



GCE AS/A level

1071/01

BIOLOGY/HUMAN BIOLOGY – BY1

P.M. TUESDAY, 21 May 2013

1½ hours plus your additional time allowance

Surname _____

Other Names _____

Centre Number _____

Candidate Number 2 _____

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	
Total	70	

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen or your usual method.

Write your name, centre number and candidate number in the spaces provided on the front cover.

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.

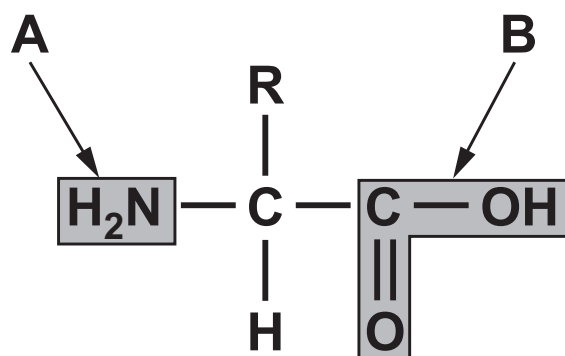
INFORMATION FOR CANDIDATES

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.



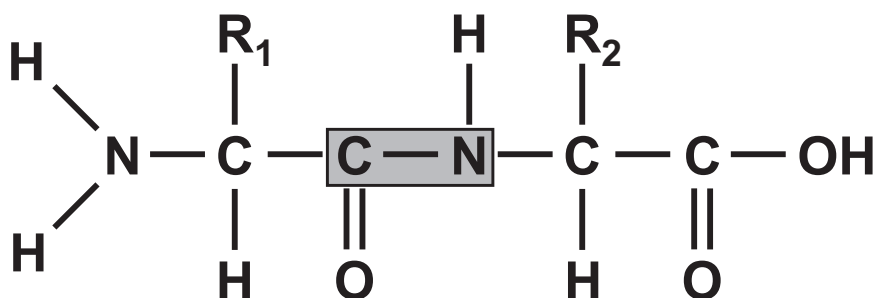
- (i) Name the two shaded groups A and B shown on the diagram above. [2]

A _____

B _____

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

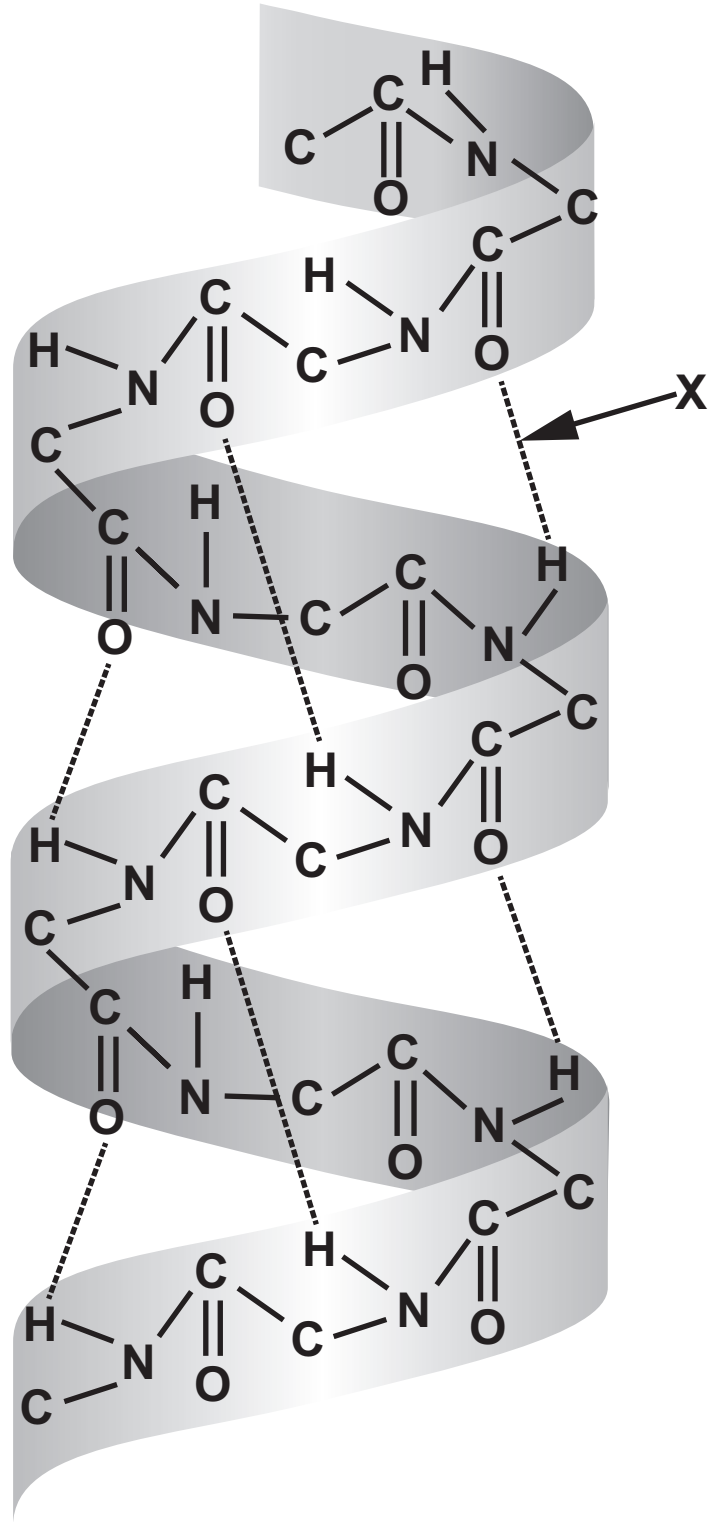
- 1(b) The diagram below shows two amino acids joined together.



Using the diagram shown above:

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

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



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

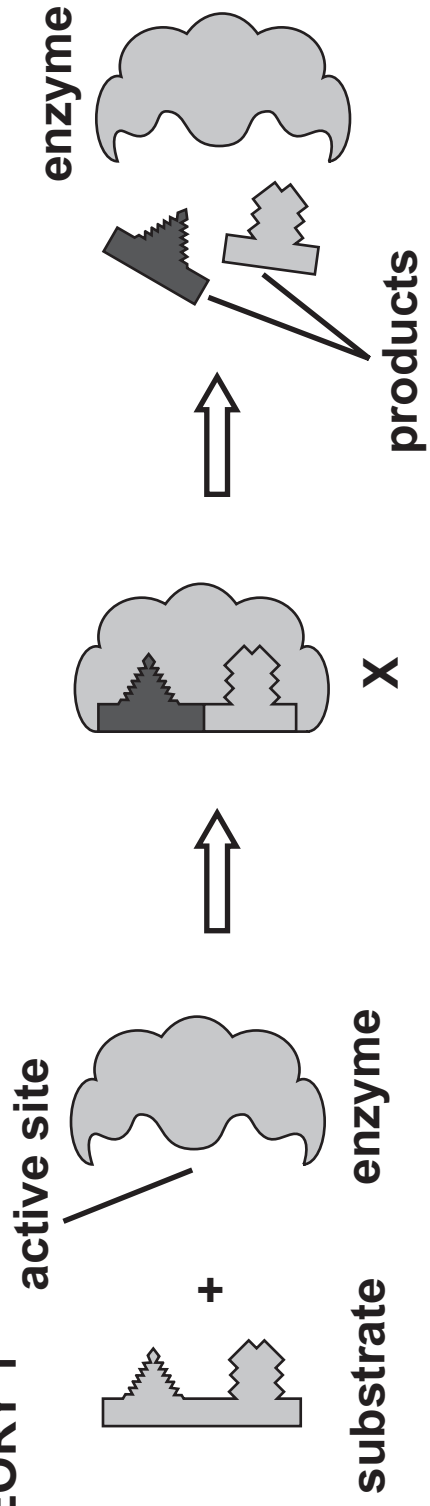
(i) Name bond X shown on the diagram opposite. [1]

(ii) What name is given to the shape of this molecule? [1]

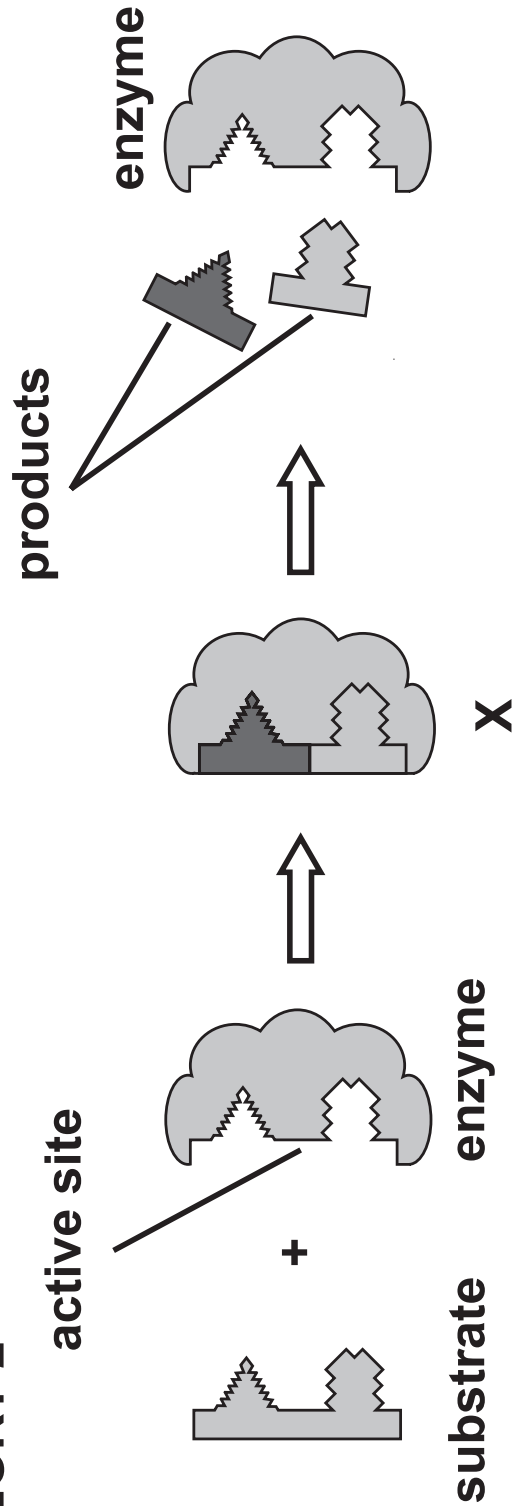
(iii) What level of protein structure does the diagram opposite show? [1]

(Total 8 marks)

THEORY 1



THEORY 2



2 The diagram opposite 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]

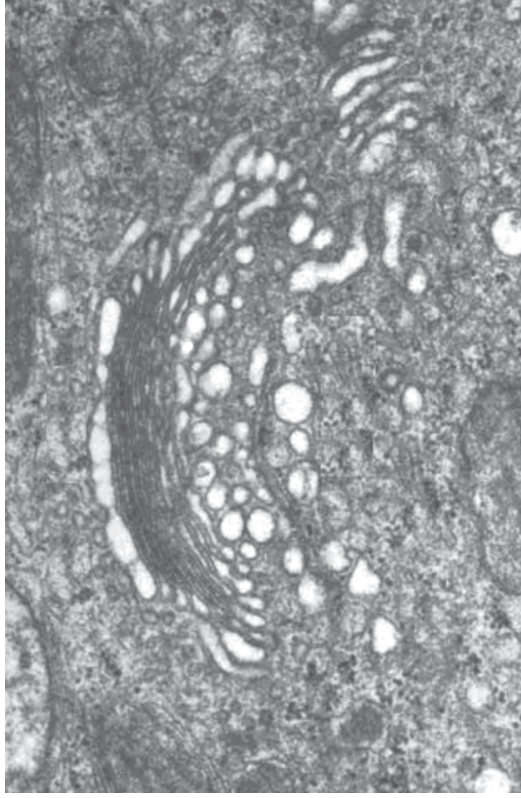
2(d) What characteristic of an enzyme at the END OF A REACTION is visible in both diagrams? [1]

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

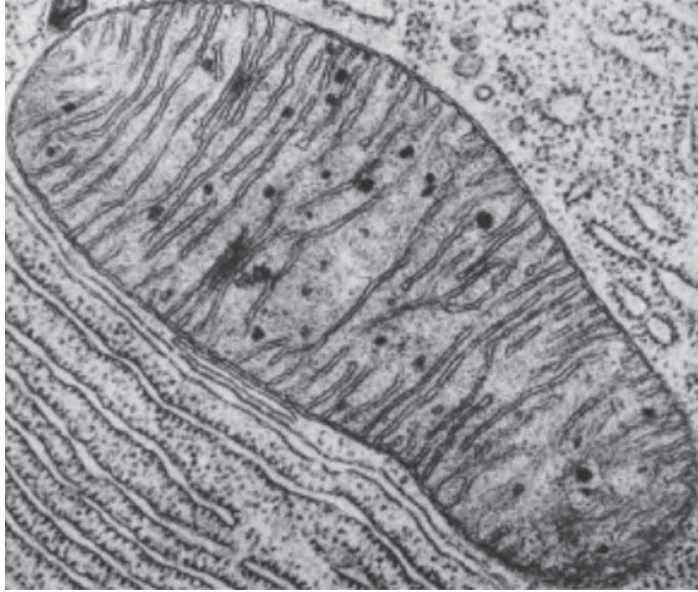
(f) Distinguish between intracellular and extracellular enzymes. [1]

(Total 9 marks)

B



A



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

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

A _____

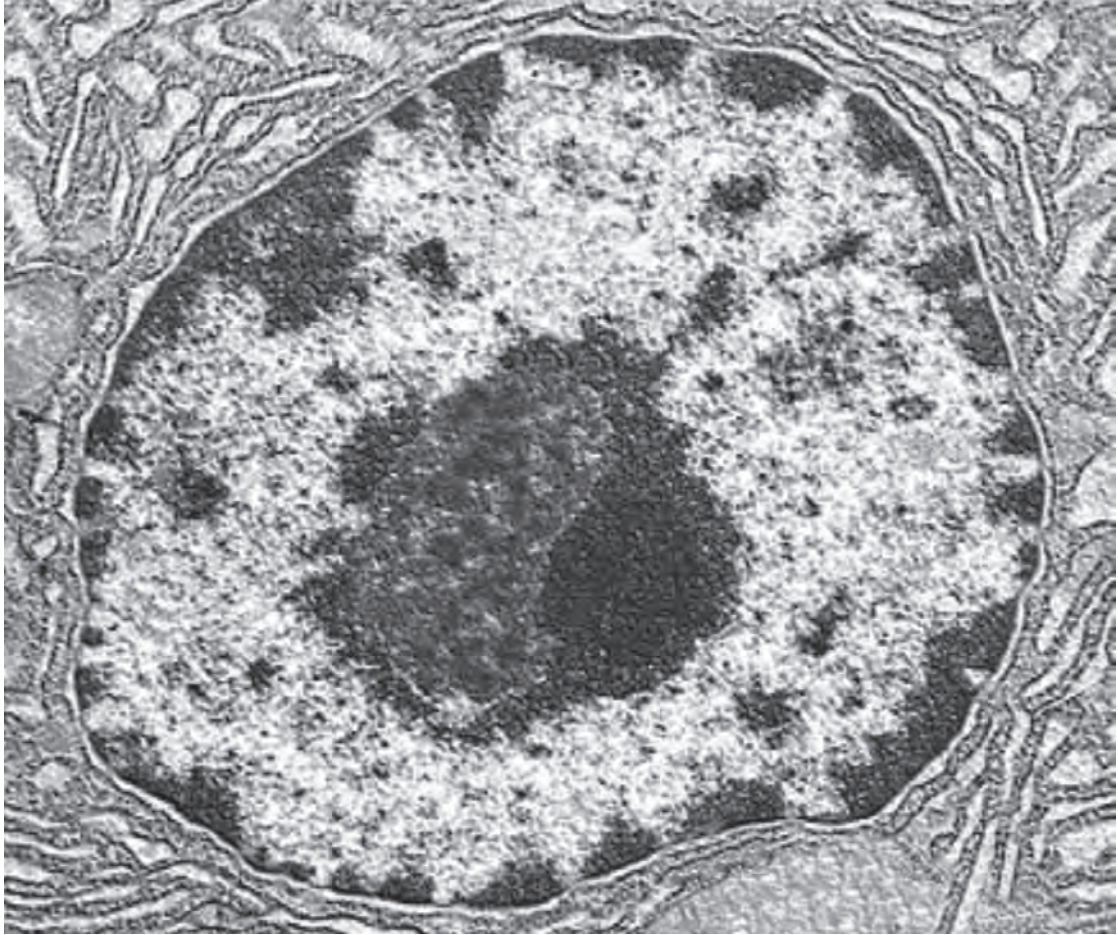
Function _____

B _____

Function _____

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

C



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

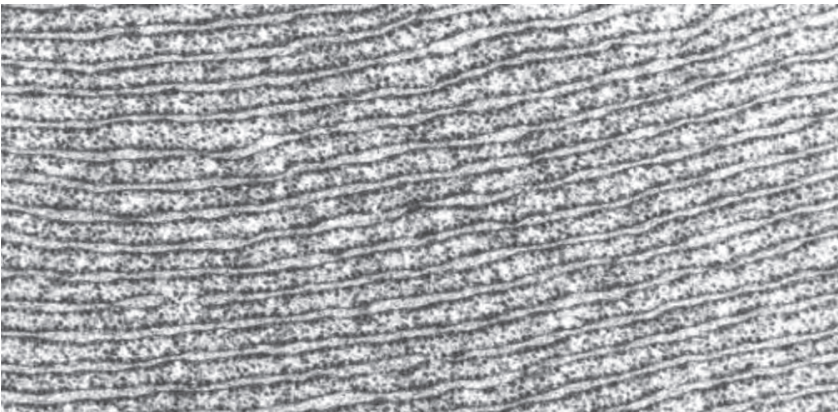
Feature 1 _____

Function _____

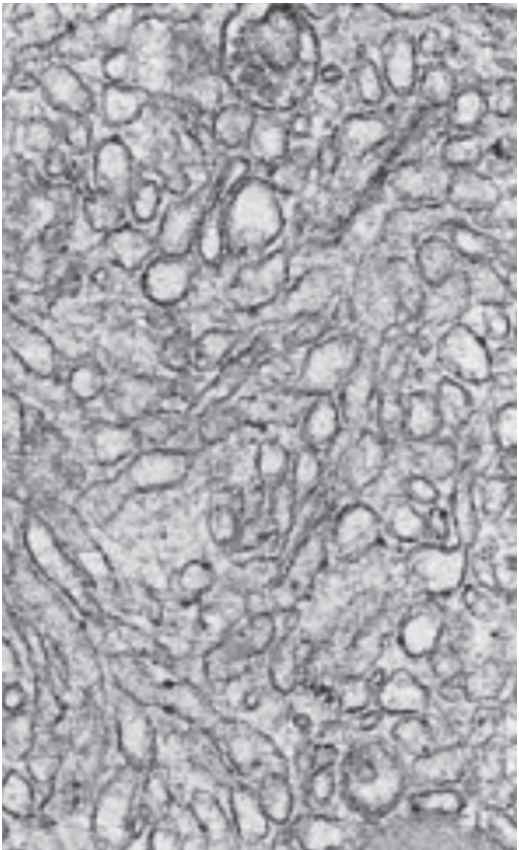
Feature 2 _____

Function _____

D

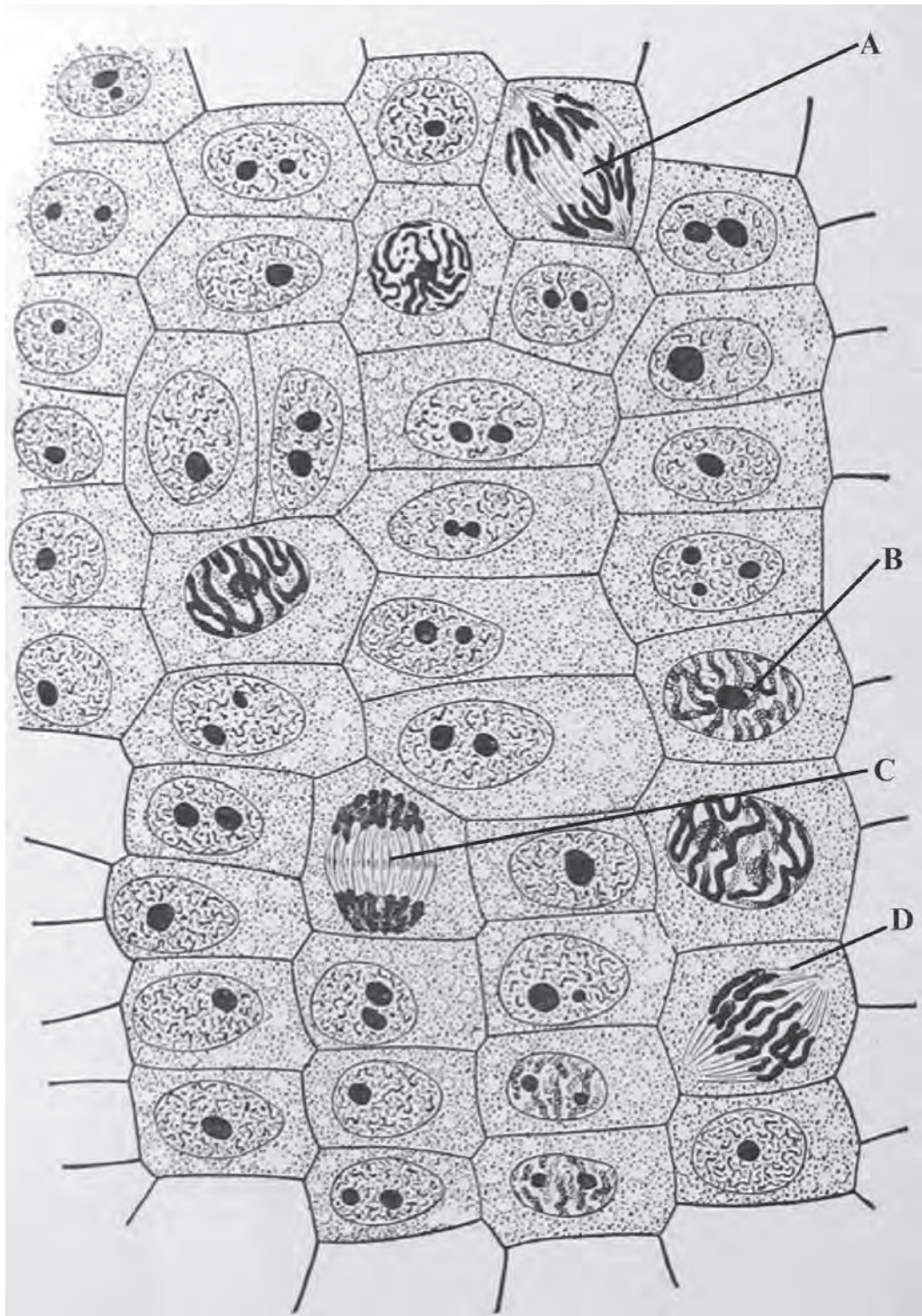


E



3(c) Photographs D and E opposite show two different types of endoplasmic reticulum. State TWO visible differences between D and E. [2]

(Total 7 marks)



4 The drawing opposite 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 _____

4(c) One stage of the CELL CYCLE shown on the diagram opposite page 12 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]

(Total 9 marks)

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]

5(a) (ii) Name the 'hydrophobic parts' referred to in the information on the previous page. [1]

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

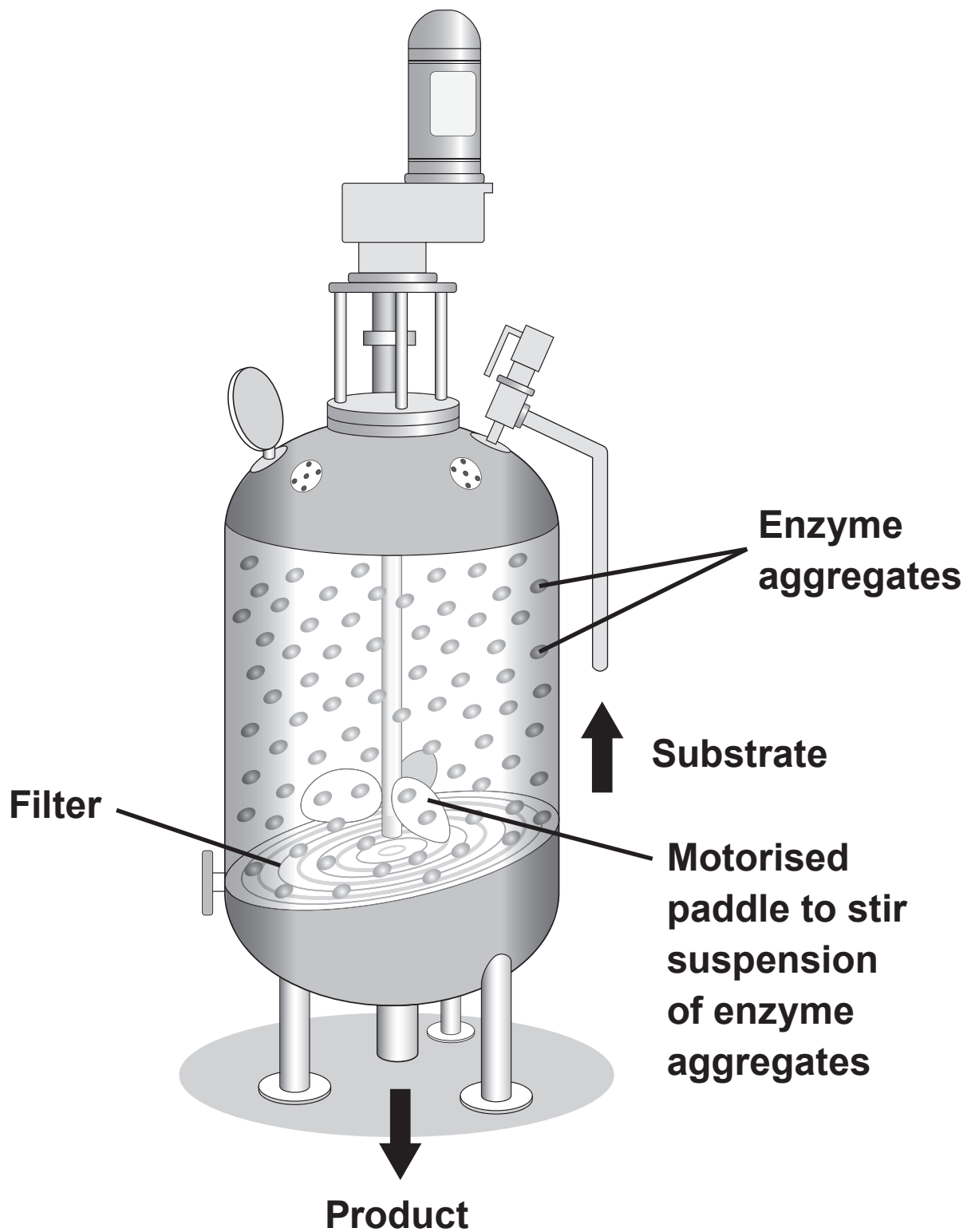
5(b) Use the information on page 14 to suggest why the changes in red blood cell membranes caused by DOX make it more toxic than IDA. [2]

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

(Total 8 marks)

6 Immobilised enzymes are prepared for industrial use in a number of ways. In the vessel shown opposite, 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]



6(b) Using your own knowledge and the diagram opposite page 18, explain why it is necessary for these enzyme aggregates to be insoluble. [2]

6(c) State THREE advantages in using immobilised enzymes in industry. [3]

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

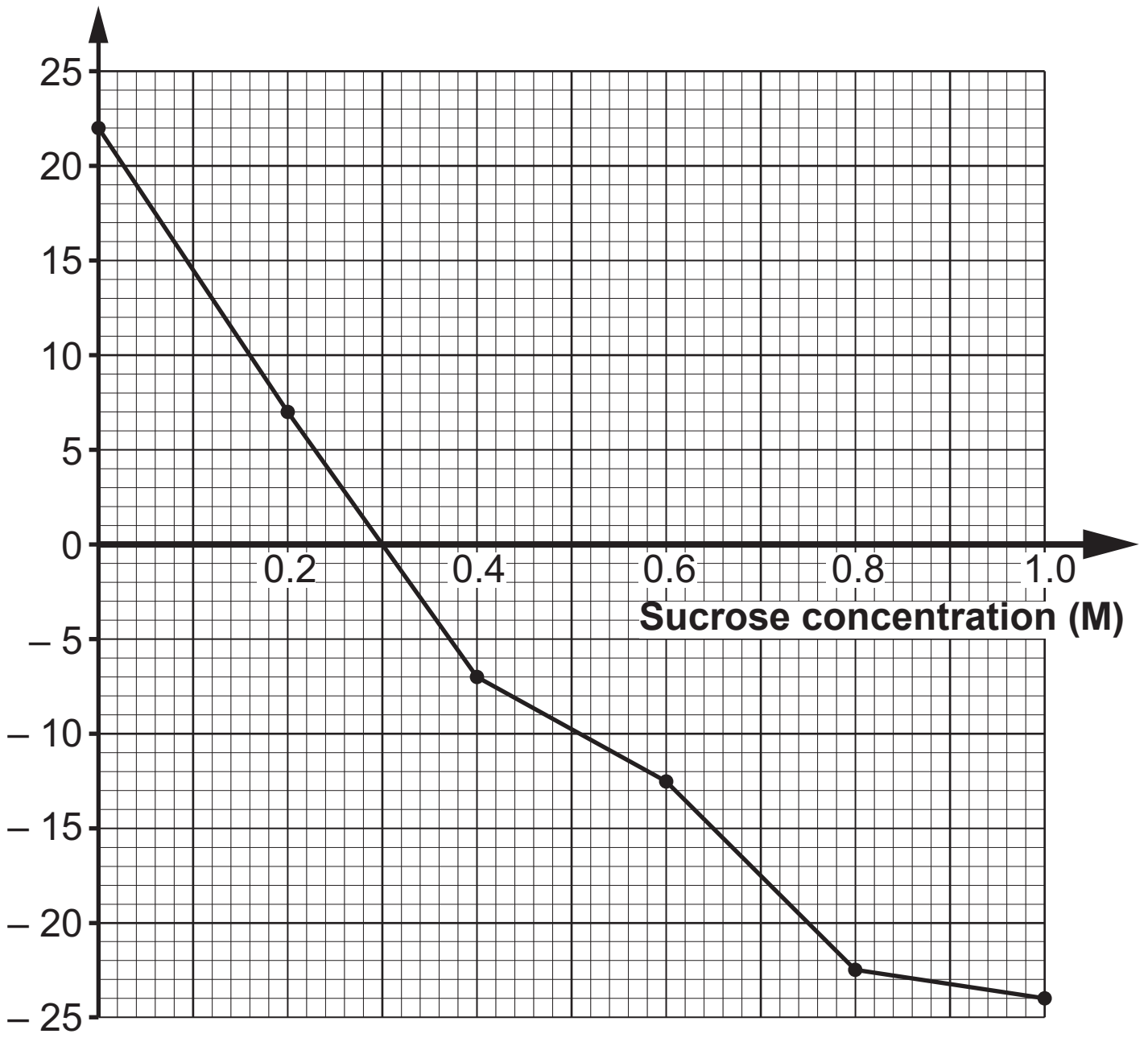
(Total 8 marks)

7 An experiment was carried out to determine the water potential (ψ_{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 opposite plotted.

(a) (i) Describe the changes in mass in 0.0M (distilled water) AND 1.0M sucrose solution.

[1]

Change in Mass (%)



7(a) (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]

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

Table to convert molarity to solute potential (kPa).

Molarity of sucrose solution (M)	Solute potential kPa
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

7(a) (v) Using the graph opposite page 21 and the table on page 23 determine the water potential (Ψ_{cell}) of potato tissue and **EXPLAIN** how you arrived at your answer.

[3]

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

8 Answer ONE of the following questions.

Any diagrams included in your answers must be fully annotated.

EITHER,

(a) Give an account of the structure and function of carbohydrates. [10]

OR

(b) Give an account of the structure and function of nucleic acids. [10]
