9.1 The Gas Exchange System

Question Paper

Course	CIE A Level Biology (9700) exams from 2022
Section	9. Gas Exchange
Topic	9.1 The Gas Exchange System
Difficulty	Hard

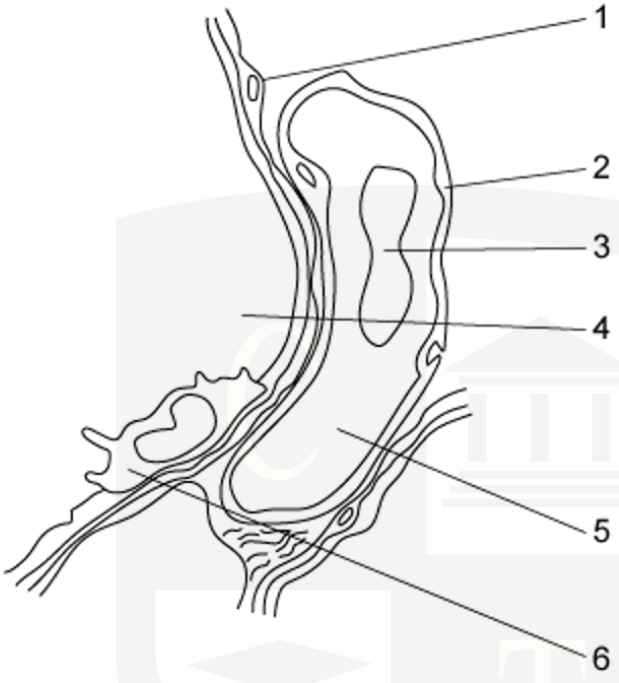
Time allowed: **10**

Score: **/10**

Percentage: **/100**

Question 1

The diagram shows specialised tissues in a magnified section of a human lung.



Where can HCO_3^- ions, carbonic anhydrase and lysosomes be found in high proportions?

	HCO_3^- ions	carbonic anhydrase	lysosomes
A	4	2	5
B	5	3	6
C	6	4	1
D	3	1	4

[1 mark]

Question 2

What is the correct order for the events that occur during mucus secretion from goblet cells in the trachea?

1 secretion of a glycoprotein

2 addition of a carbohydrate to protein

3 separation of a vesicle from the Golgi apparatus

4 fusion of the vesicle with the plasma membrane

A 3 → 2 → 4 → 1

B 4 → 1 → 3 → 2

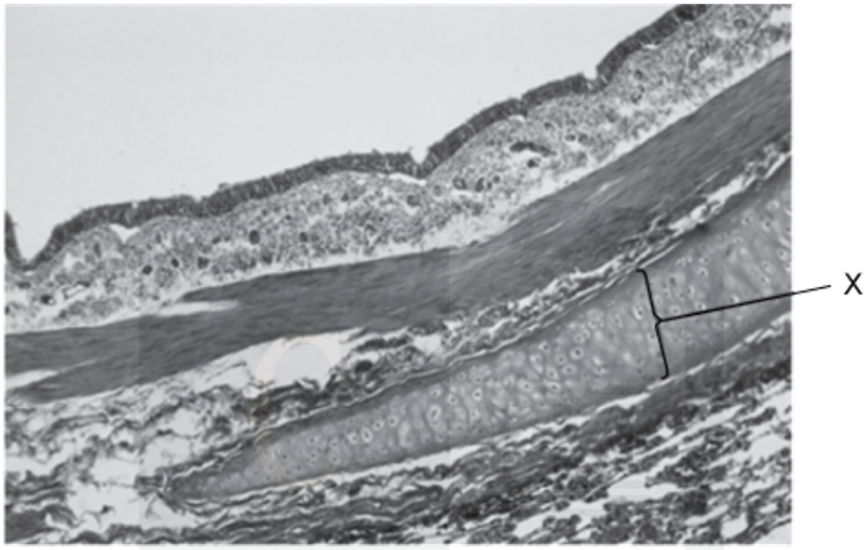
C 2 → 3 → 4 → 1

D 4 → 1 → 2 → 3

[1 mark]

Question 3

A bronchus wall is shown in the photomicrograph.



What is the function of tissue X?

A widens the airway after an allergic reaction

B contracts to constrict the airway

C provides support to stop the airway from collapsing

D produces mucus to trap bacteria and dust climbing

[1 mark]

Question 4

During an investigation on gas exchange, measurements were made on four people. The efficiency of gas exchange was the same in all four people.

tidal volume(dm^3) = *volume of lung after inhalation(dm^3) – volume of lung after exhalation(dm^3)*

Which person absorbed most oxygen during four minutes of normal breathing?

person	tidal volume / dm^3	total lung volume / dm^3	breathing rate / breaths per minute
A	0.6	6.4	14
B	0.6	6.0	15
C	0.5	6.4	16
D	0.4	5.8	17

[1 mark]

Question 5

During an asthma attack, extra mucus is produced and tubes within the gas exchange system narrow.

Which of the following responses occur during an asthma attack?

1 Exocytosis in goblet cells increases

2 Activity of ciliated epithelium increases

3 Smooth muscles respire faster

A 1 and 2 **B** 1 and 3 **C** 2 and 3 **D** 1, 2 and 3

[1 mark]

Question 6

Which of the following organelles do goblet cells have large quantities of?

1 secretory vesicles

2 rough endoplasmic reticulum

3 mitochondria

4 lysosomes

A 1 and 3 only

B 2 and 4 only

C 1, 2 and 3 only

D 2, 3 and 4 only

[1 mark]

Question 7

The alveoli walls are damaged by a disease.

What effect does this have on the surface area and volume of the lungs?

	volume	surface area
A	no change	no change
B	no change	decreased
C	decreased	decreased
D	increased	decreased

[1 mark]

Question 8

If an asthmatic person inhales an allergen the following occurs:

- goblet cells that line the bronchi and bronchioles secrete excess mucus
- bronchi and bronchioles become narrow and inflamed

What effect do these responses have on gaseous exchange?

1 increase the diffusion distance from the alveoli into the blood

2 increase the risk of developing a lung infection

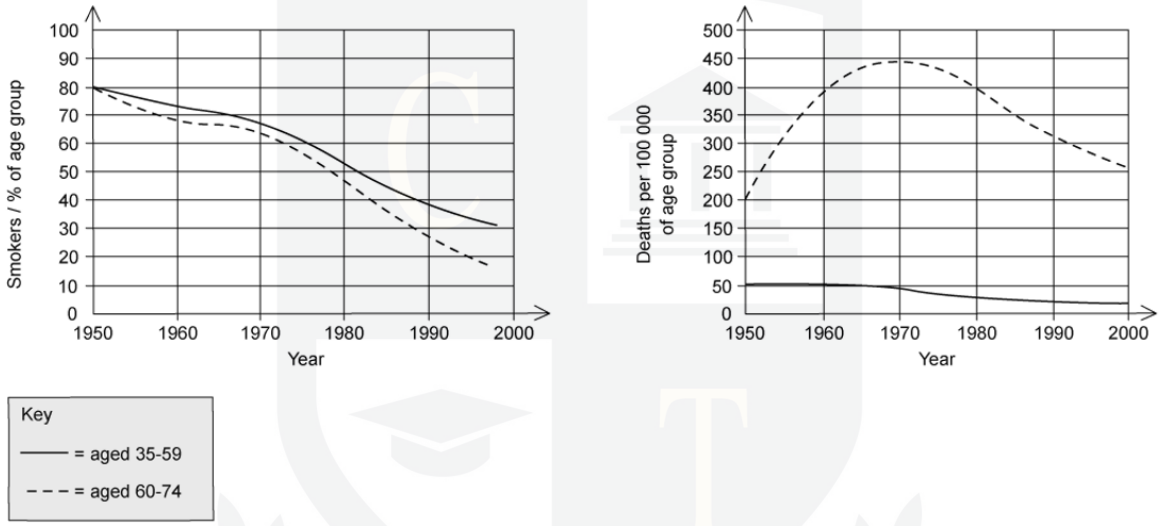
3 decrease the diffusion gradient for oxygen in the lungs

A 1 and 2 **B** 1 and 3 **C** 2 and 3 **D** 1, 2 and 3

[1 mark]

Question 9

Some research has suggested that there is a positive correlation between smoking and the risk of developing lung cancer. The results of two studies of men between 1950 and 1998 are shown in the graphs below.



Which statement is not supported by the data in the graphs?

A The data for men 60-74 between 1950 to 1970 suggests that lung cancer takes up to 20 years to develop

B Deaths from lung cancer in men 35-59 decreased by 50% over the period of the study

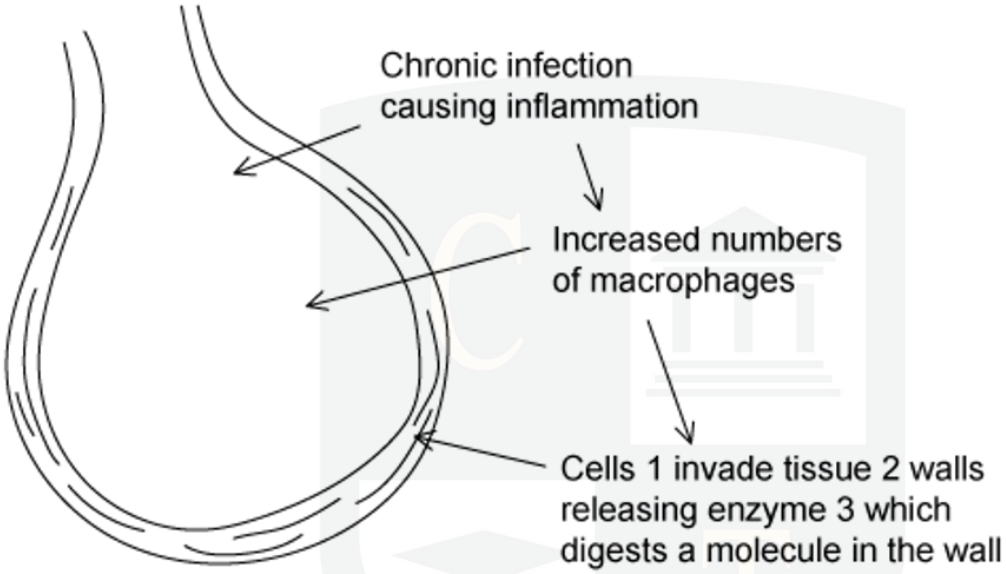
C The number of men aged 35-59 who were smokers decreased by approximately 60 % over the period of the study

D Deaths from lung cancer in men 60-74 increased up to 1970

[1 mark]

Question 10

Emphysema is a lung disease that results in the alveoli being unable to return to their original shape after inhalation. Stages in the development of emphysema are shown in the diagram below.



What correctly identifies 1, 2 and 3?

	1	2	3
A	phagocytes	alveoli	elastase
B	phagocytes	bronchiole	ligase
C	lymphocytes	alveoli	elastase
D	lymphocytes	bronchiole	ligase

[1 mark]