

6.4 Gas Exchange

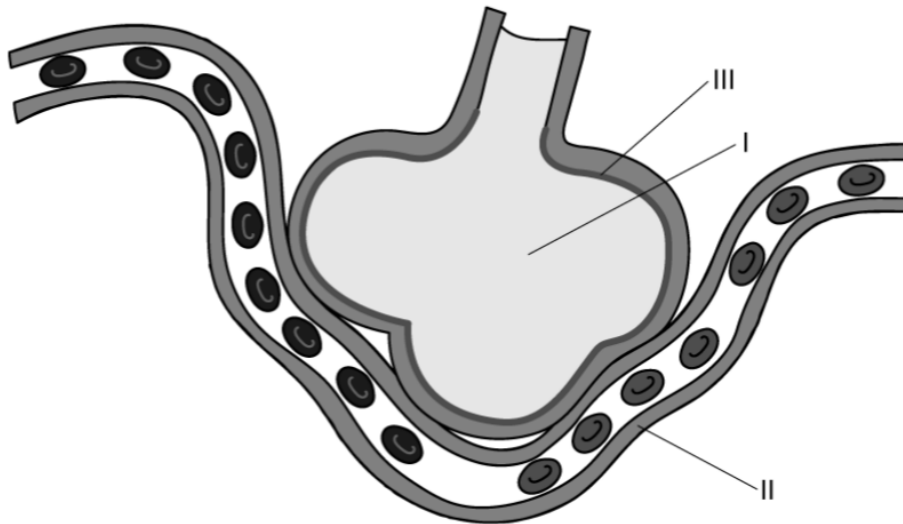
Question Paper

Course	DP IB Biology
Section	6. Human Physiology
Topic	6.4 Gas Exchange
Difficulty	Medium

Time allowed: 20
Score: /10
Percentage: /100

Question 1

An alveolus has several features to allow efficient gas exchange.



Which row of the table below matches each feature of gas exchange to the correct label on the alveolus?

	I	II	III
A	High concentration of oxygen to maintain a steep concentration gradient	One cell thick for short diffusion distance	Allows gases to dissolve to aid diffusion
B	High concentration of carbon dioxide to maintain steep concentration gradient	Allows gases to dissolve to aid diffusion	One cell thick for short diffusion distance
C	One cell thick for short diffusion distance	High concentration of oxygen to reduce the concentration gradient	Allows gases to dissolve to aid diffusion
D	One cell thick for short diffusion distance	Allows gases to dissolve to aid diffusion	High concentration of oxygen to maintain a steep concentration gradient

[1 mark]

Question 2

What is the function of pulmonary surfactant?

- A** To increase surface tension on the alveolar wall.
- B** To reduce the diffusion distance across the alveolar wall.
- C** To stop the alveoli sacs from sticking together.
- D** To trap microorganisms and prevent infection.

[1 mark]

Question 3

A scientist examines a cross section of the wall of a bronchus under an electron microscope. Which of the following would be observed?

- I. Smooth muscle.
- II. Cartilage cells.
- III. Ciliated cells.

- A** I and II.
- B** I and III.
- C** II and III.
- D** I, II and III.

[1 mark]

Question 4

Which row of the table correctly describes a bronchiole?

	Diameter / mm	Collagen and elastic fibres?	Site of gas exchange?	Presence of cilia?
A	0.25	no	yes	yes
B	0.5	no	no	no
C	1	yes	no	yes
D	20	yes	no	yes

[1 mark]

Question 5

Which set of conditions is required to allow the intake of air into the lungs during ventilation?

- A** Contracted diaphragm, increased volume and increased pressure inside the thorax.
- B** Relaxed diaphragm, increased volume and decreased pressure inside the thorax.
- C** Relaxed diaphragm, decreased volume and increased pressure inside the thorax.
- D** Contracted diaphragm, increased volume and decreased pressure inside the thorax.

[1 mark]

Question 6

What is an example of a pair of antagonistic muscles?

- A** Internal intercostal muscles and diaphragm.
- B** Diaphragm and abdominal muscles.
- C** Abdominal and internal intercostal muscles.
- D** Diaphragm and external intercostal muscles.

[1 mark]

Question 7

Why is it difficult to show a causal link between a risk factor and a particular disease?

- A** Confounding factors influence the results making the results unreliable.
- B** Epidemiological studies rely on large numbers of volunteers who suffer from the exact disease being studied to provide valid data.
- C** Statistical analysis cannot be carried out on results of epidemiological studies.
- D** There are ethical issues with publishing data from epidemiological studies.

[1 mark]

Question 8

What is the correct sequence of events for the development of emphysema in the lungs?

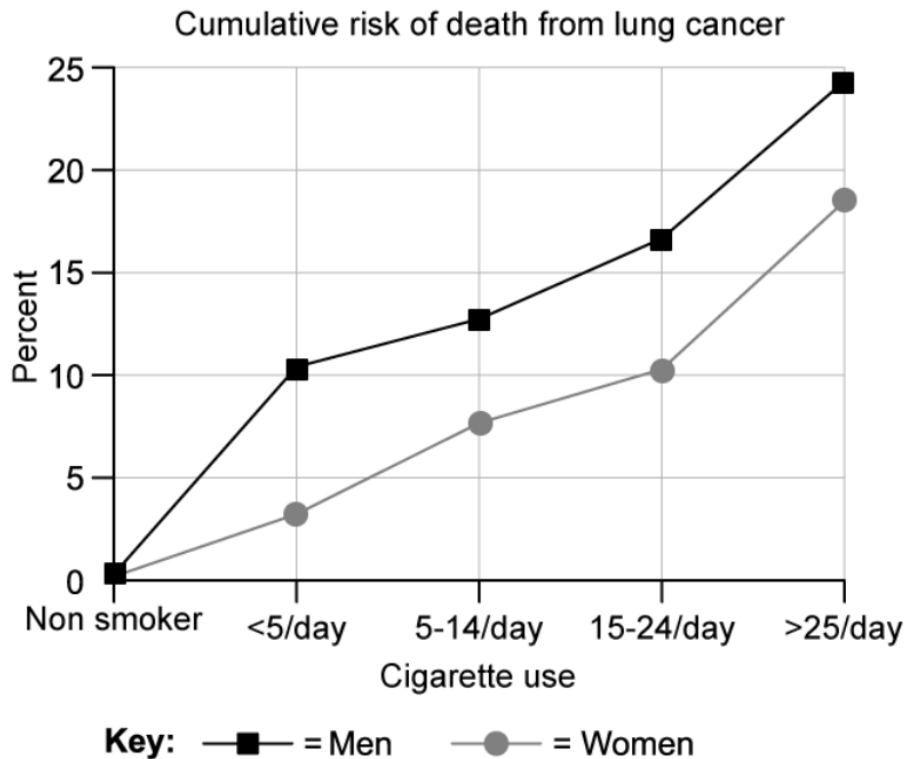
- I. Phagocytes release elastase to destroy bacteria trapped in lungs.
- II. Alveolar walls break down.
- III. Oxygen cannot diffuse into the blood quickly enough to sustain activity.
- IV. Elastase breaks down elastin reducing elasticity of the alveoli.
- V. Alpha 1-antitrypsin cannot counteract high levels of elastase.

	first	→	→	→	last
A	I	V	IV	II	III
B	III	II	IV	I	V
C	II	IV	I	V	III
D	I	III	V	II	IV

[1 mark]

Question 9

What conclusions can be drawn from the data in the graph?

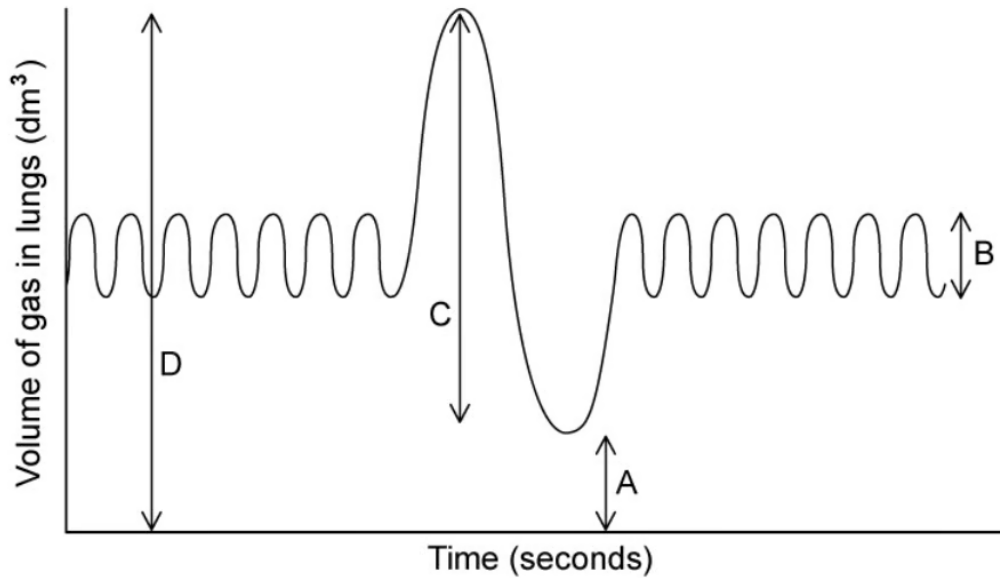


- A There is a causal relationship between smoking and deaths from lung cancer.
- B There is a positive correlation between cigarette smoking and risk of deaths from lung cancer.
- C Women are more likely to develop lung cancer as a result of smoking than men.
- D Non-smokers are not at risk of lung cancer.

[1 mark]

Question 10

The diagram shows a trace recorded from a spirometer.



Which label represents the tidal volume?

[1 mark]