

1. Fig. 15.1 shows simplified models of two alveoli after exhalation is complete. One shows an alveolus from a non-smoker and the other shows the alveolus from a smoker. X is a tissue found in the lungs. Questions 15 and 16 both refer to this figure.

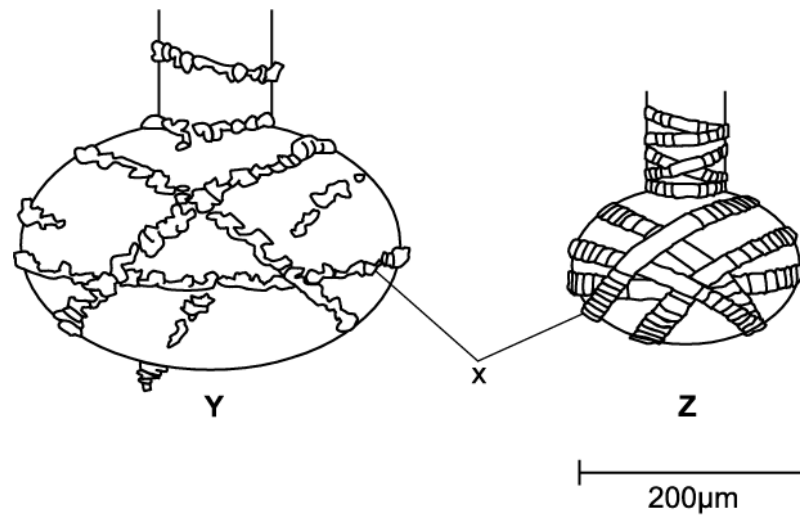


Fig. 15.1

Which of the following statements is correct:

- A Y is from a non-smoker and X labels cartilage rings.
- B Z is from a non-smoker and X labels cartilage rings.
- C Y is from a non-smoker and X labels elastic fibres.
- D Z is from a non-smoker and X labels elastic fibres.

Your answer

[1]

2. In Fig. 15.1, the two alveoli are shown as simple spheres.

Using $\pi = 3.142$, what is the approximate surface area for alveolus Z?

- A $5.0 \times 10^5 \mu\text{m}^2$
- B $1.3 \times 10^5 \mu\text{m}^2$
- C $3.1 \times 10^4 \mu\text{m}^2$
- D $4.2 \times 10^6 \mu\text{m}^2$

Your answer

[1]

3. Fig. 3.1 shows a thin section of human lung tissue as seen under medium power on a light microscope.

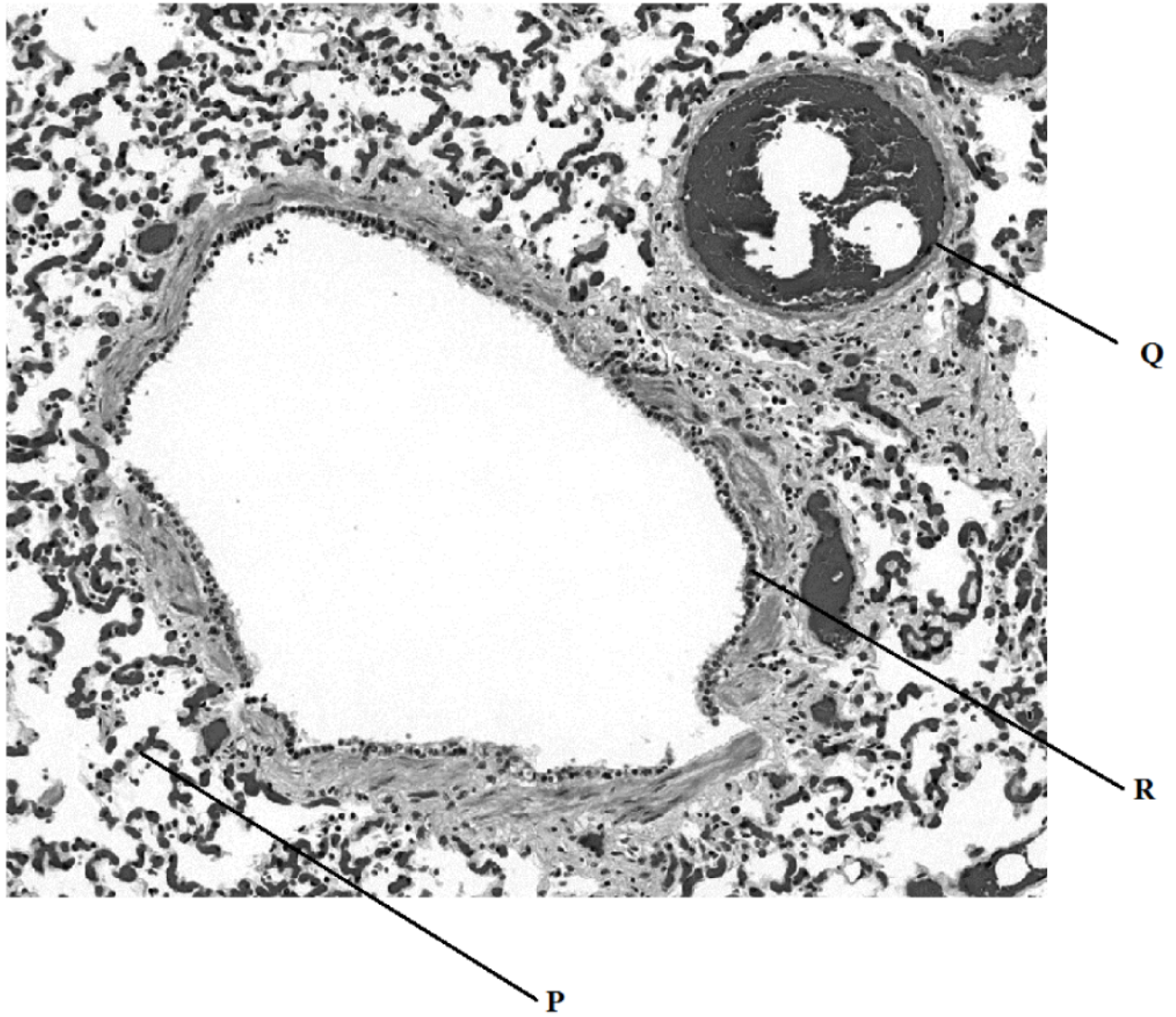


Fig. 3.1

Which of the following options correctly identifies P, Q and R?

	Ciliated epithelium	Endothelium	Squamous epithelium
A	R	P	Q
B	R	Q	P
C	Q	R	P
D	P	R	Q

Your answer

[1]

4. The opening of stomatal pores is due to the action of the guard cells. The mechanism is summarised in Fig. 5.1 and involves the entry of water by osmosis.

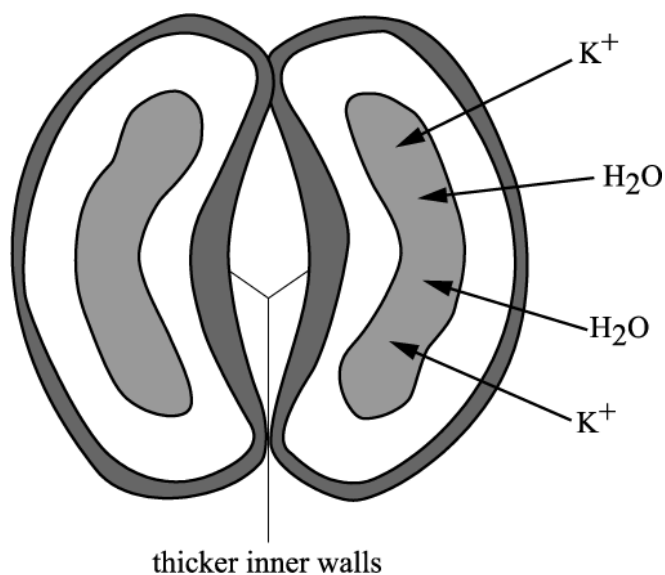


Fig. 5.1

What causes the entry of water by osmosis?

- A Diffusion of potassium ions into the cell raising the water potential.
- B Diffusion of potassium ions into the cell lowering the water potential.
- C Active transport of potassium ions into the cell raising the water potential.
- D Active transport of potassium ions into the cell lowering the water potential.

Your answer

[1]

5. The statements below refer to the location of cells S and T and the effect of the pollutants in tobacco smoke on these cells.

Fig. 9.1 shows a photomicrograph of a tissue found in the human gas exchange system. This tissue will be exposed to any pollutants present in inhaled air.

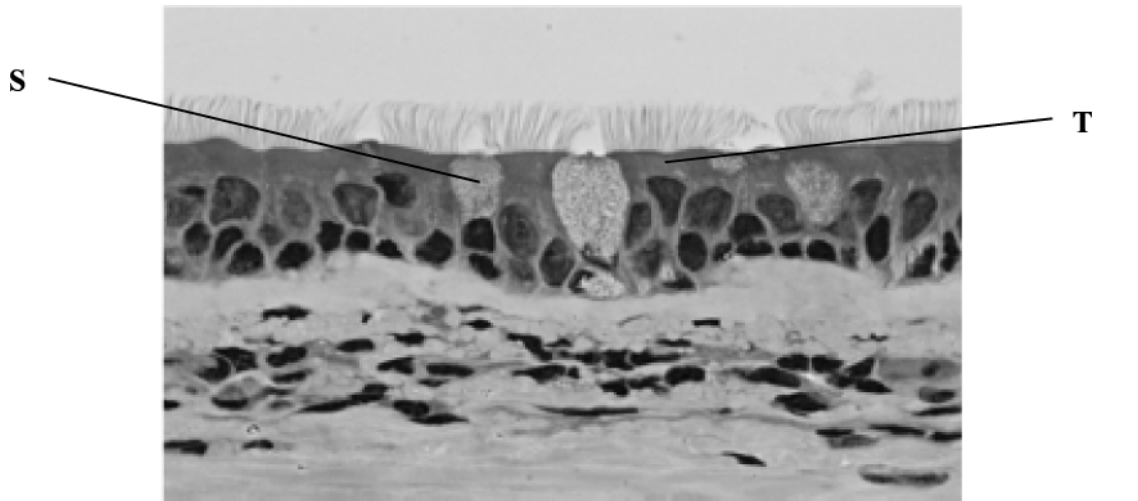
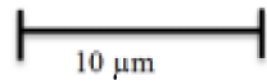


Fig. 9.1



Which of the following statements are correct?

- Statement 1:** Cell S is a goblet cell and is stimulated by pollutants.
Statement 2: Cell T is a ciliated cell and is damaged by pollutants.
Statement 3: Cell S and T are found in the bronchi, bronchioles and alveoli.

- A 1, 2 and 3
B Only 1 and 2
C Only 2 and 3
D Only 1

Your answer

[1]

6. Plants exchange gases through stomata. The opening and closing of stomata is controlled by guard cells.

Which of the sequences, **A** to **D**, would result in **open** stomata?

- A K^+ enters guard cells. The water potential of the cells is decreased. The cells take in water.
- B K^+ leaves guard cells. The water potential of the cells is increased. Water leaves the cells.
- C K^+ enters guard cells. The water potential of the cells is increased. The cells take in water.
- D K^+ leaves guard cells. The water potential of the cells is decreased. Water leaves the cells.

Your answer

[1]

7. Ventilation is increased during exercise to meet the increased oxygen demand of the body.

One way of increasing ventilation is to exchange a larger volume of air with each breath.

Which of the options, **A** to **D**, is a respiratory measurement that could detect this increase?

- A forced expiratory volume
- B residual volume
- C tidal volume
- D vital capacity

Your answer

[1]

8. A group of students were investigating the effect of exercise on pulmonary ventilation.

The table below shows some of the results recorded for one of the students in the group.

Tidal volume	0.45 dm ³
Vital capacity	3.45 dm ³
Mean breathing rate at rest	14 min ⁻¹
Mean breathing rate during exercise	18 min ⁻¹

Which of the options, **A** to **D**, shows the total volume of air that moved in and out of this student's lungs in a five minute period **before** the start of exercise?

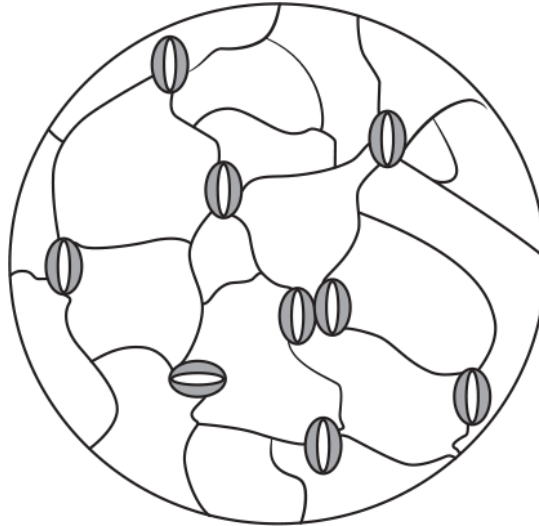
- A 31.50 dm³
- B 36.00 dm³
- C 40.50 dm³
- D 241.50 dm³

Your answer

[1]

9. A student used a light microscope to count the number of stomata in the lower epidermis of a leaf.

The diagram below shows a drawing of the field of view made by the student.



The student was given the following information:

- Diameter of the field of view = 1 mm.
- The lower epidermis of the leaf had a total area of 150 mm².

Which of the options, **A** to **D**, is the correctly calculated number of stomata in the lower epidermis of this leaf?

- A 430
- B 1350
- C 1719
- D 17

Your answer

[1]

10. Which of the structures, A to D, does not have smooth muscle tissue in its walls?

A trachea

B capillary

C bronchiole

D arteriole

Your answer

[1]

END OF QUESTION PAPER

Mark Scheme

Question			Answer/Indicative content	Marks	Guidance
1			D	1	
			Total	1	
2			B	1	
			Total	1	
3			B	1	
			Total	1	
4			D	1	
			Total	1	
5			B	1	
			Total	1	
6			A	1	
			Total	1	
7			C	1	
			Total	1	
8			A	1	<p>Examiner's Comments</p> <p>Candidates did have to process some information from a table in this question and choose appropriate values to perform a simple calculation. A significant number of candidates, either chose the incorrect values to use, or were unable to perform the calculation correctly.</p>
			Total	1	
9			C	1	<p>Examiner's Comments</p> <p>This was a tough mathematical challenge towards the end of this section and, whilst there were no omissions, only the higher attaining candidates were able to process the information and correctly calculate the number of stomata.</p>
			Total	1	
10			B	1	

Mark Scheme

Question	Answer/Indicative content	Marks	Guidance
			Total
1			