

Chapter 11

Gas exchange in humans

11.1 Gas exchange in humans

01. 0610_m22_qp_22 Q: 20

Compared with inspired air, which description of expired air is correct?

- A** It has less oxygen and less carbon dioxide.
 - B** It has less oxygen and more carbon dioxide.
 - C** It has more oxygen and less carbon dioxide.
 - D** It has more oxygen and more carbon dioxide.
-

02. 0610_m22_qp_22 Q: 21

Which row shows the features of the gas exchange surface in humans?

	surface area	thickness
A	large	thick
B	large	thin
C	small	thick
D	small	thin

03. 0610_m21_qp_22 Q: 22

Air entering human lungs contains approximately 21% oxygen and 0.04% carbon dioxide.

Which row shows the concentrations of these gases in air leaving the lungs?

	percentage of oxygen in expired air	percentage of carbon dioxide in expired air
A	4	21.0
B	12	4.0
C	16	4.0
D	20	0.4

04. 0610_s21_qp_21 Q: 22

Which sequence of changes takes place when we breathe in?

- A** diaphragm contracts → volume of thorax increases → pressure in lungs decreases
- B** diaphragm contracts → volume of thorax increases → pressure in lungs increases
- C** diaphragm relaxes → volume of thorax increases → pressure in lungs decreases
- D** diaphragm relaxes → volume of thorax increases → pressure in lungs increases

05. 0610_w21_qp_21 Q: 20

What causes the air pressure in the lungs to decrease during breathing in?

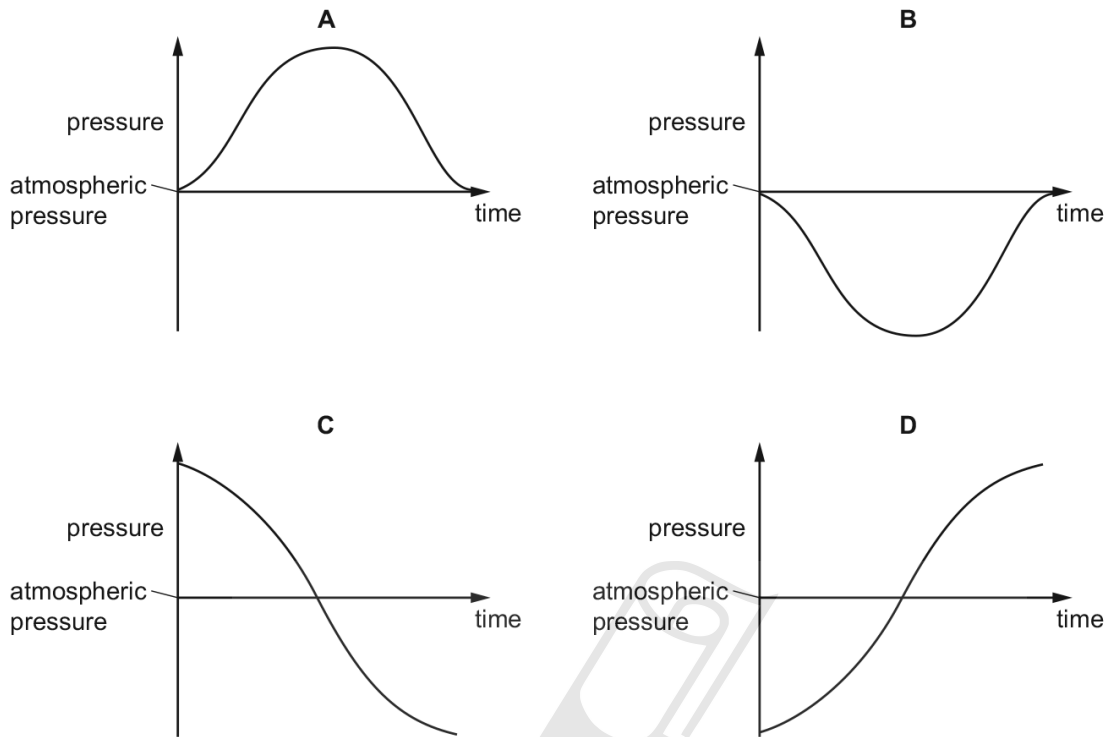
- A** contraction of the external intercostal muscles and diaphragm
- B** expansion of the lungs causing a decrease in the volume of the alveoli
- C** outward movement of the ribs and upward movement of the diaphragm
- D** higher pressure in the atmosphere than in the lungs causing the alveoli to expand

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11.1. GAS EXCHANGE IN HUMANS

06. 0610_w21_qp_22 Q: 20

Which graph shows how the pressure inside the lungs changes when taking one breath in?



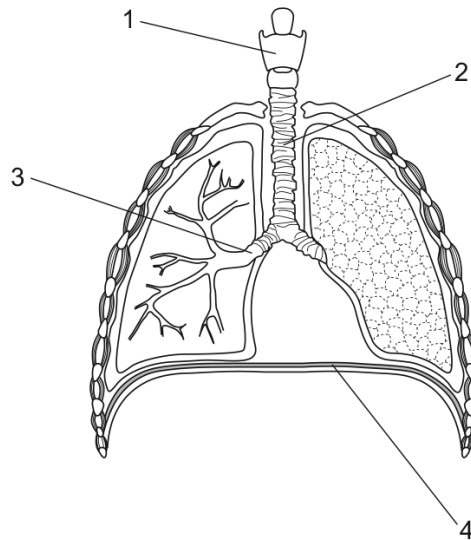
07. 0610_w21_qp_23 Q: 20

Which row shows what happens at the start of inspiration?

	external intercostal muscles contract	internal intercostal muscles contract	diaphragm contracts	volume of thorax increases	air pressure in thorax increases	
A	✓	x	✓	✓	x	key ✓ = yes x = no
B	✓	x	✓	x	✓	
C	x	✓	x	✓	x	
D	x	✓	x	x	✓	

08. 0610_w21_qp_23 Q: 22

The diagram shows the human gas exchange system.



Which row shows the correct labels?

	part of the gas exchange system			
	1	2	3	4
A	trachea	larynx	bronchus	diaphragm
B	larynx	trachea	bronchus	diaphragm
C	trachea	larynx	diaphragm	bronchus
D	larynx	trachea	diaphragm	bronchus

09. 0610_m20_qp_22 Q: 22

During physical activity, what stimulates the brain to increase the breathing rate?

- A** decreased oxygen concentration in the blood
- B** decreased oxygen concentration in the lungs
- C** increased carbon dioxide concentration in the blood
- D** increased carbon dioxide concentration in the lungs

11.1. GAS EXCHANGE IN HUMANS

10. 0610_m20_qp_22 Q: 23

The table shows some of the changes that occur during breathing.

	from contracted to relaxed	from relaxed to contracted
diaphragm	P	X
external intercostal muscles	Q	Y
internal intercostal muscles	R	Z

Which changes occur to cause inspiration?

- A** P, Q and Z **B** X, Q and R **C** X, Y and R **D** X, Y and Z
-

11. 0610_p20_qp_20 Q: 19

What happens during the process of breathing out?

	external intercostal muscles contract	pressure in the lungs increases	diaphragm contracts	volume of thorax increases
A	yes	yes	no	yes
B	yes	no	yes	yes
C	no	yes	no	no
D	no	no	yes	no

12. 0610_s20_qp_21 Q: 20

What is the approximate percentage of oxygen contained in the air breathed out of the lungs?

- A** 0% **B** 4% **C** 16% **D** 20%
-

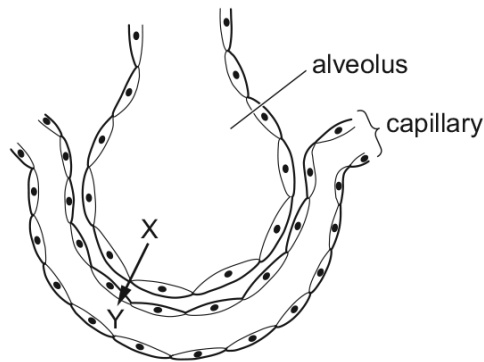
13. 0610_s20_qp_22 Q: 20

What is the site of gas exchange in humans?

- A** nose
B alveoli
C bronchus
D trachea
-

14. 0610_s20_qp_23 Q: 20

The diagram shows an alveolus and capillary in a human lung.



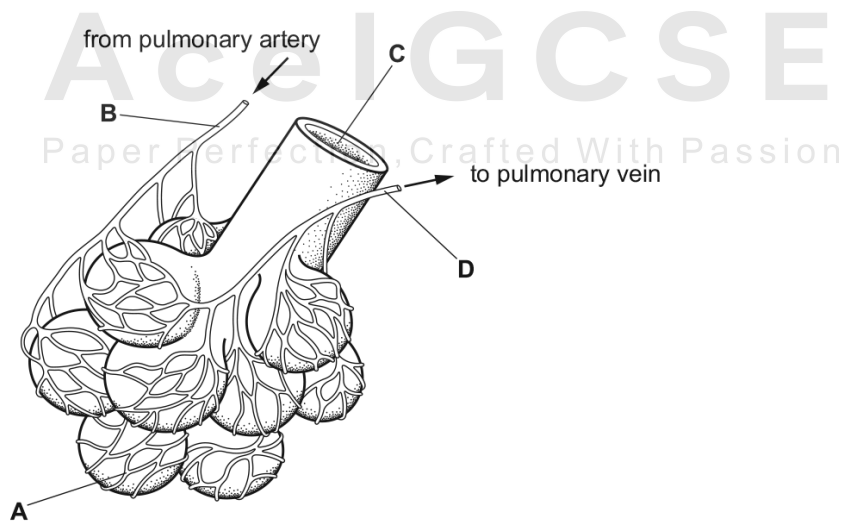
Which row shows the correct gas and concentrations for diffusion from X to Y in normal conditions?

	at point X	at point Y
A	high concentration of carbon dioxide	low concentration of carbon dioxide
B	high concentration of oxygen	low concentration of oxygen
C	low concentration of carbon dioxide	high concentration of carbon dioxide
D	low concentration of oxygen	high concentration of oxygen

15. 0610_w20_qp_21 Q: 20

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

Where is the carbon dioxide concentration highest?



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16. 0610_m19_qp_22 Q: 21

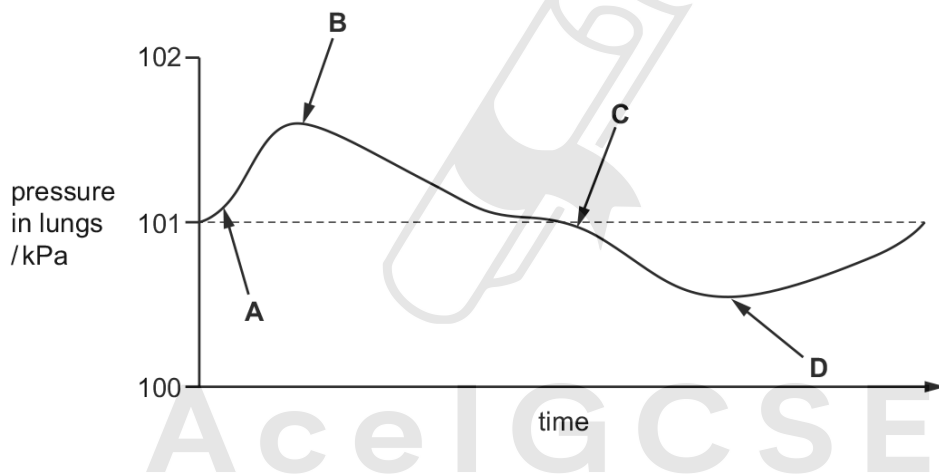
What are the approximate percentages of oxygen and carbon dioxide in inspired air?

	percentage of oxygen	percentage of carbon dioxide
A	16	4.00
B	16	8.00
C	20	0.04
D	20	4.00

17. 0610_s19_qp_21 Q: 21

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?



18. 0610_s19_qp_22 Q: 22

Which pathway is followed by air passing into the body?

- A** larynx → trachea → bronchi → bronchioles → alveoli
- B** larynx → trachea → bronchioles → bronchi → alveoli
- C** trachea → larynx → bronchi → alveoli → bronchioles
- D** trachea → larynx → bronchi → bronchioles → alveoli

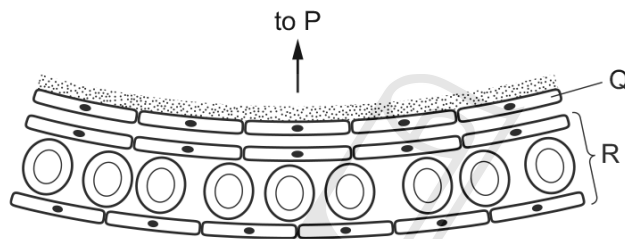
19. 0610_w19_qp_21 Q: 19

Which row shows the approximate percentage of gases in expired air?

	percentage of carbon dioxide	percentage of oxygen
A	12	9
B	4	16
C	24	24
D	27	20

20. 0610_w19_qp_22 Q: 19

The diagram shows part of the human gas exchange system.



Which row identifies P, Q and R?

	P	Q	R
A	alveolus wall	capillary wall	vein
B	bronchiole	alveolus wall	capillary
C	capillary	layer of moisture	bronchiole
D	alveolus wall	bronchiole	capillary

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11.1. GAS EXCHANGE IN HUMANS

21. 0610_w19_qp_23 Q: 19

What is the sequence of structures through which a molecule of oxygen passes from the air to the blood of a person?

- 1 bronchiole
 - 2 capillary
 - 3 alveolus wall
 - 4 larynx
- A** 1 → 4 → 2 → 3
- B** 3 → 2 → 1 → 4
- C** 4 → 1 → 3 → 2
- D** 4 → 2 → 1 → 3

22. 0610_m18_qp_22 Q: 16

During exercise, receptors detect a change in the blood and cause the breathing rate to increase.

What change do the receptors detect and where are they found in the body?

	change in blood	site of detection
A	carbon dioxide increases	brain
B	carbon dioxide increases	intercostal muscles
C	oxygen decreases	brain
D	oxygen decreases	intercostal muscles

23. 0610_s18_qp_21 Q: 20

Muscles are responsible for the ventilation of the lungs during breathing.

Which row describes their action during the inspiration of air?

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

24. 0610_s18_qp_22 Q: 7

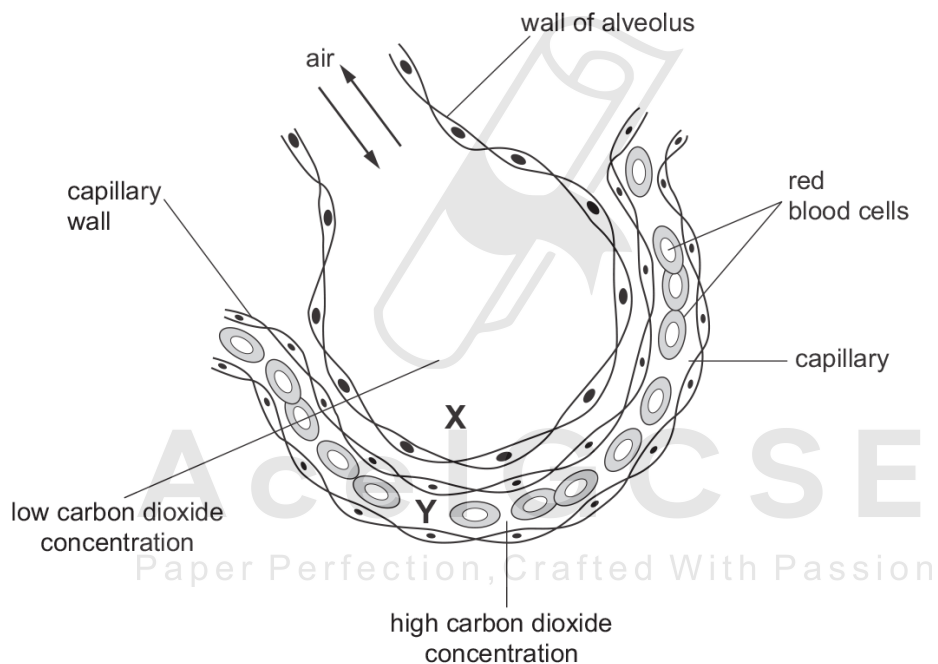
The table shows the concentration of gases in a blood vessel and in an alveolus.

Which row shows the conditions that cause a gas produced in respiration to diffuse from the blood vessel into the alveolus?

	gas produced	concentration in the blood vessel	concentration in the alveolus
A	carbon dioxide	low	high
B	carbon dioxide	high	low
C	oxygen	low	high
D	oxygen	high	low

25. 0610_s18_qp_23 Q: 7

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



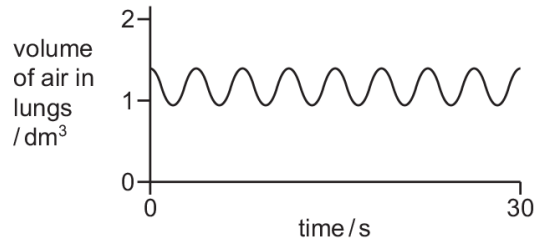
How does carbon dioxide move from Y to X?

- A** by diffusion
- B** by osmosis
- C** by translocation
- D** by transpiration

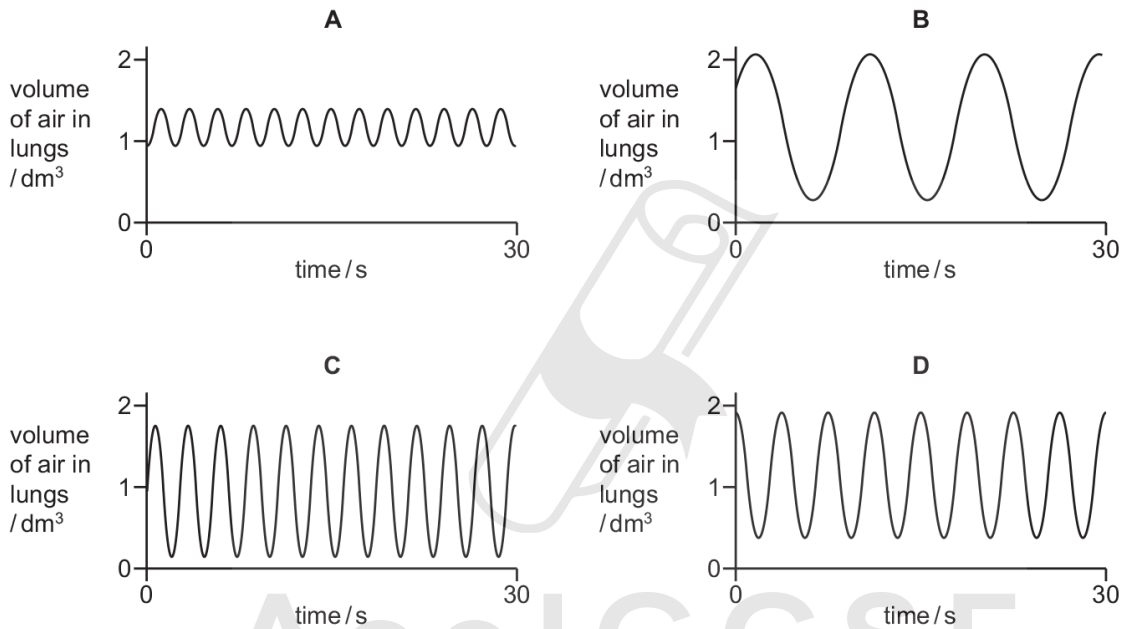
11.1. GAS EXCHANGE IN HUMANS

26. 0610_w18_qp_21 Q: 20

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?



27. 0610_w18_qp_22 Q: 21

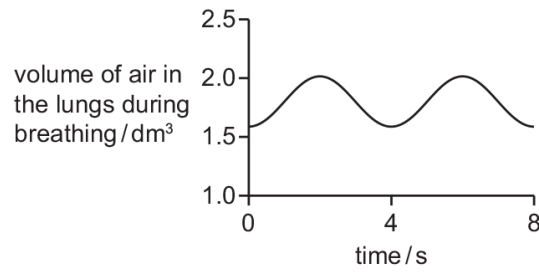
As we breathe out,1..... is2..... through the lungs.

Which words correctly complete gaps 1 and 2?

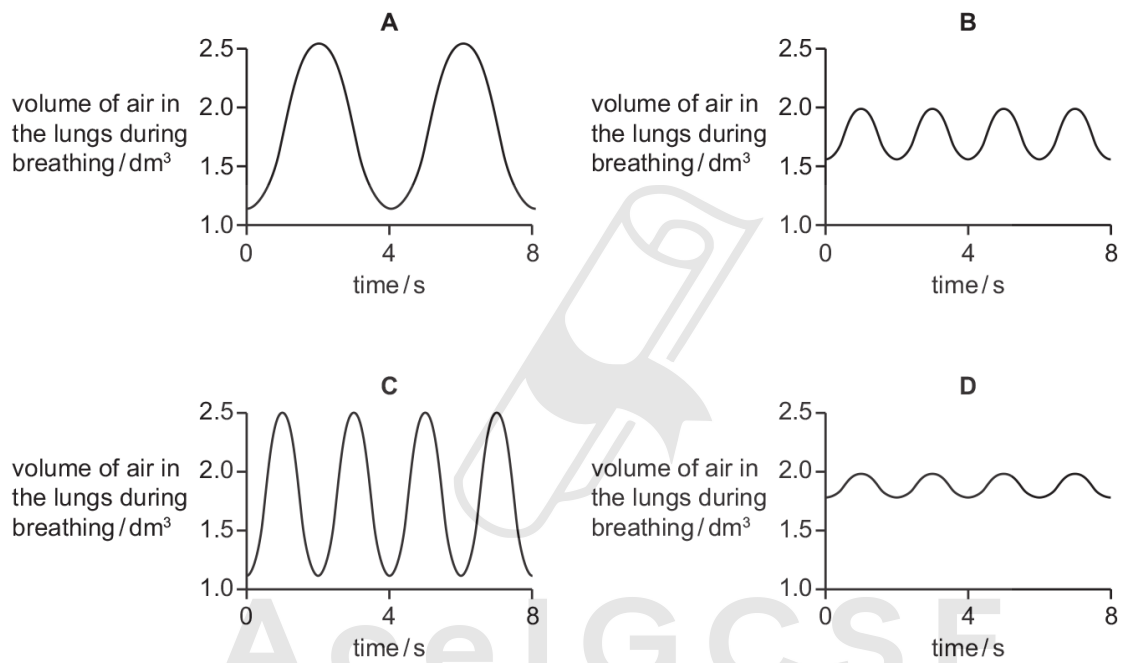
	1	2
A	carbon dioxide	excreted
B	carbon dioxide	respired
C	oxygen	excreted
D	oxygen	respired

28. 0610_m17_qp_22 Q: 18

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



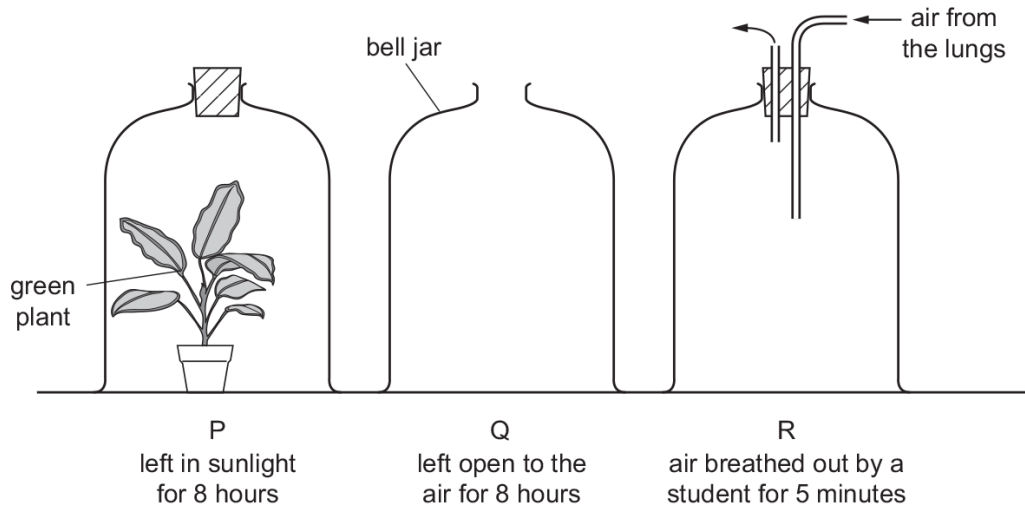
Which graph shows the rate and depth of breathing of the same person immediately after a period of exercise?



11.1. GAS EXCHANGE IN HUMANS

29. 0610_m17_qp_22 Q: 19

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

30. 0610_s17_qp_21 Q: 20

Which is a function of the cartilage in the trachea?

- A** gas exchange
- B** prevents collapse of the trachea
- C** produces mucus
- D** traps bacteria

31. 0610_s17_qp_23 Q: 20

Which row shows the correct combination of muscle contractions and the pressure in the thorax when breathing out?

	internal intercostal muscles	external intercostal muscles	diaphragm	pressure in thorax
A	contracted	contracted	contracted	high
B	contracted	relaxed	relaxed	high
C	relaxed	contracted	contracted	high
D	relaxed	relaxed	relaxed	low

32. 0610_w17_qp_21 Q: 20

The table shows some of the changes that occur during breathing.

	from contracted to relaxed	from relaxed to contracted
diaphragm	P	X
external intercostals	Q	Y
internal intercostals	R	Z

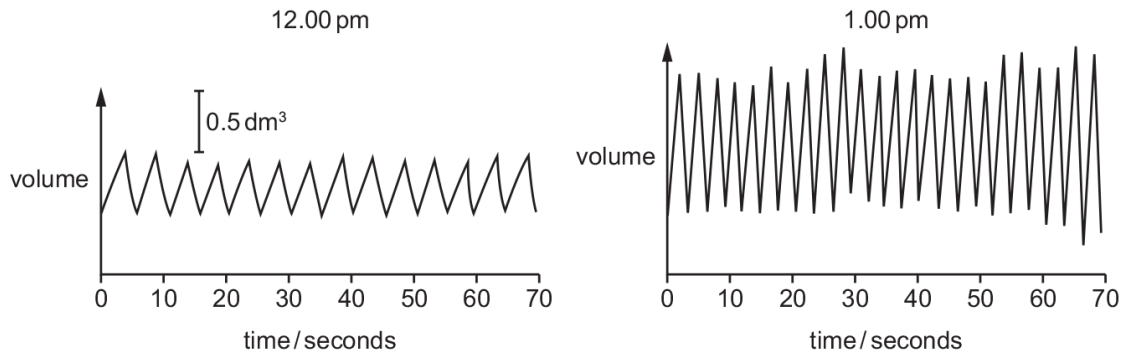
Which changes occur to cause inspiration?

- A** P, Q and Z **B** X, Q and R **C** X, Y and R **D** X, Y and Z

11.1. GAS EXCHANGE IN HUMANS

33. 0610_w17_qp_21 Q: 37

The diagrams show the depth and rate of breathing in a person at 12.00 pm and 1.00 pm.



What happens to the person's breathing between 12.00 pm and 1.00 pm?

	depth of breathing	rate of breathing
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

34. 0610_m16_qp_22 Q: 22

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.

35. 0610_s16_qp_21 Q: 21

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.

36. 0610_s16_qp_21 Q: 22

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

37. 0610_s16_qp_22 Q: 18

Which actions increase the volume of the thorax during breathing?

	external intercostal muscles	internal intercostal muscles	muscles of the diaphragm
A	contract	contract	relax
B	contract	relax	contract
C	relax	contract	relax
D	relax	relax	contract

38. 0610_s16_qp_23 Q: 20

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

39. 0610_w16_qp_21 Q: 22

Which sequence of changes takes place when we breathe in?

- A** diaphragm contracts → volume of thorax increases → pressure in lungs decreases
B diaphragm contracts → volume of thorax increases → pressure in lungs increases
C diaphragm relaxes → volume of thorax increases → pressure in lungs decreases
D diaphragm relaxes → volume of thorax increases → pressure in lungs increases

SN	Paper	Q. No.	Answer
01	0610_m22_qp_22	20	B
02	0610_m22_qp_22	21	B
03	0610_m21_qp_22	22	C
04	0610_s21_qp_21	22	A
05	0610_w21_qp_21	20	A
06	0610_w21_qp_22	20	B
07	0610_w21_qp_23	20	A
08	0610_w21_qp_23	22	B
09	0610_m20_qp_22	22	C
10	0610_m20_qp_22	23	C
11	0610_p20_qp_20	19	C
12	0610_s20_qp_21	20	C
13	0610_s20_qp_22	20	B
14	0610_s20_qp_23	20	B
15	0610_w20_qp_21	20	B
16	0610_m19_qp_22	21	C
17	0610_s19_qp_21	21	A
18	0610_s19_qp_22	22	A
19	0610_w19_qp_21	19	B
20	0610_w19_qp_22	19	B
21	0610_w19_qp_23	19	C
22	0610_m18_qp_22	16	A
23	0610_s18_qp_21	20	A
24	0610_s18_qp_22	7	B
25	0610_s18_qp_23	7	A
26	0610_w18_qp_21	20	C
27	0610_w18_qp_22	21	A
28	0610_m17_qp_22	18	C
29	0610_m17_qp_22	19	B
30	0610_s17_qp_21	20	B
31	0610_s17_qp_23	20	B
32	0610_w17_qp_21	20	B
33	0610_w17_qp_21	37	D
34	0610_m16_qp_22	22	C
35	0610_s16_qp_21	21	D
36	0610_s16_qp_21	22	D
37	0610_s16_qp_22	18	B
38	0610_s16_qp_23	20	A
39	0610_w16_qp_21	22	A