

# 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	Medium

**Time allowed:** 10

**Score:** /10

**Percentage:** /100

### Question 1

Haemoglobin can bind to oxygen, carbon dioxide and carbon monoxide.

- 1      Oxygen
- 2      carbon dioxide
- 3      carbon monoxide

Which gases bind to the same site?

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

[1 mark]

### Question 2

Which row correctly describes a bronchiole?

	diameter (mm)	collagen and elastic fibres	site of gas exchange	cilia
<b>A</b>	0.25	no	yes	yes
<b>B</b>	0.5	no	no	no
<b>C</b>	1	yes	no	yes
<b>D</b>	20	yes	no	yes

[1 mark]

### Question 3

The trachea and alveoli are key structures in the human gas exchange system. Which tissues are present in each?

		cartilage	epithelium with goblet cells	smooth muscle
<b>A</b>	trachea	Y	Y	Y
	alveoli	N	N	N
<b>B</b>	trachea	Y	Y	N
	alveoli	N	Y	Y
<b>C</b>	trachea	Y	Y	Y
	alveoli	N	N	Y
<b>D</b>	trachea	Y	Y	Y
	alveoli	Y	Y	Y

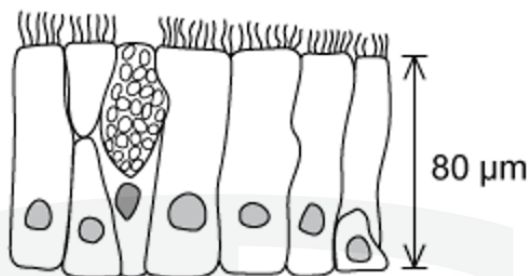
Key: Y=present N=absent

[1 mark]

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#### Question 4

The diagram shows a section of a specialised type of epithelium.



Where can this epithelium be found in the respiratory system?

	bronchus	all bronchioles	trachea
A	✓	✓	✓
B	✓	X	✓
C	X	✓	✓
D	✓	✓	X

Key: ✓= present, X= absent

[1 mark]

#### Question 5

A scientist looks at the wall of a bronchus under an electron microscope. What would they see?

- 1 exocytotic vesicles
- 2 cartilage cells
- 3 ciliated cells

**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 does not lead to a maximised uptake of oxygen in the lungs?

- A** Binding of the first oxygen molecule increases haemoglobin's affinity for other oxygen molecules
- B** Up to eight oxygen atoms can be bound to one haemoglobin molecule
- C** Dissociation of carbon dioxide from carboxyhaemoglobin allows more haemoglobin to be available for oxygen binding
- D** Oxyhaemoglobin formation increases the capacity of red blood cells to transport oxygen

[1 mark]

### Question 7

Why do bronchioles have a folded inner lining?

- A** to trap foreign particles
- B** to increase the surface area
- C** to allow for expansion during breathing
- D** to facilitate gaseous exchange

[1 mark]

### Question 8

What is the correct order of binding affinity to haemoglobin?

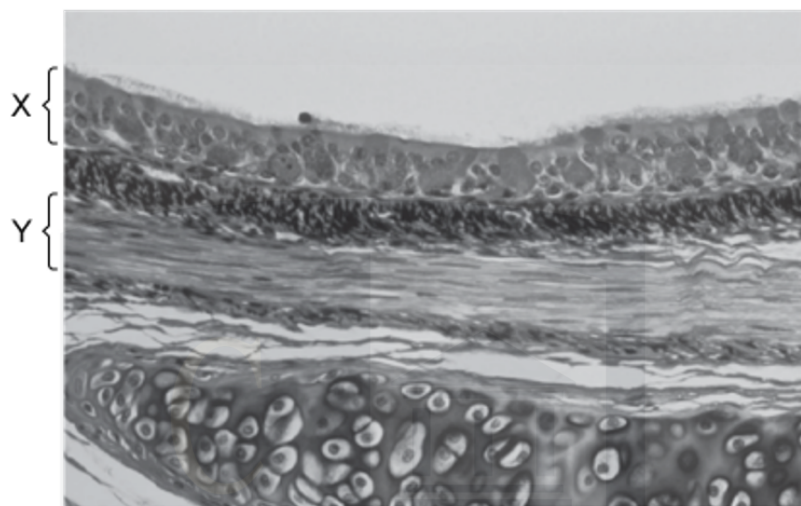
	highest affinity	→	lowest affinity
A	oxygen		carbon monoxide
B	oxygen		carbon dioxide
C	carbon monoxide		oxygen
D	carbon monoxide		carbon dioxide

[1 mark]



**Question 9**

A cross-section of a bronchus is shown in the photomicrograph.



What is the function of **X** and **Y**?

	<b>X</b>	<b>Y</b>
<b>A</b>	trap dust and dirt	secrete mucus
<b>B</b>	secrete mucus	prevent collapse of the airway
<b>C</b>	waft dust and dirt upwards	constrict airway
<b>D</b>	support the airway	dilate airway

**[1 mark]**

### Question 10

A student was asked to describe the differences between four microscope slides of sections taken from different parts of the gas exchange system.

slide 1 not present: glands, cartilage  
present: few ciliated epithelial cells, smooth muscle

slide 2 present: goblet cells, incomplete cartilage rings, glands, smooth muscle, ciliated epithelial cells

slide 3 present: goblet cells, plates of cartilage, ciliated epithelial cells, glands, smooth muscle

slide 4 not present: goblet cells, cartilage, glands, smooth muscle  
present: squamous epithelial cells

Which is the correct identification of the parts of the gas exchange system?

	slide 1	slide 2	slide 3	slide 4
A	bronchiole	trachea	bronchus	alveolus
B	bronchus	trachea	alveolus	bronchiole
C	bronchiole	bronchus	trachea	alveolus
D	alveolus	bronchiole	trachea	bronchus

[1 mark]

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