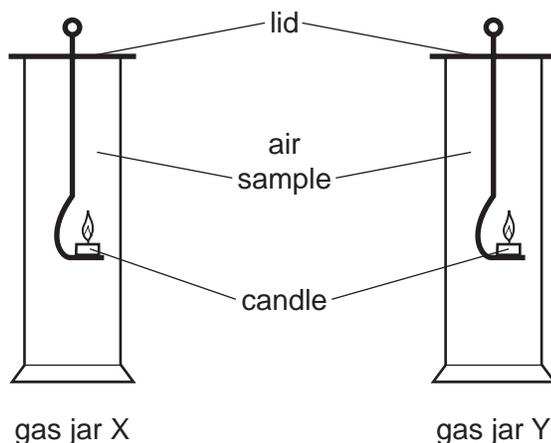


D



17 A sample of expired air is collected in a gas jar. Another gas jar contains normal atmospheric air.

A lighted candle is placed inside each gas jar as shown. The time taken for each flame to go out is measured. As the candles burn they use up the oxygen available in the jar.



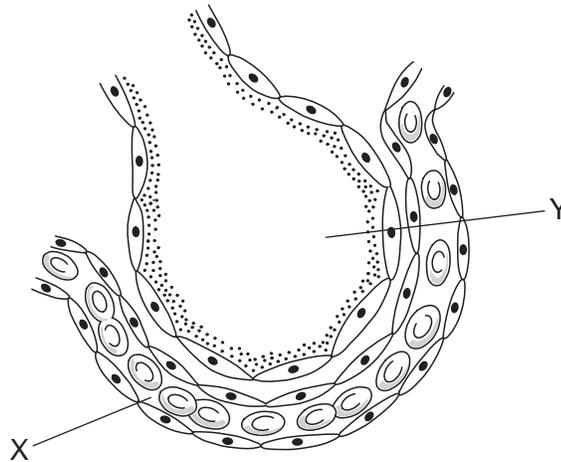
The table shows the results of this experiment.

gas jar	time for candle flame to go out / s
X	15
Y	9

What is an explanation of the difference between the results in jars X and Y?

- A Jar X contains atmospheric air which has more carbon dioxide.
- B Jar X contains expired air which has more carbon dioxide.
- C Jar Y contains atmospheric air which has less oxygen.
- D Jar Y contains expired air which has less oxygen.

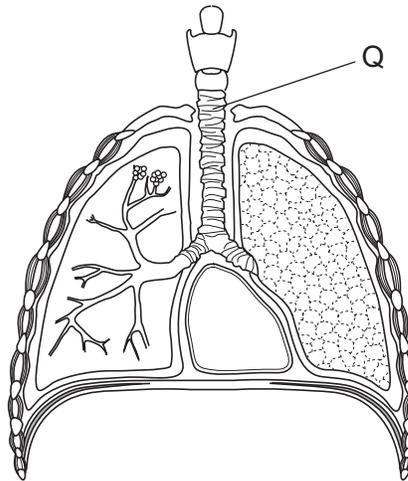
18 The diagram shows a section through an alveolus and a capillary.



Why does carbon dioxide move from X to Y?

- A** Air has a lower concentration of carbon dioxide than blood.
- B** Carbon dioxide moves more freely in air than in blood.
- C** Carbon dioxide must replace oxygen.
- D** Diffusion of carbon dioxide can only be out of the blood.

19 The diagram shows some structures in the human neck and thorax.

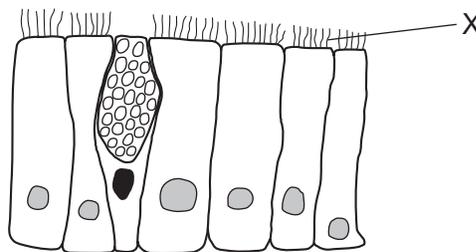


The lining of tube Q has cilia.

What is an important function of the cilia?

- A to help in the exchange of gases
- B to increase the internal surface area of tube Q
- C to moisten the air entering and leaving the lungs
- D to move mucus towards the throat

20 The diagram shows some ciliated cells from the trachea.



What is the function of the parts labelled X?

- A detecting stimuli
- B exchanging gases
- C moving mucus
- D trapping bacteria