

Surname	Centre Number	Candidate Number
Other Names		2



**GCE AS/A level**

1071/01

**BIOLOGY/HUMAN BIOLOGY – BY1**

P.M. TUESDAY, 21 May 2013

1½ hours

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	8	
2	9	
3	7	
4	9	
5	8	
6	8	
7	11	
8	10	
<b>Total</b>	<b>70</b>	

**INSTRUCTIONS TO CANDIDATES**

Use black ink or black ball-point pen. Do not use pencil or gel pen. Do not use correction fluid.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet. If you run out of space, use the continuation pages at the back of the booklet, taking care to number the question(s) correctly.

**INFORMATION FOR CANDIDATES**

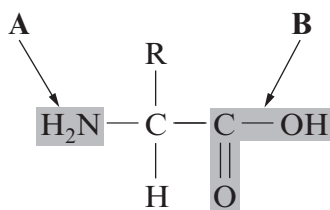
The number of marks is given in brackets at the end of each question or part-question.

You are reminded of the necessity for good English and orderly presentation in your answers.

The quality of written communication will affect the awarding of marks.



1. (a) The diagram below shows the structure of an amino acid.



- (i) Name the two shaded groups **A** and **B** shown on the diagram above. [2]

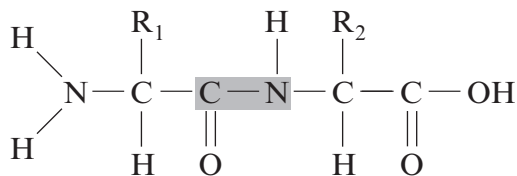
**A** .....

**B** .....

- (ii) What is represented by letter R in the diagram above? [1]

.....

- (b) The diagram below shows two amino acids joined together.



Using the diagram shown above:

- (i) Name the type of molecule shown. [1]

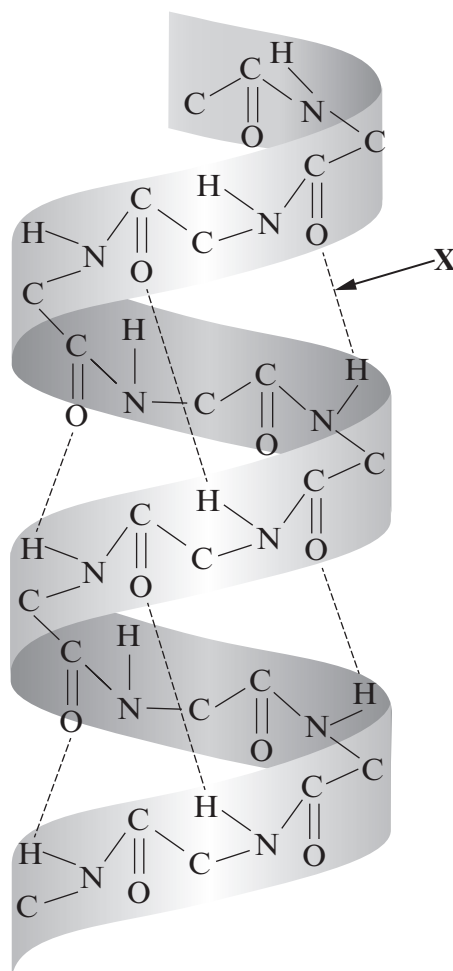
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- (ii) Name the bond highlighted in diagram (b) above. [1]

.....



(c) The diagram below shows part of a protein molecule.

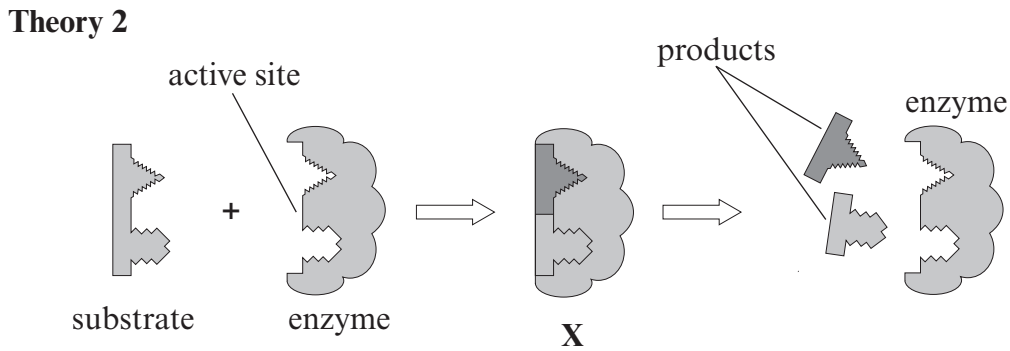
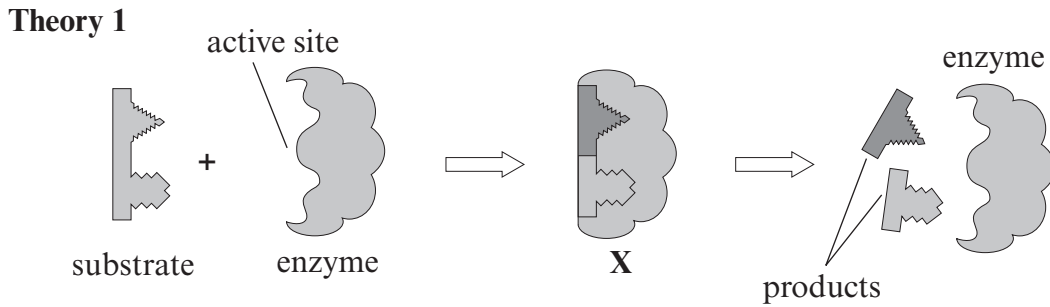


- (i) Name bond X shown on the diagram above. [1]
- .....
- (ii) What name is given to the shape of this molecule? [1]
- .....
- (iii) What level of protein structure does the diagram above show? [1]
- .....

(Total 8 marks)



2. The diagram below shows two theories used to explain enzyme activity.



(a) (i) **Theory 1** shows the induced fit hypothesis. What name is given to **Theory 2**? [1]

.....

(ii) Which theory represents the activity of lysozyme? [1]

.....

(b) Name **X** as shown in both theories. [1]

.....

(c) Enzymes are biological catalysts. How do they bring about their effect of speeding up a reaction? [1]

.....  
 .....



(d) What characteristic of an enzyme at the **end of a reaction** is visible in both diagrams? [1]

(e) State **three** factors which affect enzyme activity, excluding the presence of inhibitors. [3]

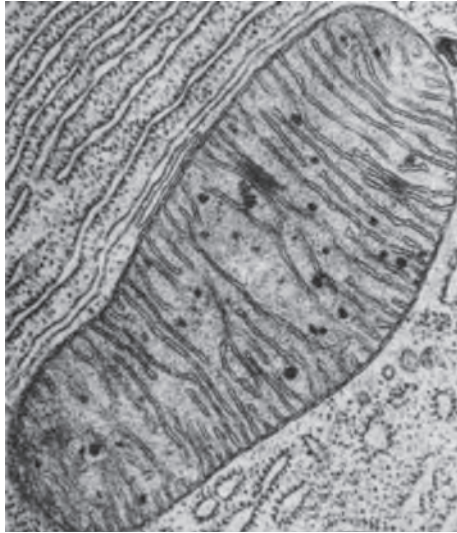
(f) Distinguish between intracellular and extracellular enzymes. [1]

(Total 9 marks)

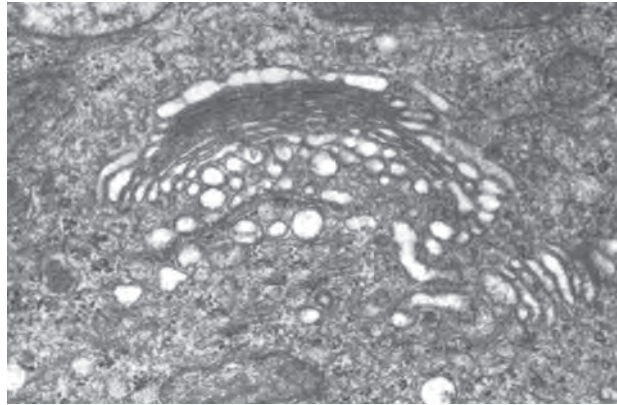
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3 (a) The electron micrographs below show organelles in eukaryote cells.



**A**



**B**

(i) Identify the organelles in photographs **A** and **B** and state their function. [2]

**A** .....

Function .....

.....

**B** .....

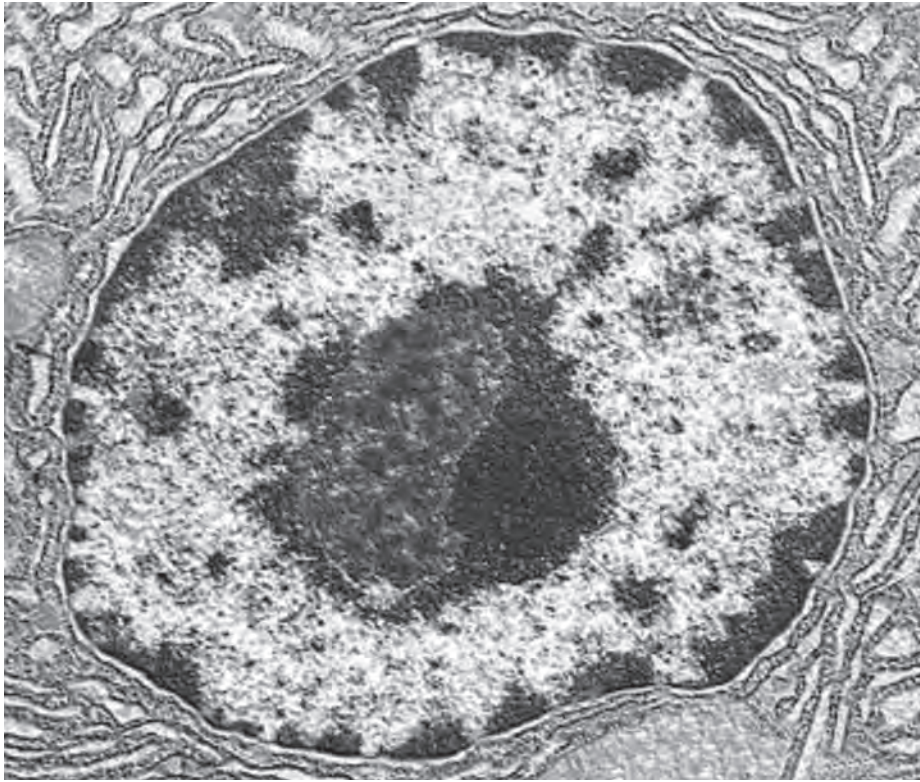
Function .....

.....

(ii) Name a tissue which contains large numbers of the organelle shown in **A**. [1]

.....





C

(b) Photograph C above shows a nucleus. State **two** features of a nucleus that can be seen in this electron micrograph and their function. [2]

Feature 1 .....

Function .....

.....

Feature 2 .....

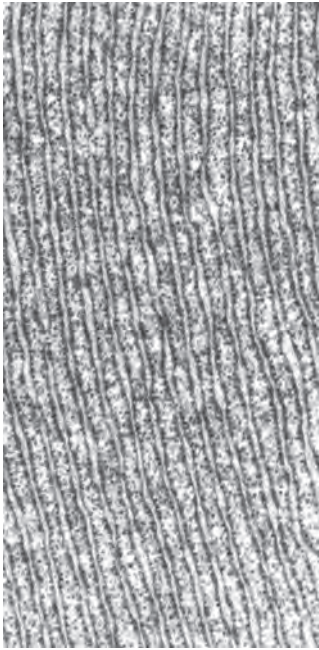
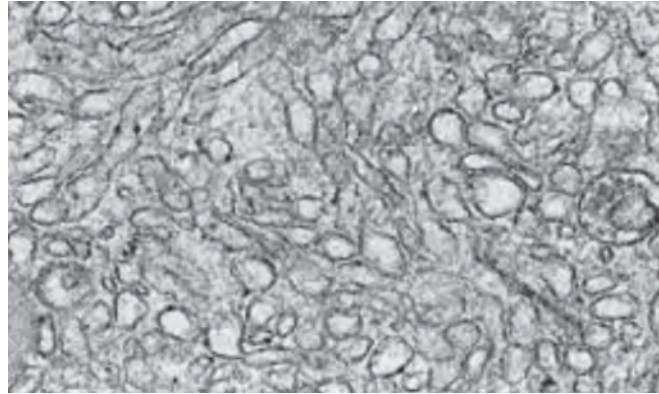
Function .....

.....

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**D****E**

- (c) Photographs **D** and **E** above show two different types of endoplasmic reticulum. State **two** visible differences between **D** and **E**. [2]

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(Total 7 marks)





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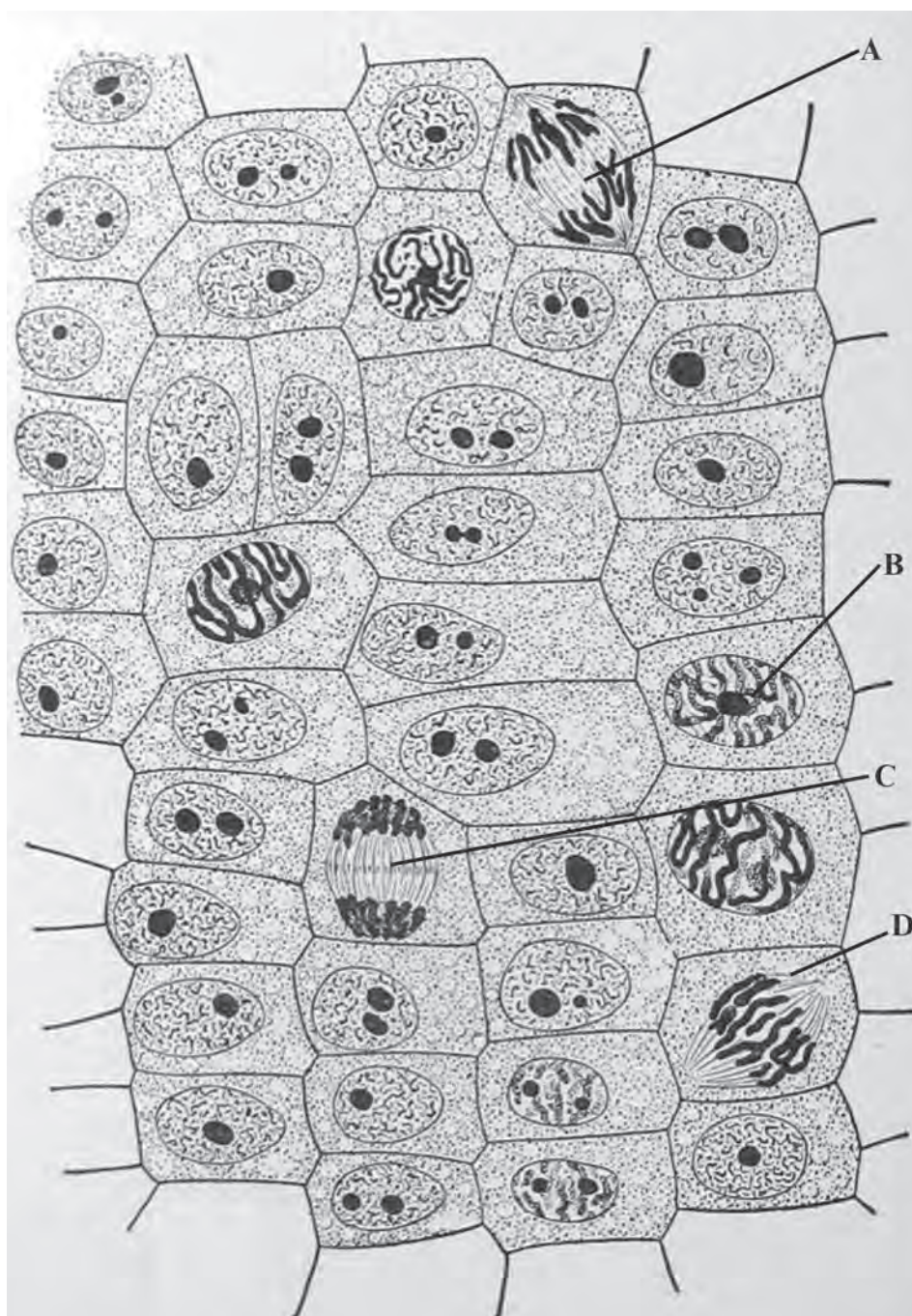
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4. The drawing below is taken from plant tissue which shows cells undergoing mitosis.



- (a) What plant tissue could be observed to produce this drawing?

[1]



(b) Identify from the diagram opposite the stages of mitosis labelled **A** to **D**. [4]

**A** .....

**B** .....

**C** .....

**D** .....

(c) One stage of the **cell cycle** shown on the diagram is present in greater numbers than the others. Name this stage and explain this observation. [2]

Stage: .....

Explanation .....

.....

(d) How would cells produced by meiosis differ from those produced by mitosis? [2]

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(Total 9 marks)

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- 5.
- Doxorubicin (DOX) and idarubicin (IDA) are antibiotics.
  - They are widely used in human cancer treatment.
  - DOX causes rapid changes in red blood cell membranes following injection.
  - These changes are
    - decreased fluidity of the hydrophobic parts of the lipid bilayer
    - the membrane proteins change shape.
  - IDA is considered to be less toxic to cancer patients than DOX.

(a) (i) Explain what is meant by the term ‘lipid bilayer’. [1]

.....

.....

(ii) Name the ‘hydrophobic parts’ referred to in the information above. [1]

.....

(iii) State **two** functions of membrane proteins. [2]

.....

.....

.....

.....

(b) Use the information above to suggest why the changes in red blood cell membranes caused by DOX make it more toxic than IDA. [2]

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(c) These drugs are used in cancer treatment. Explain briefly what is meant by the term cancer. [2]

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(Total 8 marks)

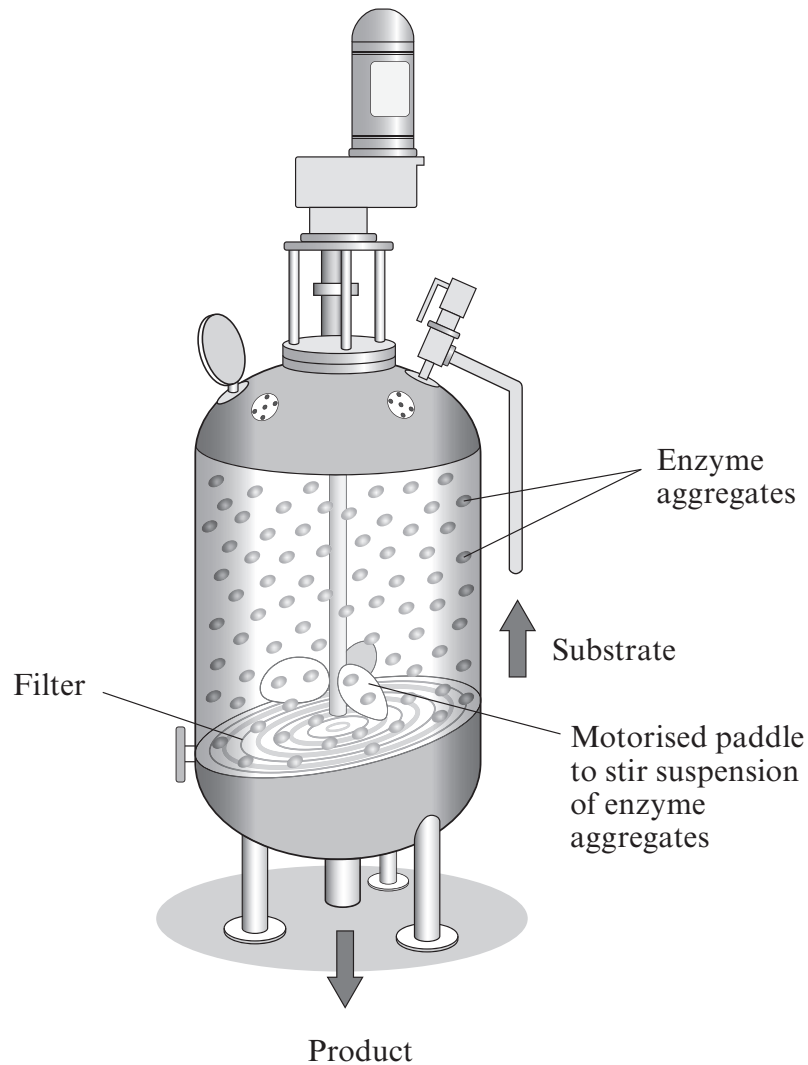


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6. Immobilised enzymes are prepared for industrial use in a number of ways. In the vessel shown below, the enzymes have been formed into clumps called enzyme aggregates. These are held together by cross-linking without altering their tertiary structure. They are permanently insoluble but maintain their catalytic activity.



- (a) Why is it important that the tertiary structure of these enzymes is not altered by the cross-linking? [2]

.....

.....

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.....

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(b) Using your own knowledge and the diagram opposite, explain why it is necessary for these enzyme aggregates to be insoluble. [2]

.....

.....

.....

(c) State **three** advantages in using immobilised enzymes in industry. [3]

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(d) Name another method of immobilising enzymes, other than cross-linking. [1]

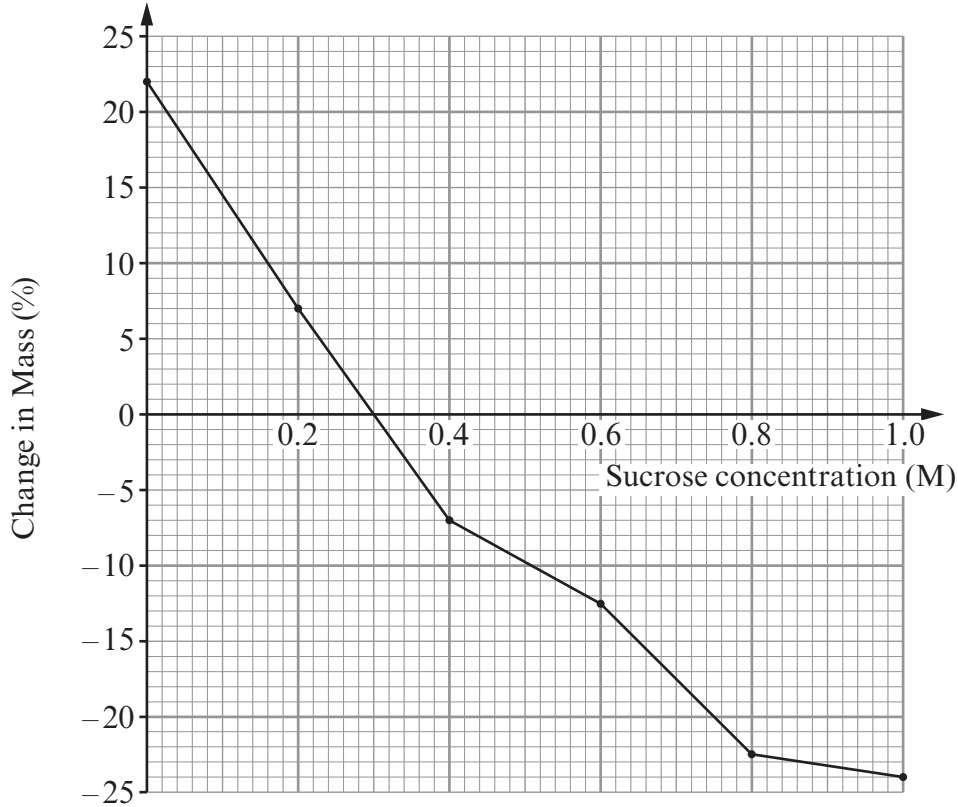
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(Total 8 marks)





7. An experiment was carried out to determine the water potential ( $\Psi_{\text{cell}}$ ) of potato. A range of sucrose concentrations were prepared. Potato cylinders were weighed and then one was immersed into each of the solutions. After 2 hours they were blotted dry and reweighed. The percentage change in mass was calculated and the graph below plotted.



(a) (i) Describe the changes in mass in 0.0M (distilled water) **and** 1.0M sucrose solution. [1]

.....

.....

.....

(ii) What term is used to describe the appearance of the cells in 0.0M (distilled water)? [1]

.....

(iii) Explain the mass change in the 1.0M sucrose solution in terms of water potential. [3]

.....

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.....

.....



- (iv) What term is given to the solution which causes no change in mass? [1]

.....

Table to convert molarity to solute potential (kPa).

<i>Molarity of sucrose solution (M)</i>	<i>Solute potential kPa</i>
0.05	-130
0.10	-260
0.15	-410
0.20	-540
0.25	-680
0.30	-860
0.35	-970
0.40	-1120
0.45	-1280
0.50	-1450
0.55	-1620
0.60	-1800

- (v) Using the graph opposite and the table above determine the water potential ( $\Psi_{\text{cell}}$ ) of potato tissue and **explain** how you arrived at your answer. [3]

.....  
 .....  
 .....  
 .....

- (b) Draw a labelled diagram of a cell as it would appear in the 1.0M solution. [2]

(Total 11 marks)





Examiner  
only

A large rectangular area with a solid top border and a solid bottom border. Inside this area, there are 25 horizontal dotted lines spaced evenly, providing a guide for handwriting.



Handwriting practice area with horizontal dotted lines.

(Total 10 marks)



2 0









