

Candidate Name	Centre Number	Candidate Number
		2



GCE AS/A level

1071/01

BIOLOGY/HUMAN BIOLOGY – BY1

A.M. TUESDAY, 11 January 2011

1½ hours

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	4	
2	6	
3	14	
4	10	
5	7	
6	6	
7	13	
8	10	
Total	70	

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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.

1. Inorganic ions are needed by living organisms. Complete the table below to give a function for **each** of the four ions. [4]

<i>Ion</i>	<i>Function</i>
Magnesium	
Iron	
Phosphate	
Calcium	

(Total 4 marks)

2. Complete the following passage by inserting the correct terms in the spaces provided. [6]

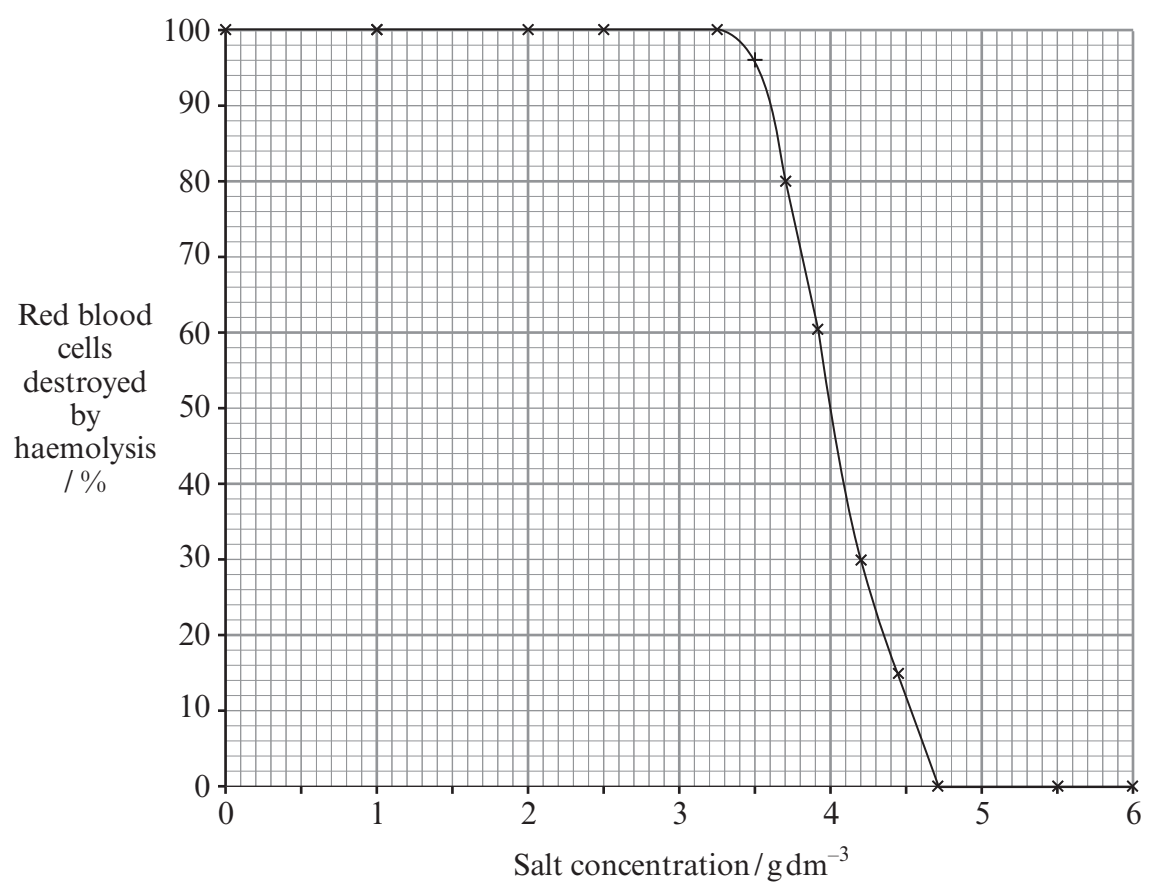
Cellulose is a fibrous molecule. It is a carbohydrate and is the main component of the of plants. Cellulose consists of chains of glucose molecules which are joined together by 1-4 bonds. Each adjacent glucose molecule is rotated by ° resulting in a chain. Chains are held together by bonds forming groups of chains known as

(Total 6 marks)



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3. (a) An investigation was carried out in which red blood cells were placed in salt (sodium chloride) solutions of different concentrations. The percentage of cells destroyed by bursting (haemolysis) was recorded and the results shown in the graph below.



(i) Explain, in terms of water potential, why red blood cells burst when placed in a solution that has a lower concentration than plasma. [3]

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(ii) State the salt concentration at which the number of cells haemolysed is equal to that not haemolysed. [1]

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- (iii) The graph shows that haemolysis occurs between $3.3 - 4.7 \text{ g dm}^{-3}$ salt concentration. Suggest why there is a range. [2]

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- (b) An investigation was carried out on the uptake of potassium ions by root tissue. The root was cut into four discs of uniform size and each disc was added to an equal volume of a solution containing a fixed potassium ion concentration. The experiment was carried out in different oxygen concentrations and the results are shown in the table below.

Oxygen concentration / arbitrary units	0	4	11	20
Rate of potassium ion uptake / arbitrary units	7	27	92	100

- (i) State, with a reason, **one other** variable that should be kept constant. [2]

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- (ii) Using the information in the table, state with an explanation, the **main** method by which potassium ions are taken into the root. [3]

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- (c) State the rate of uptake you would expect if a drop of cyanide solution had been added to **each** of the four solutions. Explain your answer. [3]

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(Total 14 marks)

4. (a) Complete the table to show whether each role applies to mitosis, meiosis or both. If the role applies put a tick (✓) and a cross (✗) where it does not apply.

<i>Role</i>	<i>Mitosis</i>	<i>Meiosis</i>
Involved in growth		
Produces variation		
Produces haploid cells		
Occurs in plants		

[4]

- (b) In the space below draw a labelled diagram to show a single chromosome as it appears during prophase of mitosis. [2]

(c) Describe and explain what happens to chromosomes during anaphase of mitosis. [3]

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(d) Name the cell organelle responsible for the production of the spindle fibres. [1]

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(Total 10 marks)

5. (a) When a triglyceride molecule is broken down name:

(i) the products formed; [2]

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(ii) the type of bond broken and describe the process. [3]

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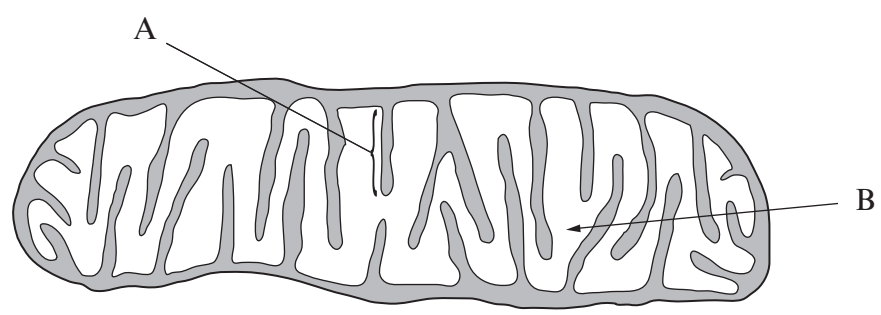
(b) Describe **two** functions of lipids in plants. [2]

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(Total 7 marks)

6. The diagram below shows an organelle found in a liver cell.



(a) (i) Name the organelle. [1]

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(ii) State the function of the organelle. [1]

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(iii) Name the structures labelled A and B in the diagram. [2]

A

B

(b) Explain why liver cells have large numbers of these organelles present. [2]

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(Total 6 marks)

7. (a) Complete the table below which compares DNA with messenger RNA (mRNA). [4]

<i>Feature</i>	<i>DNA</i>	<i>mRNA</i>
Name of sugar		
Number of carbon atoms in sugar		
Number of polynucleotide chains in molecule		
Location in cell		

(b) The table below shows the relative amounts of the four bases in DNA taken from three sources.

<i>Cellular source of DNA</i>	<i>Nitrogenous base (relative amounts)</i>			
	<i>Adenine</i>	<i>Guanine</i>	<i>Cytosine</i>	<i>Thymine</i>
rat muscle	28.6	21.4	21.5	28.4
wheat seed	27.3	22.7	22.9	27.1
yeast	31.3	18.7	17.1	32.9

(i) Explain why the relative amount of adenine is almost the same as the relative amount of thymine in **each** source. [3]

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(ii) Explain why the base sequence of the DNA samples taken from a rat's bone marrow would be the same as those taken from the muscle of the **same** rat. [3]

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(iii) Explain how a sample of DNA from a rat sperm cell differs from that of a muscle cell from the **same** rat. [3]

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(Total 13 marks)

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