

6.4 Gas Exchange

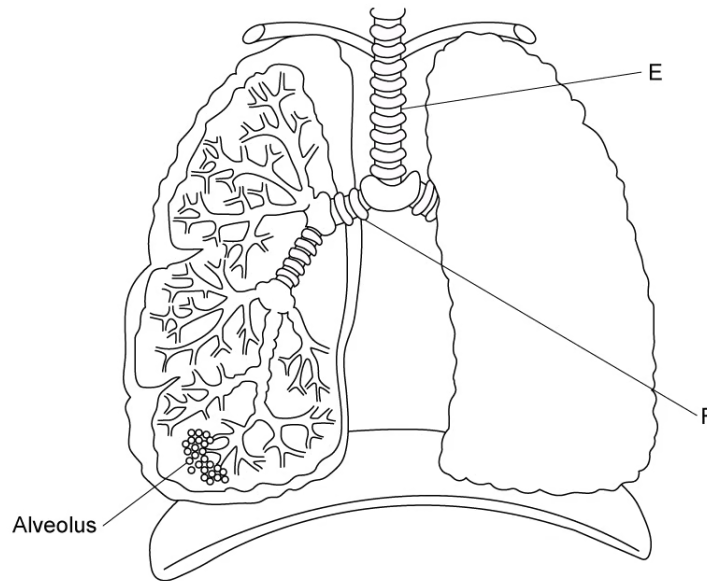
Question Paper

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

Time allowed: 50
Score: /36
Percentage: /100

Question 1a

- a) Some of the structures involved with the movement of air into the lungs are shown in the diagram below.



Identify structures **E** and **F**.

[2 marks]

[2 marks]

Question 1b

- b) Both structures **E** and **F** contain cartilage.
State the role of cartilage in structures **E** and **F**.

[1 mark]

[1 mark]

Question 1c

c)

The alveolus in the diagram in part a) is lined with cells known as Type I pneumocytes.

Explain how Type I pneumocytes are adapted to their function.

[2 marks]

[2 marks]

Question 1d

d)

In amongst the Type I pneumocytes described in part c) are cells known as Type II pneumocytes. Type II pneumocytes secrete a solution which covers the lining of the alveolus.

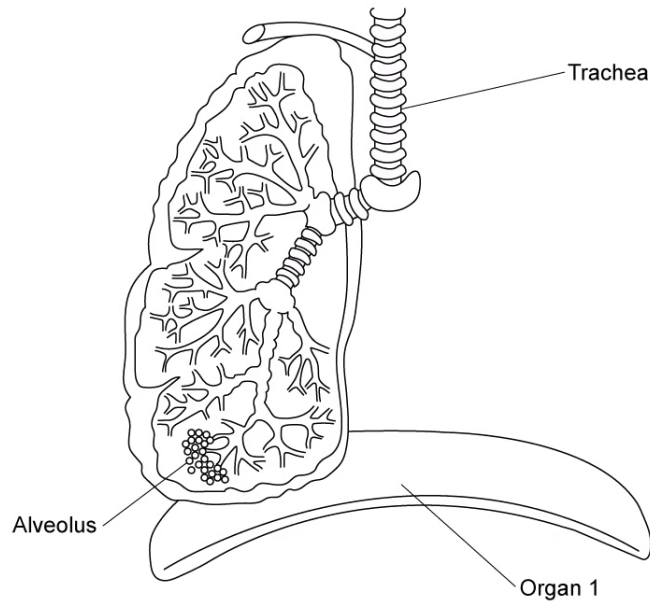
State **two** ways in which the solution secreted by Type II pneumocytes aids alveolar function.

[2 marks]

[2 marks]

Question 2a

a)
The diagram below shows some of the structures in the human body involved with the ventilation process.



Identify **Organ 1** in the diagram above.

[1 mark]

[1 mark]

Question 2b

b)
Describe how the contraction of **Organ 1** in part a) aids the inspiration process.

[2 marks]

[2 marks]

Question 2c

c)
Organ 1 is part of an antagonistic pair of muscles.

Explain what is meant by the term **antagonistic pair**.

[2 marks]

[2 marks]

Question 2d

d)
Aside from the antagonistic pair that includes Organ 1, identify **one other** antagonistic pair of muscles involved with inspiration and expiration.

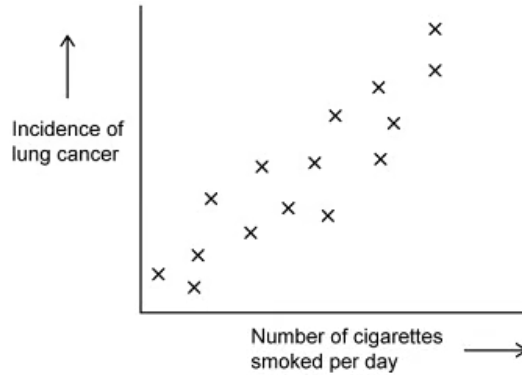
[1 mark]

[1 mark]

Question 3a

a)

The graph below shows the results of a study that monitored the number of cigarettes smoked per day alongside incidence of lung cancer.



Two students looked at the graph and came to different conclusions:

Student **A** concluded that smoking more cigarettes causes lung cancer.

Student **B** concluded that there is a connection between smoking more cigarettes and lung cancer.

State, with a reason, which student reached the correct conclusion from looking at the graph above.

[2 marks]

[2 marks]

Question 3b

b)

Outline how the study described in part a) should have been designed in order to gain **valid** evidence regarding the link between cigarettes and lung cancer.

[2 marks]

[2 marks]

Question 3c

c)

Other research into cigarettes has shown that the smoke produced when tobacco is burned contains mutagenic chemicals.

Explain how tobacco smoke can cause lung cancer.

[2 marks]**[2 marks]****Question 3d**

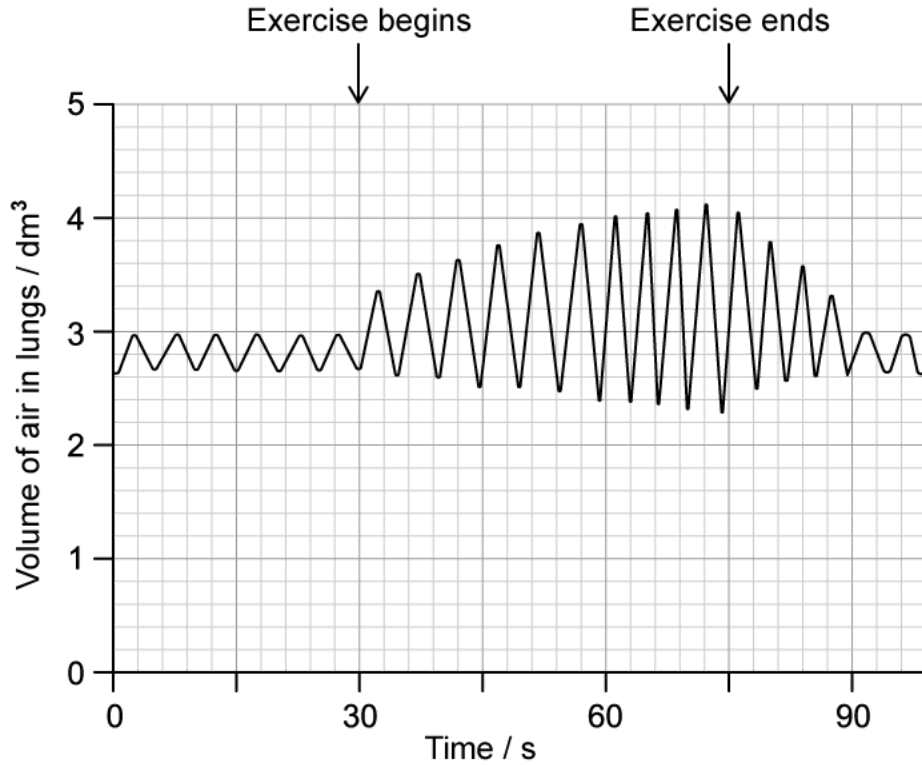
d)

List **three** symptoms associated with lung cancer.

[3 marks]**[3 marks]**

Question 4a

a)
A group of students investigated the effect of physical activity on ventilation. The graph below shows the results of their investigation.



[1 mark]

[1 mark]

Question 4b

b)
Describe the effects of exercise on ventilation shown in the graph in part a).

[2 marks]

[2 marks]

Question 4c

c)

Emphysema is a lung condition that can cause shortness of breath and breathing difficulties, especially during exercise.

Outline why emphysema can lead to shortness of breath and breathing difficulties.

[2 marks]

[2 marks]

Question 4d

d)

State **one** factor that increases the risk of emphysema.

[1 mark]

[1 mark]

Question 5a

One mark is available for clarity of communication throughout this question.

a)

Outline the process of forced, or active, expiration.

[4 marks]

[4 marks]

Question 5b

b)

Describe how the effect of mild and vigorous exercise on ventilation can be monitored.

[4 marks]**[4 marks]**