Practice Question Set For GCSE
Subject : Biology
Paper-1 Topic: B4 Bioenergetics

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Name of the Student:_____
Max. Marks : 25 Marks **Time : 25 Minutes**

Q1.

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

Explain why lactic acid is produced during exercise.

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(Total 2 marks)

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Q2.

(a) The concentration of sulfate ions was measured in the roots of barley plants and in the water in the surrounding soil.

The table shows the results.

	Concentration of sulfate ions in mmol per dm^3
Roots of barley plants	1.4
Soil	0.15

Is it possible for the barley roots to take up sulfate ions from the soil by diffusion?

Draw a ring around your answer. **Yes / No**

Explain your answer.

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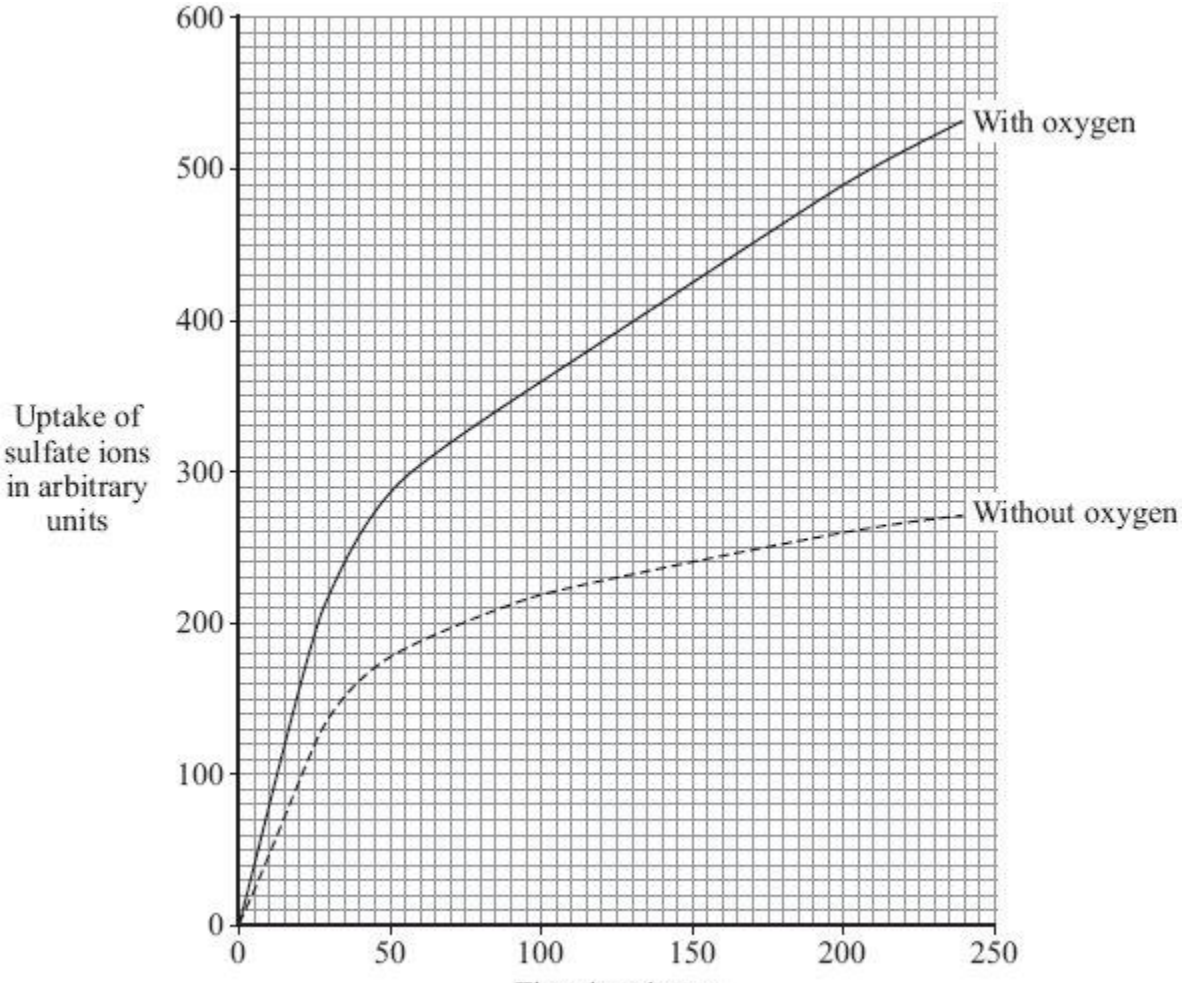
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(2)

(b) Some scientists investigated the amounts of sulfate ions taken up by barley roots in the presence of oxygen and when no oxygen was present.

The graph below shows the results.

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(i) The graph shows that the rate of sulfate ion uptake between 100 and 200 minutes, **without** oxygen, was 0.4 arbitrary units per minute.

The rate of sulfate ion uptake between 100 and 200 minutes, **with** oxygen, was greater.

How much greater was it? Show clearly how you work out your answer.

_____

_____

_____

Answer _____ arbitrary units

(2)

(ii) The barley roots were able to take up more sulfate ions with oxygen than without oxygen.

Explain how.

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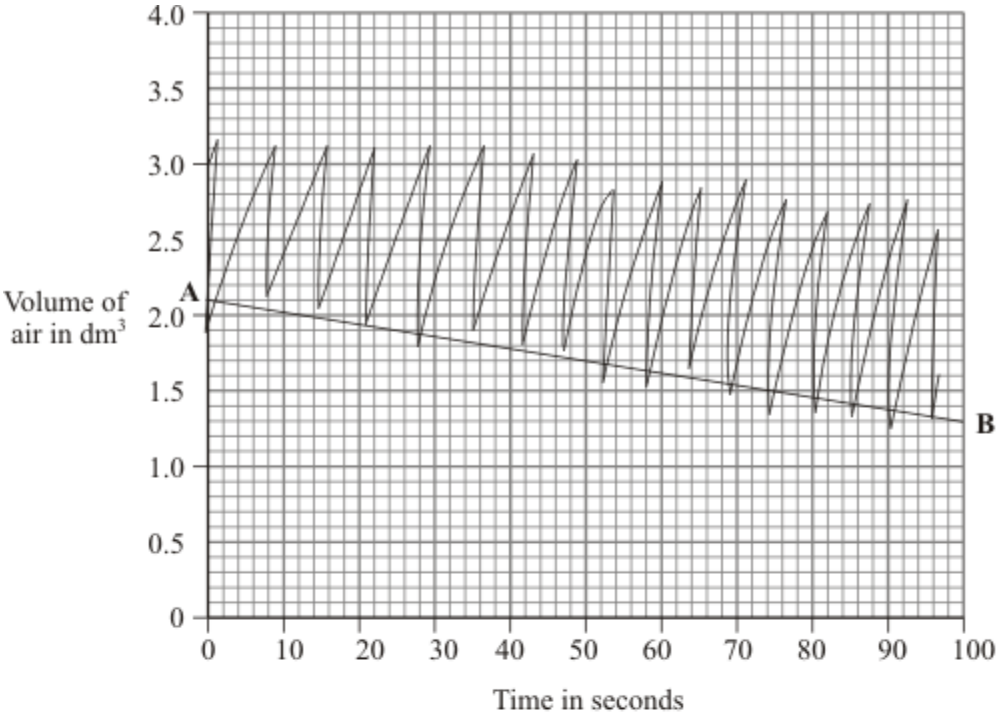
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(Total 7 marks)

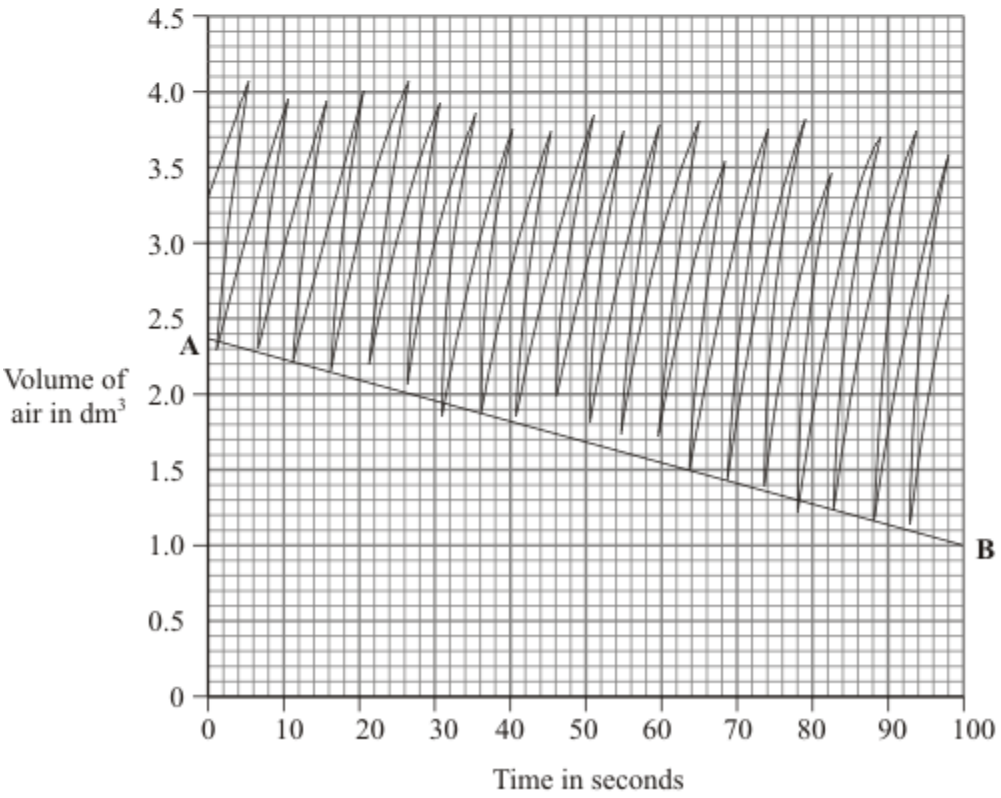
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Q3.

A student's breathing was monitored before and after vigorous exercise. The student breathed in and out through a special apparatus. The graphs show the changes in the volume of air inside the apparatus. Each time the student breathed in, the line on the graph dropped. Each time the student breathed out, the line went up.



Before exercise



After exercise

(a) How many times did the student breathe in per minute:

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before exercise; _____

after exercise? _____

(1)

(b) On each graph, the line **A** – **B** shows how much oxygen was used. The rate of oxygen use before exercise was 0.5 dm^3 per minute. Calculate the rate of oxygen use after exercise.

_____

_____

_____

Rate of oxygen use after exercise = _____ dm^3 per minute

(2)

(c) The breathing rate and the amount of oxygen used were still higher after exercise, even though the student sat down to rest. Why were they still higher?

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(4)

(Total 7 marks)

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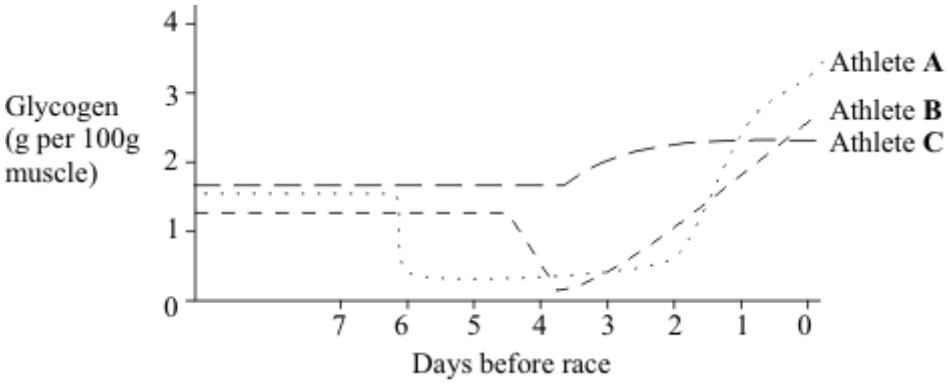
Q4.

Marathon runners are recommended to have a high carbohydrate diet prior to a race. Three athletes tried out three dietary regimes prior to a marathon race.

These three dietry regimes were as follows.

Athlete A	Up to 7 days before the race	-	Normal mixed diet
	7 days before the race	-	Prolonged extreme physical activity
	6-3 days before the race	-	Protein and fat diet; no carbohydrate
	2 and 1 days before the race	-	Large carbohydrate intake
Athlete B	Up to 5 days before race	-	Normal mixed diet
	5 days before the race	-	Prolonged extreme physical activity
	4-1 days before the race	-	Large carbohydrate intake
Athlete C	Up to 4 days before the race	-	Normal mixed diet
	4-1 days before the race	-	Large carbohydrate intake

The graph below shows the effect of each of these dietary regimes on glycogen levels in the athletes' muscles



(a) (i) What is the immediate effect of extreme physical activity on the glycogen content of muscles?

_____

_____

(1)

(ii) Describe how this effect occurs.

_____

_____

_____

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(3)

(b) (i) Evaluate the three regimes as preparation for a marathon race.

(3)

(ii) Suggest a possible explanation for the different effects of the three regimes.

(2)

(Total 9 marks)

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