

17 Which muscles in the breathing system contract during inspiration?

- A** external intercostal and diaphragm only
- B** external intercostal and internal intercostal only
- C** external intercostal, internal intercostal and diaphragm
- D** internal intercostal and diaphragm only

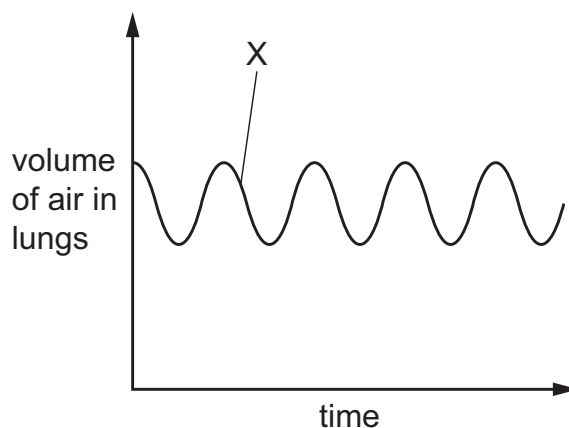
16 Which row describes what happens when breathing in?

	diaphragm	external intercostal muscles
A	contracts	contract
B	contracts	relax
C	relaxes	contract
D	relaxes	relax

18 Which changes cause expiration?

	external intercostal muscles	diaphragm
A	contract	relaxes and moves down
B	contract	relaxes and moves up
C	relax	relaxes and moves down
D	relax	relaxes and moves up

18 The graph shows how the volume of air in lungs changes when a person is breathing at rest.



Which processes are occurring to change the volume at the point marked X?

- A** The diaphragm is relaxing and the external intercostal muscles are relaxing.
- B** The diaphragm is contracting and the internal intercostal muscles are contracting.
- C** The diaphragm is contracting and the internal intercostal muscles are relaxing.
- D** The diaphragm is relaxing and the external intercostal muscles are contracting.

6 Which row shows the conditions when diffusion of oxygen into the blood is fastest?

	alveolar surface area	concentration gradient	diffusion path distance
A	high	high	short
B	high	low	short
C	low	high	long
D	low	low	long

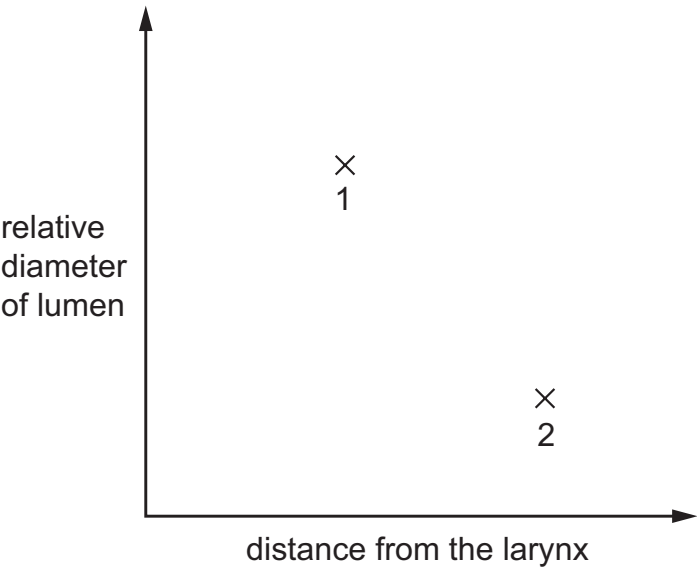
- 20** The table shows the breathing rate and the average total volume of air breathed by a student when exercising for 20 minutes.

time /minutes	breathing rate / breaths per minute	average total volume of air breathed / cm ³ per minute
0	12	5 000
5	12	9 000
10	12	15 000
15	18	20 000
20	22	25 000

Which conclusion can be made from the data in the table about the effect of exercise on breathing?

- A** Between 0 minutes and 10 minutes, there is no change to the depth of breathing.
- B** Between 0 minutes and 10 minutes, the depth of breathing increases.
- C** Between 10 minutes and 20 minutes, there is no change to the rate of breathing.
- D** Between 15 minutes and 20 minutes, the depth of breathing decreases.

18 The plotted points, 1 and 2, on the graph show two different types of structure in the breathing system of a human.



Which row identifies a structure attached to alveoli and a structure containing cartilage?

	a structure attached to alveoli	a structure containing cartilage
A	1	1
B	1	2
C	2	1
D	2	2

1 (a) Fig. 1.1 shows part of the human gas exchange system.

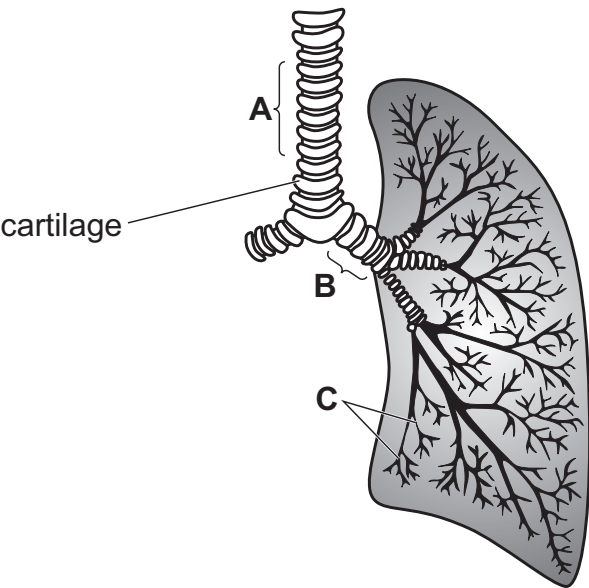


Fig. 1.1

(i) Identify structures **A**, **B** and **C** shown in Fig. 1.1.

- A
- B
- C [3]

(ii) State the function of the cartilage shown in Fig. 1.1.

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- [1]

(iii) Explain how inspiration occurs.

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(b) Cystic fibrosis is a condition that affects the lungs. People with cystic fibrosis have mucus in the airways of their lungs that is thicker and stickier than usual.

(i) Two types of cells that line the airways protect the body against pathogens and particles.

State the names of these **two** types of cell **and** describe how they protect the body.

[3]

(ii) Suggest how having thicker and stickier mucus in the airways affects the ability of a person to do exercise.

[4]

(c) Cystic fibrosis is an inherited condition in humans caused by a recessive allele of a gene.

There are two alleles for this gene:

- the allele for no cystic fibrosis is represented by the letter **F**
- the allele for cystic fibrosis is represented by the letter **f**.

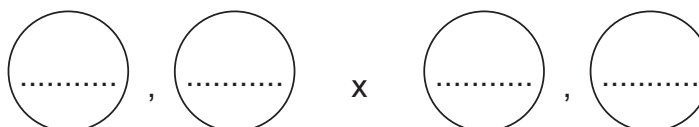
Two heterozygous parents wanted to have a child.

Complete the genetic diagram to predict the probability of these parents having a child with cystic fibrosis.

parental phenotypes no cystic fibrosis x no cystic fibrosis

parental genotypes x

gametes



offspring genotypes

offspring phenotypes

probability of having a child with cystic fibrosis

[5]

[Total: 20]