6.4 Gas Exchange

Question Paper

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

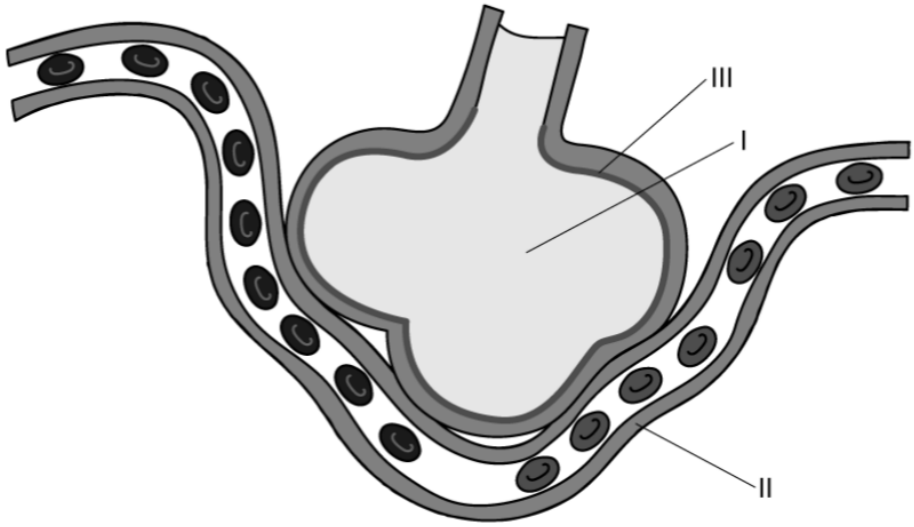
Time allowed: 20

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 walli.

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?

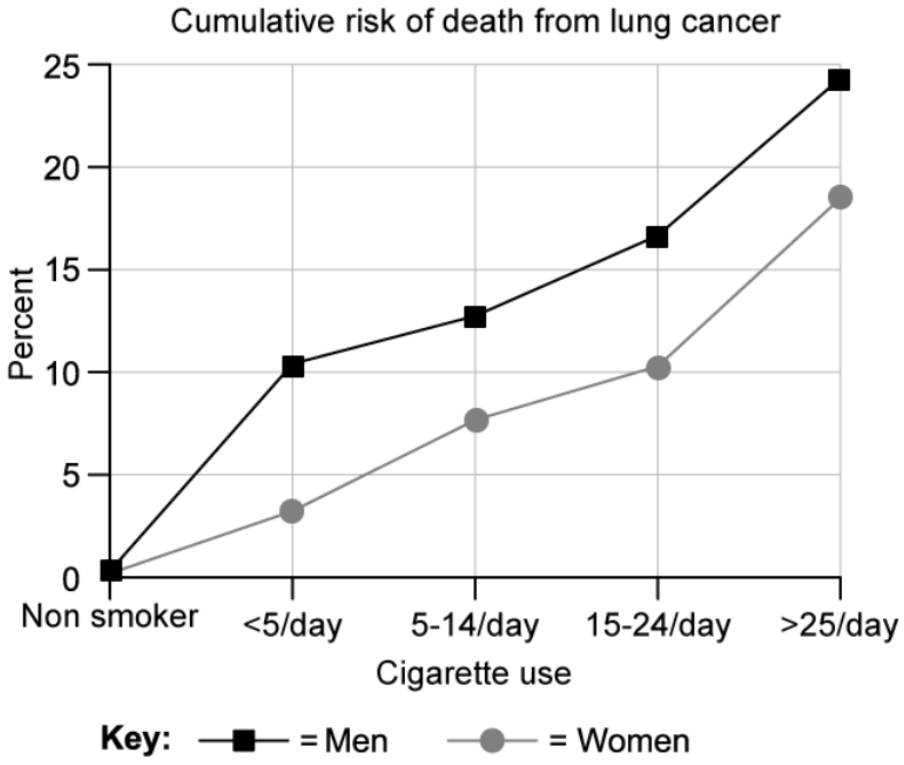
I. Phagocytes release elastase to destroy bacteria trapped in lungs.
II. Alveolar walls break down.
III. Oxygen cannot diffuse into the blood quickly enough to sustain activity.
IV. Elastase breaks down elastin reducing elasticity of the alveoli.
V. Alpha 1-antitrypsin cannot counteract high levels of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

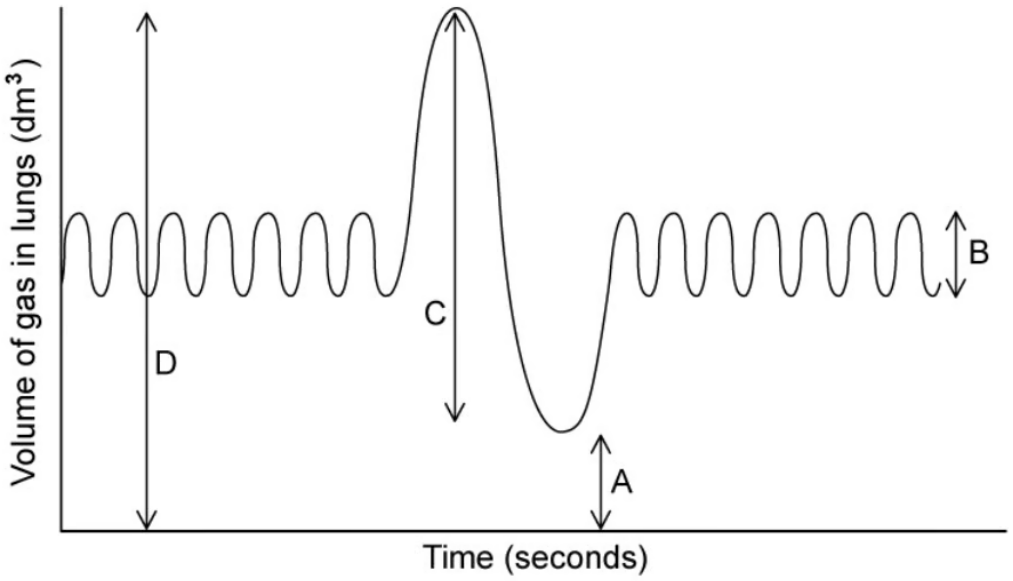
C Women are more likely to develop lung cancer as a result of smoking than men.

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]