Surname		Other Names	
Centre Number			Candidate Number									
Candidate Signature												

For Examiner's Use

General Certificate of Education
June 2008
Advanced Level Examination

ASSESSMENT and QUALIFICATIONS ALLIANCE

BIOLOGY (SPECIFICATION B) **BYB678/B**
Unit 6 Section B Applying Biological Principles
Unit 7 Section B Applying Biological Principles
Unit 8 Section B Applying Biological Principles

Wednesday 18 June 2008 1.30 pm to 3.45 pm

For this paper you must have:
- Section A
- a ruler with millimetre measurements.

You may use a calculator.

Time allowed: The total time for Section A and Section B of this paper is 2 hours 15 minutes

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Question	Mark	Question	Mark
1			
2			
3			
4			
Total (Column 1) →			
Total (Column 2) →			
TOTAL			
Examiner's Initials			

Instructions

- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Answers written in margins or on blank pages will not be marked.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

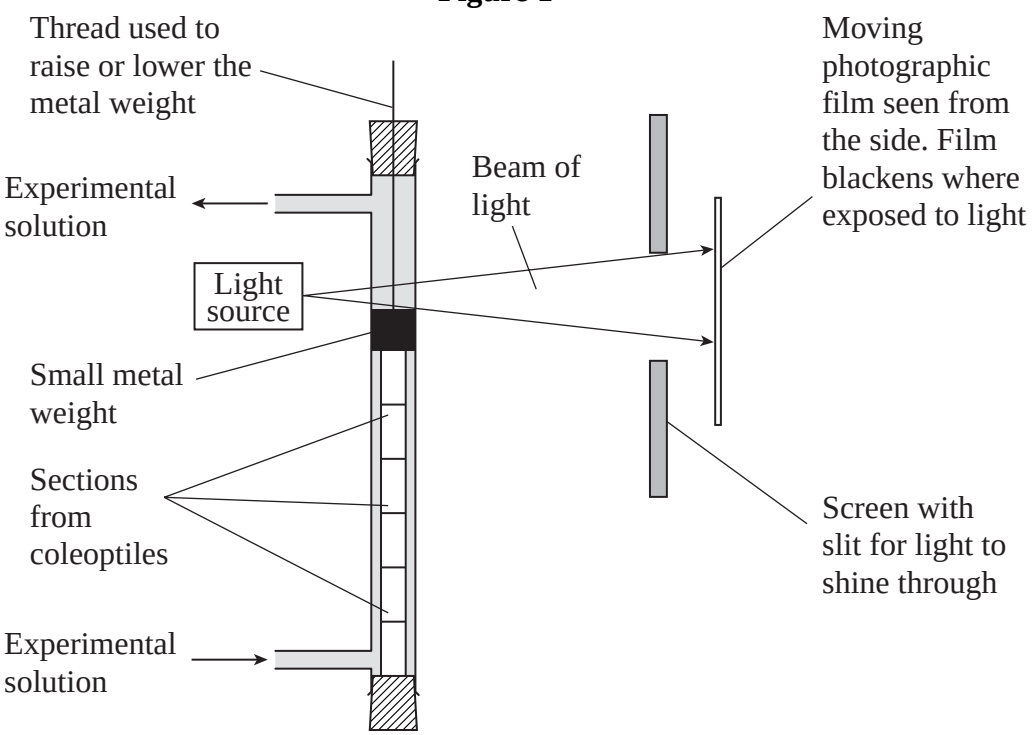
- The maximum mark for **Section B** is 50.
- The marks for questions are shown in brackets.
- You are reminded that all questions in this **Section B** are synoptic (indicated by the letter **S**). You must use your knowledge of different parts of the specification when answering this section.
- You are advised to spend 1 hour 15 minutes on **Section B**.
- Use accurate scientific terminology in all your answers.
- You are reminded of the need for good English and clear presentation in your answers. Question 4 should be answered in continuous prose. Quality of Written Communication will be assessed in your answer.

SECTION B

Answer **all** questions in the spaces provided.

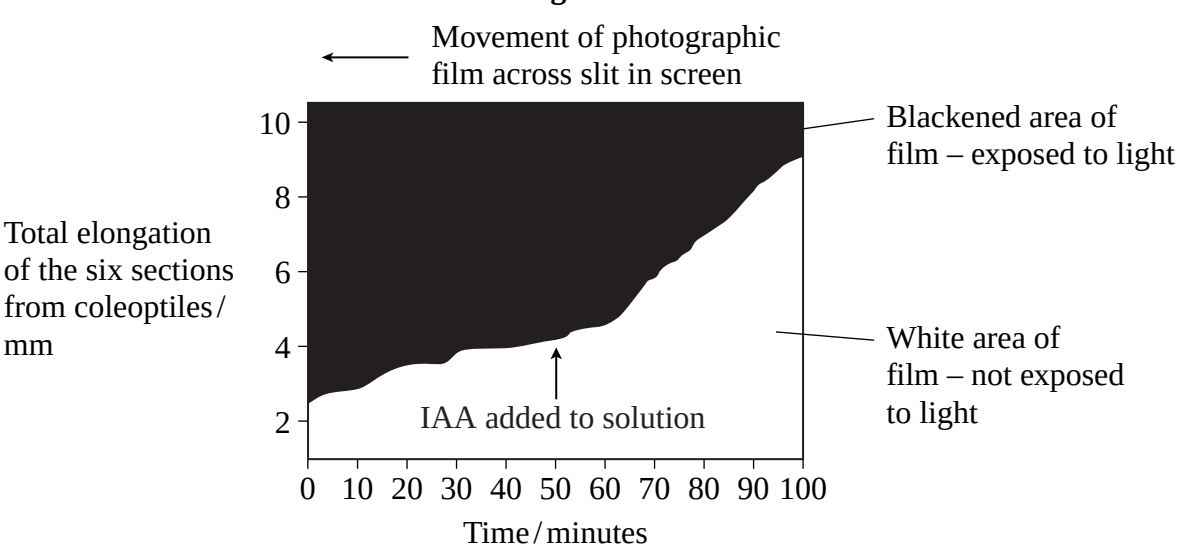
S 1 Coleoptiles are the first green shoots that grow from grass seeds. Scientists investigated the effects of different concentrations of the substance, IAA, on the growth of sections taken from coleoptiles. **Figure 1** shows the apparatus the scientists used.

Figure 1



The growth of the six sections of coleoptiles in buffer solution was measured for 50 minutes. IAA was then added to the buffer solution and growth was recorded for another 50 minutes. **Figure 2** shows the photographic film recording from one experiment.

Figure 2



1 (a) Sections from six coleoptiles were used in each experiment, rather than just one section from one coleoptile. This made it easier to make measurements of growth. Suggest why.

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(2 marks)

(Extra space) .....

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1 (b) Suggest **two** reasons for using the metal weight.

1 .....

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2 .....

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(2 marks)

(Extra space) .....

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1 (c) The white area on the film increases with time. Explain why.

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(2 marks)

(Extra space) .....

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Question 1 continues on the next page

1 (d) IAA leads to a softening of plant cell walls. Describe and explain the results shown in **Figure 2**.

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(3 marks)

(Extra space) .....

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1 (e) The scientists repeated the experiment several times with different concentrations of IAA.
Suggest **two** factors they would have to keep constant in all the experiments.
Give a reason for keeping each factor constant.

Factor .....

Reason .....

.....

Factor .....

Reason .....

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(2 marks)

(Extra space) .....

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1 (f) The vertical axis on **Figure 2** was calibrated by raising the metal weight by known amounts. Explain why this calibration was necessary.

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(1 mark)

(Extra space) .....

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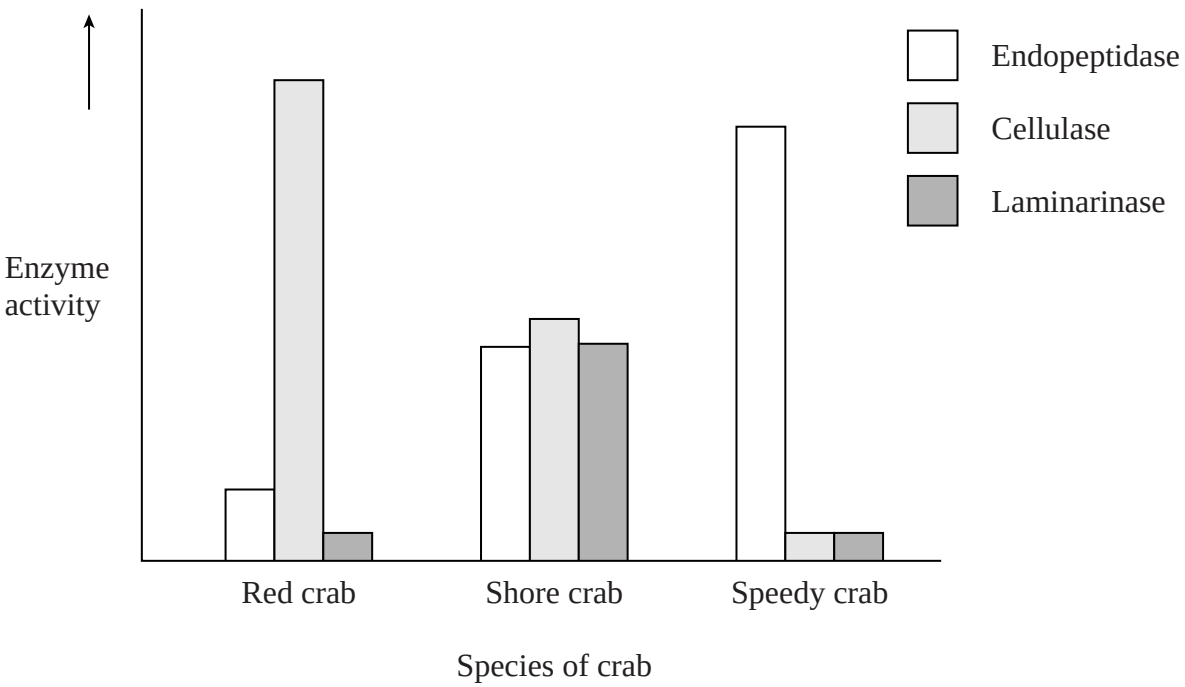
12

Turn over for the next question

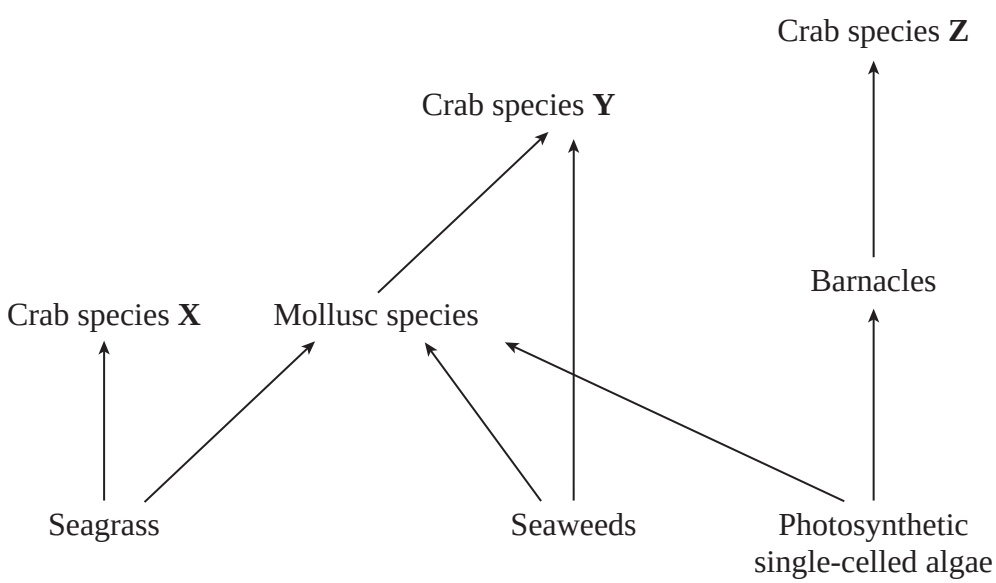
DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED

S 2 (a) Crabs are invertebrates that live on the seashore. Scientists investigated the digestive enzymes produced by three species of crab.
They measured the activity of three enzymes

- endopeptidase
- cellulase (digests cellulose)
- laminarinase (digests a substance only found in seaweeds).



The diagram shows part of the food web to which the three species of crab belong.



Use information in the question to name the species of crabs **Y** and **Z**. Give reasons for your answers.

Name of species **Y** .....

Reasons .....

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(2 marks)

(Extra space) .....

Name of species **Z** .....

Reasons .....

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(2 marks)

(Extra space) .....

2 (b) The activity of the endopeptidase from one species of crab was measured. A sample of the enzyme was added to a solution of a colourless substance called BAPNA.
A yellow compound is produced when BAPNA is broken down by the enzyme.

endopeptidase + BAPNA (colourless) ⟶ yellow compound

Describe how you would carry out an investigation to find the optimum temperature for the activity of the endopeptidase.

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(3 marks)

(Extra space) .....

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7

S 3 Ketamine is a drug that acts at synapses. Scientists injected volunteers with low doses of ketamine. After ketamine was injected, there were changes in blood flow to some parts of the brain.

Figure 3 shows parts of the brain and their functions.
Figure 4 shows where there were significant changes in the flow of blood after injection with ketamine.

Figure 3

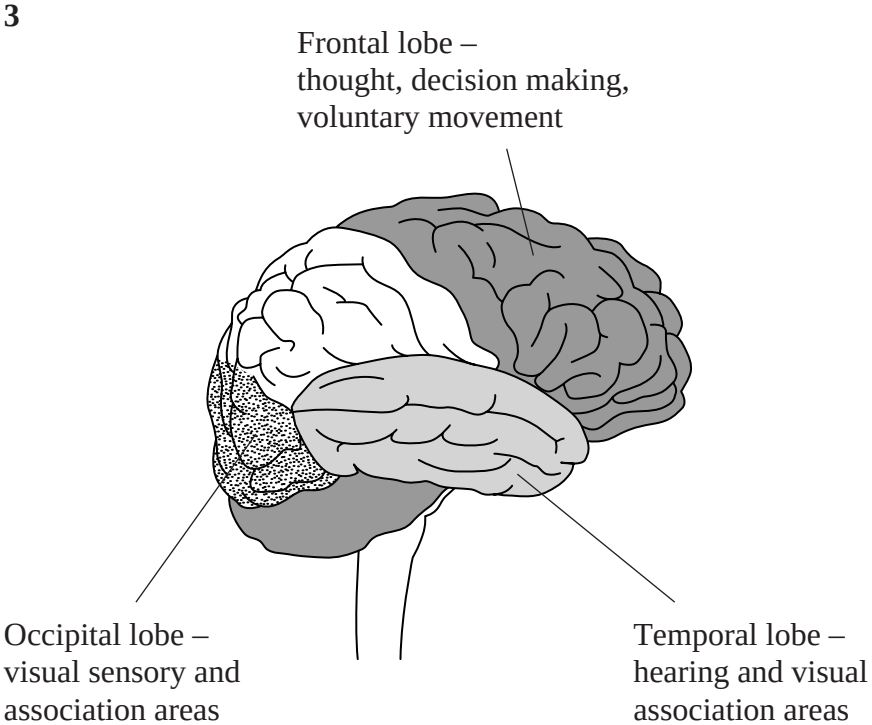
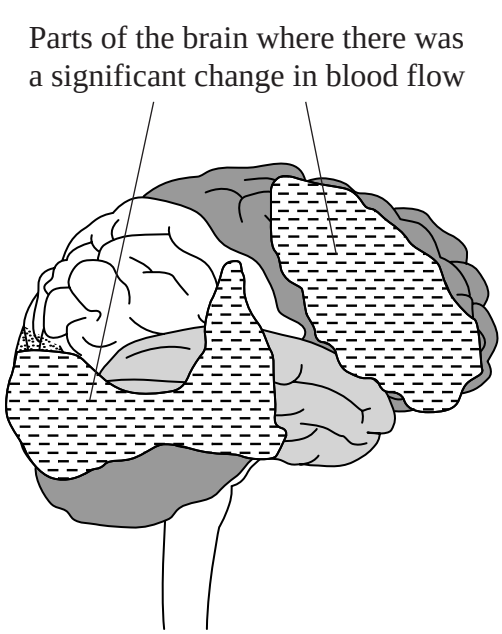


Figure 4



3 (a) Ketamine affects some synapses but not others. Suggest what causes ketamine to affect only these synapses.

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(2 marks)

(Extra space) .....

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3 (b) Ketamine produces changes in blood flow to certain parts of the brain. Suggest how the action of ketamine at synapses alters the flow of blood.

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(2 marks)

(Extra space) .....

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3 (c) Using only the information given, suggest and explain **one** symptom the volunteers experienced after injection with ketamine.

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(2 marks)

(Extra space) .....

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6

S 4 Write an essay on **one** of the topics below.

EITHER

(a) The part played by the movement of substances across cell membranes in the functioning of different organs and organ systems. *(25 marks)*

OR

(b) The part played by enzymes in the functioning of different cells, tissues and organs. *(25 marks)*

In the answer to this question you should bring together relevant principles and concepts from different parts of the specification.
Your essay will be marked not only for its scientific accuracy, but also for the selection of relevant material.
The essay should be written in continuous prose.

The maximum number of marks that can be awarded is:

Scientific content	*16*
Breadth of knowledge	*3*
Relevance	*3*
Quality of Written Communication	*3*

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END OF QUESTIONS

For Examiner's use only

	Mark	Comment
S		
B		
R		
Q		