Candidate Name	Centre Number	Candidate Number
		2

WJEC CBAC

GCE AS/A level

1071/01

BIOLOGY/HUMAN BIOLOGY – BY1

A.M. MONDAY, 16 May 2011

1½ hours

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1	**5**	
2	**8**	
3	**11**	
4	**12**	
5	**8**	
6	**9**	
7	**7**	
8	**10**	
Total	**70**	

1071 010001

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

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.

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.

Examiner only

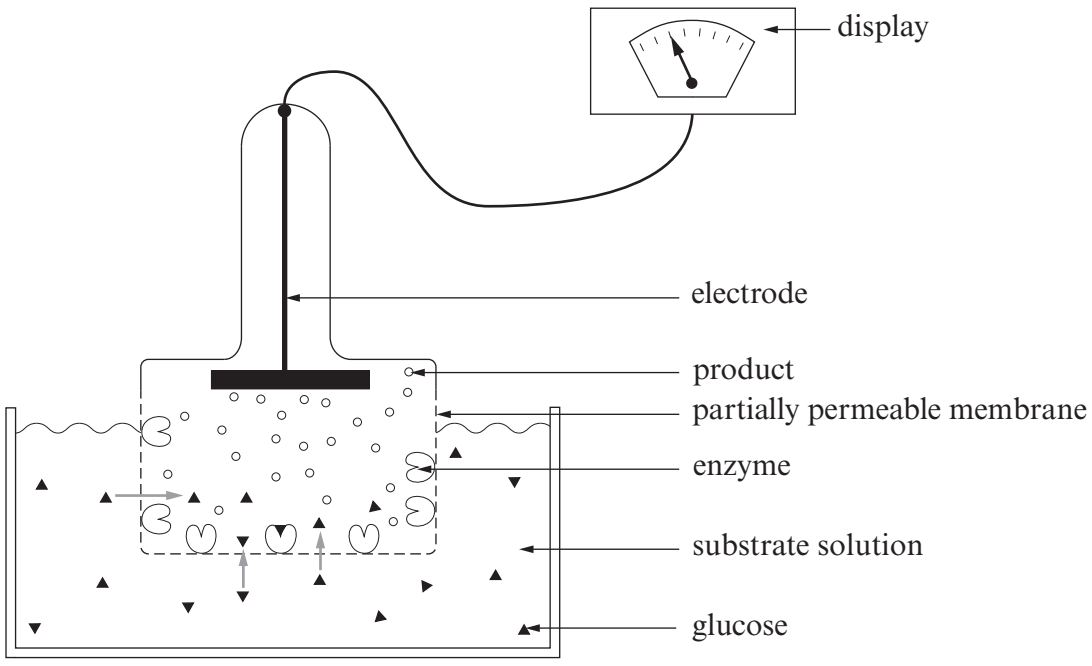
1. The table below shows some features of prokaryotic and eukaryotic cells. Complete the table to show the differences between the two types of cell.

Feature	*Prokaryotic*	*Eukaryotic*
Mitochondria		
Arrangement of DNA		DNA forms chromosomes
Position of DNA	Free in cytoplasm	
Composition of cell wall if present		
Size of ribosomes		

[5]

(Total 5 Marks)

2. The diagram below shows a possible structure for a biosensor that uses enzymes to detect glucose.



(a) Immobilised enzymes that are used in biosensors must have certain properties. Suggest **two** of these properties. [2]

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(b) Explain the function of the partially permeable membrane. [2]

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(c) Describe how the concentration of glucose is transmitted to the display. [2]

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(d) Explain why the temperature of the biosensor should be kept constant when using it to measure the concentration of glucose in different solutions. [2]

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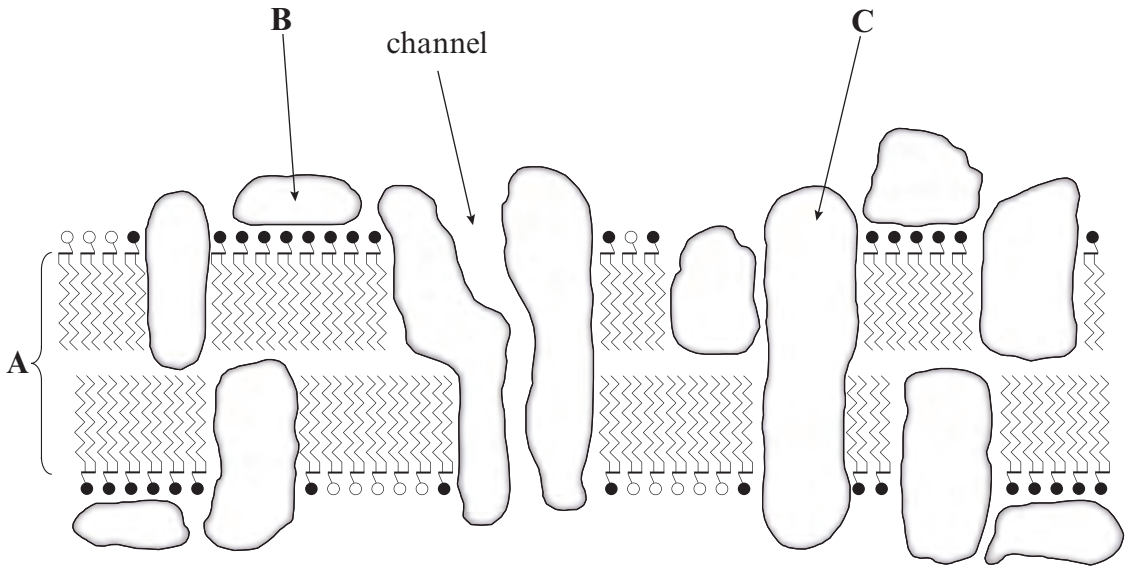
(Total 8 Marks)

Examiner only

3. *(a)* The diagram below is of a model of a section through a cell surface membrane, as proposed by Singer and Nicholson.



(i) State the name given to this model and give reasons why it is so-called. [3]

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(ii) Name the structures labelled **A**, **B** and **C**. [3]

A .....

B .....

C .....

(iii) Describe the function of the channel shown in the diagram. [1]

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(b) Some molecules are transported across the membrane by active transport. Explain what is meant by the term *active transport*. [2]

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(c) Suggest **two** reasons why transport across the membrane is vital to the cell. [2]

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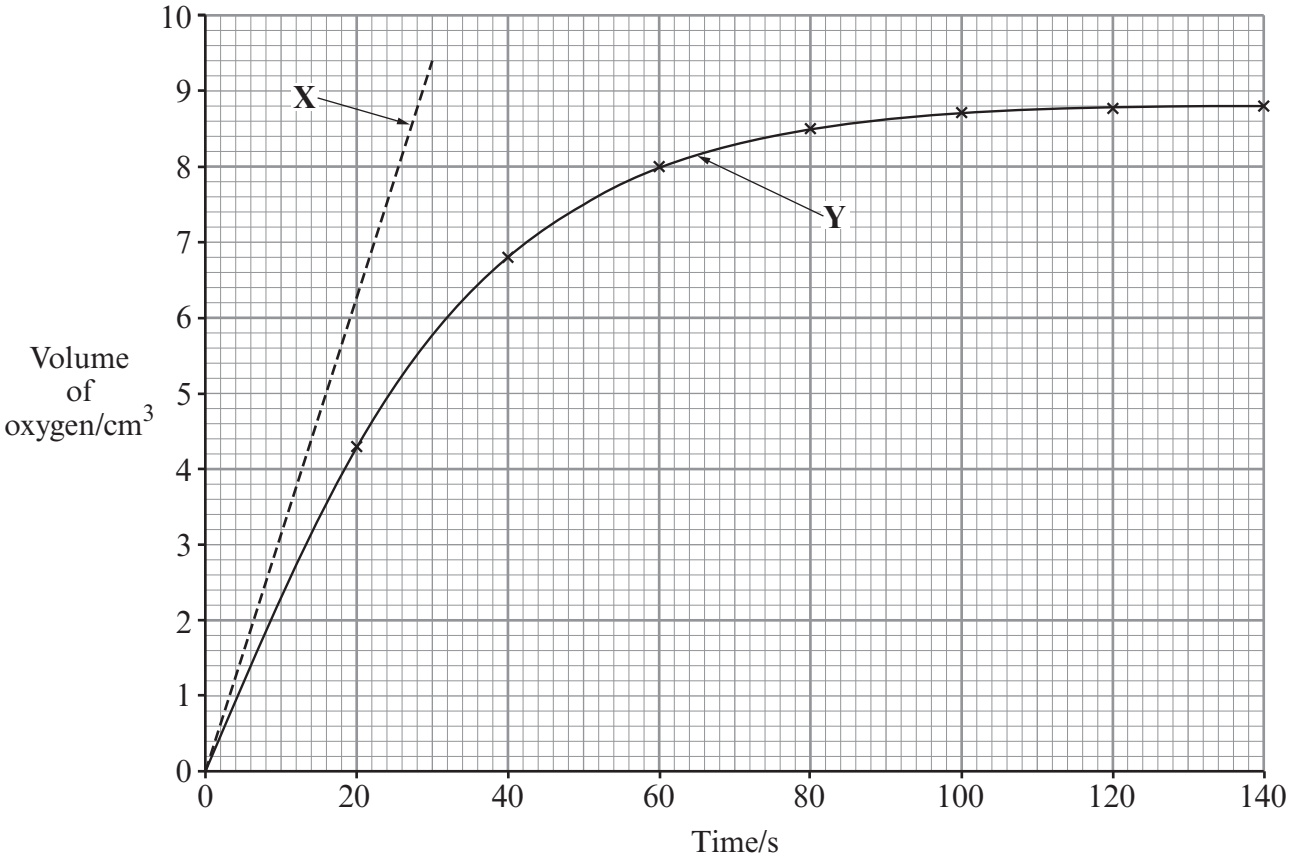
(Total 11 Marks)

Examiner only

4. A student investigated the action of the enzyme catalase. This enzyme catalyses the breakdown of hydrogen peroxide into oxygen and water.
The student collected the oxygen given off in a measuring cylinder. The volume of gas was recorded every 20 seconds as shown on the graph labelled **Y** below.



(a) The rate of reaction can be calculated using the formula:

$$\frac{\text{Volume of oxygen collected}}{\text{Time taken to collect}}$$

Use the formula to calculate the rate in $cm^3 min^{-1}$ for the first 30 seconds. [2]

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(b) The initial rate is the rate of reaction at the beginning and is the maximum rate. It is shown by line **X**. The initial rate is $19\,cm^3 min^{-1}$.
Explain why the initial rate is greater than the rate calculated in *(a)*. [2]

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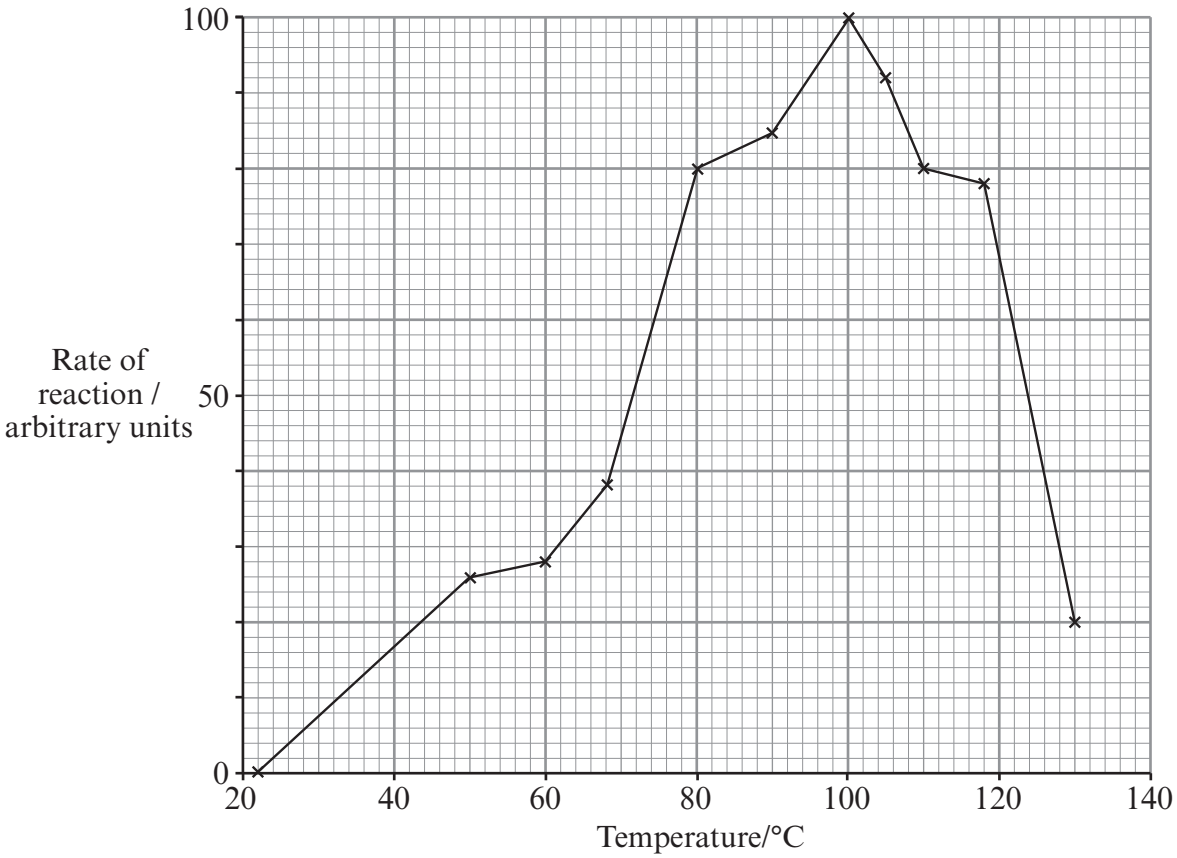
Examiner only

(c) The graph below shows the effect of temperature on the activity of an amylase enzyme found in bacteria that live in hot water in volcanic regions.



(i) Using the graph, describe and explain the effect of temperature on the rate of activity of the amylase. [6]

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(ii) State the difference between bacterial amylase and an amylase found in humans. [2]

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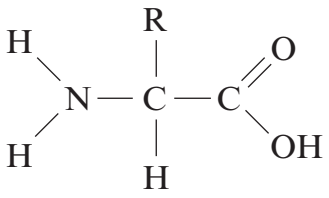
(Total 12 Marks)

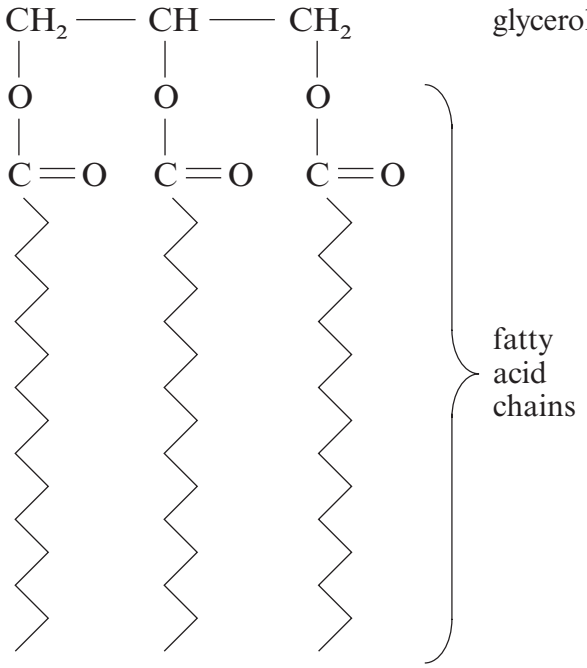
Turn over.

Examiner only

5. The diagrams below show two molecules, **A** and **B**, which are found in living organisms.



molecule **A**



molecule **B**

(a) (i) Name molecules **A** and **B**. [2]

A .....

B .....

(ii) Name an element found in molecule **A** that is not found in molecule **B**. [1]

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(b) Many molecules of **A** can join together to form a long chain. Name the process that joins the molecules together and the bond formed when they join. [2]

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(c) (i) Describe a suitable test that could be performed to show that a solution contained polymers of molecule **A**. [2]

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(ii) Suggest a problem that could arise in using this test if very low concentrations of the polymer are present in the solution. [1]

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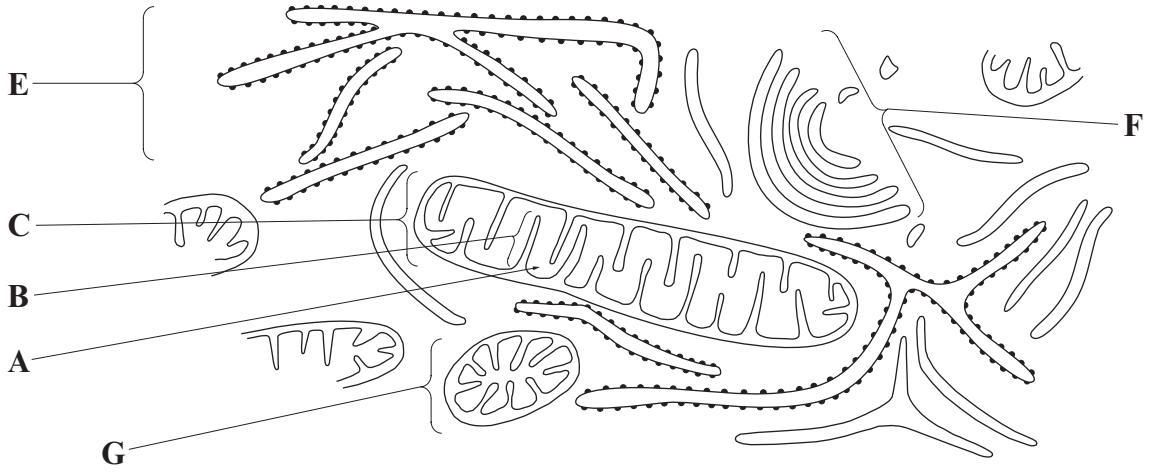
(Total 8 Marks)

Examiner only

6. The diagram below shows part of a cell that secretes a hormone into the bloodstream.



(a) Name structures **A** and **B**. [2]

A .....

B .....

(b) Explain the functions of structures **E** and **F**. [4]

E .....

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F .....

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(c) Suggest why this type of cell is likely to contain large numbers of structure **C**. [2]

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(d) Labels **C** and **G** show the same type of organelle. Explain why they differ in appearance. [1]

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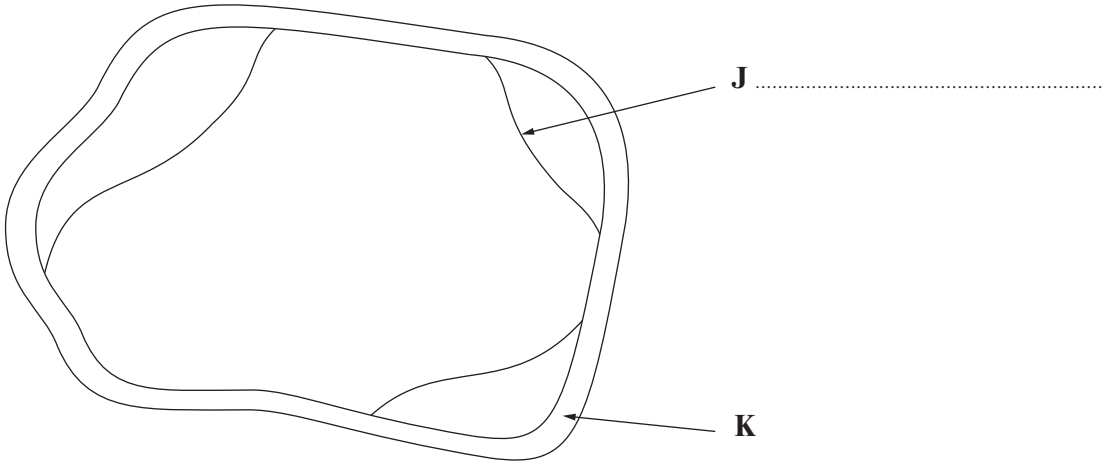
(Total 9 Marks)

Examiner only

7. A student carried out an investigation on the solute potential of a plant tissue. The tissue was placed in a sucrose solution that had a water potential (Ψ) of –600 kPa and was left for one hour. The diagram below shows one cell after that time.
Approximately 50% of the cells showed signs of plasmolysis, the other 50% did not.



(a) Label structure **J** on the diagram. [1]

(b) The student concluded that the solute potential of the cell contents was –600 kPa. Explain why you think the student reached that conclusion. [3]

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(c) Explain the role of structure **K** in generating pressure potential in the cell. [3]

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(Total 7 Marks)

Examiner only

8. Answer **one** of the following questions.
Any diagrams included in your answer must be fully annotated.

Either, *(a)* (i) Describe the functions and importance of mitosis to living organisms using examples where appropriate. [6]

(ii) Describe how meiosis differs from mitosis and explain the significance of these differences. [4]

Or, *(b)* Describe the structure of DNA. [10]

Examiner only

(Total 10 Marks)