

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided (there may be more space than you need).

Information

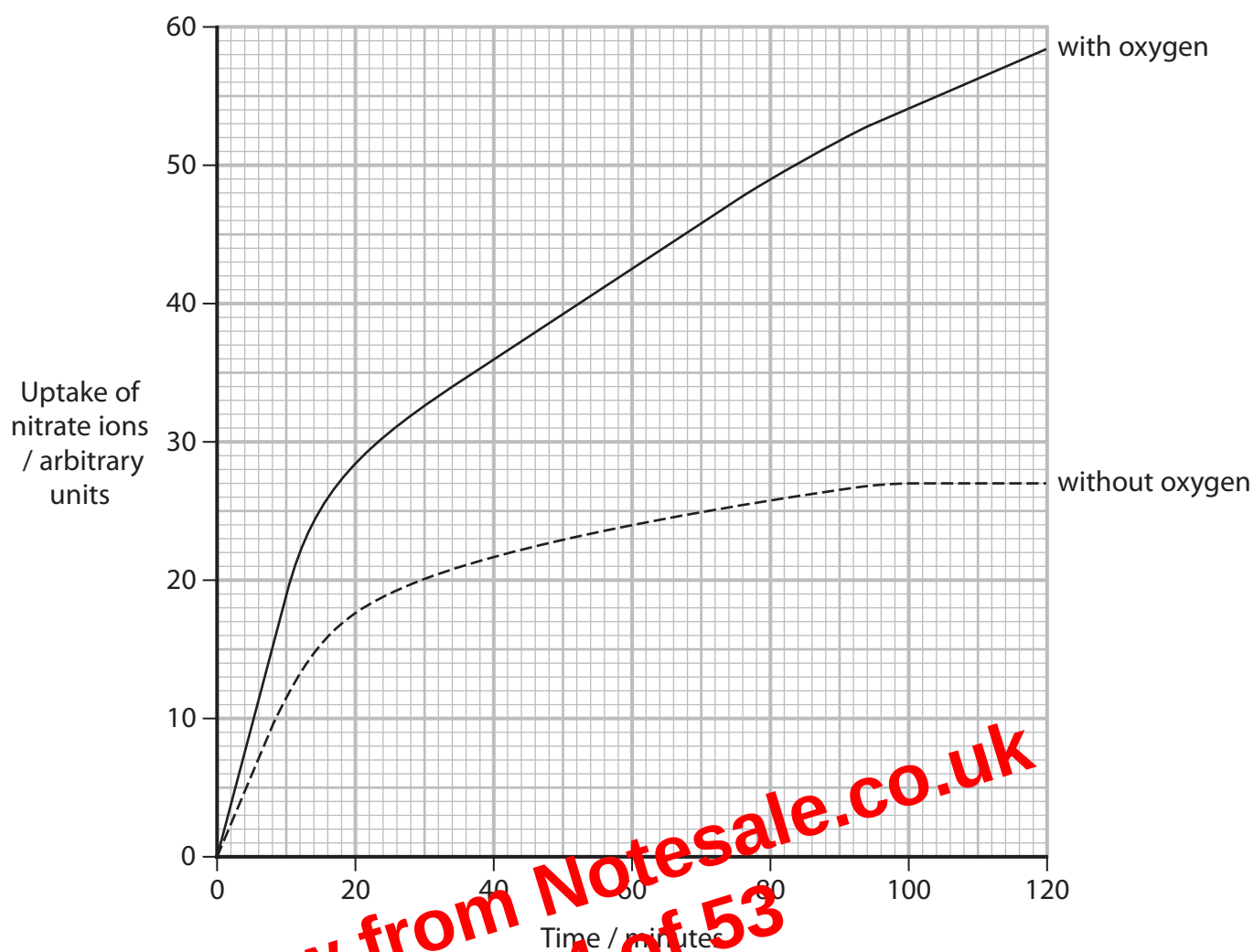
Information

- The total mark for this paper is 80.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*
- In question(s) marked with an **asterisk** (*), marks will be awarded for your ability to structure your answer logically, showing how the points that you make are related or follow on from each other where appropriate.

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.



- (b) The graph shows the uptake of nitrate ions by a plant in the presence and absence of oxygen.



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Analyse the data to describe two conclusions that can be made about the uptake of nitrate ions by this plant.

(2)

1

.....

.....

2

.....

.....

(Total for Question 1 = 5 marks)

.....

.....

.....

.....



(c) The actual length of this mitochondrion is $0.9\text{ }\mu\text{m}$.

(i) What is the magnification of this photograph?

(1)

- ☐ **A** $\times 1200$
☐ **B** $\times 8200$
☐ **C** $\times 12\,000$
☐ **D** $\times 82\,000$

(ii) The magnification of this photograph can be shown as a scale bar.

Complete the 1 cm scale bar for this photograph.

(1)

1 cm scale bar 

Answer μm

(d) Explain why specimens have to be stained with coloured dyes when viewed using a light microscope and not when using an electron microscope.

(2)

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(Total for Question 5 = 8 marks)

- 8 Carbohydrates can be classified as monosaccharides, disaccharides, or polysaccharides.

- (a) The table gives some information about polysaccharides.

For each polysaccharide, put **one** cross in the appropriate box, in each row, to show the type of glycosidic bond present.

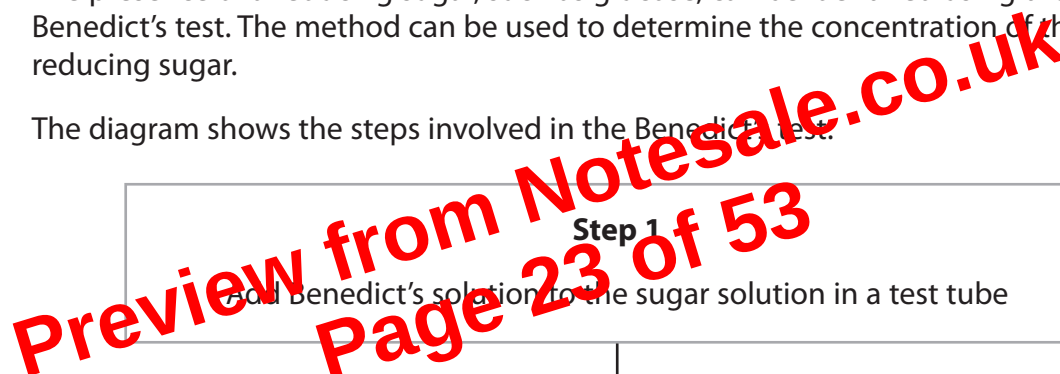
(3)

Polysaccharide	Type of glycosidic bond			
	both 1-4 and 1-6	1-4 only	1-6 only	neither 1-4 nor 1-6
cellulose	☐	☐	☐	☐
glycogen	☐	☐	☐	☐
starch	☐	☐	☐	☐

- (b) Monosaccharides and disaccharides are either reducing sugars or non-reducing sugars.

The presence of a reducing sugar, such as glucose, can be identified using the Benedict's test. The method can be used to determine the concentration of the reducing sugar.

The diagram shows the steps involved in the Benedict's test.



Question Number	Answer	Additional Guidance	Mark
1(a)(i)	The only correct answer is C A is incorrect because magnesium ions are not incorporated into amino acids or nucleotides B is incorrect because magnesium ions are not incorporated into amino acids D is incorrect because magnesium ions are not incorporated into nucleotides		(1)

Question Number	Answer	Additional Guidance	Mark
1(a)(ii)	An explanation that makes reference to the following: - because water is {(di)polar } (solvent) (1) - ions form charged attractions / electrostatic attractions (with it) (1)	ACCEPT charged / hydrophilic ACCEPT form hydrogen bonds	(2)

Question Number	Answer	Additional Guidance	Mark
3(a)(i)	The only correct answer is A B is incorrect because bacteria have 70S ribosomes C is incorrect because bacteria do not have a nucleus D is incorrect because bacteria do not have a nucleus or 80S ribosomes		(1)

Question Number	Answer	Additional Guidance	Mark
3(a)(ii)	An answer that makes reference to the following: • cytoplasm • plasmids • cell membrane	3 correct = 2 marks 1 or 2 correct = 1 mark ACCEPT glycogen granules / lipid droplets / mesosome	(2)

Question Number	Answer	Additional Guidance	Mark
6(b)	A description that makes reference to two of the following: • globular / 3D / tertiary protein (1) • held together by {hydrogen bonds / disulfide bridges / ionic bonds/hydrophobic (interactions)} (1) • between R groups (1) • has an active site (1)	Accept hydrophobic R groups on inside /hydrophilic R groups on outside = mp 2 & 3	(3) EXP

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Question Number	Answer	Additional Guidance	Mark
9(b)(ii)	An answer that makes reference to three of the following: Similarities (max 2) - all contain all four types of phospholipid (1) - A is the commonest in all four types of membrane (1) - B has the second highest percentage in all four types (1) Differences (max 2) - each membrane has a different { ratio/ percentage } of the four types of phospholipid (1) - C has the lowest percentage in the cell membrane and D has the lowest percentage in the other types of membrane (1) - the relative proportions of B, C and D are different in the cell membrane compared with the other three types of membrane (1)	Accept D is lowest in all except the cell membrane Accept description of the order of the types	(3)