

B9- Respiration Exam Practice 2

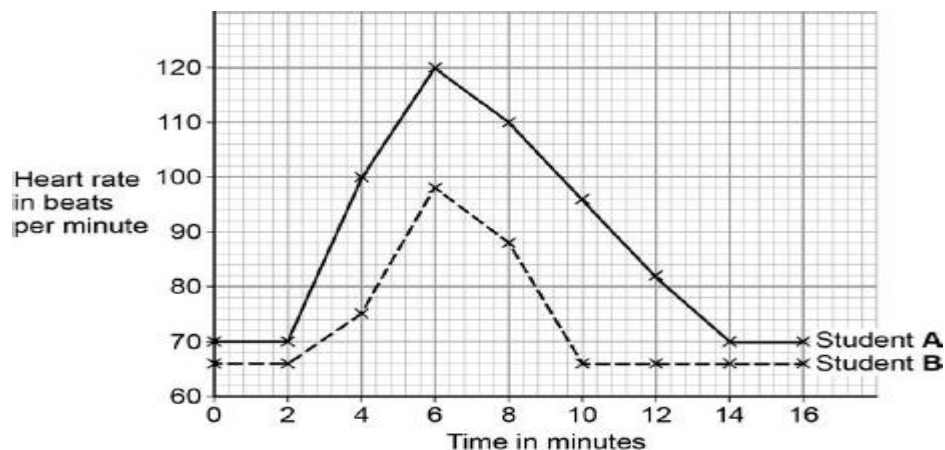
Name:

Score:

Q1.

Some students investigated how exercise affects heart rate.

The figure below shows their results.



- (a) What was Student **B**'s resting heart rate?

Resting heart rate = _____ beats per minute

(1)

- (b) The students started running at 2 minutes.

What evidence for this is in the figure above?

(1)

- (c) For how many minutes did the students run?

Tick **one** box.

2

4

6

14

(1)

(d) Student **B** is fitter than Student **A**.

Use the figure above to give **two** pieces of evidence that support this statement.

1. _____

2. _____

(2)

(e) There are other changes in the body during exercise.

Explain why these changes occur.

(4)

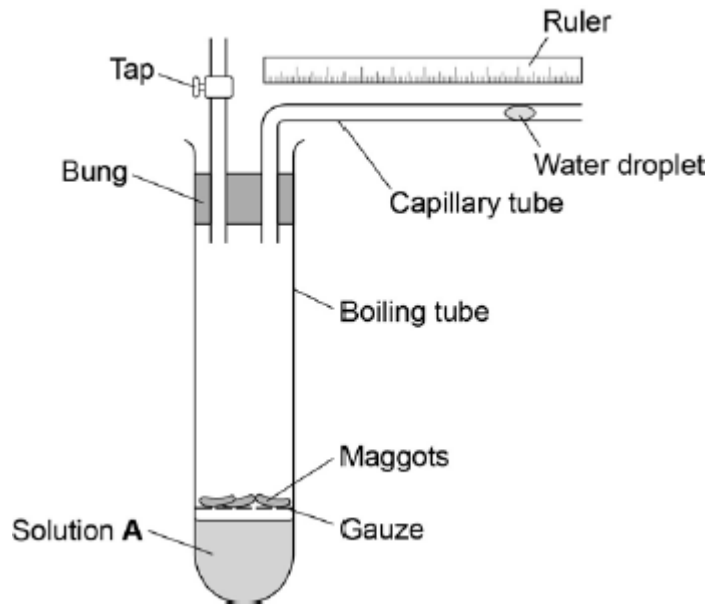
(Total 9 marks)

Q2.

A student investigates the rate of respiration in maggots.

Figure 1 shows the equipment he uses.

Figure 1



- (a) Why does the student put the maggots on gauze?

(1)

- (b) When maggots respire they take in a gas from the air and release a different gas.
Solution **A** absorbs the gas released.

At the start of the investigation the student records the distance of the water droplet from the bend in the capillary tube.

Explain what happens to the water droplet as the maggots respire.

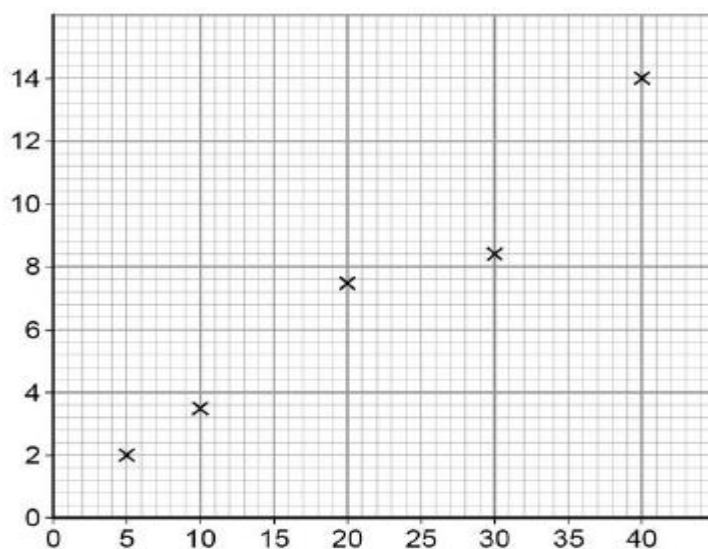
(c) The table below shows the results the student calculated.

Temperature in °C	Rate of respiration in units
5	2.2
10	3.5
20	7.5
30	8.4
40	14.0

The student uses his results to plot the graph in **Figure 2**.

Label the x and y axis.

Figure 2



(1)

(d) How could the student find out if the result at 30 °C is anomalous?

(1)

(e) Suggest what the value at 30 °C should be to fit the pattern of the graph.

(1)

(Total 8 marks)

Higher Questions

Q3.

Lactic acid production during exercise affects an athlete's performance.

Explain why lactic acid is produced during exercise.

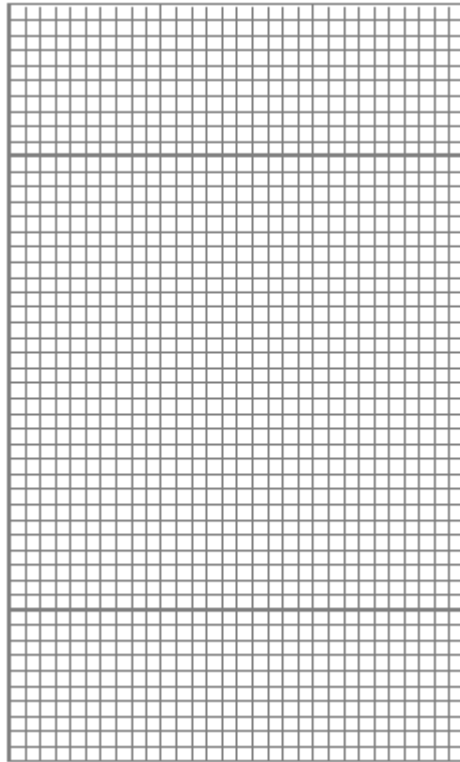
(Total 2 marks)

Q4.

(a) The table shows an athlete's breathing rate after the end of a race.

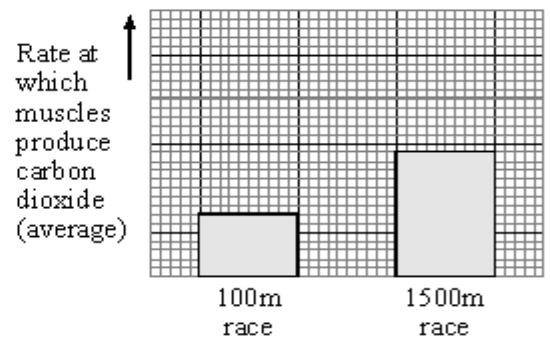
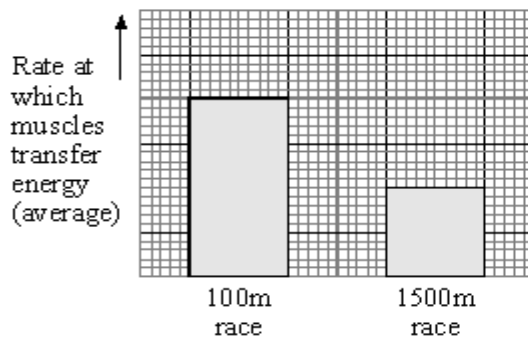
Use the information shown in the table to draw a line graph.

Time after end of race (minutes)	Breathing rate (litres per second)
0	4
1	2
2	1
3	1
4	1
5	1



(3)

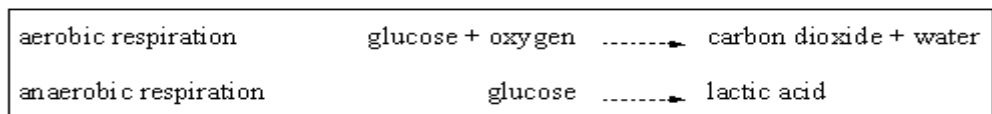
(b) The bar charts show what happens in an athlete's muscles when running in two races of different distances.



(i) Compare what happens in the athlete's muscles when running in the two races.

(3)

(ii) Use the information in the box to explain your answer to (i).



(2)

- (c) Explain why the athlete breathes at a faster rate than normal for two minutes after finishing a 100 metres race.

(2)

(Total 10 marks)

Mark schemes

Q1.

- (a) 66 (beats per minute) 1
- (b) heart rate increased 1
- (c) 4 1
- (d) any **two** from:
- resting heart rate was lower
 - heart rate did not increase as much
 - heart rate did not increase as fast
 - heart rate returned to normal sooner
- 2

- (e) **Level 2 (3–4 marks):**
A detailed and coherent explanation is given, which logically links changes in the body during exercise to reasons for these changes.

Level 1 (1–2 marks):

Discrete relevant points made. Links may not be made.

0 marks:

No relevant content

Indicative content

Changes:

- breathing rate increases
- deeper breathing
- (body) temperature increases
- sweating occurs
- muscle fatigue
- vasodilation

Explanations linked to correct change:

- to provide more oxygen
- to remove carbon dioxide faster
- (as) more energy required
- (so) increased respiration
- (so) more energy transferred
- for movement or contraction of muscles
- some energy warms the body
- (sweating) cools the body down
- (by) evaporation of sweat

4

[9]

Q2.

- (a) (to) stop them falling in the solution

or

to stop them drowning (in the solution)

1

(b) **Level 2 (3–4 marks):**

A detailed and coherent explanation is given of how the droplet moves, clearly and logically linked to the process of respiration.

Level 1 (1–2 marks):

Simple statements are made about movement of the water droplet, but any attempts at explaining the reason or linking the movement to the process of respiration are unclear and poorly structured.

0 marks:

No relevant content

Indicative content

- water droplet moves towards the maggots / boiling tube

Explanation:

- the oxygen in the boiling tube is used up in respiration
- (and) the carbon dioxide released from respiration is absorbed by solution **A**
- which causes a pressure difference
- so air is drawn into the tube
- bringing the water droplet with it.

4

(c) x axis: Temperature in °C

both needed for the mark

y axis: Rate of respiration in units

1

(d) repeat the experiment at 30 °C

1

(e) 10.5

allow range 10.4–10.8

1

[8]

Higher Mark Scheme

Q3.

insufficient / no oxygen available

1

for (just) aerobic respiration

or

respires anaerobically

1

[2]

Q4.

- (a)
- appropriate scales (> halfway along each axis)
 - all points correctly plotted to better than $\frac{1}{2}$ a square
 - lines carefully drawn

(allow point to point in this case)

N.B.

- no mark available for labelling axes
- *allow* either orientation
for 1 mark each

3

(b) (i) *ideas that*

- energy transferred faster in 100m race
(*not* more energy transferred)
- carbon dioxide produced faster during 1500m race
for 1 mark each

(allow more carbon dioxide produced)

correct reference to twice / half as fast in either / both cases
for 1 further mark

3

- (ii)
- respiration during 100m race (mainly) anaerobic
 - respiration during 1500m race aerobic
 - aerobic respiration produces carbon dioxide
 - anaerobic respiration doesn't produce carbon dioxide
/ produces lactic acid
any two for 1 mark each

2

(c) *ideas that*

- there is an oxygen debt / more than normal oxygen needed
- lactic acid needs to be oxidised / combined with oxygen
for 1 mark each

2

[10]