

2008 Senior External Examination



Paper Two — Question and response book

Biology

Thursday 30 October 2008

1:00 pm to 3:10 pm

Directions

1. Perusal time: **10 minutes**.

Do not write in this book during perusal time.

A blank sheet of paper has been provided for you to write on during perusal time, if required.

Additional pages for planning are on the reverse of this cover and on pages 21–25 for use during the examination.

2. Working time: **2 hours**.

3. Materials provided:

- blank sheet of paper.

4. Equipment allowed:

- normal writing implements
- other QSA-approved equipment.

5. Paper Two has **two** parts:

- Part A: Questions 1–9 Short response
- Part B: Questions 1–5 Extended response.

Attempt **all** questions.

6. Clearly cross out any draft work that is not to be assessed.

7. Do not take this book, used or unused, from the examination room.

Do not tear out any part of this book. The supervisor will collect this book when you leave the examination room.

Candidate use

Print your candidate number here

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Attach barcode here

Number of books used

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Supervisor use only

Supervisor's initials

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QSA use only

Marker number

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Notes

Suggested time allocation:

Part A: 30 minutes

Part B: 90 minutes.

Assessment:

Paper Two assesses the following criteria published in the 2006 senior external syllabus for Biology:

- Understanding biology (UB)
- Investigating biology (IB)
- Evaluating biological issues (EBI).

The criterion assessed by each question is indicated in brackets after each question.

Standards for assessment are at the end of this book.

Planning space

Part A

Short response

Suggested time allocation: **30 minutes**.

This part has nine questions of equal value. Attempt all questions.

Respond to the questions in the spaces provided.

Question 1

Design an experiment that investigates the rate of plant growth when fertilisers are applied. Clearly identify the following in your response:

- Aim
- Hypothesis
- Procedure
- Controls
- Variables

(IB)

Question 2

Develop a researchable question that investigates plant physiology. Use a realistic context to justify the question.

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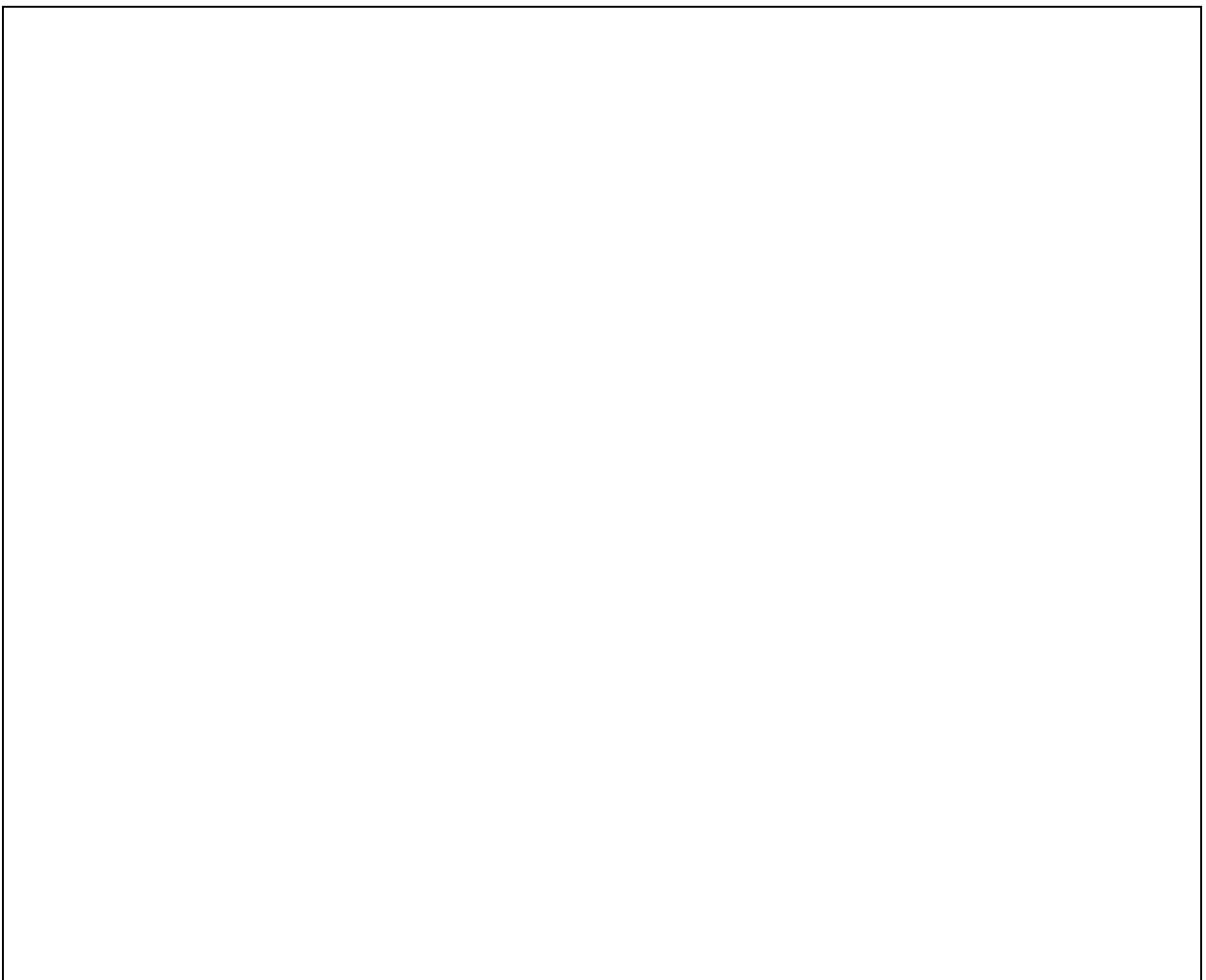
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(IB)

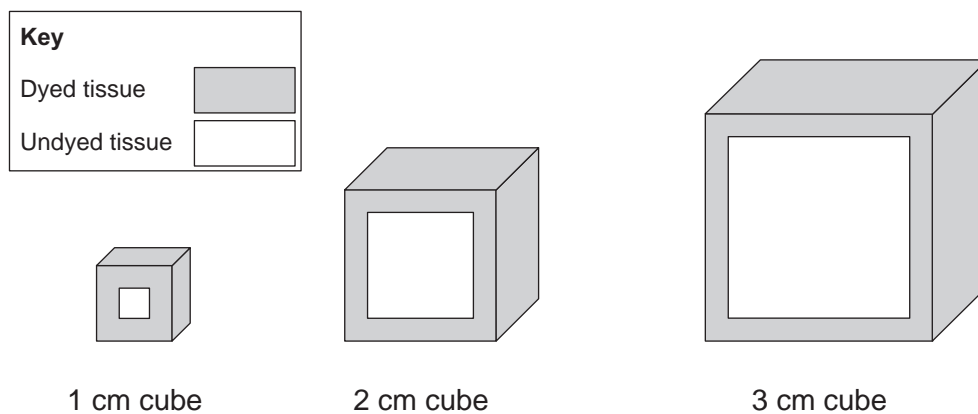
Question 3

In the space below, draw and label a simple plant cell diagram that adheres to guidelines for correct biological drawings. Include the following structures (at least): cell wall, cell membrane, nucleus, vacuole, chloroplast.



(UB)

Use the diagram and text below to respond to questions 4 and 5.



Three potato cubes were soaked in a coloured dye for the same length of time. The cubes were removed from the dye and cut in half. The diagram shows the resulting cross-sections.

Question 4

State the data that could be collected from the cubes, and design a table that could organise this data.

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(IB)

Question 5

State a possible hypothesis that this experiment could have been testing.

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(IB)

Use the following information to respond to questions 6 and 7.

An equal amount of protein was placed into seven test tubes each containing water. The tubes were then treated as shown in the table below and left overnight. The amount of peptides (protein fragments) was then estimated.

Tube	Treatment	Peptides produced	Visible effects
1	added pepsinogen	no	no change
2	pepsinogen + acid	large amounts	clear
3	nothing	no	no change
4	acid	trace	no change
5	pepsinogen (boiled) + acid	no	no change
6	pepsinogen + base	no	no change
7	base	no	no change

Question 6

State which tube is the control tube for the experiment and outline its significance.

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(IB)

Question 7

The pH of the medium is important to the activity of pepsinogen. Discuss how the data supports this.

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(IB)

Question 8

When pure-breeding black Andalusian chickens are crossed with pure-breeding white Andalusian chickens, the first-generation offspring are all grey in colour (known as “blue” Andalusians). What is the expected phenotypic ratio when two of these “blue” Andalusians are mated and produce offspring?

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(UB)

Question 9

A family has five sons. Explain the theoretical probability that a sixth child will be a daughter.

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(UB)

End of Part A

Part B

Extended response

Suggested time allocation: **90 minutes**.

This part has five questions of equal value. Attempt all questions.

Write an extended response to each of the questions on the following pages.

Plan your responses carefully. If you do a first draft and then a final draft, indicate which is the draft to be assessed.

Clearly cross out any draft work that is not to be assessed.

Additional lined pages for responses, if required, start on page 16. If you use the additional pages, clearly label the question you are responding to in the box provided on each page.

Question 1

Australia has experienced extreme drought in the last few decades and governments have worked hard to establish environmentally sustainable levels of water use across the country. South-East Queensland has recently experienced unexpectedly high amounts of rainfall that have raised the levels of supply dams considerably. Some are even overflowing out to the ocean. Governments are under increasing pressure to remove water restrictions.

Discuss how water restrictions protect natural ecosystems.

(EBI)

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Question 2

The use of organisms is very important in understanding biological concepts and knowledge. Evaluate the acceptability of collecting and dissecting organisms in classrooms. Use specific examples to justify your evaluation.

(EBI)

Question 3

Natural selection occurs relatively slowly. Breeders use artificial selection to more rapidly develop animals and plants with desirable characteristics. Evaluate the use of intense breeding programs.

Reflect particularly on how such programs can, in a short time, produce a breed of organism containing individuals that are genetically very similar.

(EBI)

Question 4

When AIDS (Acquired Immune Deficiency Syndrome) was first identified, most victims died in a relatively short space of time. Due to the development of modern drugs that assist the immune system to maintain its function, people who have contracted HIV (Human Immuno-deficiency Virus), the virus that causes AIDS, are now often able to lead much longer and healthier lives. In addition, the onset of AIDS is often delayed.

Discuss the benefits of an education program aimed at HIV-positive people. What messages should be included in such a program? What effects might such a program have on the rate of HIV infection and AIDS in the future?

(EBI)

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Question 5

Lifestyle diseases result from choices made in relation to factors such as sun exposure, diet, smoking and alcohol consumption. Choose one such lifestyle disease and comment on the potential effect on society of increasingly effective treatment options.

(EBI)

End of Part B

End of Paper Two

Additional pages for responses (if required)

Part	Topic
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Planning space

Planning space

Planning space

Planning space

Planning space

Standards associated with exit criteria (Paper Two)

Criterion	A	B	C	D	E
Understanding biology	<p>The candidate communicates understanding by:</p> <ul style="list-style-type: none"> making links between related ideas, concepts, principles and theories to reveal meaningful interrelationships applying knowledge and understanding to a range of complex and challenging tasks. 	<p>The candidate communicates understanding by:</p> <ul style="list-style-type: none"> explaining ideas, concepts, principles and theories and describing interrelationships between them applying knowledge and understanding to a range of complex tasks. 	<p>The candidate communicates understanding by:</p> <ul style="list-style-type: none"> defining and describing ideas, concepts, principles and theories, and identifying interrelationships applying knowledge and understanding to a range of tasks. 	<p>The candidate communicates understanding by stating ideas and using terminology relevant to concepts and recalling interrelationships.</p>	<p>The candidate states terminology and ideas relevant to concepts.</p>
Investigating biology	<p>The candidate communicates investigative processes by:</p> <ul style="list-style-type: none"> formulating justified researchable questions designing an investigation by providing methodology, addressing variables and control, planning replicate treatments and identifying data to be collected organising data to identify trends and interrelationships interpreting and critically analysing data with links to theoretical concepts to draw conclusions relating to the question(s) evaluating the design of the investigation and reflecting on the adequacy of the data collected and proposing refinements. 	<p>The candidate communicates investigative processes by:</p> <ul style="list-style-type: none"> formulating researchable questions designing an investigation by providing methodology, addressing obvious variables and control and planning replicate treatments organising data interpreting data and drawing conclusions relating to the question(s) evaluating the design of the investigation and the adequacy of the data collected. 	<p>The candidate communicates investigative processes by:</p> <ul style="list-style-type: none"> identifying researchable questions designing an investigation by providing incomplete methodology with few variables and attempts to include a control organising data using data to draw conclusions. 	<p>The candidate communicates investigative processes by:</p> <ul style="list-style-type: none"> using data to answer questions designing an investigation which provides incomplete methodology and mentions variables attempting to organise data. 	<p>The candidate communicates investigative processes by providing incomplete methodology, and transcribes data.</p>

Standards associated with exit criteria (Paper Two)

Evaluating biological issues	<p>The candidate communicates by:</p> <ul style="list-style-type: none"> critically analysing and evaluating information and data from a variety of sources to determine validity, reliability and bias integrating the information and data to make justified and responsible decisions comparing alternatives and predictions relevant in past, present and future biological contexts. 	<p>The candidate communicates by:</p> <ul style="list-style-type: none"> analysing information and data from a variety of sources to determine validity and bias selecting relevant information and data to make plausible decisions and predictions recognising concepts that form the basis of present-day biological issues in a range of biological contexts. 	<p>The candidate communicates by:</p> <ul style="list-style-type: none"> making statements related to source material making unsupported decisions recognising that a given issue has biological implications. 	<p>The candidate communicates by restating supplied information.</p>
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