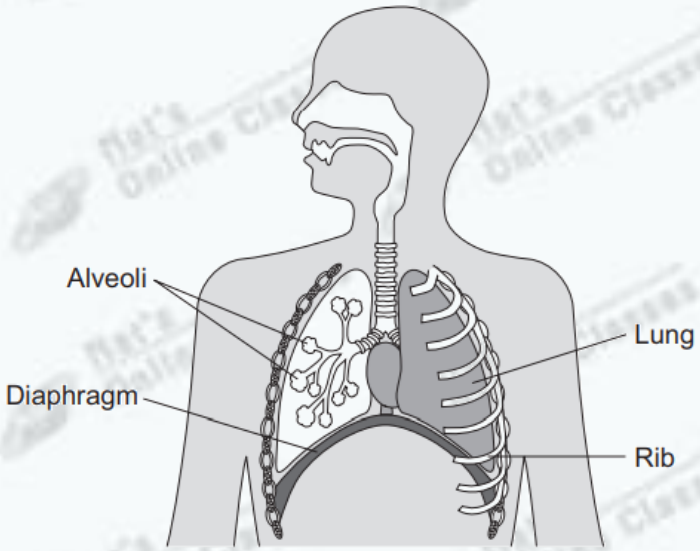
# Gas exchange

## Total mark – 17

## Question: 1

**1 (a)** **Figure 1** shows the breathing system in humans.

**Figure 1**




Use the correct answer from the box to complete the sentence.

**[1 mark]**

| | | |
|---|---|---|
| **abdomen** | **air passages** | **thorax** |

The lungs and ribs are found in the _____ .

**1 (b) (i)** What happens to the ribs when we breathe in?

**[1 mark]**

Tick (✓) **one** box.

The ribs move down and in. ☐

The ribs move up and in. ☐

The ribs move up and out. ☐

**1 (b) (ii)** Describe what happens to the muscles between the ribs when we breathe in.

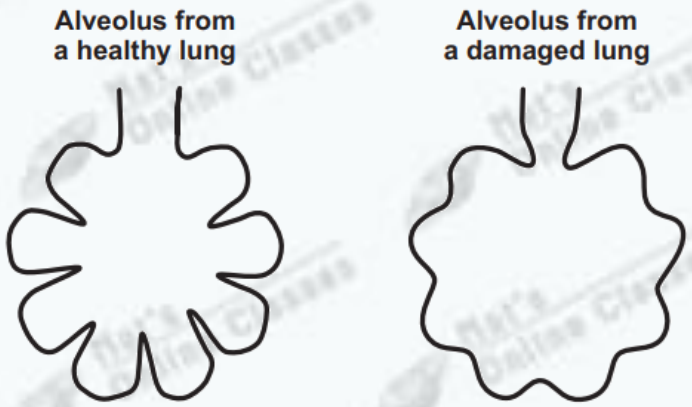
**[1 mark]**

_____

_____

**1 (c)** **Figure 2** shows an alveolus from a healthy lung and an alveolus from a damaged lung.

**Figure 2**




**1 (c) (i)** Which **one** of the following is a difference between the alveolus from the damaged lung and the alveolus from the healthy lung?

**[1 mark]**

Tick (✓) **one** box.

The damaged alveolus has a smaller surface area. ☐

The damaged alveolus has a shorter diffusion pathway. ☐

The damaged alveolus has a better blood supply. ☐

**1 (c) (ii)** A person with damaged alveoli finds exercising difficult.

Which **one** of the following is the reason why the damaged alveoli will make exercising difficult?

**[1 mark]**

Tick (✓) **one** box.

Less carbon dioxide is taken in. ☐

Less energy is needed for exercise. ☐

Less oxygen is taken in. ☐

| Question | Answers | Extra information | Mark | AO / Spec. Ref. |
|---|---|---|---|---|
| 1(a) | thorax | | 1 | AO1<br>3.1.2a |
| 1(b)(i) | The ribs move up and out. | | 1 | AO1<br>3.1.2c |
| 1(b)(ii) | (they) contract | allow shorten | 1 | AO1<br>3.1.2c |
| 1(c)(i) | The damaged alveolus has a smaller surface area. | | 1 | AO3<br>3.1.1h |
| 1(c)(ii) | Less oxygen is taken in. | | 1 | AO2<br>3.1.2b |
| Total | | | 5 | |

# Question: 2

**4** Substances are transported through plants.

**4 (a)** Use the correct answer from the box to complete each sentence.

| | | |
|---|---|---|
| **capillary** | **guard cells** | **phloem** |
| **stomata** | **transpiration** | **xylem** |

**4 (a) (i)** Water is transported from the roots to the stem of a plant

in the ..... .

**[1 mark]**

**4 (a) (ii)** Dissolved sugars are transported through the plant

in the ..... .

**[1 mark]**

**4 (a) (iii)** Movement of water through the plant is called the

..... stream.

**[1 mark]**

**4 (a) (iv)** Water vapour moves out of the plant through pores

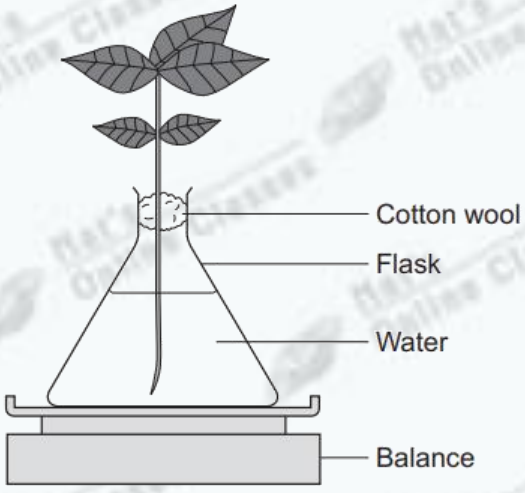
called ..... .

**[1 mark]**

**4 (b)** Students investigated the effect of different conditions on water loss from leaves.

The apparatus is shown in **Figure 6**.

**Figure 6**



The students set up four flasks, **A**, **B**, **C** and **D**.

The students:

- used the same size plant shoot in each flask
- recorded the mass of the flask and plant shoot at the start of each experiment
- left each flask and plant shoot in different conditions
- recorded the mass of each flask and plant shoot after 2 hours.

**Table 2** shows the conditions that flasks **A**, **B**, **C** and **D** were left in for 2 hours.

**Table 2**

| Flask | Temperature in °C | Fan or no fan |
|---|---|---|
| **A** | 20 | No fan |
| **B** | 20 | Fan |
| **C** | 35 | No fan |
| **D** | 35 | Fan |

**4 (b) (i)** Suggest why the students used cotton wool in each flask.

**[1 mark]**

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.....

**4 (b) (ii)** The use of the same size of plant shoot made the investigation a fair test.

Explain why.

**[2 marks]**

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**4 (b) (iii)** **Table 3** shows the students' results.

**Table 3**

| Flask | Conditions | | Mass at the start in grams | Mass after 2 hours in grams | Mass of water lost in 2 hours in grams |
|---|---|---|---|---|---|
| | Temperature in °C | Fan or no fan | | | |
| **A** | 20 | No fan | 150.0 | 148.1 | 1.9 |
| **B** | 20 | Fan | 152.0 | 148.5 | 3.5 |
| **C** | 35 | No fan | 149.0 | 145.9 | 3.1 |
| **D** | 35 | Fan | 150.0 | 145.5 | |

What mass of water was lost by the plant shoot in flask **D**?

**[1 mark]**

.....

.....

..... grams

**4 (b) (iv)** Suggest what conclusion can be made about the effect of temperature on water loss from the plant shoot.

**[1 mark]**

.....

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.....

**4 (b) (v)** Suggest what conclusion can be made about the effect of the fan on water loss from the plant shoot.

**[1 mark]**

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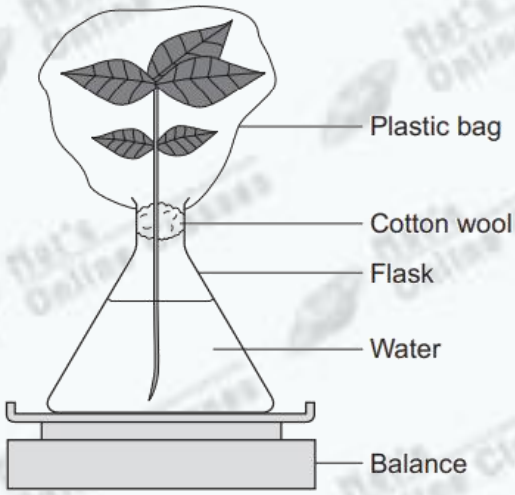
.....

**4 (c)** The students carried out another experiment at 20 °C, with no fan.

The students used the apparatus in **Figure 7**.

**Figure 7**




In this experiment, the students:

- recorded the mass of the flask and plant shoot before tying the plastic bag around the plant shoot
- removed the bag after 2 hours and recorded the mass again.

**4 (c) (i)** What mass of water would be lost from the plant shoot in 2 hours?

Draw a ring around the correct answer.

**[1 mark]**

**4 (c) (ii)** Give a reason for your answer to part **(c)(i)**.

**[1 mark]**

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.....

.....

| Question | Answers | Extra information | Mark | AO / spec ref. |
|---|---|---|---|---|
| 4(a)(i) | xylem | | 1 | AO1 3.2.3a |
| 4(a)(ii) | phloem | | 1 | AO1 3.2.3a |
| 4(a)(iii) | transpiration | | 1 | AO1 3.2.3a |
| 4(a)(iv) | stomata | | 1 | AO1 3.1.3d |
| 4(b)(i) | any **one** from:<br>• reduce / prevent evaporation of water from flask<br>• holds plant shoot in place<br>• prevent damage to the plant | | 1 | AO2 3.2.3 |
| 4(b)(ii) | same surface area **or** number of leaves<br><br>from which (the same amount of) water evaporates | (because if they used larger / smaller size shoots) there would be a larger / smaller surface area **or** a larger/ smaller number of leaves<br>allow same number of stomata<br><br>(and therefore) more / less water would escape<br>allow from which water escapes | 1<br><br>1 | AO2 3.2.3 |
| 4(b)(iii) | 4.5 | look for answer written in table | 1 | AO2 3.2.3 |
| 4(b)(iv) | increasing temperature / heat increases (rate of) water loss / evaporation | | 1 | AO3 3.2.3 |
| 4(b)(v) | having moving air / a fan increases (rate of) water loss / evaporation | | 1 | AO3 3.2.3 |
| 4(c)(i) | 0.3 g | | 1 | AO2 3.2.3 |
| 4(c)(ii) | plastic bag reduces air flow across leaves<br>**or**<br>air is humid around the leaves | allow plastic bag stops water (vapour) leaving<br>allow air (in plastic bag) becomes saturated (with water) | 1 | AO3 3.2.3 |
| **Total** | | | 12 | |