

<b>Total marks</b>	15
<b>Time allowed</b>	Approximately 25 minutes
<b>Instructions</b>	Answer ALL questions. Write answers in the spaces provided.

### Question 1

The student performed 3 minutes of stepping exercise, then rested and recorded recovery. Heart rate was measured every minute.

Time	Condition	Heart rate (bpm)	Breathing rate (breaths/min)
0 min	Rest	68	15
3 min	End of exercise	142	28
4 min	Recovery	118	24
6 min	Recovery	89	19
8 min	Recovery	75	17
10 min	Recovery	68	15

A student measures their heart rate before, during and after exercise. The table shows the results.

[0 marks]

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### Question 2

Describe the effect of exercise on heart rate, using data from the table to support your answer.

[3 marks]

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### Question 3

Explain why heart rate increases during exercise.

[3 marks]

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### Question 4

The student's breathing rate remained elevated for several minutes after exercise stopped. Explain why.

[3 marks]

**Question 5**

The student repeats the experiment the following day but their recovery time is much shorter. Suggest ONE reason why.

[1 mark]

**Question 6**

Suggest TWO improvements the student could make to this investigation to make the results more reliable.

[2 marks]

★ Higher Tier

**Question 7**

Explain why a trained athlete would be expected to have a lower resting heart rate and faster recovery time than an untrained person.

[3 marks]

**END OF QUESTIONS — Total: 15 marks**