

**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)

Wednesday 14 January 2009**Afternoon****Duration: 1 hour**

Candidate Forename		Candidate Surname	
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Centre Number						Candidate Number				
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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.

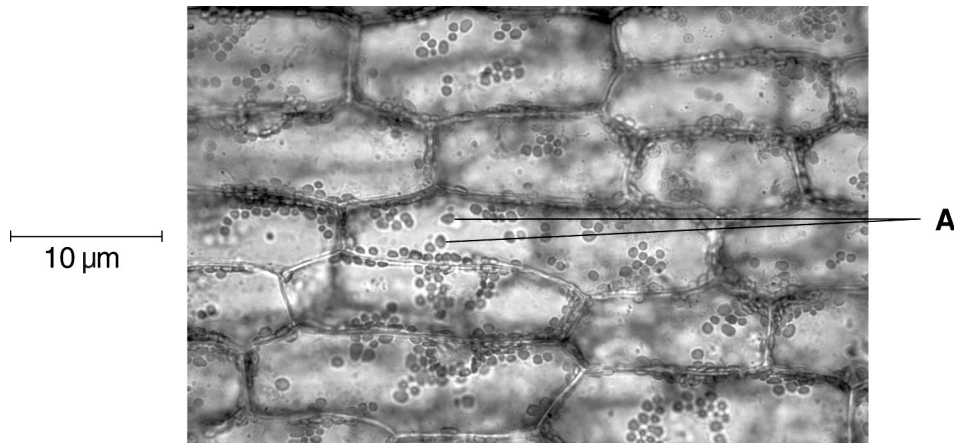
INFORMATION FOR CANDIDATES

- 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 **16** pages. Any blank pages are indicated.

FOR EXAMINER'S USE		
Qu.	Max.	Mark
1	10	
2	6	
3	11	
4	13	
5	10	
6	10	
TOTAL	60	

Answer **all** the questions.

- 1 Fig. 1.1 is a photomicrograph of cells from a leaf of Canadian pondweed, *Elodea canadensis*, which lives in fresh water.



© Claude Nuridsany & Marie Perennou / Science Photo Library

Fig. 1.1

- (a) Use the scale bar to calculate the magnification of the photomicrograph.

Show your working.

Answer = x [2]

- (b) A leaf of Canadian pondweed, which had been kept out of water for a short time, was seen to have wilted (its cells were no longer turgid).

Explain, **in terms of water potential**, what would happen to its cells if the leaf were then placed in distilled water with a water potential (Ψ) of 0.

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..... [4]

- (c) A student wanted to find out more about the structures labelled **A** in Fig. 1.1. Use of an electron microscope revealed that each structure labelled **A** is surrounded by two membranes.

(i) Name structure **A**.

..... [1]

(ii) Suggest a function of these membranes around structure **A**.

.....
..... [1]

- (d) Some cells of Canadian pondweed were broken open using a liquidiser and some of the structures labelled **A** were released intact.

What would happen to an intact structure **A** if it were then placed into distilled water with a water potential (Ψ) of 0?

.....
..... [2]

[Total: 10]

- 2 The table below contains statements about four biological molecules.

Complete the table, using a tick (✓) or a cross (✗), to indicate whether the statement **does** or **does not** apply to each of the biological molecules.

The first one has been done for you.

	starch	glycogen	cellulose	protein
is found in an animal cell	✗	✓	✗	✓
contains α glucose units				
contains β glucose units				
contains bonds formed by condensation				
is a branched structure				
contains peptide bonds				
is found in a plant cell				

[6]

[Total: 6]

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3 Fig. 3.1 represents the events that take place during the cell cycle.

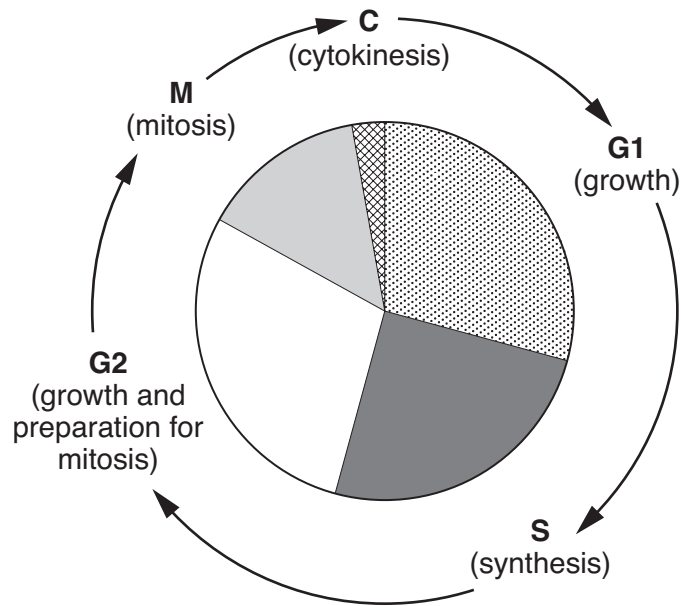


Fig. 3.1

Table 3.1 shows the DNA content of a cell measured during one cell cycle.

Table 3.1

stage	DNA content of cell / arbitrary units
G1	20
S	20 increasing to 40
G2	40
M	40
C	40 decreasing to 20

(a) (i) State the name given to the period in the cell cycle that includes stages **G1**, **S** and **G2**.

..... [1]

(ii) Describe the products of a mitotic cell division.

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..... [3]

- (iii) Using the information given in Fig. 3.1 and Table 3.1, explain why it is important that the DNA content of the cell increases during stage **S** and decreases during stage **C**.

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..... [2]

- (b) The cell cycle is regulated by proteins that determine if and when the cycle proceeds to the next stage. These proteins also control repair of damaged DNA. Cell death is allowed to occur if the DNA damage is too great.

Transcription of some of the genes that code for these proteins is in turn regulated by a protein known as p53. The protein p53 is responsible for pausing the cell cycle at **G1** to allow time for DNA repair or cell death to take place.

During cancerous growth triggered by the Human Papilloma Virus (HPV), p53 is destroyed.

- (i) Using the information given above, suggest how cancerous growths can develop as a result of infection by HPV.

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.....

..... [3]

- (ii) Name **two** factors, **other than viral infection**, that can result in cancerous growth.

1

2 [2]

[Total: 11]

4 Fig. 4.1 represents part of a food web in open farmland.

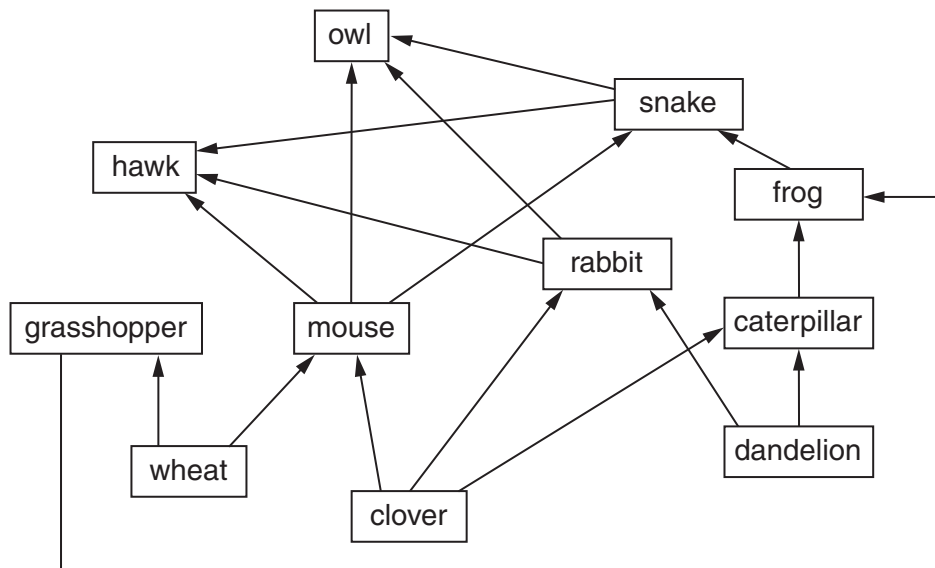


Fig. 4.1

(a) Using the information in Fig. 4.1, name:

(i) an organism that is **both** a secondary and a tertiary consumer;

..... [1]

(ii) an organism that is a secondary consumer **only**.

..... [1]

(b) Construct, in the space below, a **food chain** of five organisms from the information in Fig. 4.1.

(c) Plants have root hair cells near their root tips.

(i) Describe how root hair cells are adapted for the uptake of substances from the soil.

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..... [3]

(ii) Explain how ions, such as nitrate ions, can be taken up by the root hair cell when these ions are present in **low** concentrations in the soil.

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..... [3]

(d) Clover has swellings on its roots that contain *Rhizobium* bacteria.

Explain the importance of *Rhizobium* in the nitrogen cycle.

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..... [4]

[Total: 13]

5 (a) Nucleic acids contain pentose sugars.

Name the pentose sugar in DNA.

..... [1]

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

Describe the replication of DNA.

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

[Total: 10]

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Turn over

6 Lead is a metal that can bind to the –SH groups of enzyme molecules.

(a) (i) Name the bond in an enzyme molecule that is formed from –SH groups.

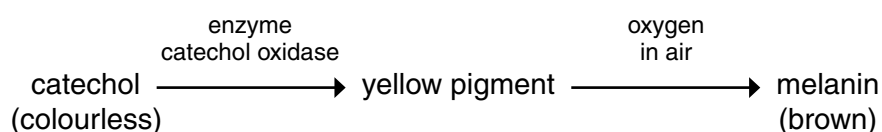
..... [1]

(ii) Suggest how an enzyme molecule may be affected when lead ions bind to it.

.....

 [4]

(b) When an apple is cut and exposed to the air, the cut surface will turn brown after a few minutes. This is the result of reactions involving the enzyme catechol oxidase.



(i) Suggest why tinned apple does not turn brown.

.....
 [1]

The rate of reaction of catechol oxidase was investigated for a range of concentrations of catechol solution.

The experiment was then repeated for the same concentrations of catechol solution, but with the addition of a fixed volume and concentration of lead ethanoate solution.

The results are shown in Fig. 6.1.

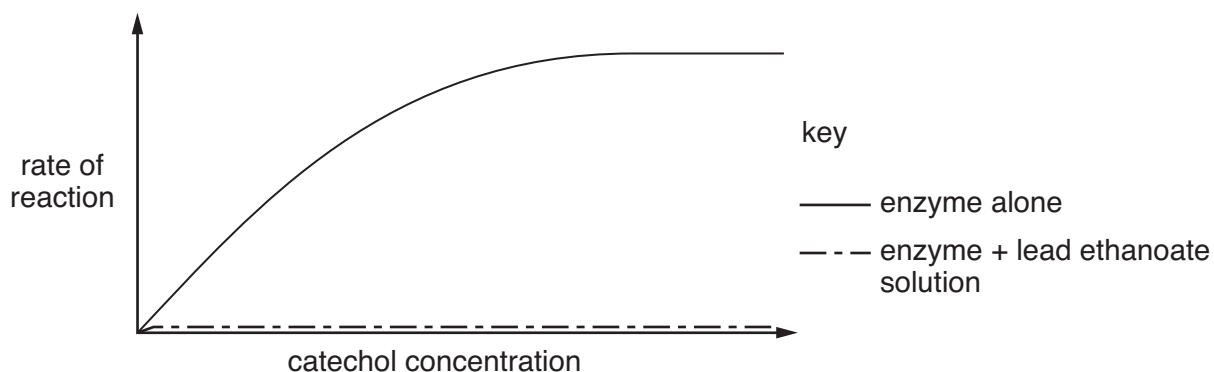


Fig. 6.1

- (ii) What conclusions may be drawn about the way in which lead ethanoate solution affects the activity of the enzyme catechol oxidase?

Use the information provided in (a) and (b) to help you.

Give reasons for your conclusions.

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..... [4]

[Total: 10]

END OF QUESTION PAPER

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