AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 4.3.1.9

Discovery and development of drugs

Past-paper questions

Tier	**Foundation**
Question groups	**2**
Available paper years	**2019–2020**

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.

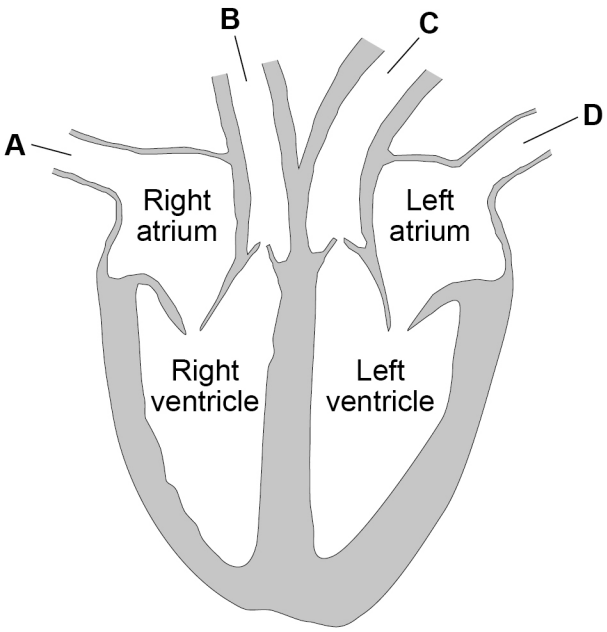
4.3.1.9 Discovery and development of drugs

Question 01

June 2019 | 8464/B/1F | Original Q6

0 6 **Figure 10** shows a human heart.

Figure 10



0 6 . 1 Which blood vessel carries deoxygenated blood away from the heart to the lungs?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

0 6 . 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 ☐

4.3.1.9 Discovery and development of drugs

Question 01 · continued

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

0 6 . 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 6 continues on the next page

Question 01 · continued

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

Table 2 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 2

	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 6 . 4 Calculate stroke volume **X** in **Table 2**.

Use the equation:

cardiac output = stroke volume × heart rate

Give your answer to 2 significant figures.

[3 marks]

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

4.3.1.9 Discovery and development of drugs

Question 01 · continued

0 6 . 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 2**.

[6 marks]

12

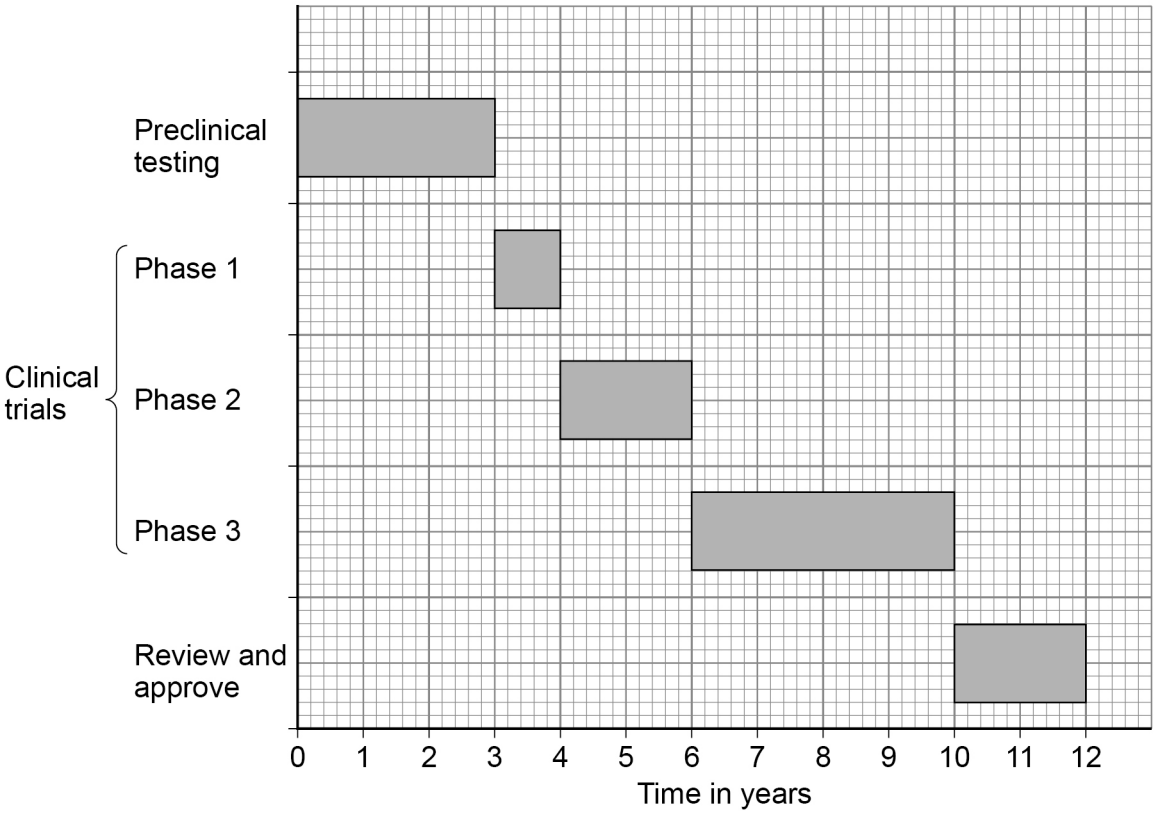
4.3.1.9 Discovery and development of drugs

Question 02

0 2 New drugs are tested before they can be licensed for use with patients.

Figure 2 shows how much time the different stages of testing took for one new drug.

Figure 2



0 2 . 1 Preclinical testing is done in a laboratory.

What is the drug tested on in a laboratory?

Give **one** example.

[1 mark]

0 2 . 2 How many years did the clinical trials take for the drug in **Figure 2**?

[1 mark]

Time for clinical trials = _____ years

0 2 . 3 During Phase 1 clinical trials, the drug is tested on **healthy** volunteers using **low** doses.

What is the main purpose of Phase 1 testing?

[1 mark]

Tick (✓) **one** box.

To find the best dose to use. ☐

To see if the drug is safe to use. ☐

To see if the drug works. ☐

During clinical trials, half of the patients are given a placebo in a double blind trial.

0 2 . 4 What is a placebo?

[1 mark]

0 2 . 5 Who knows which patients are given the placebo and which patients are given the drug in a double blind trial?

[1 mark]

Tick (✓) **one** box.

Not the patients or the doctors ☐

The patients and the doctors ☐

The patients but not the doctors ☐

4.3.1.9 Discovery and development of drugs

Question 02 · continued

Paracetamol and ibuprofen are two medicines used to reduce a high body temperature.

Doctors investigated which medicine was more effective at reducing high body temperature in 200 children who were ill.

The children were put into two groups, which were matched for:

- age
- gender
- body mass.

Each group had 100 children.

This is the method used.

1. Measure the body temperature of each child before any medicine is given.
2. Give children in Group 1 paracetamol.
3. Give children in Group 2 ibuprofen.
4. Measure the body temperature of each child every hour after the medicine is given.

0 2 . 6 Give **two** control variables in this investigation.

[2 marks]

1 _____

2 _____

4.3.1.9 Discovery and development of drugs

Question 02 · continued

0 2 . 7 None of the children was given a placebo.

Suggest **one** reason why.

[1 mark]

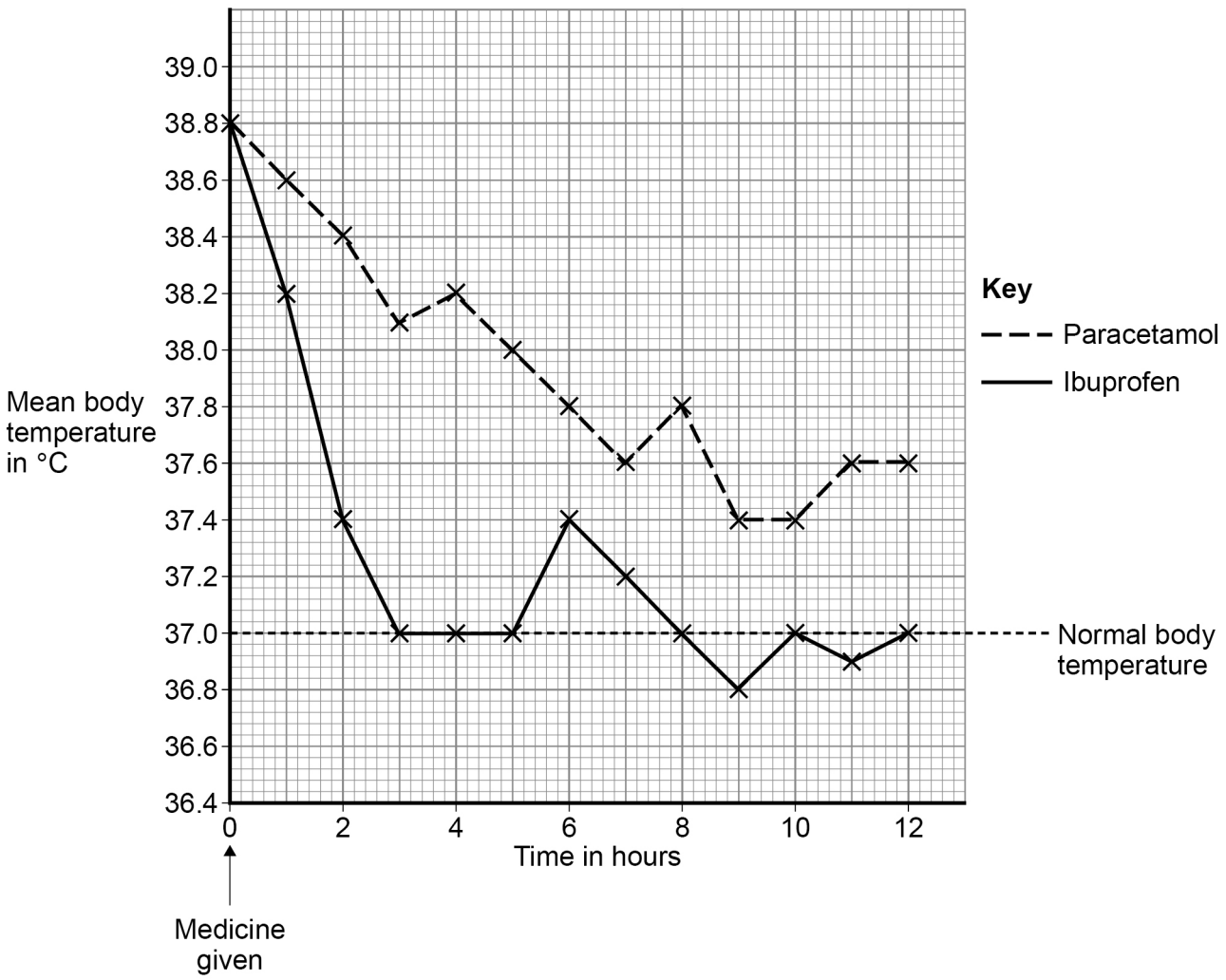
Question 2 continues on the next page

4.3.1.9 Discovery and development of drugs

Question 02 · continued

Figure 3 shows the results.

Figure 3



0 2 . 8 What was the mean body temperature after 6 hours for the children given ibuprofen?

[1 mark]

Mean body temperature = _____ °C

4.3.1.9 Discovery and development of drugs

Question 02 · continued

0 2 . 9 The doctors concluded that children with a high body temperature should be given ibuprofen and not paracetamol.

Give **two** reasons for the doctors' conclusion.

Use **Figure 3**.

[2 marks]

1 _____

_____

2 _____

_____

11

Turn over for the next question