

**ADVANCED SUBSIDIARY GCE****BIOLOGY**

Biology Foundation

**2801**

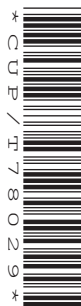
Candidates answer on the question paper

**OCR Supplied Materials:**

None

**Other Materials Required:**

- Electronic calculator
- Ruler (cm/mm)

**Monday 1 June 2009****Afternoon****Duration: 1 hour**

Candidate Forename		Candidate Surname	
-----------------------	--	----------------------	--

Centre Number						Candidate Number				
---------------	--	--	--	--	--	------------------	--	--	--	--

**INSTRUCTIONS TO CANDIDATES**

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.

**INFORMATION FOR CANDIDATES**

- The number of marks is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is **60**.
- You will be awarded marks for the quality of written communication where this is indicated in the question.
- You may use an electronic calculator.
- You are advised to show all the steps in any calculations.
- This document consists of **12** pages. Any blank pages are indicated.

**FOR EXAMINER'S USE**

Qu.	Max.	Mark
1	6	
2	6	
3	9	
4	13	
5	6	
6	11	
7	9	
<b>TOTAL</b>	<b>60</b>	

Answer **all** the questions.

- 1 (a) Active transport and facilitated diffusion are two ways by which substances can cross plasma (cell surface) membranes.

Complete the table to show **two** differences between active transport and facilitated diffusion.

	active transport	facilitated diffusion
1		
2		

[2]

- (b) Vitamins B<sub>1</sub> and K enter cells by crossing the plasma (cell surface) membrane. Vitamin B<sub>1</sub> is water-soluble while Vitamin K is fat-soluble and so they take different routes across the membrane.

Explain how the different **routes** taken by these vitamins into a cell is determined by the structure of the plasma (cell surface) membrane.

*vitamin B<sub>1</sub>* .....

.....

.....

.....

.....

*vitamin K* .....

.....

.....

.....

..... [4]

[Total: 6]

2 Cancer can exist in many forms. All forms have a common link with cell division.

(a) Explain the link between cell division and cancer.

.....

.....

.....

.....

.....

.....

..... [3]

(b) Two ways of treating cancerous growth are:

- radiotherapy, in which the cancerous region is treated with controlled doses of radiation
- decreasing the diameter of blood vessels leading to the cancerous region.

Suggest how these treatments might be effective in treating cancer.

*radiotherapy* .....

.....

.....

.....

*decreasing the diameter of blood vessels* .....

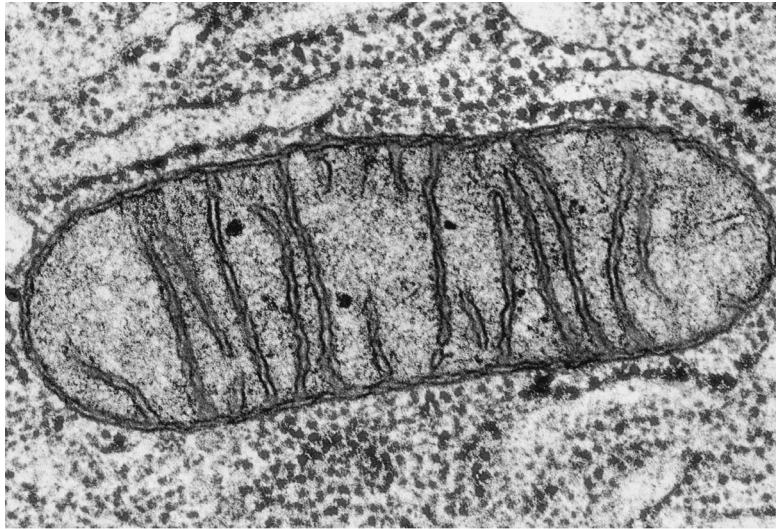
.....

.....

..... [3]

[Total: 6]

- 3 (a) Fig. 3.1 is an electron micrograph of an organelle. This organelle is present in large numbers in muscle cells.



**Fig. 3.1**

- (i) The scale bar represents an actual length of  $2\mu\text{m}$ .

Calculate the magnification of the drawing. Show your working.

Answer =  $\times$  ..... [2]

- (ii) Name the organelle shown in Fig. 3.1.

..... [1]

- (iii) Explain why muscle cells contain large numbers of this organelle.

.....  
 .....  
 .....  
 .....  
 .....  
 .....  
 ..... [3]

- (b) Muscle cells are examples of eukaryotic cells. Bacterial cells are examples of prokaryotic cells.

State **three** ways in which the structure of muscle cells differ from bacterial cells.

1 .....

.....

2 .....

.....

3 .....

..... [3]

[Total: 9]

- 4 (a) Fig. 4.1 is a diagram representing four neighbouring spongy mesophyll cells from the leaf of a dicotyledonous plant. The water potential,  $\Psi$ , of the cell contents is shown in kPa.

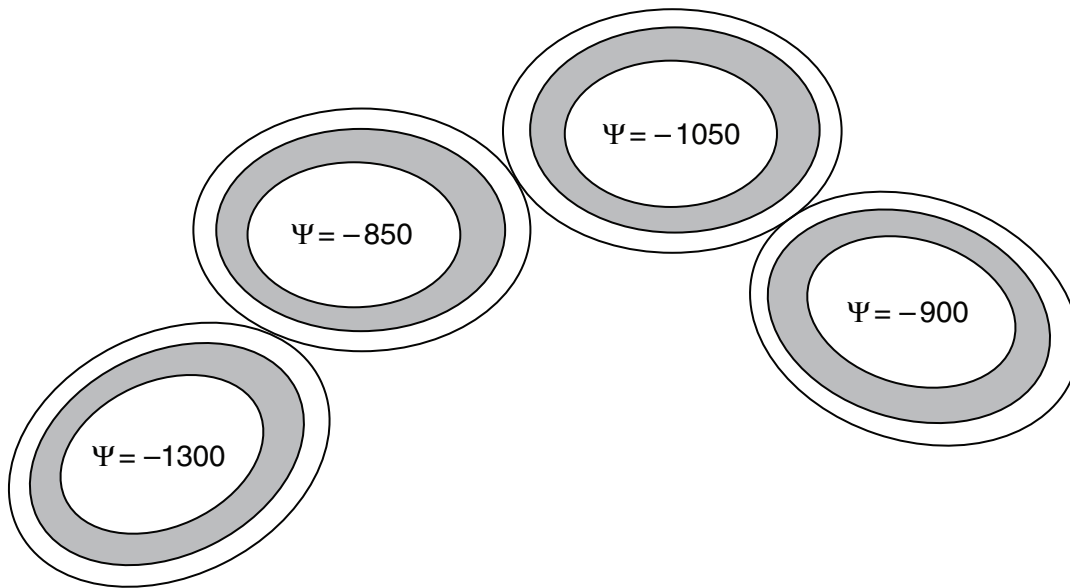


Fig. 4.1

Draw arrows on Fig. 4.1 to show the **net flow** of water between these cells.

[3]

- (b) In this question, one mark is available for the quality of spelling, punctuation and grammar.

Some properties of water are listed below.

- It freezes at  $0^{\circ}\text{C}$ .
- It boils at  $100^{\circ}\text{C}$ .
- Water at  $4^{\circ}\text{C}$  is more dense than water below  $4^{\circ}\text{C}$ .
- It is an excellent solvent.
- A lot of energy is needed to raise the temperature of water.
- A lot of energy is needed to change water into water vapour.
- It shows high surface tension.

Describe **and** explain how these properties of water make it a suitable **environment** for living organisms.

.....

.....

.....

.....

.....

.....

.....

**[9]**

**[Total: 13]**

© OCR 2009

- 5 (a) 'Biological' washing powders contain a number of cleaning agents, including different enzymes, that will act on the various stains that are found on dirty clothes.

- (i) Explain why a washing powder should contain more than one enzyme in order to deal with clothes that have grease and blood stains.

.....

.....

.....

.....

..... [2]

- (ii) Many 'biological' washing powders work best at temperatures between 40°C and 50°C.

Explain why these 'biological' washing powders are not as effective in a very hot wash at 90°C.

.....

.....

.....

.....

..... [2]

- (b) In the development of 'biological' washing powders, scientists make use of bacteria that are found in hot water springs.

Suggest **one** advantage of using enzymes from these bacteria in the development of 'biological' washing powders.

.....

..... [1]

- (c) The manufacturers of some 'biological' washing powders now claim that their powders can be used effectively at 30°C.

Suggest **one** advantage of being able to wash clothes effectively at 30°C.

.....

..... [1]

[Total: 6]



6 Two key aspects of ecosystems are the cycling of materials and the flow of energy.

- (a) The table shows some organisms and processes relating to the nitrogen cycle. It also shows four statements.

Complete the table, using **one tick (✓) in each row** to indicate the statement that correctly matches the organism or process.

	converts nitrogen to ammonium ions / ammonia	converts nitrate ions to nitrogen	converts ammonium ions to nitrite ions	converts protein to amino acids
<i>Rhizobium</i>				
denitrification				
nitrifying bacteria				
nitrogen fixation				
decomposer				
Haber process				
<i>Nitrosomonas</i>				

[7]

- (b) (i) State **two** reasons why not all of the sun's energy that **strikes a producer** is converted into chemical energy.

1 .....

.....

2 .....

..... [2]

- (ii) State **two** ways in which energy is lost between trophic levels.

1 .....

.....

2 .....

..... [2]

[Total: 11]

- 7 Complete the following passage by choosing the **most appropriate** term for each blank space from the list below.

anticodon	hidden	random
channel	hydrolysis	ribosomal
codon	messenger	specific
complementary	peptide	transcription
condensation	polypeptide	translation
exposed	pore	translocation

Protein synthesis is a process that takes place in all cells. The DNA nucleotide sequence determines the order of amino acids in the protein that is produced.

The first step in the process, ....., takes place in the nucleus and is the formation of ..... RNA. This RNA strand is formed by ..... base pairing with the appropriate section of the DNA molecule.

The RNA strand then leaves the nucleus via a nuclear ..... and becomes attached to a ribosome. In the cytoplasm, transfer RNA molecules are found. Each one is attached to a ..... amino acid. The particular sequence of three bases at one end of the transfer RNA molecule, the ....., determines which amino acid will be found at the other end of the molecule.

As the ribosome moves along the RNA strand, two binding sites, each consisting of three bases, are ..... at a time. The transfer RNA with the appropriate bases for the first triplet binds to the RNA strand. When the next transfer RNA molecule binds, the amino acids are held next to each other. The neighbouring amino acids become joined by ..... bonds that are formed by a ..... reaction.

[Total: 9]

**END OF QUESTION PAPER**

11  
**BLANK PAGE**

**PLEASE DO NOT WRITE ON THIS PAGE**

**PLEASE DO NOT WRITE ON THIS PAGE**



**Copyright Information**

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations, is given to all schools that receive assessment material and is freely available to download from our public website ([www.ocr.org.uk](http://www.ocr.org.uk)) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact the Copyright Team, First Floor, 9 Hills Road, Cambridge CB2 1PB.

OCR is part of the Cambridge Assessment Group; Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.