

New
Specification



Centre Number

71	
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Candidate Number

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General Certificate of Secondary Education
2011–2012

Double Award Science: Biology

Unit B1

Higher Tier

[GSD12]



TUESDAY 15 MAY 2012, MORNING

TIME

1 hour.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

Write your answers in the spaces provided in this question paper.
Answer **all six** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 70.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

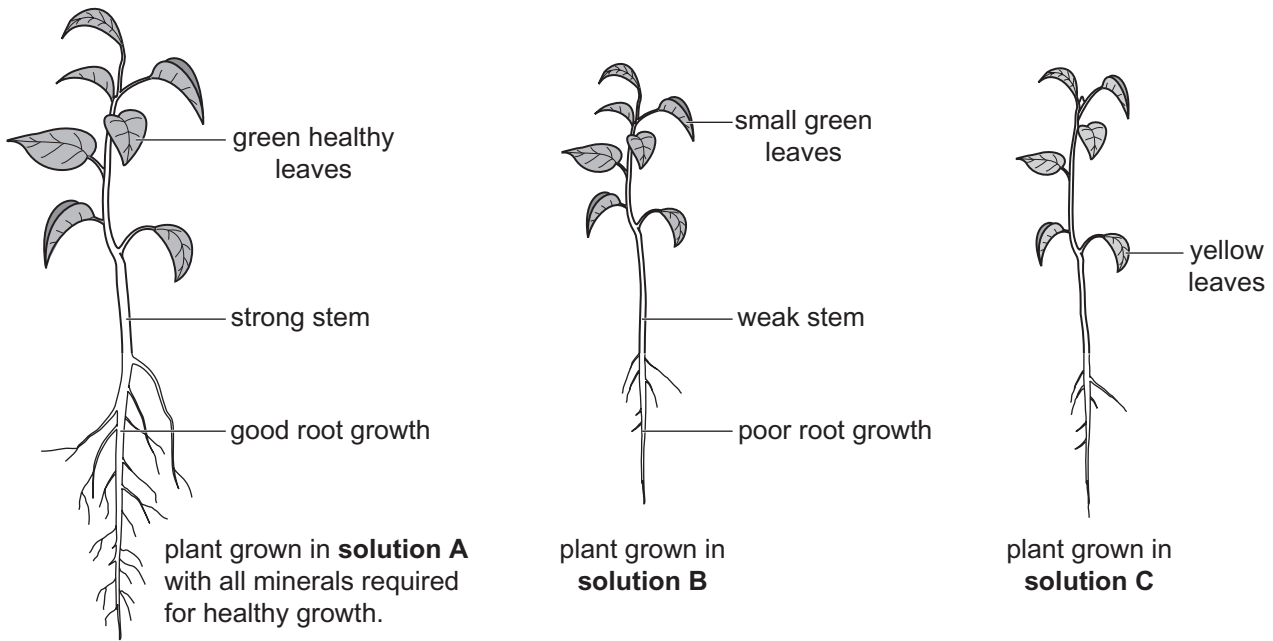
Quality of written communication will be assessed in Questions **3(a)(v)** and **5(b)**.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	

Total Marks	
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1 (a) The diagrams show three plant cuttings two weeks after they had been growing in three different mineral solutions.



Source: © *Biology at a Glance 3rd edition*, J. Dodds, ISBN 9781840760866, Manson Publishing Ltd. Page 119

(i) Suggest which mineral is missing from solution B and explain why the cutting in this solution shows poor growth.

_____ [2]

(ii) Magnesium is missing from solution C.

Use the diagram to explain why the growth of this cutting is reduced.

_____ [2]

(iii) The process of absorbing minerals from the soil by root hair cells requires energy.

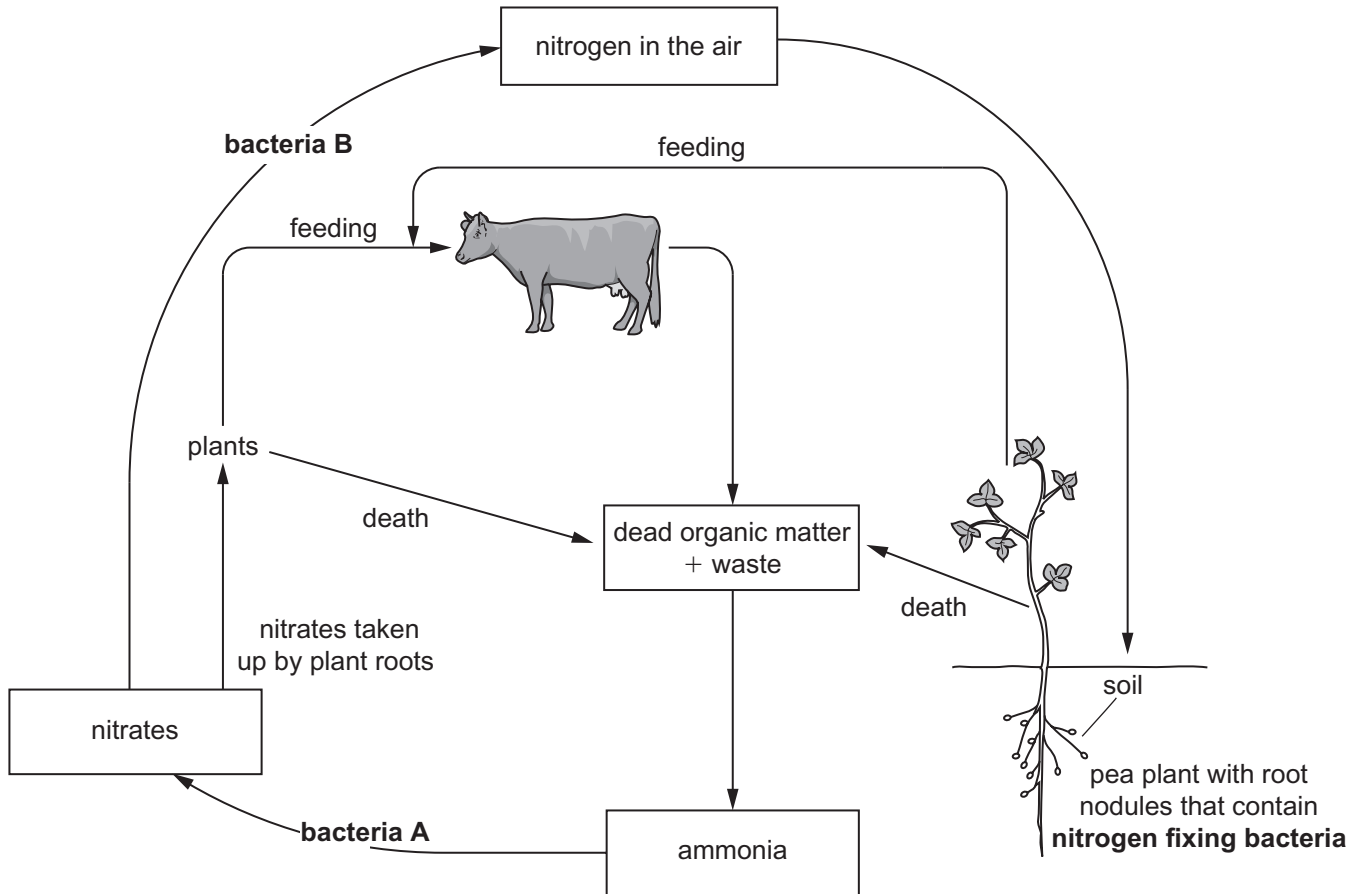
Name the process used in absorption and explain why it requires energy.

Process _____

Explanation _____ [2]

Examiner Only	
Marks	Remark

(b) The diagram shows the nitrogen cycle.



Source: © Biology at a Glance 3rd edition, J. Dodds, ISBN 9781840760866, Manson Publishing Ltd. Page 58

Use the information in the diagram and your knowledge to answer the following questions.

Nitrogen fixing bacteria in the root nodules of the pea plant have a relationship with the pea plant where they both benefit.

(i) Suggest how the pea plant benefits from the relationship.

_____ [1]

(ii) Suggest what substance the pea plant provides for the benefit of the bacteria living in its root nodules.

_____ [1]

(iii) Name the process carried out by **bacteria B**.

_____ [1]

Examiner Only	
Marks	Remark

(iv) When growing crops, farmers often increase the mineral content of the soil by adding manure or artificial fertiliser.

Give **one** advantage of adding manure rather than artificial fertiliser to the soil.

_____ [1]

(c) (i) Name the process that can result when excess fertiliser runs off (leaches) from fields into a stream.

_____ [1]

(ii) Describe the role of bacteria in this process.

_____ [2]

(iii) Describe the effect this has on aquatic animals in the stream.

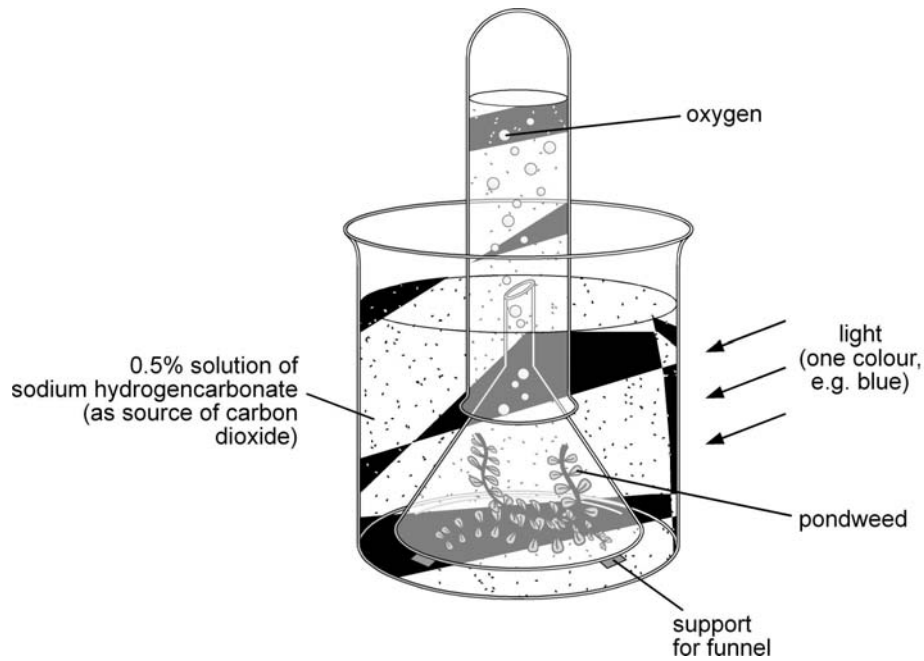
_____ [1]

Examiner Only	
Marks	Remark

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(Questions continue overleaf)

- 2 (a) Normal light is made up of different individual colours. A student carried out an experiment to test the effect of different individual colours on the rate of photosynthesis. The diagram shows the apparatus he used.

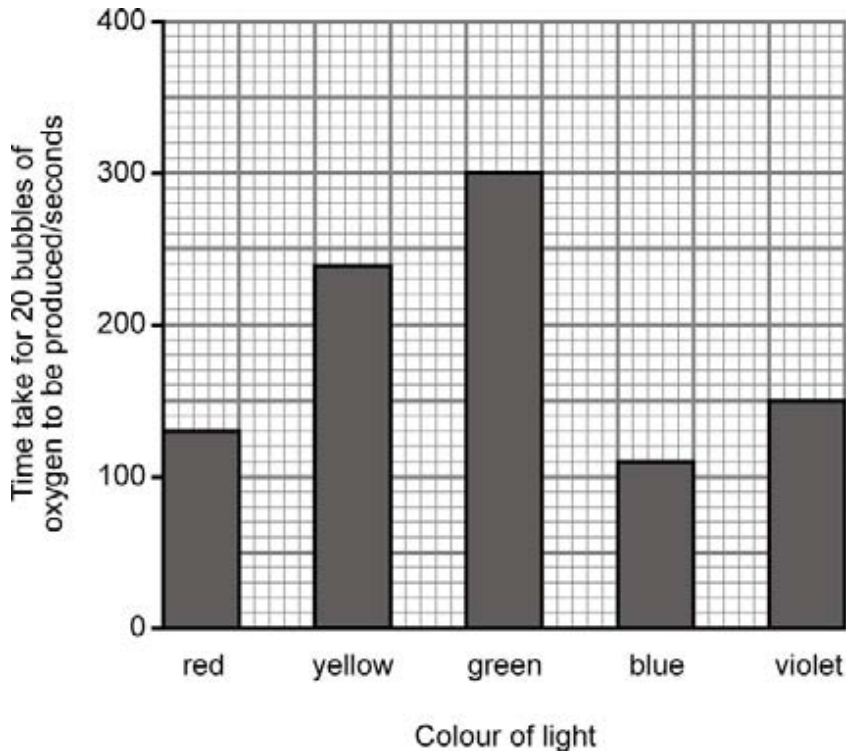
The pondweed was exposed to one colour of light, e.g. blue, for five minutes. The student then measured the time taken for twenty bubbles of oxygen to be produced. He repeated the experiment with different individual colours of light.



Adapted from Understanding Biology through problem solving - Hoey - ISBN-0216-92938-5

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Marks	Remark

The bar chart shows the results of the experiment.



Adapted from Understanding Biology through problem solving - Hoey - ISBN - 0216-92938-5

- (i) Suggest why measurements were only taken after the pondweed had been left for five minutes in each individual colour of light.

_____ [1]

- (ii) Give **one** factor that should be kept constant during the experiment.

_____ [1]

Examiner Only	
Marks	Remark

(iii) The photograph shows a geranium plant.



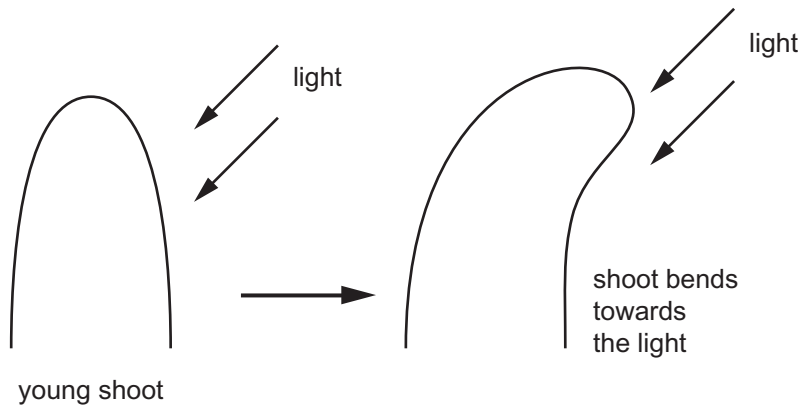
Source: Principal Examiner

Using the results from the bar chart, explain why a grower would use blue light to maximise profit when growing geraniums.

[3]

Examiner Only	
Marks	Remark

(b) The diagram shows the growth response of a young shoot to light from one direction.



(i) Name the growth response shown by the young shoot.

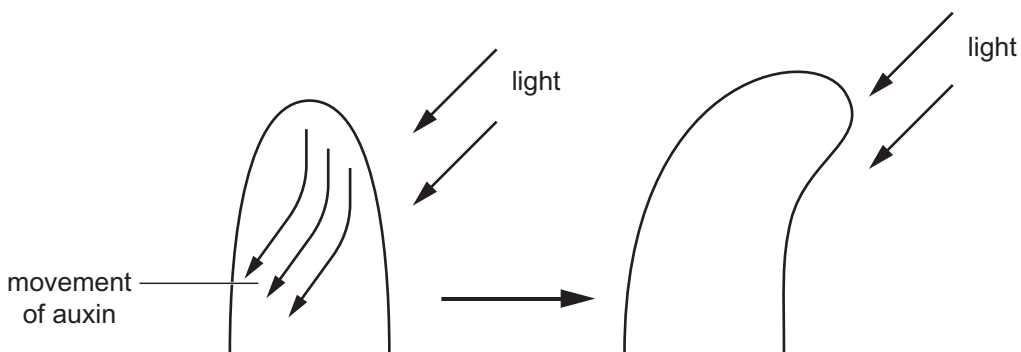
_____ [1]

(ii) Auxin is the substance that causes this growth response.

What type of substance is auxin?

_____ [1]

The diagram shows the movement of auxin in the shoot tip.



(c) Suggest how bending of the shoot tip is brought about by auxin.

 _____ [2]

Examiner Only	
Marks	Remark

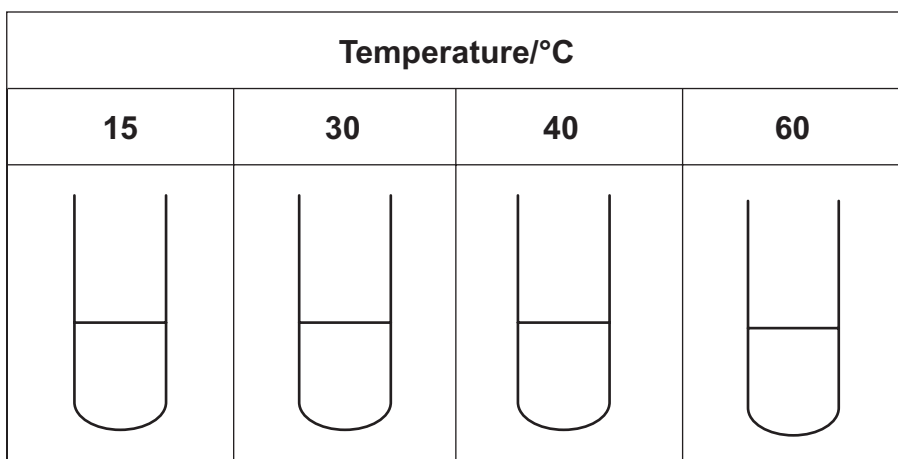
Examiner Only	
Marks	Remark

3 Some washing powders contain enzymes which help to break down stains on clothes. A student tested two enzymes (enzyme 1 and enzyme 2) to find which was more effective at breaking down fat stains on clothing over a range of temperatures.

(a) (i) Name the enzyme that breaks down fats.

_____ [1]

The diagram shows the experimental set-up the student used to find out the time taken to break down fat in the test tubes.



(ii) What substances would need to be present in each of the test tubes?

_____ and _____ [1]

(iii) Give **two** variables that the student should have kept the same.

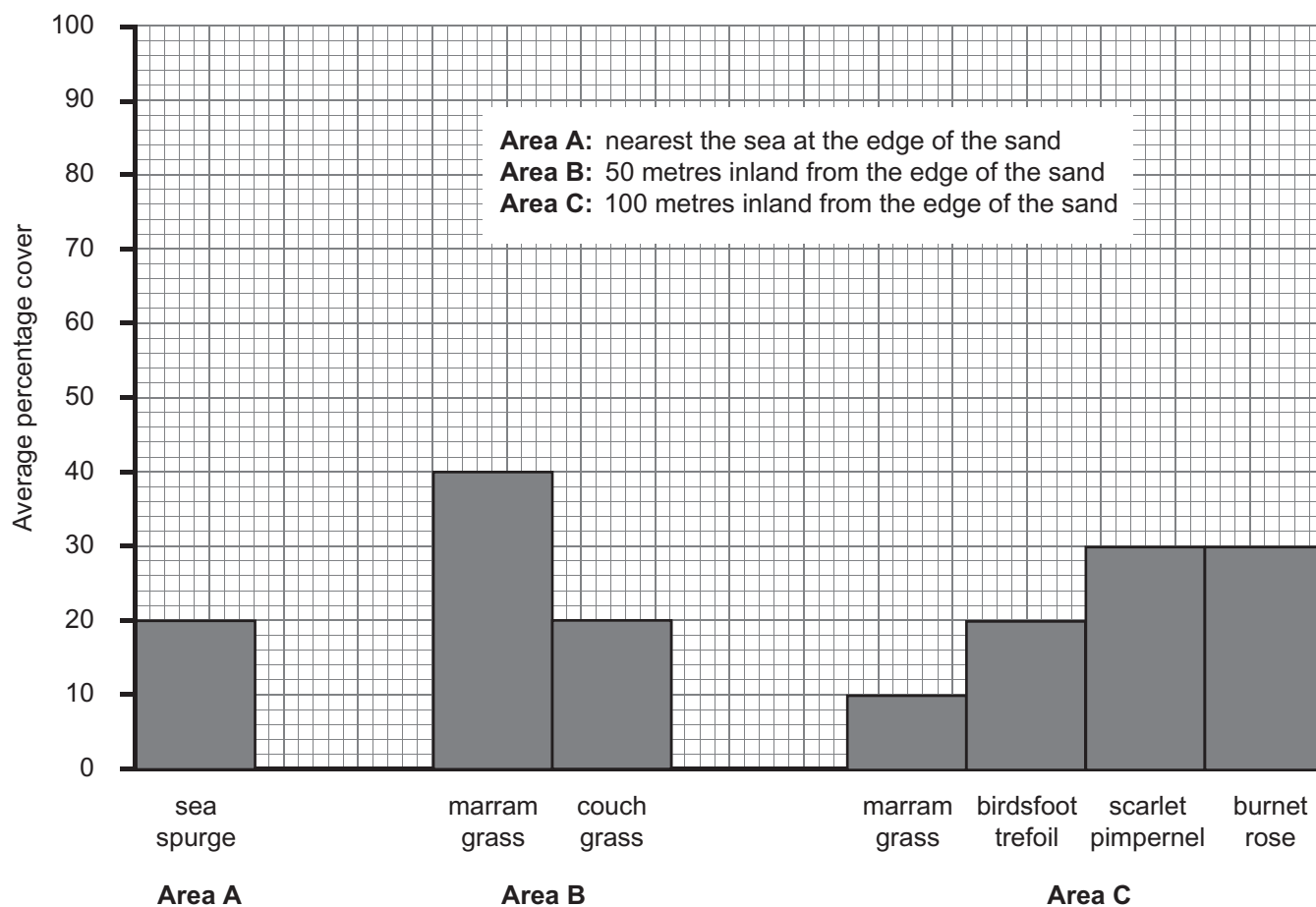
1. _____

2. _____ [2]

(iv) What are fats broken down into?

_____ and _____ [2]

- 5 (a) Pupils carried out an investigation into plant distribution and physical (abiotic) factors on sand dunes in April. The graph below shows their results for the plant distribution.



- (i) Give **two** trends shown by the graph across the three areas.

1. _____
 2. _____ [2]

- (ii) Suggest **one** explanation for these trends.

_____ [1]

Examiner Only	
Marks	Remark

6 (a) During strenuous exercise, lactic acid is produced in certain tissues.

The table below gives figures for the lactic acid level in these tissues during strenuous exercise and for a period of time after the exercise stops.

The exercise was carried out for a fifteen minute period.

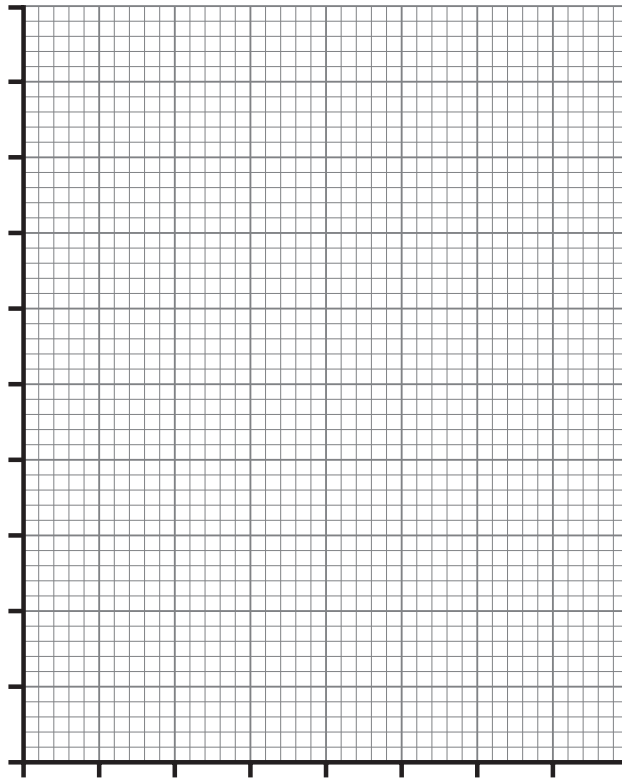
	Time after start of exercise/min	Lactic acid level in tissue/arbitrary units
Exercise started →	0	0
	10	80
Exercise stopped →	15	95
	20	70
	40	35
	60	22
	80	0

(i) Name the tissue where lactic acid is produced.

_____ [1]

Examiner Only	
Marks	Remark

- (ii) Using the data in the table, plot and draw a line graph on the axes below to show how the lactic acid level changed over time.



[4]

Using the information in the table or graph, calculate:

- (iii) the rate of increase in the lactic acid level during the first fifteen minutes.

_____ arbitrary units/min [1]

- (iv) the rate of decrease in the lactic acid level between fifteen and forty minutes.

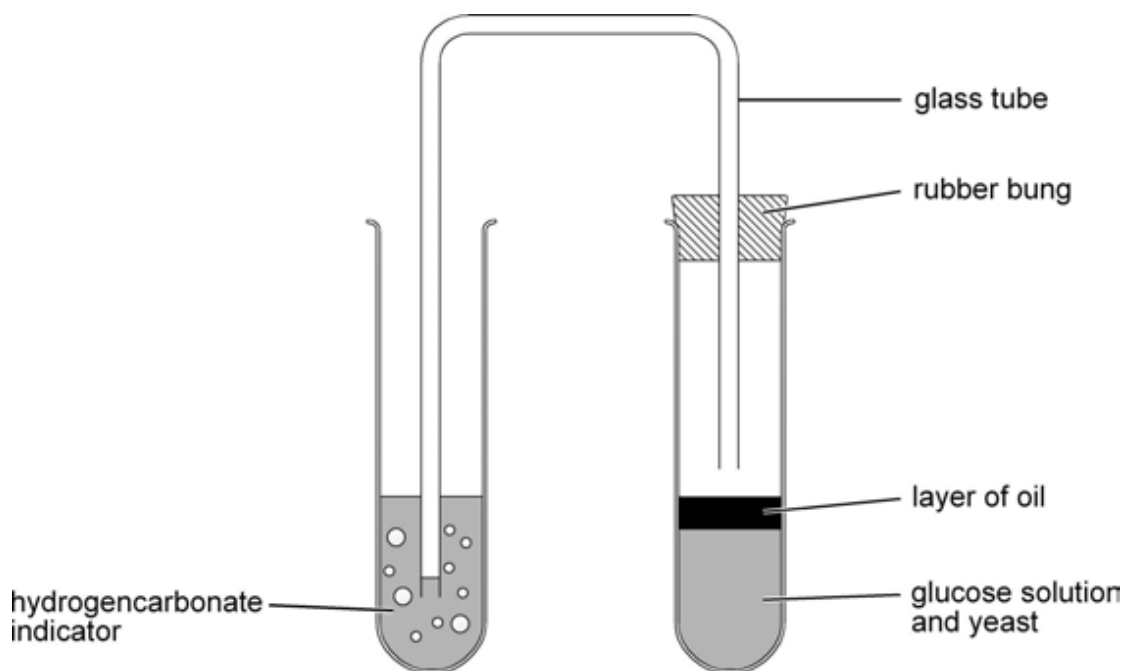
_____ arbitrary units/min [1]

- (v) Describe the difference between the two rates and explain what causes the initial increase in lactic acid.

[3]

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Marks	Remark

(b) The diagram shows apparatus that was set up to investigate respiration in yeast.



Adapted from GCSE Quick Check Study Guide ISBN 0-17-448153-5

(i) Suggest the function of the layer of oil.

_____ [1]

(ii) What colour would you expect the hydrogencarbonate indicator to be after thirty minutes?

Explain your answer.

_____ [2]

THIS IS THE END OF THE QUESTION PAPER

Examiner Only	
Marks	Remark

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