AQA – Respiration – GCSE Biology

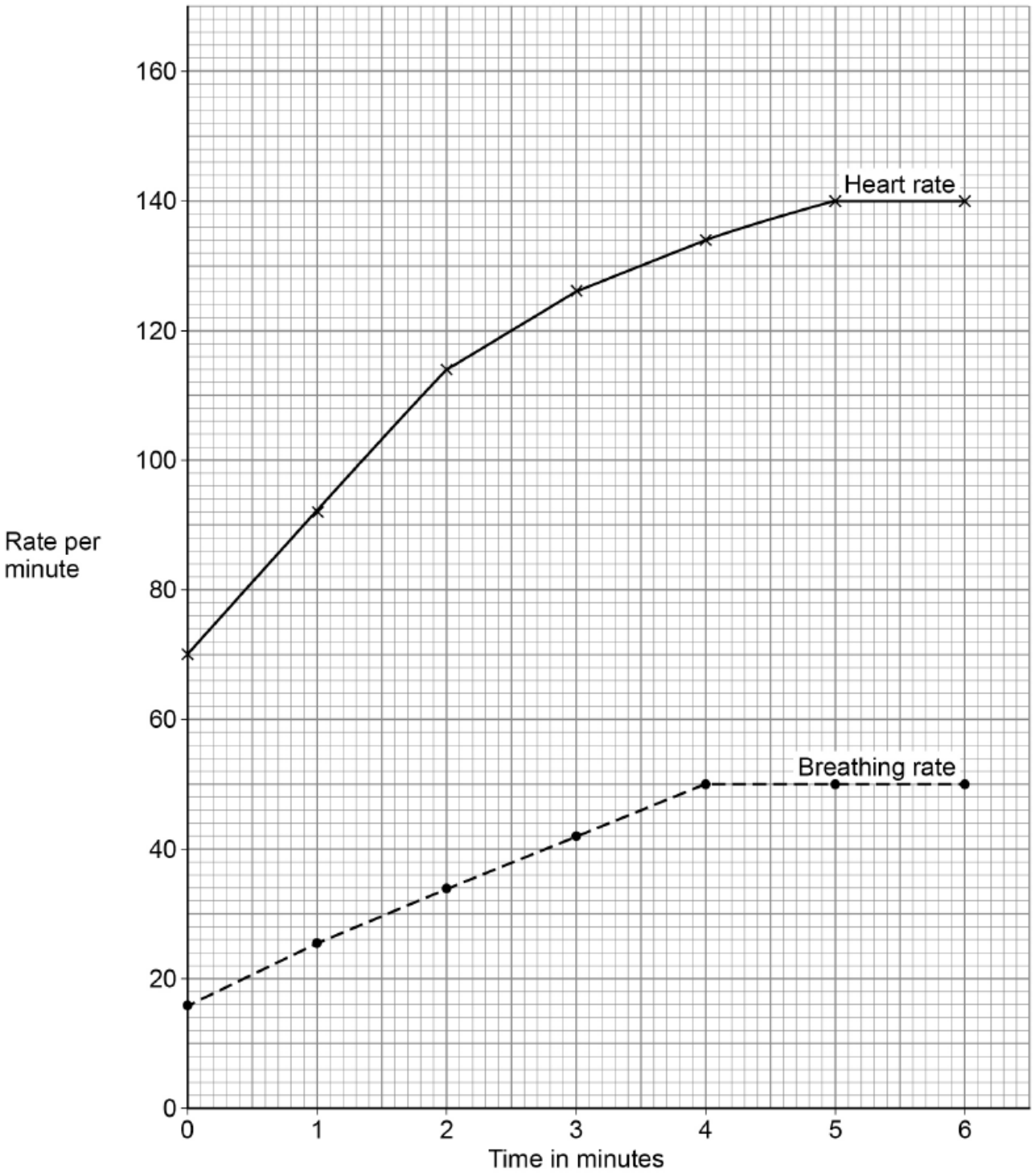
1. May/2020/Paper_1F/No.4

A 45-year-old man exercised on a rowing machine for six minutes.

A fitness monitor recorded his heart rate and breathing rate every minute.

Figure 6 shows the results.

Figure 6



0 4 . 1 Describe the trend for breathing rate shown in **Figure 6**.

Use data from **Figure 6** in your answer.

[3 marks]

0 4 . 2 The safe maximum heart rate for a person exercising can be calculated using the equation:

safe maximum heart rate = 220 – age in years

Calculate the safe maximum heart rate for the man.

[1 mark]

Safe maximum heart rate = _____ beats per minute

0 4 . 3 What is the man's maximum heart rate?

Use **Figure 6**.

[1 mark]

Man's maximum heart rate = _____ beats per minute

0 4 . 4 The man concluded that he was exercising at a safe heart rate.

Give the reason for his conclusion.

Use your answers from Question **04.2** and Question **04.3**

[1 mark]

0 4 . 5 Explain the ways the man's body has responded to the exercise.

Use information from **Figure 6** on page 16.

[6 marks]

2. May/2020/Paper_1H/No.4

. 1 Lipases break down lipids.

Which **two** products are formed when lipids are broken down?

[2 marks]

Tick (✓) **two** boxes.

Amino acids ☐

Fatty acids ☐

Glucose ☐

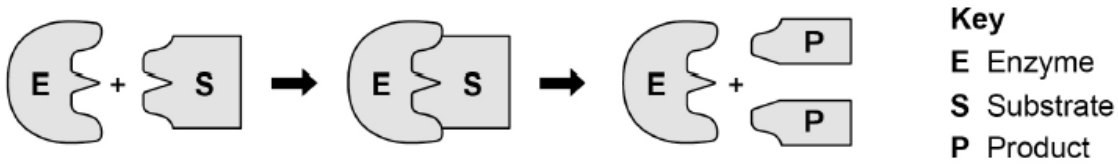
Glycerol ☐

Glycogen ☐

One model used to explain enzyme action is the 'lock and key theory'.

Figure 7 shows a model of the theory.

Figure 7



0 4 . 2 Explain the 'lock and key theory' of enzyme action.

Use information from **Figure 7** in your answer.

[3 marks]

0 4 . 3 There are many different types of lipase in the human body.

Why does each different type of lipase act on only **one** specific type of lipid molecule?

[1 mark]

Students investigated the presence of starch and glucose in the leaves of geranium plants.

This is the method used.

1. Place two identical geranium plants on a bench near a sunny window for two days.

2. After two days:
   - leave one plant near the window for two more days.
   - place one plant in a cupboard with no light for two more days.

3. Remove one leaf from each plant.

4. Crush each leaf to extract the liquid from the cells.

5. Test the liquid from each leaf for glucose and for starch.

0 4 . 4 Describe how the students would find out if the liquid from the leaf contained glucose.

[3 marks]

0 4 . 5 Describe how the students would find out if the liquid from the leaf contained starch.

[2 marks]

Table 2 shows the students' results.

Table 2

Test	Leaf from plant kept in light for four days	Leaf from plant kept in light for two days and then no light for two days
Glucose	Strong positive	Weak positive
Starch	Positive	Negative

0 4 . 6 Explain why the leaf in the light for four days contained both glucose and starch.

[2 marks]

0 4 . 7 Explain why the leaf left in a cupboard with no light for two days did contain glucose but did **not** contain starch.

[3 marks]

0 4 . 8 Suggest **one** way the students could develop the investigation to find out more about glucose and starch production in plants.

[1 mark]