5 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.

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

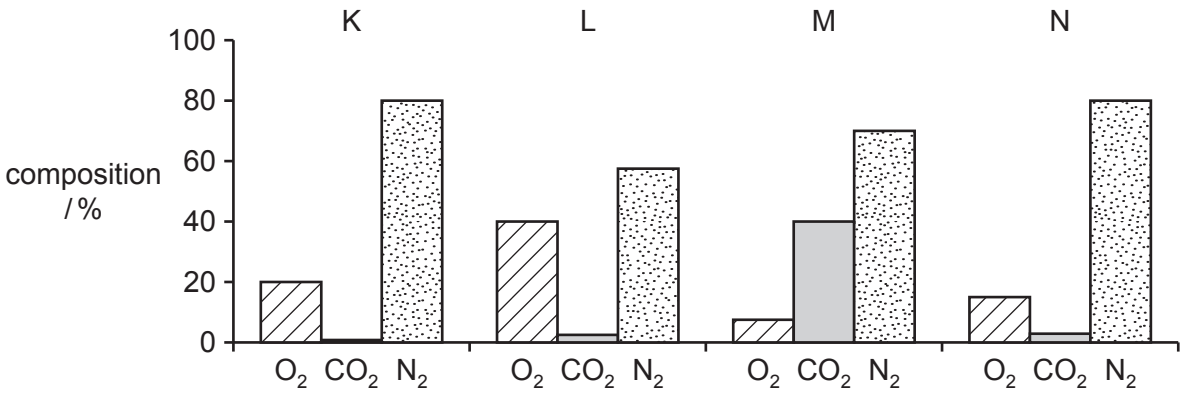
A Air breathed in has less oxygen than air breathed out.

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.

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

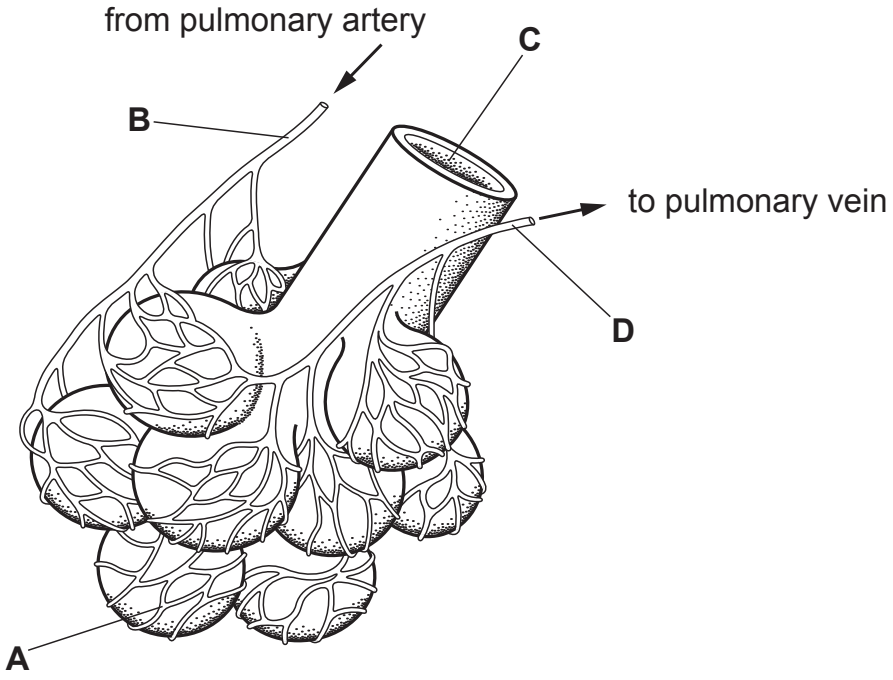


Which sample is inspired air and which sample is expired air?

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

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

Where is the carbon dioxide concentration highest?



9 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

10 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.

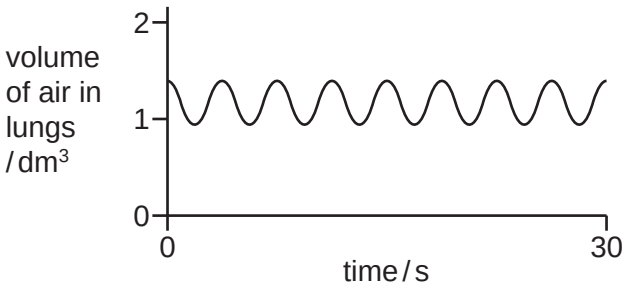
C oxygen and carbon dioxide.

D oxygen and nitrogen.

11 What makes alveoli suitable as a gas exchange surface?

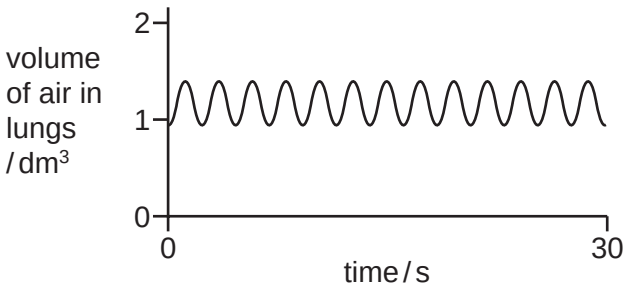
	large total surface area	well-supplied with blood vessels
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

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

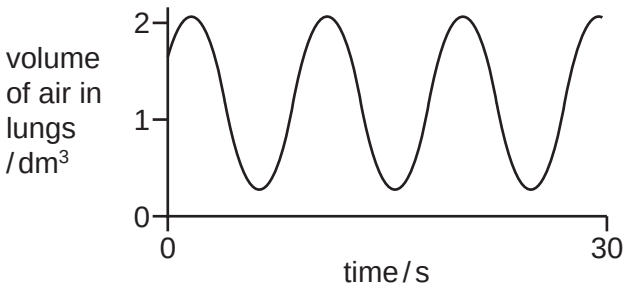


Which graph shows changes in the volume of air in the lungs of the same person immediately after they have done five minutes of vigorous exercise?

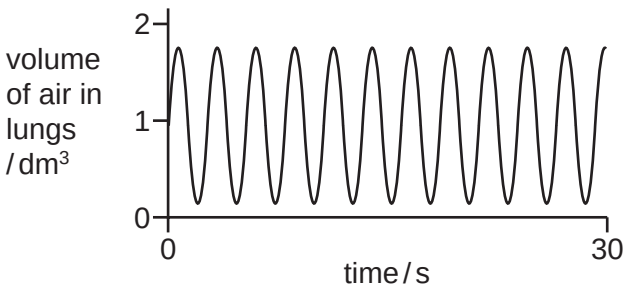
A



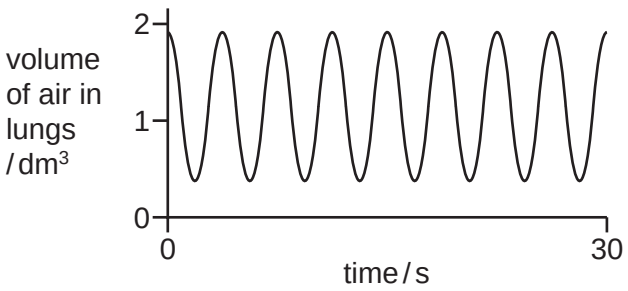
B



C

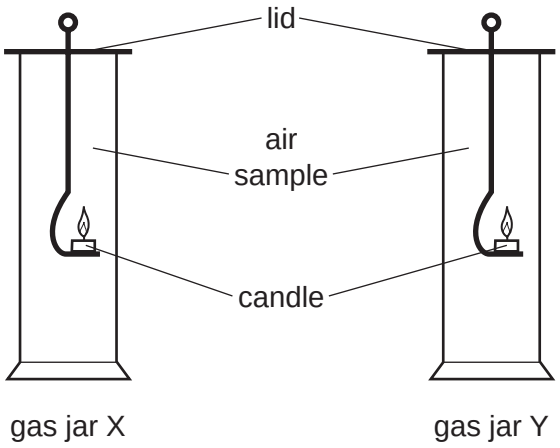


D



13 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?

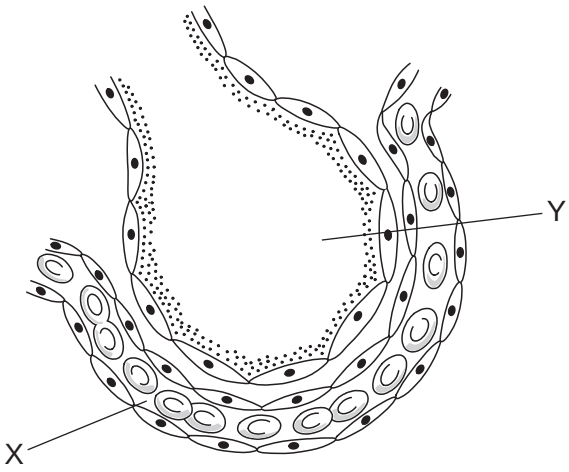
A Jar X contains atmospheric air which has more carbon dioxide.

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.

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



Why does carbon dioxide move from X to Y?

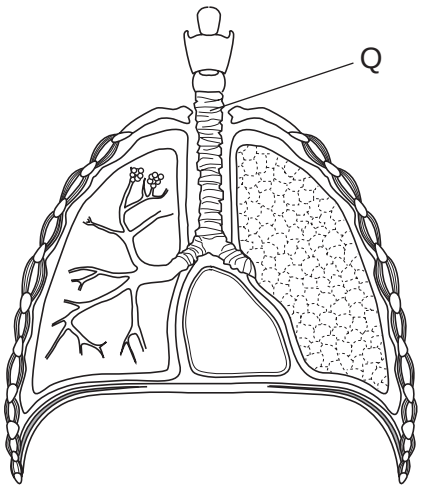
A Air has a lower concentration of carbon dioxide than blood.

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.

15 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?

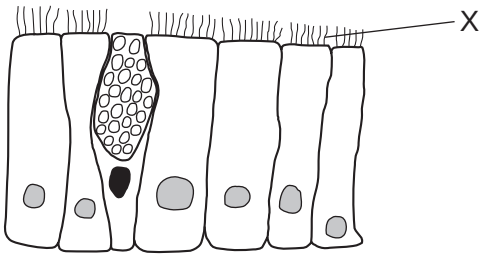
A to help in the exchange of gases

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

16 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

17 What are the functions of the diaphragm and the cilia in the human gas exchange system?

	diaphragm	cilia
A	contracts to cause breathing in	carry mucus to the throat
B	contracts to cause breathing out	trap bacteria from the air
C	relaxes to cause breathing in	filter dust from the air
D	relaxes to cause breathing out	produce mucus

18 The table shows the percentage composition of three gases in atmospheric air.

oxygen	carbon dioxide	nitrogen
21	0.04	78

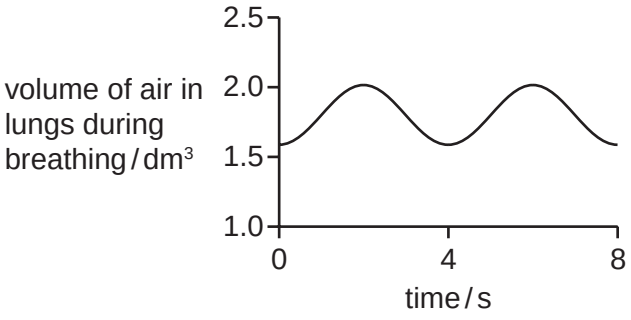
What is the composition of the air breathed out by a person?

	oxygen / %	carbon dioxide / %	nitrogen / %
A	5	73	20
B	16	4	78
C	21	0.04	78
D	78	2	20

19 Which materials are excreted by kidneys and lungs?

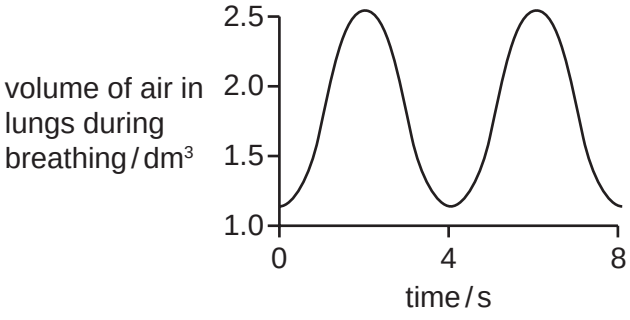
	kidneys	lungs
A	carbon dioxide	carbon dioxide
B	carbon dioxide	urea
C	urea	carbon dioxide
D	urea	urea

20 The graph shows the rate and depth of a person's breathing before exercise.

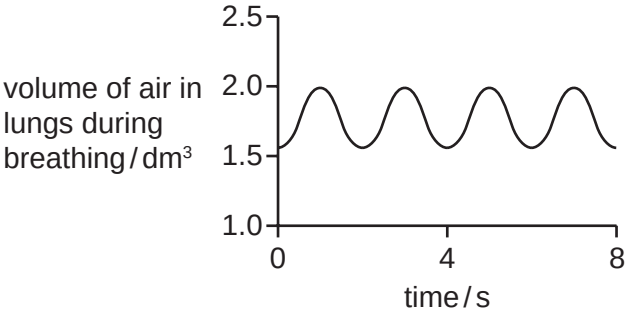


Which graph shows the rate and depth of breathing of the same person immediately after a period of exercise?

A



B



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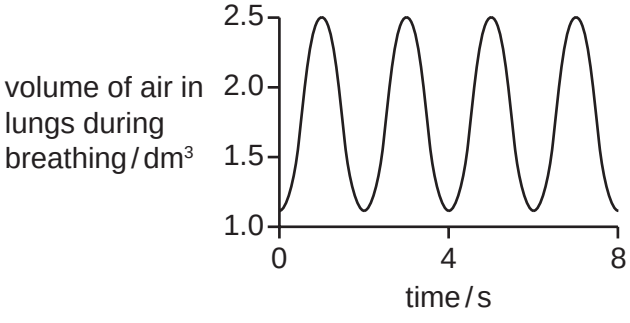

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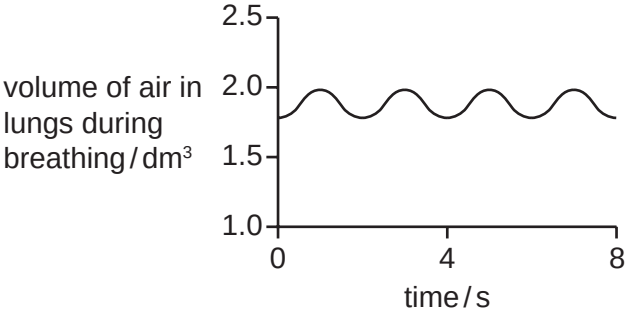
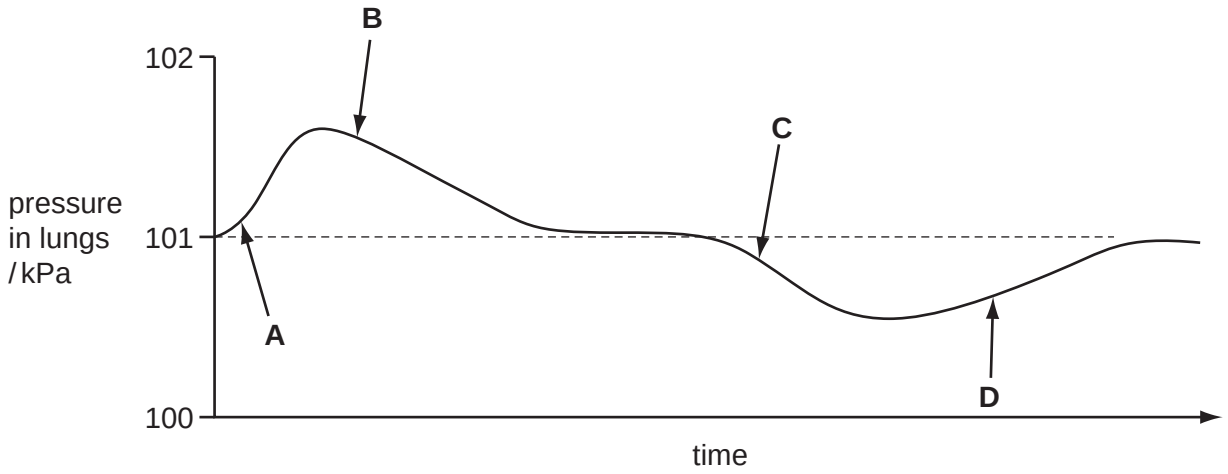


21 The diagram shows changes in air pressure inside the lungs during a complete cycle of breathing. Atmospheric pressure is 101 kPa.

Which position on the graph marks the point at which the ribs are beginning to be raised?



22 Which substance is lost from the body by the kidneys, lungs and skin?

A carbon dioxide

B excess ions

C urea

D water

23 What are the properties of an efficient gas exchange system, assuming it has a good blood supply?

A large surface and thick walls

B large surface and thin walls

C small surface and thick walls

D small surface and thin walls

24 The diagram shows someone blowing up a balloon.

What percentage of the gas in the balloon is carbon dioxide?

A 0.04 % **B** 0.4 % **C** 4.0 % **D** 40 %

25 What increases the rate of diffusion of oxygen into red blood cells in the lungs?

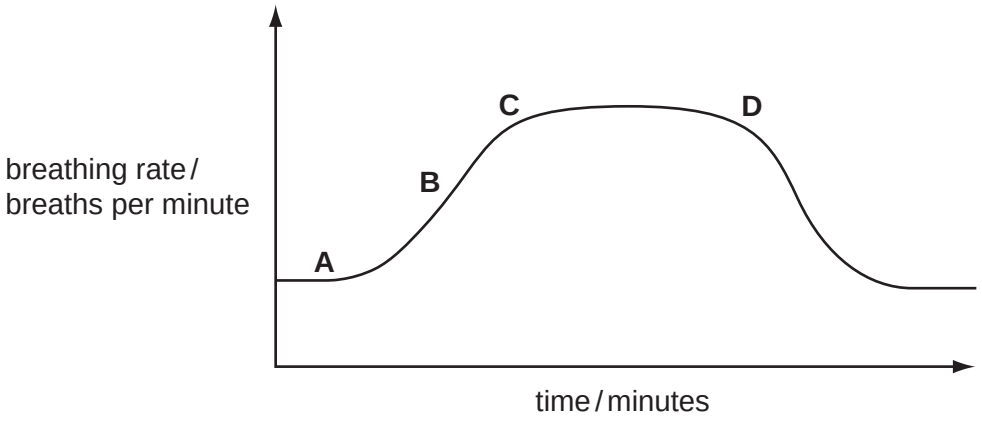
A Air leaving the lungs is saturated with water vapour.

B Air leaving the lungs still contains 16 % oxygen.

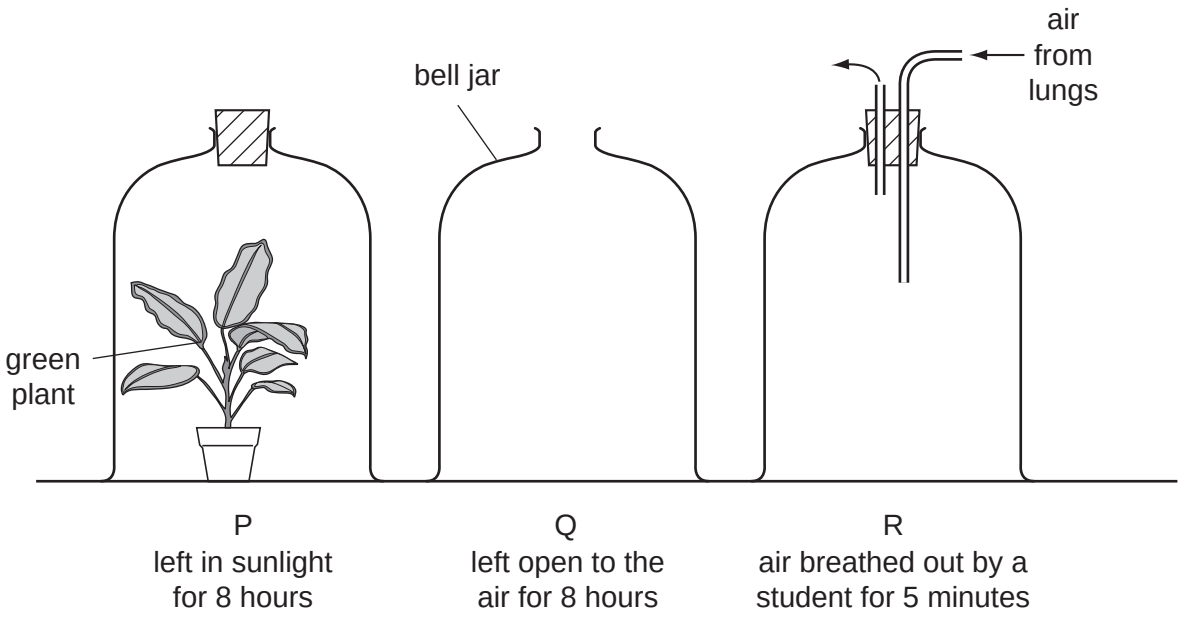
C Blood arriving in the lungs is saturated with oxygen.

D Blood is taken away from the lungs as it circulates.

26 From the graph, when did the person begin a period of vigorous exercise after resting?



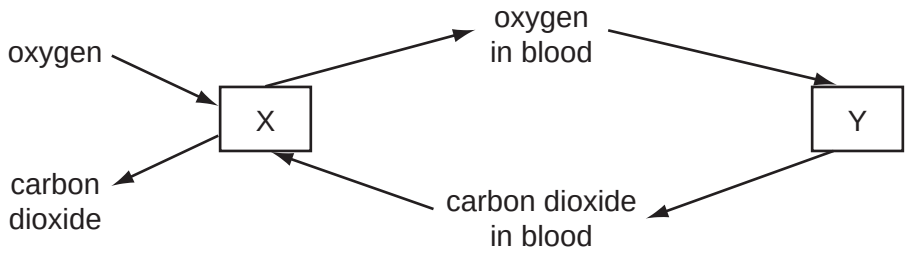
27 In an experiment, three glass bell jars were set up as shown in the diagram.



At the end of the experiment, which bell jar has the most oxygen and which has the least?

	most oxygen	least oxygen
A	P	Q
B	P	R
C	Q	P
D	R	P

28 The diagram represents the exchange of gases during breathing and during respiration in the body.



What is represented by X and by Y?

	X	Y
A	lungs	air
B	lungs	body cells
C	body cells	air
D	body cells	lungs

29 Gas exchange in annelid worms occurs through the whole of the skin surface.

What are the most likely characteristics of the skin surface?

	surface area to volume ratio	condition of surface
A	large	dry
B	large	wet
C	small	dry
D	small	wet

30 Which route is taken by air passing into the lungs of a human?

A alveolus → trachea → bronchus

B bronchus → trachea → alveolus

C trachea → alveolus → bronchus

D trachea → bronchus → alveolus

31 What are features of gaseous exchange surfaces in animals?

A thick-walled, dry, large area

B thick-walled, moist, small area

C thin-walled, dry, small area

D thin-walled, moist, large area

32 Which features are present in gaseous exchange surfaces?

	large surface area	moist	thick walls
A	✓	✓	✗
B	✓	✗	✓
C	✗	✓	✓
D	✓	✓	✓

key

✓ = present

✗ = not present