

2007 Senior External Examination



Paper Two — Question and response book

Biology

Thursday 1 November 2007

1:00 pm to 3:10 pm

Directions

- 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 23–25, for use during the examination.
- Working time: **2 hours**.
- Materials provided:
 - blank sheet of paper.
- Equipment allowed:
 - normal writing implements
 - other QSA-approved equipment.
- This book contains:
 - formatted pages for responses to Part A
 - lined pages for all responses to Part B.
- Paper Two has **two** parts:
 - Part A: Questions 1–7 Short response
 - Part B: Questions 1–5 Extended response.Attempt **all** questions.
- Clearly cross out any draft work that is not to be assessed.
- 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.

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.

Candidate use

Print your candidate number here

0	7	–						–	
---	---	---	--	--	--	--	--	---	--

Attach barcode here

Number of books used

--

Supervisor use only

Supervisor's initials

--

QSA use only

Marker number

--

Planning space

Part A

Short response

Suggested time allocation: 30 minutes.

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

Respond to the questions in the spaces provided.

Question 1

Using an example from your own experimental experiences briefly describe the role of a control in experimental design.

.....

.....

.....

.....

.....

.....

(UB)

Question 2

Design an experiment to determine a particular abiotic preference of a species of plant or animal. You should include an aim, hypothesis, procedure and some indication of the form the results may take.

.....

.....

.....

.....

.....

.....

.....

.....

.....

(IB)

Question 3

When scientists want to observe an organism's chromosomes they add a chemical called colchicine to a sample of cells from the organism that are about to go through mitosis. Colchicine inhibits the formation of spindle fibres. Why is it useful to add colchicine to mitotically dividing cells if you want to observe chromosomes?

.....

.....

.....

.....

.....

(UB)

Question 4

“Flavr Savr” tomatoes have been genetically modified so that they take longer than normal to ripen. Genetic engineers have achieved this delay in ripening by disabling a critical tomato gene so that it fails to produce a protein that is needed for ripening. In order to disable the gene, a start codon is inserted at the beginning of the non-coding strand so that both the coding strand and the non-coding strand get copied into mRNA. Explain why this will prevent a polypeptide from being produced.

.....

.....

.....

.....

.....

.....

(UB)

Question 5

Explain why natural selection acts on individuals but evolution occurs only in populations.

.....

.....

.....

.....

.....

(UB)

Question 6

An overweight person suffers many effects from the excess weight that is being carried on the body. With specific reference to at least two interrelated body systems (e.g. respiratory system and cardiovascular system) describe how this extra fat being stored by the body can affect normal system functioning.

.....

.....

.....

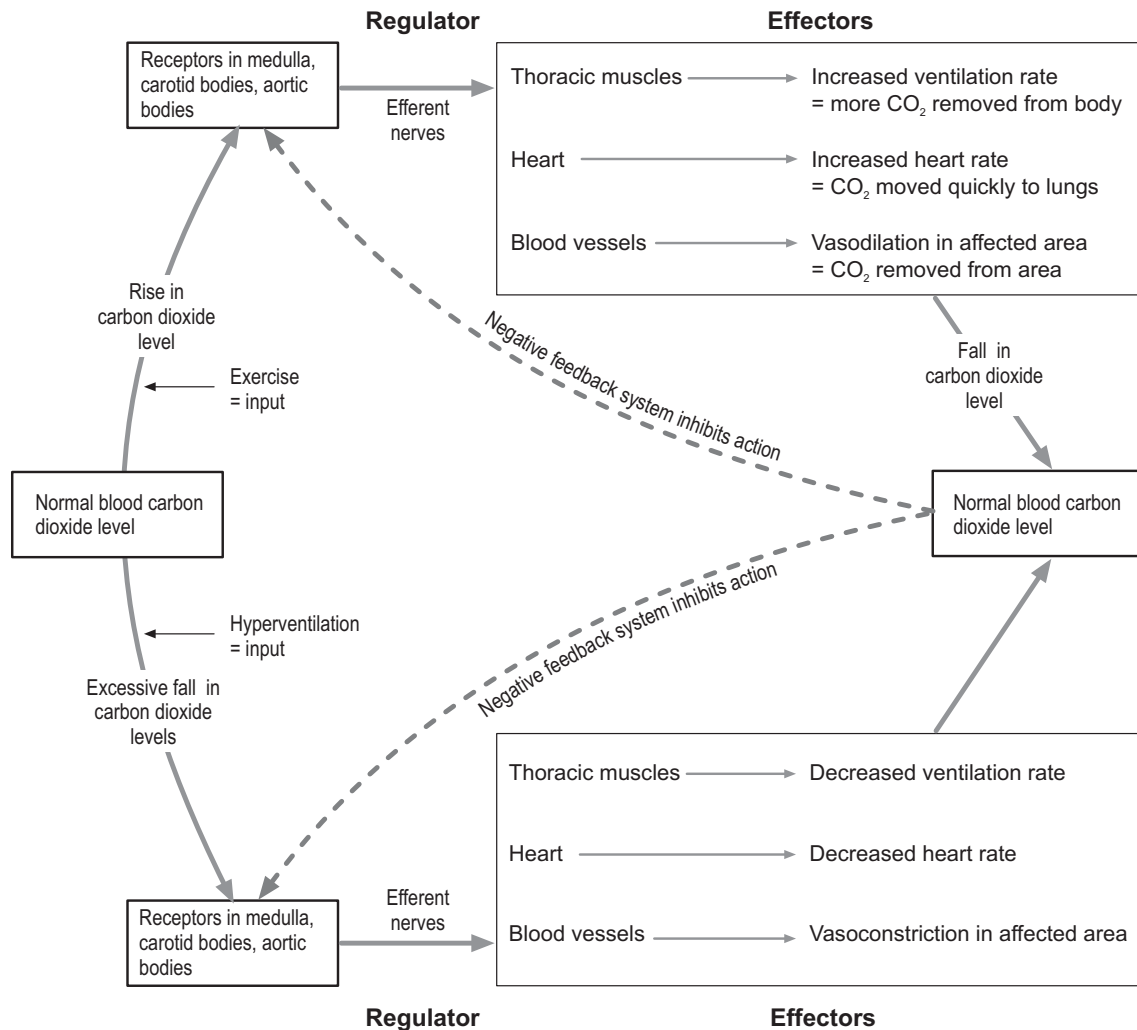
.....

.....

(UB)

Question 7

The following diagram refers to the control of carbon dioxide levels in the blood.



With reference to this diagram state how a person who has received severe brain damage to the section of the brain involved in detecting carbon dioxide, the medulla, may be adversely affected when exercising at a high intensity level.

.....

.....

.....

.....

.....

.....

(IB)

End of Part A

This page intentionally left blank.

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.

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.

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.

Question 1

Extensive bushfires in Australia often threaten human settlements, cash-producing crops and farming areas. Discuss the impact of permanent total fire bans and successful long-term fire prevention practices on both natural ecosystems and human activity.

(EBI)

Question 2

Organisations wishing to minimise the impact of hard-hoofed animals on the fragile Australian landscape have supported the farming of kangaroos using a system of allocated quotas, where farmers are allowed to harvest a certain number of kangaroos from their properties and then sell them for income. Briefly outline some biological arguments that would support this viewpoint.

(EBI)

Question 3

Fertility treatments can be used to either prevent or encourage pregnancies. Choose a modern treatment, e.g. in vitro fertilisation (IVF) or the contraceptive pill, to explain the biological processes involved and the possible subsequent impact on future generations that the widespread use of this type of fertility treatment may bring about.

(EBI)

Question 4

Aphids are small insects that feed on sap from plants. They are capable of both sexual and asexual reproduction. In summer months, when food is readily available, an aphid population consists entirely of asexually reproducing females, which give birth to new females. Just before the onset of the harsh winter months, a few males are born and sexual reproduction occurs. Discuss the possible impact of global warming on the population dynamics of aphids and the long-term outlook for the survival of the species.

(UB)

Question 5

Many zoos attempt breeding programs with species that are endangered. One aim of these programs is to build up numbers to a level where controlled release into the natural populations can occur to boost their numbers. Discuss the implications of keeping a species “destined for extinction” alive and breeding in captivity. Comment on the likelihood of future success of such programs in situations with animals that are very endangered.

(EBI)

End of Part B

End of Paper Two

Additional pages for responses (if required)

Part	Question
------	----------

Planning space

Planning space

Planning space

Standards associated with exit criteria

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>

Criterion	A	B	C	D	E
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 and evaluating information and data from a variety of sources to determine validity, reliability and bias integrating the information and data to make logical decisions recognising alternatives and predictions that are relevant in a range of past and present 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>

Acknowledgments

Oxford University Press Australia, South Melbourne, and Lorraine Huxley and Margaret Walker for material from *Biology: An Australian Perspective* by Lorraine Huxley and Margaret Walker, published by Oxford University Press Australia, 1998.

Every reasonable effort has been made to contact owners of copyright material. We would be pleased to hear from any copyright owner who has been omitted or incorrectly acknowledged.