



Centre Number		
71		

Candidate	Number

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

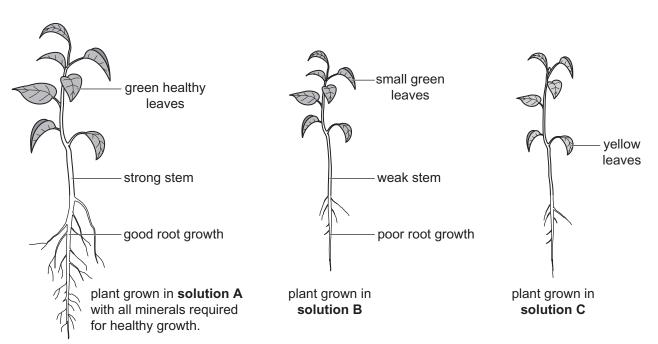
The total mark for this paper is 70.

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).

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Question Number	Marks
1	
2	
3	
4	



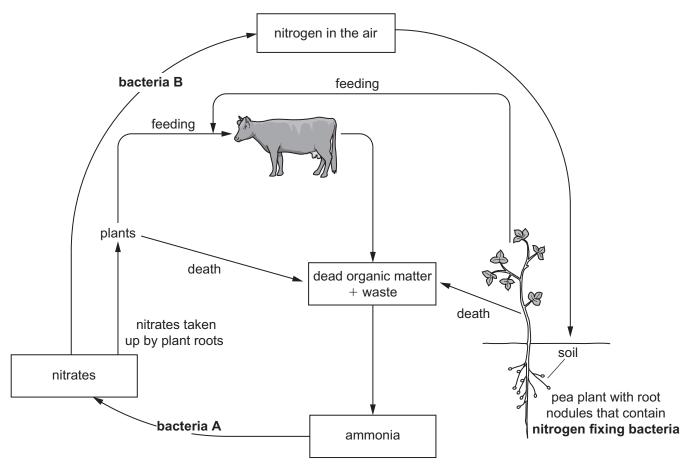
1 (a) The diagrams show three plant cuttings two weeks after they had been growing in three different mineral solutions.



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

/:\	Overset which asia and is using the Co. D. C. D. C. C.		Examine	er Only
(i)	Suggest which mineral is missing from solution B and explain why the cutting in this solution shows poor growth.		Marks	Remark
	,			
		[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 cerequires energy.	lls		
	Name the process used in absorption and explain why it require energy.	es		
	Process			
	Explanation	[2]		

(b) The diagram shows the nitrogen cycle.



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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]

	er Only Remark
Marks	Remark

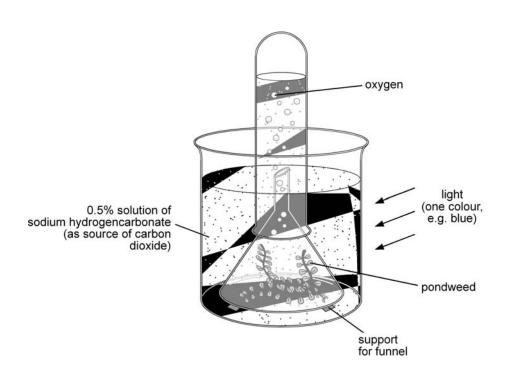
	(iv)	When growing crops, farmers often increase the mineral content of the soil by adding manure or artificial fertiliser.	Examino Marks	er Only Remark
		Give one advantage of adding manure rather than artificial fertiliser to the soil.		
		[1]	1	
(c)	(i)	Name the process that can result when excess 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]		

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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.



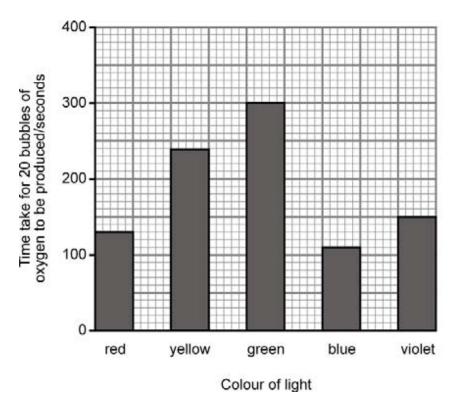
Adapted from Understanding Biology through problem solving - Hoey - ISBN-0216-92938-5

Examiner Only

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]

(iii) The photograph shows a geranium plant.



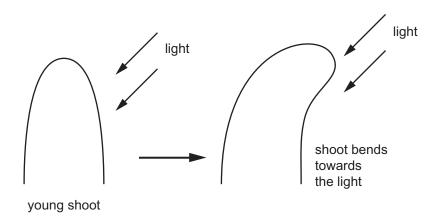
Source: Principal Examiner

Examiner Only

Marks Remark

Using the results from the bar chart, explain why a grower wou use blue light to maximise profit when growing geraniums.	
	[3]

(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.

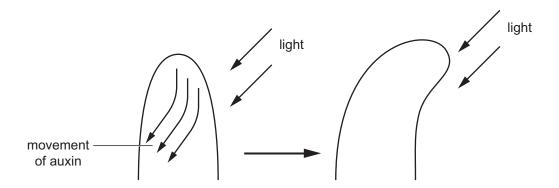
______[1]

(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.

a) (i)	Name the er	nzyme that brea	aks down fats.		
					[1]
	•	•	nental set-up th n fat in the test	e student used t tubes.	to find
		Tempera	ature/°C		
	15	30	40	60	
(ii)	What substatubes?	ances would ne	ed to be preser	nt in each of the	test
			and		[1]
(iii) Give two va	riables that the	student should	have kept the s	ame.
	1				
	2				[2]
(iv) What are fat	s broken down	into?		
			and		[2]

The table shows the student's results using the two enzymes.

Examin	er Only
Marks	Remark

	Time taken to brea	k down fat/minutes
Temperature/°C	Enzyme 1	Enzyme 2
15	30	40
30	10	20
40	15	18
60	50	120

(v) Most washes in washing machines are carried out at temperatures between 30 °C and 60 °C and the washing cycle lasts no more than 90 minutes.

Describe and explain the results for the two enzymes and explain why enzyme 1 is more effective when added to washing powder.

In this question you will be assessed on your written communication skills, including the use of specialist science terms.		
IC		

	(D)	(1)			Examine larks	r Only Remark
			by a different type of enzyme. Name the enzyme involved.		arno	roman
				[1]		
		(ii)	Suggest why this enzyme would not break down fat stains.			
				[1]		
4	Dia	hoto	es is a condition in which the blood glucose control mechanism fa	ile		
4						
	(a)	(i)	One symptom of diabetes is the presence of glucose in the urine	Э.		
			Give one other symptom of diabetes and one possible long term effect.	n		
				[2]		
		(ii)	An older man who is overweight is at risk of developing diabetes Give two lifestyle changes you would advise to reduce his risk.	S		
			1			
			2	[2]		
	(b)	(i)	For many years, the presence of glucose in urine was detected using the normal food test for glucose.	by		
			Describe this test and give the colour change when glucose is present.			
			Description			
			Colour change			

Testing urine for the presence of glucose can now be carried out in a doctor's surgery using small diagnostic strips called Clinistix.

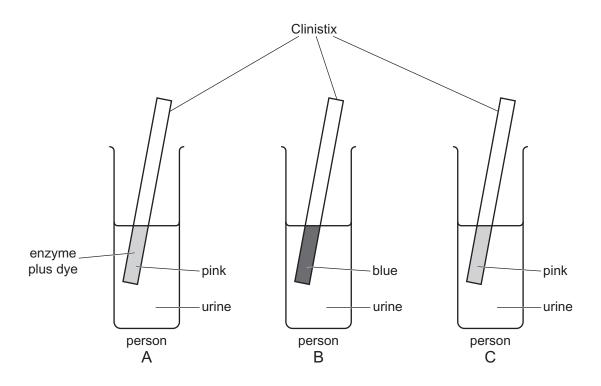
Examiner Only

Marks Remark

These are dipped into the urine and change colour if glucose is present.

The strips contain an enzyme and a dye. The enzyme reacts with any glucose present producing a change in the colour of the dye from pink to blue.

The diagram shows the results when the urine from three people was tested with Clinistix.

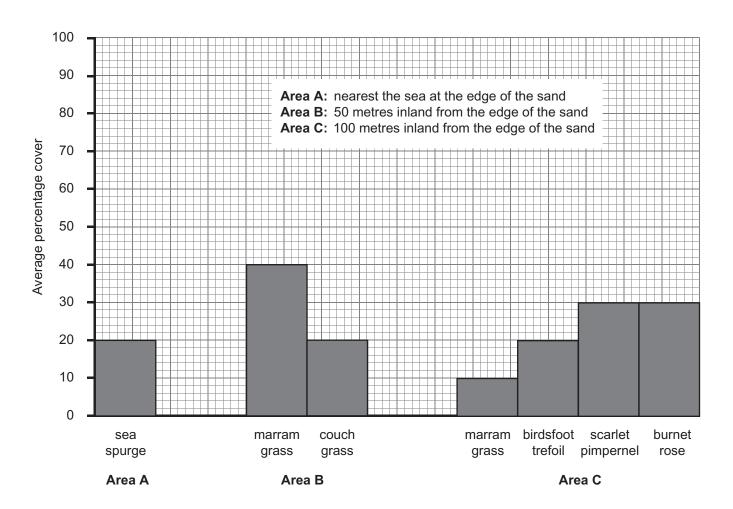


(ii)	Describe and explain the results for person C	
		[2]

(iii)	Give one advantage of using Clinistix for this test rather than using the normal food test for sugar.	
		[1]

(iv) Suggest why the Clinistix will only react with glucose.

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
١,	'/	CIVC LVVC	ti Ci ius si iowi i	Dy tile	graph	401033	uic	uncc	arcas

1. _____

2. _______[2]

(ii) Suggest one explanation for these trends.

_____[1]



(b)	Describe how the pupils would have carried out this investigation into plant distribution. Your account should describe how they would have measured one physical factor.	Examin Marks	er Only Remark
	In this question you will be assessed on your written communication skills, including the use of specialist science terms.		
	[6]		

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

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		crea	se in	the	lactic	acio	d leve	el du	ring	th	e first	fifteer	1
nutes	6.												
									arbi	itra	ry uni	ts/min	[1]

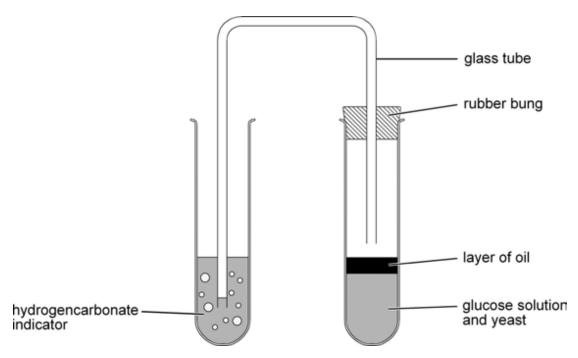
_ [3]

(v) Describe the difference between the two rates and explain what

causes the initial increase in lactic acid.

(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.

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

_____[1]

Explain your answer.	
	ro

THIS IS THE END OF THE QUESTION PAPER

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