AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 4.4.2.2

Response to exercise

Past-paper questions

Tier	**Higher**
Question groups	**5**
Available paper years	**2019–2024**

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

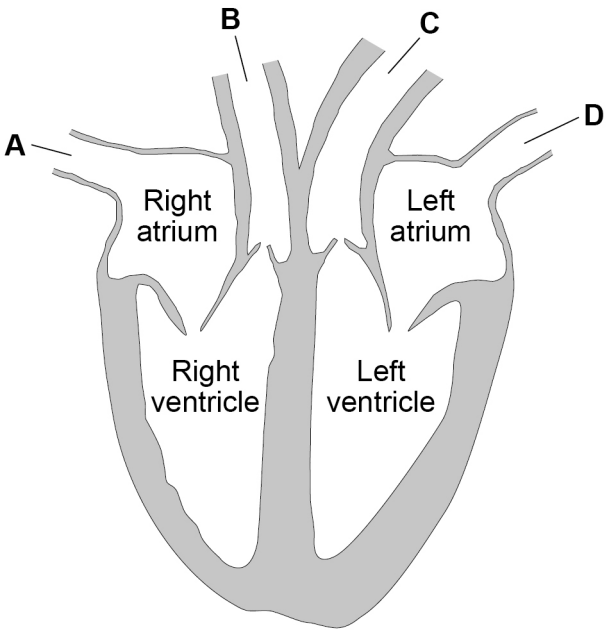
4.4.2.2 Response to exercise

Question 01

June 2019 | 8464/B/1H | Original Q1

0 1 **Figure 1** shows a human heart.

Figure 1



0 1 . 1 Which blood vessel carries deoxygenated blood away from the heart to the lungs?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

0 1 . 2 The natural resting heart rate is controlled by a group of cells that act as a pacemaker.

Where in the heart are 'pacemaker cells' found?

[1 mark]

Tick (✓) **one** box.

Left atrium ☐

Left ventricle ☐

Right atrium ☐

Right ventricle ☐

4.4.2.2 Response to exercise

Question 01 · continued

Some people may be treated with a drug to slow their heart rate.

0 1 . 3 Digitalis is a drug that slows the heart rate.

Where does the drug digitalis originate from?

[1 mark]

Tick (✓) **one** box.

- Bacteria ☐
- Foxgloves ☐
- Mould ☐
- Willow ☐

Question 1 continues on the next page

4.4.2.2 Response to exercise

Question 01 · continued

Beta blockers are another type of drug that slows the heart rate.

Table 1 shows information for people who do not take beta blockers and for people who do take beta blockers.

- Stroke volume is the volume of blood pumped out of the heart each time it beats.
- Cardiac output is the total volume of blood pumped out of the heart each minute.

Table 1

	No beta blockers taken		Taking beta blockers	
	At rest	**During exercise**	**At rest**	**During exercise**
Heart rate in beats per minute	68	150	52	88
Stroke volume in cm^3	80	120	**X**	98
Cardiac output in cm^3 per minute	5440	18 000	2800	8624

0 1 . 4 Calculate stroke volume **X** in **Table 1**.

Use the equation:

cardiac output = stroke volume × heart rate

Give your answer to 2 significant figures.

[3 marks]

Stroke volume **X** = _____ cm^3

4.4.2.2 Response to exercise

Question 01 · continued

0 1 . 5 Some people who take beta blockers get out of breath when they exercise.

Explain why beta blockers can have this effect during exercise.

You should refer to information given in **Table 1**.

[6 marks]

12

4.4.2.2 Response to exercise

Question 02

November 2020 | 8464/B/1H | Original Q3

0 3 Being overweight can affect the health and life expectancy of a person.

0 3 . 1 Give **one** disease related to being overweight.

[1 mark]

0 3 . 2 Body mass index (BMI) helps to show if a person has a healthy body mass for their height.

BMI is calculated using the equation:

$$\text{BMI} = \frac{\text{body mass in kg}}{(\text{height in m})^2}$$

A woman has a BMI of 27 and a body mass of 68.1 kg

Calculate the woman's height in metres.

[3 marks]

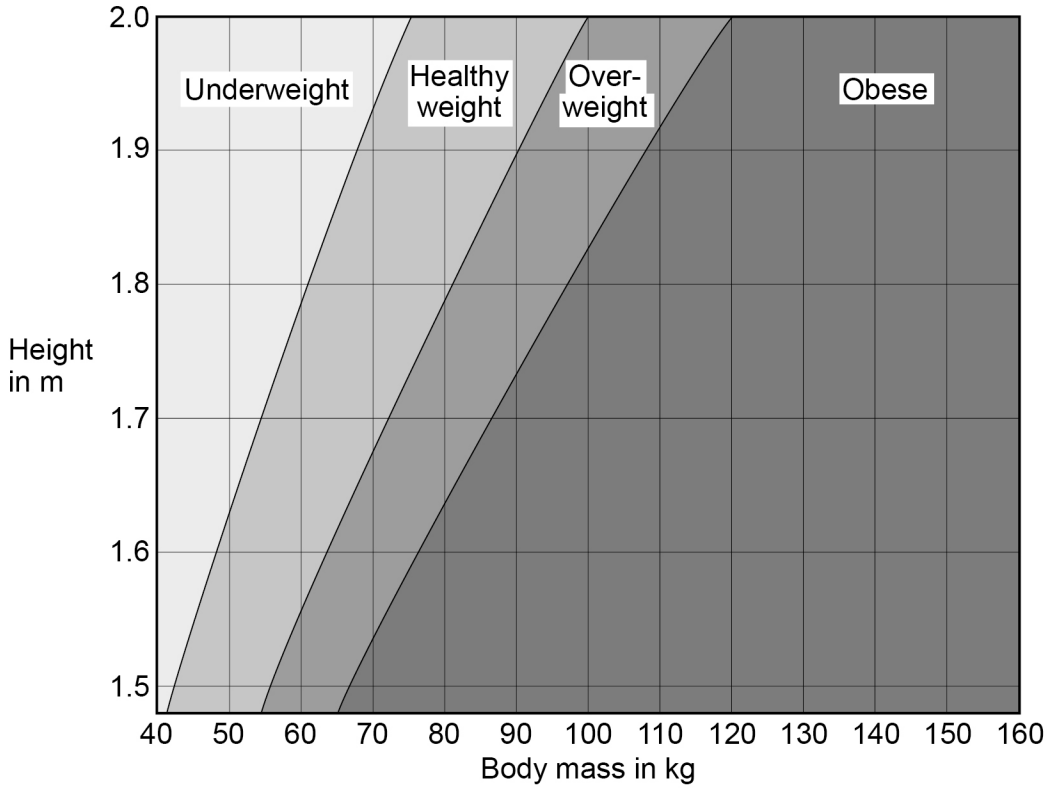
Height = _____ m

4.4.2.2 Response to exercise

Question 02 · continued

0 3 . 3 **Figure 4** shows a height-body mass chart for adults.

Figure 4



Which weight category describes the woman in Question **03.2**?

[1 mark]

Tick (✓) **one** box.

Underweight ☐

Healthy weight ☐

Overweight ☐

Obese ☐

4.4.2.2 Response to exercise

Question 02 · continued

0 3 . 4 People are encouraged to control their body mass with diet and exercise.

Describe how the balance between the mass of food eaten and the amount of exercise a person does controls body mass.

[3 marks]

4.4.2.2 Response to exercise

Question 02 · continued

0 3 . 5 During long periods of vigorous exercise the body respires anaerobically.

Explain the changes that happen in the body during **and** after vigorous exercise.

[6 marks]

14

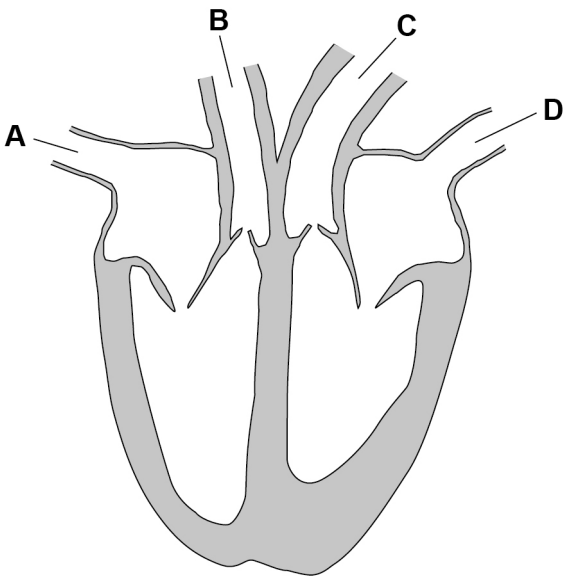
4.4.2.2 Response to exercise

Question 03

November 2021 | 8464/B/1H | Original Q5

0 5 **Figure 5** shows the human heart.

Figure 5



0 5 . 1 Which blood vessel transports blood with the highest oxygen concentration **into** the heart?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

0 5 . 2 Blood pressure is a measure of the force of the blood against the walls of the blood vessels.

Which blood vessel transports blood at the highest pressure?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

4.4.2.2 Response to exercise

Question 03 · continued

0 5 . 3 What is the correct order for blood flowing through the heart to the lungs?

[1 mark]

Tick (✓) **one** box.

- left atrium → left ventricle → pulmonary artery ☐
- left atrium → left ventricle → pulmonary vein ☐
- right atrium → right ventricle → pulmonary artery ☐
- right atrium → right ventricle → pulmonary vein ☐

Question 5 continues on the next page

4.4.2.2 Response to exercise

Question 03 · continued

Every year thousands of people in the UK have heart attacks.

A heart attack is caused when the heart muscle cells do **not** get enough oxygen, causing the cells to die.

0 5 . 4 Statins and stents are two treatments used to reduce the risk of someone having a heart attack.

Evaluate the use of statins compared with the use of a stent to reduce the risk of a heart attack.

[6 marks]

4.4.2.2 Response to exercise

Question 03 · continued

0 5 . 5 Many people who survive a heart attack get out of breath easily when they exercise gently.

Explain why heart attack survivors get out of breath easily.

[4 marks]

Question 5 continues on the next page

4.4.2.2 Response to exercise

Question 03 · continued

Scientists have developed patches of beating heart cells to repair damaged heart tissue.

The patches are placed onto areas of the heart where cells have died. New cells grow to replace the dead cells.

The patches are made using a person's own cells that are converted into stem cells.

0 5 . 6 Explain why stem cells are used to make the patches.

[2 marks]

0 5 . 7 The scientists could have used human embryonic stem cells to make the patches.

Give **two** advantages of using stem cells made from the person's own cells, rather than using embryonic stem cells.

[2 marks]

1

2

17

4.4.2.2 Response to exercise

Question 04

June 2023 | 8464/B/1H | Original Q1

0 1 Communicable and non-communicable diseases are major causes of ill health.

0 1 . 1 Which disease is a **non-communicable** disease?

[1 mark]

Tick (✓) **one** box.

- AIDS ☐
- Cancer ☐
- Gonorrhoea ☐
- Malaria ☐

Obesity is a risk factor for many non-communicable diseases.

0 1 . 2 Give **one** non-communicable disease that obesity is a risk factor for.

Do **not** refer to the diseases given in Question **01.1** in your answer.

[1 mark]

0 1 . 3 National policies are used to help people who are obese to lose weight.

One national policy is to reduce the amount of sugar added to food and drinks.

Suggest **one other** national policy that could help people to lose weight.

[1 mark]

4.4.2.2 Response to exercise

Question 04 · continued

0 1 . 4 Body mass index (BMI) is one measure of obesity.

BMI is calculated using the equation:

$$\text{BMI} = \frac{\text{body mass in kg}}{(\text{height in m})^2}$$

Table 1 shows how BMI is used to describe an adult's BMI category.

Table 1

BMI	BMI category
<18.5	Underweight
18.5 to 24.9	Healthy weight
25.0 to 29.9	Overweight
>29.9	Obese

A person is 1.64 m tall and has a mass of 69 kg.

Determine the **BMI category** for this person.

Use the BMI equation and **Table 1**.

[3 marks]

The person's BMI category is _____

Question 1 continues on the next page

4.4.2.2 Response to exercise

Question 04 · continued

Scientists investigated the effect of smoking and of BMI on the birth mass of babies.

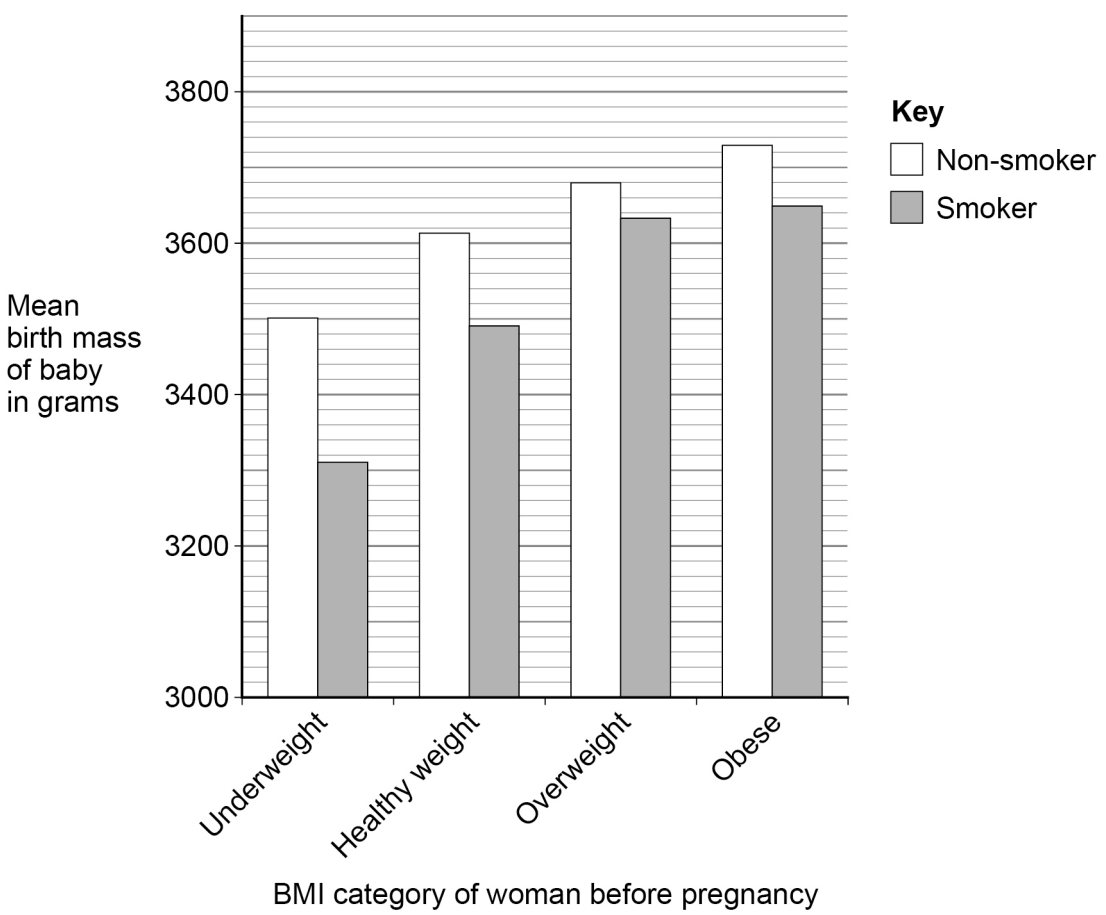
Women's BMI categories were determined before the women became pregnant.

0 1 . 5 Suggest why BMI categories were determined **before** the women became pregnant.

[1 mark]

Figure 1 shows the results.

Figure 1



4.4.2.2 Response to exercise

Question 04 · continued

0 1 . 6 Give **two** conclusions that can be made from **Figure 1**.

[2 marks]

1 _____

_____

2 _____

_____

0 1 . 7 Measles is a communicable disease.

A virus causes measles.

Describe how the measles virus is transferred from person to person.

[2 marks]

_____

_____

_____

_____

Question 1 continues on the next page

4.4.2.2 Response to exercise

Question 04 · continued

Athlete's foot is a communicable disease.

A fungus causes athlete's foot.

The athlete's foot fungus infects the skin on feet.

0 1 . 8 Scientists estimate that 17% of the UK population have athlete's foot.

The estimated UK population is 67 961 900

Calculate how many people are estimated to have athlete's foot.

[2 marks]

Estimated number of people with athlete's foot = _____

0 1 . 9 Athlete's foot fungus grows in moist conditions.

Suggest **one** way a person could reduce their chance of catching athlete's foot.

[1 mark]

14

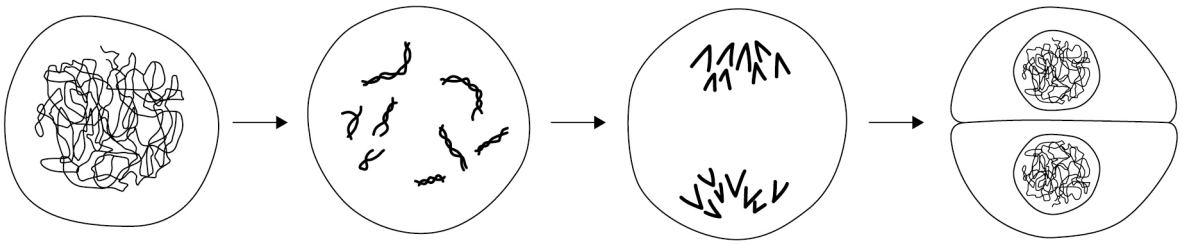
4.4.2.2 Response to exercise

Question 05

0 6 Smoking increases the risk of lung cancer.

0 6 . 1 **Figure 5** shows a lung cell dividing.

Figure 5



Describe the process of the cell cycle shown in **Figure 5**.

[4 marks]

4.4.2.2 Response to exercise

Question 05 · continued

0 6 . 2 Lung cancer is malignant.

Explain what is meant by a malignant tumour.

[3 marks]

Question 6 continues on the next page

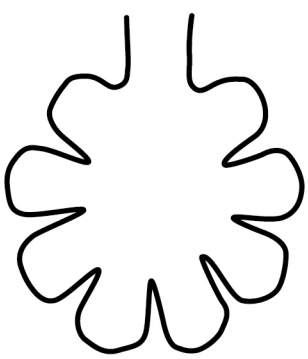
4.4.2.2 Response to exercise

0 6 . 3 Smoking can damage the lungs in different ways.

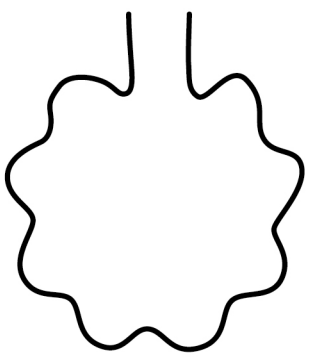
Figure 6 shows alveoli from the lungs of two people.

Figure 6

Person A
Alveolus from a person who does **not** smoke



Person B
Alveolus from a person who does smoke



Person **A** and person **B** do the same exercise.

Explain why person **B** breathes much faster than person **A** during the exercise.

[4 marks]

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