The gas exchange system and Smoking

Question Paper 5

Level	International A Level
Subject	Biology
Exam Board	CIE
Topic	Gas exchange and smoking
Sub Topic	The gas exchange system and Smoking
Booklet	Theory
Paper Type	Question Paper 5

Time Allowed : **64 minutes**

Score : **/ 53**

Percentage : **/100**

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	'77.5%	70%	62.5%	57.5%	45%	<45%

1 **(a)** Tuberculosis (TB) and chronic obstructive pulmonary disease (COPD) are diseases that affect the lungs.

With reference to TB and COPD, explain how infectious diseases differ from non-infectious diseases.

.....

.....

.....

.....

.....[2]

Macrophages are large phagocytic cells that are found in many tissues including alveolar tissue in the lungs. They provide the main means of defence against pathogens in this tissue.

Fig. 3.1 is a drawing made from an electron micrograph showing part of a capillary and two alveoli, with a macrophage.

Fig. 3.1

(b) With reference to Fig. 3.1, explain:

(i) how alveoli are adapted for gaseous exchange

.....

.....

.....

.....

.....

.....[3]

(ii) how macrophages function to protect the lungs from becoming infected.

.....

.....

.....

.....

.....

.....

.....

.....[4]

(c) Phagocytes release enzymes that digest proteins. In smokers, this may lead to the large-scale destruction of alveolar walls.

Outline the effects of this destruction on a person's health.

.....

.....

.....

.....

.....

.....[3]

[Total: 12]

2 Fig. 4.1 is a diagram of a section through a mammalian heart.

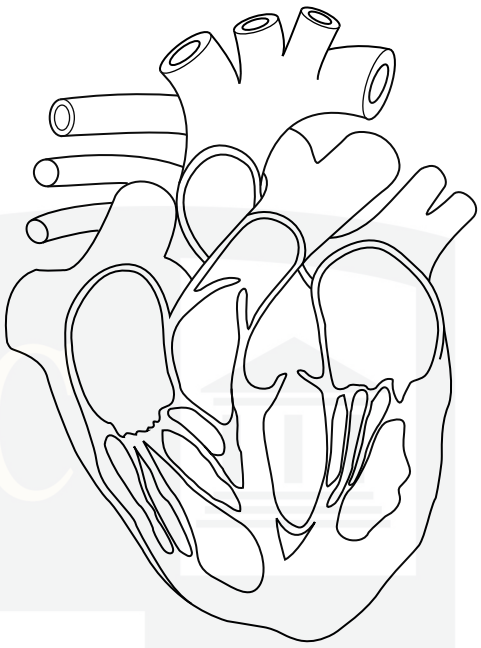

Fig. 4.1

(a) Use a label line and the appropriate letter to label each of the following on Fig. 4.1:

W right atrium

X tricuspid valve

Y aorta.

[3]

(b) Starting from the left ventricle, describe the route taken by the blood as it travels to the lungs.

.....

.....

.....

.....

.....

.....

..... [3]

(c) Describe **and** explain how the structure of the human **gas exchange surface** is adapted for maximum efficiency.

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

[Total: 10]

3 A study was carried out on a large number of people, some of whom were smokers. The study investigated the link between percentage of deaths due to lung cancer in smokers and their smoking habits. The age at which they started smoking and the number of cigarettes smoked per day were recorded. The results of the study are shown in Fig. 3.1.

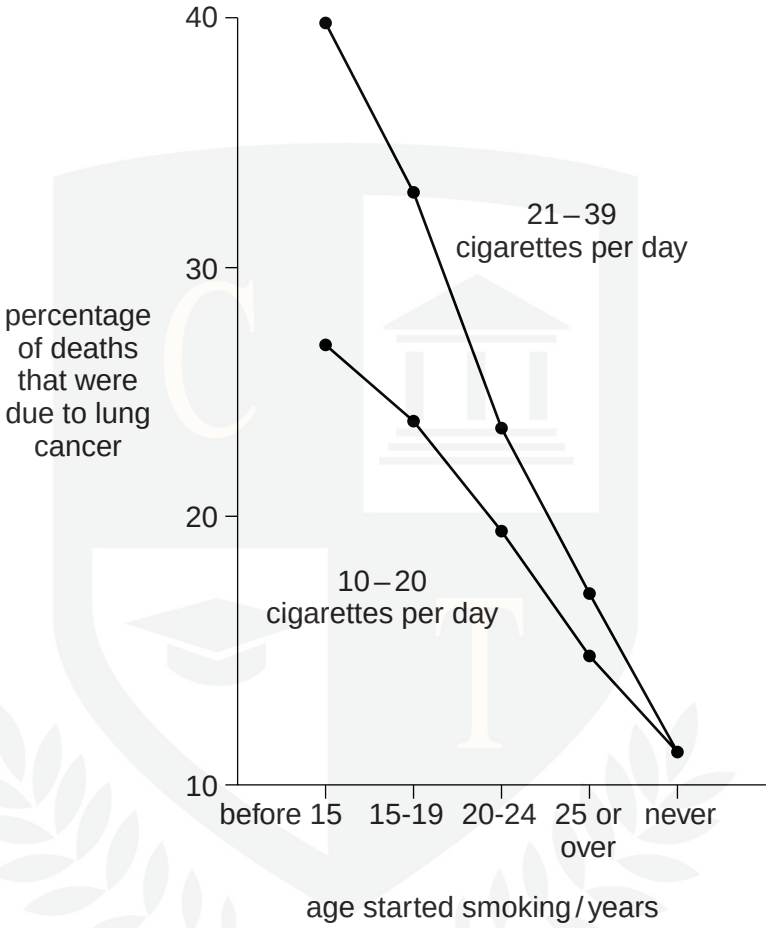

Fig. 3.1

(a) Explain what the results in Fig. 3.1 show about the link between cigarette smoking and percentage of deaths due to lung cancer.

.....

.....

.....

.....

.....

.....

.....

.....

[4]

(b) Tobacco smoke contains many substances which are harmful to the body.

Outline the harmful effects on the cardiovascular system of:

(i) carbon monoxide

.....

.....

.....

.....[2]

(ii) nicotine.

.....

.....

.....

.....[2]

(iii) Describe briefly the effects of tar on the goblet cells and cilia of the trachea.

goblet cells .....

.....

.....

.....

cilia .....

.....

.....

.....[4]

[Total: 12]

4 **(a)** Fig. 1.1 shows a neurone forming three synapses with adjacent neurones.

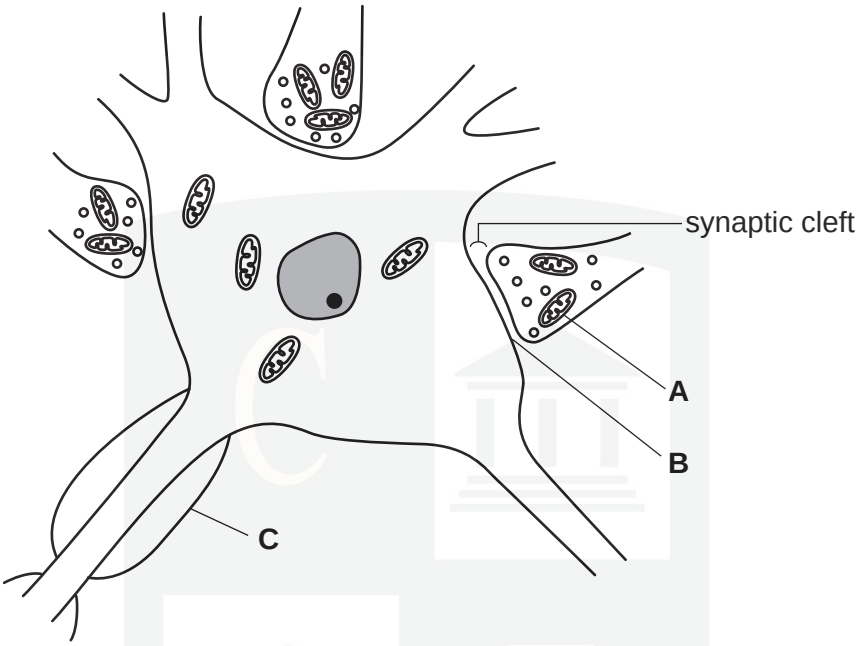

Fig. 1.1

Name **A**, **B** and **C**.

A.....

B.....

C.....[3]

(b) Outline the role of structure **A** in synaptic transmission.

.....

.....

.....

.....

.....

.....

.....

.....[3]

(c) The drug nicotine has a similar structure to acetylcholine.

Suggest the effects on brain neurones of inhaling nicotine from a cigarette.

.....

.....

.....

.....

.....

.....[2]

[Total: 8]

5 Fig. 1.1 is a scanning electron micrograph of part of the wall of the bronchus of a healthy human.

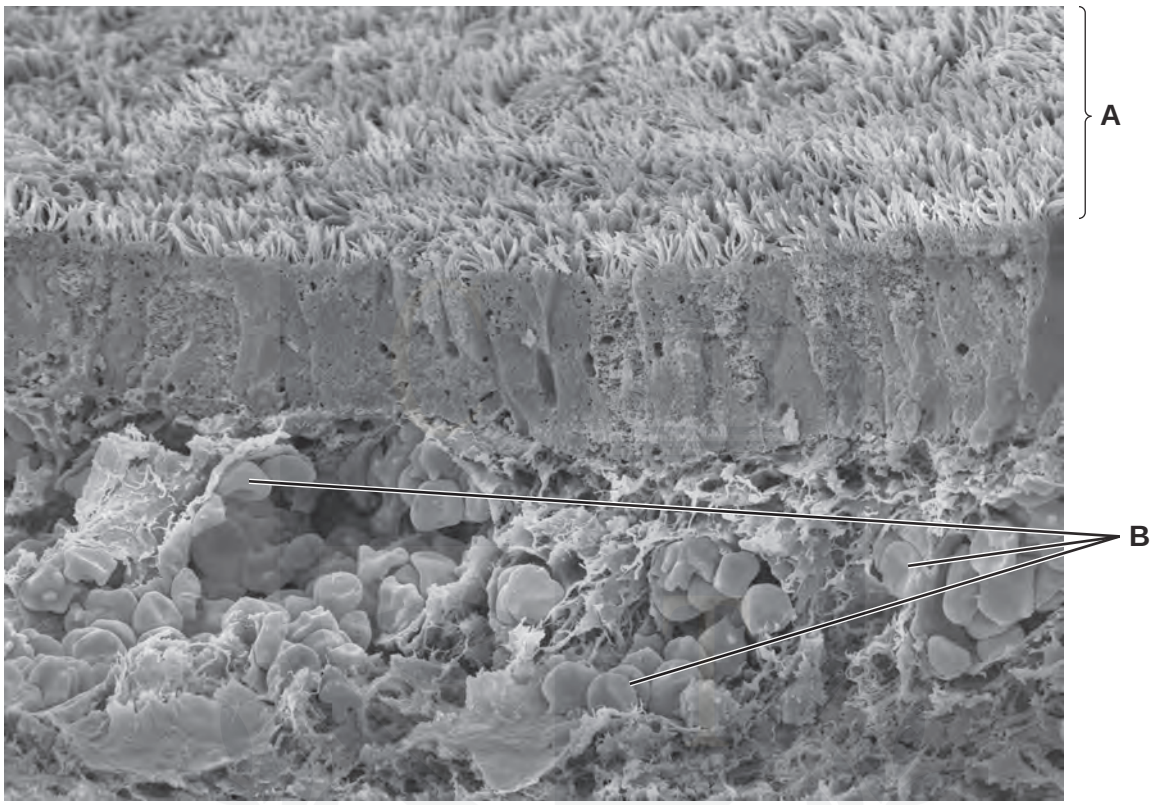

Fig. 1.1

(a) **(i)** Name the structures labelled **A**.

.....[1]

(ii) State the function of the cells labelled **B**.

.....[1]

(b) Name two tissues found in the wall of the bronchus that are not visible in Fig. 1.1.

1. .....

2. .....[2]

Chronic bronchitis is one of the conditions that contributes to chronic obstructive pulmonary disease (COPD).

(c) State the name of the other condition that contributes to COPD.

.....[1]

(d) Describe the appearance of a section through the **wall** of a bronchus in a person with chronic bronchitis.

.....

.....

.....

.....

.....

.....

.....

.....[4]

(e) Suggest why a person with chronic bronchitis is more likely than a healthy person to suffer from infectious diseases of the gas exchange system.

.....

.....

.....

.....[2]

[Total: 11]