

2008 Senior External Examination

Biology



Paper One — Question and response book

Thursday 30 October 2008

9:00 am to 11:40 am

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 15 and 16 for use during the examination.

2. Working time: **2 hours 30 minutes**.

3. Materials provided:

- blank sheet of paper
- Multiple-choice response sheet for Part A.

4. Equipment allowed:

- 2B pencil (for completing the multiple-choice response sheet)
- eraser
- normal writing implements
- other QSA-approved equipment.

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

- Part A: Questions 1–20 Multiple choice
- Part B: Questions 1–20 Short 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: 50 minutes

Part B: 1 hour 40 minutes.

Assessment:

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

- Understanding biology (UB)
- Investigating biology (IB).

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

Multiple choice

Suggested time allocation: **50 minutes**.

This part has 20 questions of equal value. Attempt all questions.

Each question has four options, **one** of which is correct or is the best option. Respond to each question by selecting one of the four possible options and blackening the appropriate circle on the multiple-choice response sheet provided. Use a 2B pencil to blacken the circles.

No credit for your response will be given if more than one circle is blackened.

Question 1

An organelle found only in a plant cell would be a

- A nucleus.
- B lysosome.
- C chloroplast.
- D Golgi apparatus.

(UB)

Question 2

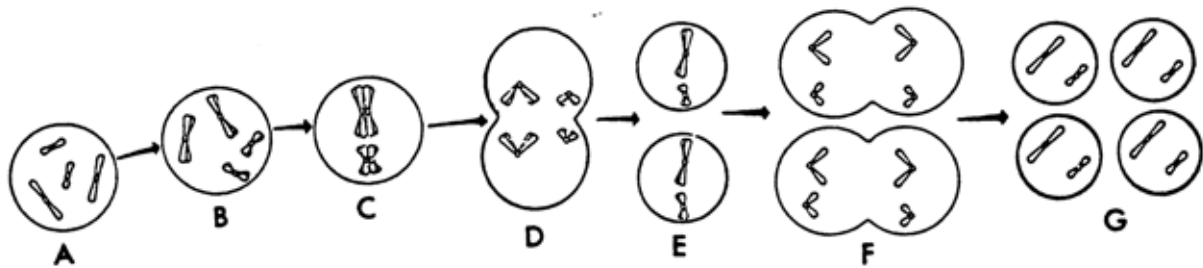
Which of the following is the site for aerobic respiration?

- A nucleus
- B ribosomes
- C mitochondria
- D endoplasmic reticulum

(UB)

Question 3

The diagram below is a simplified version of the process known as meiosis.



What type of cell is represented by figure G?

- A zygote
- B gamete
- C embryo
- D normal body cell

(UB)

Question 4

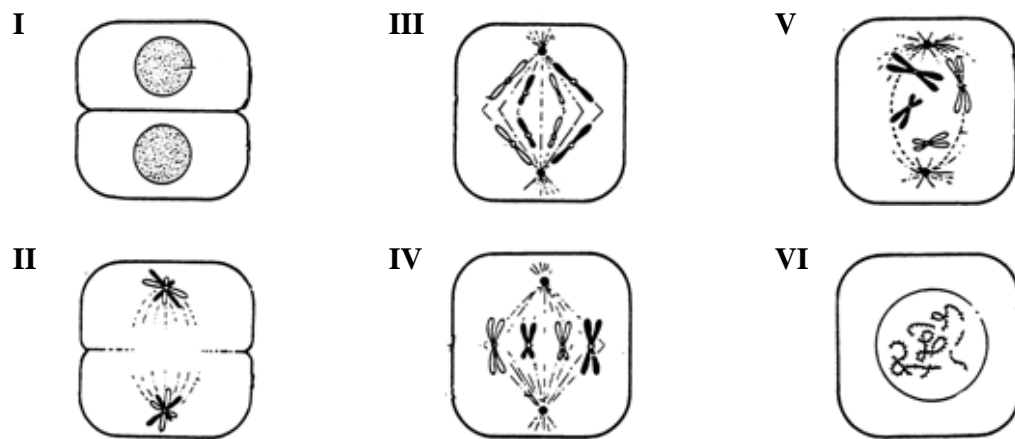
Which of the following diagrams best represents the arrangement of the cell's chromosomes during metaphase?



(UB)

Question 5

The diagrams below represent the stages of a mitotic cell division.



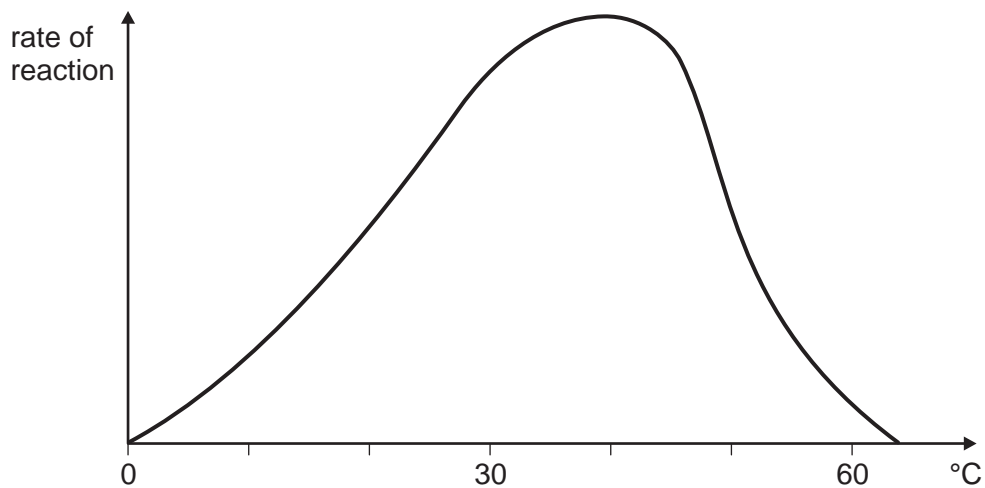
Which letter sequence shows the correct order of the mitotic process?

- A VI, II, V, IV, III, I
- B V, VI, III, IV, II, I
- C V, III, VI, II, IV, I
- D VI, V, IV, III, II, I

(UB)

Question 6

The following graph shows the results of an experiment involving the breakdown of starch by an enzyme.



Using the information in the graph, at what temperature are the maximum number of molecules involved?

- A 25°C
- B 40°C
- C 50°C
- D 65°C

(IB)

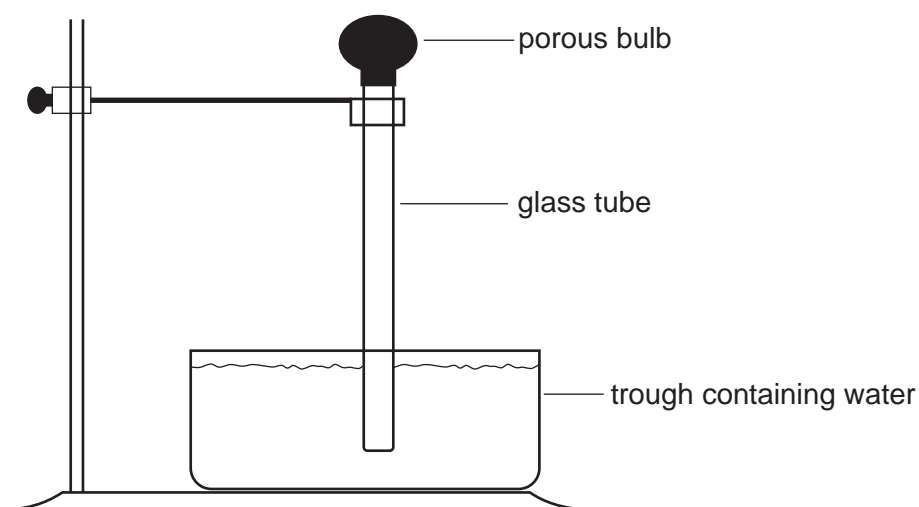
Question 7

Which of the following statements about photosynthesis is correct?

- A Inorganic molecules are converted into complex organic molecules using sunlight.
- B It is the process by which glucose is converted to sucrose and starch.
- C The raw materials include glucose, carbon dioxide and oxygen.
- D Only plants can photosynthesise.

(UB)

Use the following diagram to respond to questions 8 and 9.



Question 8

What part of a plant does the glass tube represent?

- A vascular bundles
- B cambium
- C phloem
- D xylem

(UB)

Question 9

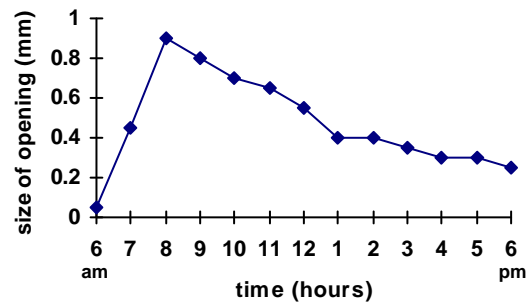
If the bulb represents a leaf, what occurs at the bulb to produce an upward stream of water?

- A water evaporates
- B a vacuum must be produced
- C air forces the water out of the bulb
- D there must be more salt in the bulb than there is in the trough

(UB)

Question 10

The graph below depicts stomatal opening changes of a plant within a 12-hour period.

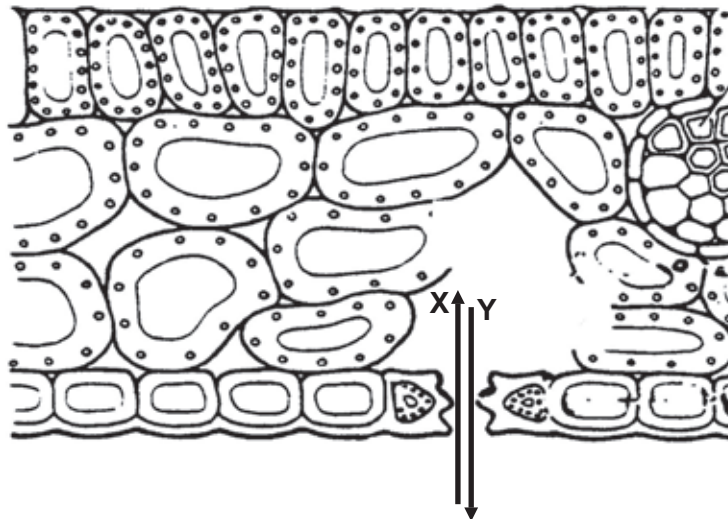


The graph suggests that

- A there is more light available at 8:00 am than there is at 12 noon that can be utilised for photosynthesis.
- B there is a lot of water available early in the day to allow photosynthesis to occur.
- C photosynthesis does not occur during the hot periods of the day.
- D the plant must be in a cool climate.

(IB)

Question 11



The diagram above is a cross-section of a leaf where the arrows represent the net movement of two substances. These substances, X and Y, are (in order)

- A water and oxygen.
- B water and carbon dioxide.
- C carbon dioxide and oxygen.
- D oxygen and carbon dioxide.

(UB)

Question 12

A biologist was investigating whether certain liquids contain agents which cause decay. The following table sets out details of the experiment in which five test tubes of clear nutrient broth were prepared, inoculated and then sealed. All test tubes were stored under the same conditions for 48 hours during which observations were made at 24-hour intervals.

Tube	Nutrient medium	Inoculum	Appearance after	
			24 hours	48 hours
1	100 mL sterile broth	1 mL sour wine	cloudy	cloudy
2	100 mL sterile broth	1 mL tap water	clear	cloudy
3	100 mL sterile broth	1 mL boiled sour wine	clear	clear
4	100 mL sterile broth	1 mL distilled water	clear	clear
5	100 mL unheated broth	No inoculum used	cloudy	cloudy

The cloudy appearance which developed in some of the tubes most probably resulted from

- A** the development of a chemical reaction between the nutrient broth and the inoculum.
- B** the temperature changes to which the broth was subjected.
- C** effects of the growth of micro-organisms.
- D** inoculation with alcohol.

(IB)

Question 13

In which of the following groups of organisms would you expect to see the greatest array of structural and reproductive differences?

- A** a snake, a goanna and a turtle
- B** a marine lobster, a shrimp and a crab
- C** a tube worm, a fish and a sea cucumber
- D** a kangaroo, a spiny anteater and a koala

(UB)

Question 14

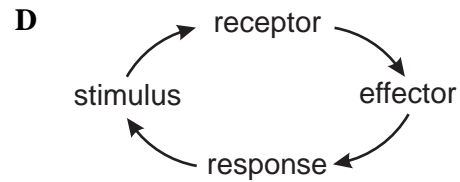
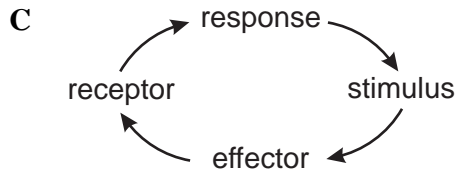
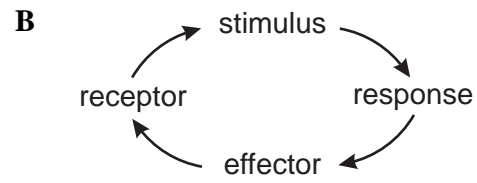
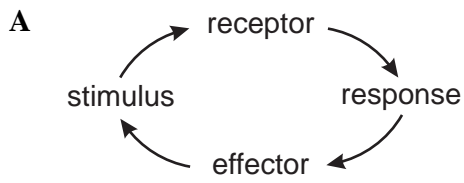
On what type of evidence is the classification of organisms usually based?

- A** structural
- B** behavioural
- C** physiological
- D** environmental

(UB)

Question 15

Which diagram below best represents a feedback loop?



(UB)

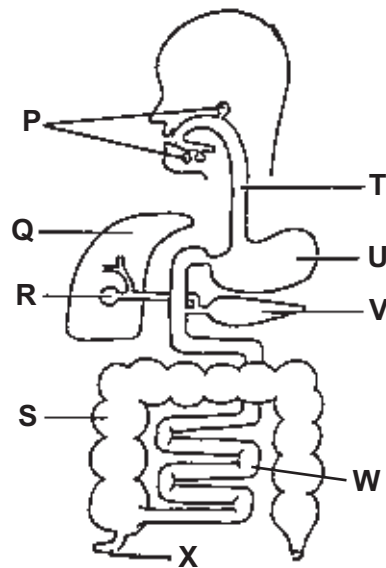
Question 16

Which of the following responses occurs when a person is immersed in icy water?

- A** panting
- B** vasoconstriction
- C** increased hydration
- D** decreased metabolism

(UB)

Use the following diagram representing the human digestive system to respond to questions 17 and 18.



Question 17

Which structure is responsible for water absorption from undigested food?

- A S
- B U
- C V
- D X

(UB)

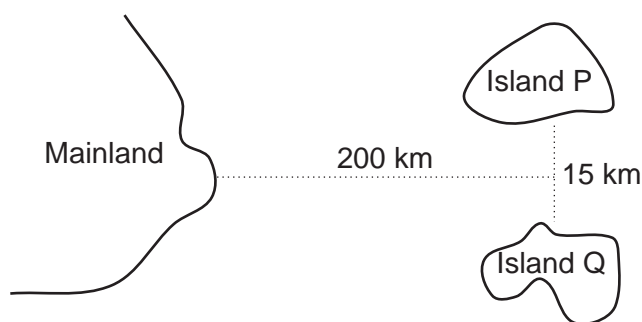
Question 18

Which structure is responsible for storing glycogen, vitamins and minerals?

- A V
- B U
- C Q
- D R

(UB)

Use the following information to respond to questions 19 and 20.



Insect population	Location	Population size	Characteristics
Type I	Island P	3000	Light body colour, no wings
Type II	Island Q	500	Dark body colour, no wings
Type III	Mainland	300 000	Light body colour, some with wings, some with no wings

Question 19

From the above data it would be reasonable to assume that the insects' ancestors

- A originated on Island P.
- B came from the mainland.
- C originated in warmer climates.
- D came from other islands found in the region.

(1B)

Question 20

Considering the characteristics of the insect types, it could probably be inferred that the climates of the islands have

- A higher temperatures than the mainland.
- B more humidity than the mainland.
- C stronger winds than the mainland.
- D higher rainfall than the mainland.

(1B)

End of Part A

Part B

Short response

Suggested time allocation: **1 hour 40 minutes**.

This part has 20 questions of equal value. All questions assess Understanding biology.
Attempt all questions.

Respond to the questions in the spaces provided.

Question 1

State one of the roles of membranes in cells.

.....

Question 2

The generalised equation for respiration is:



In this equation, energy is in the form of what molecule?

.....

Question 3

State a link between respiration and photosynthesis within a green plant.

.....
.....
.....

Question 4

State the number of mature gametes that can result from the division of a parent cell.

.....

Question 5

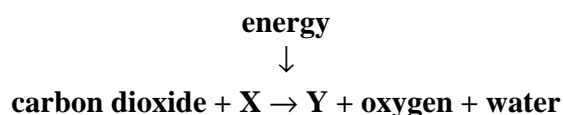
Choosing molecules from the following list, state one of the pairings that occur in DNA.

adenine, cytosine, guanine, thymine

..... and

Question 6

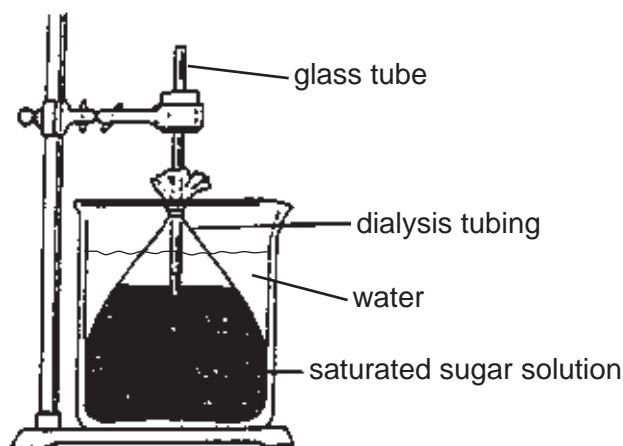
The generalised equation for photosynthesis is:



where X is..... and Y is.....

Use the following information to respond to questions 7 and 8.

A bag made from dialysis tubing filled with a saturated sugar solution is immersed into a beaker of water. A glass tube is inserted into the bag as shown in the diagram below.



Question 7

Briefly describe what will happen to the level of liquid in the glass tube.

.....
.....

Question 8

Refer to your response to Question 7. State the biological process responsible.

.....

Question 9

State the main location of water loss during transpiration.

.....

Question 10

Young corn plants are placed in a greenhouse where soil, light, temperature and humidity are kept at optimal levels. If the grower wants to increase the rate of photosynthesis, what else should be done?

.....

Question 11

State one disadvantage of external fertilisation.

.....

.....

Question 12

State one benefit of biological classification systems.

.....

.....

Question 13

Felis catus is the scientific name for the domestic cat. State the genus to which the domestic cat belongs.

.....

Question 14

Define homeostasis.

.....

.....

Question 15

State two characteristics of an effective respiratory surface.

.....

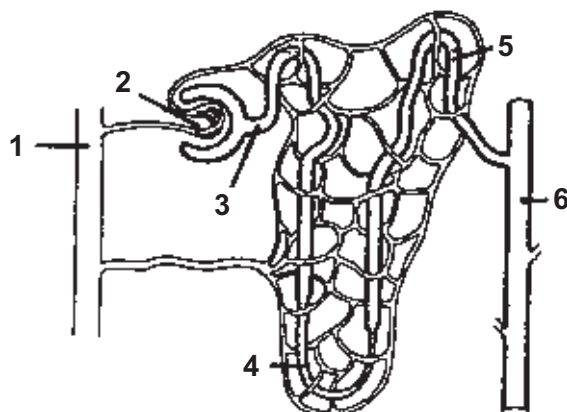
.....

Question 16

What occurs due to the direct combined action of follicle-stimulating hormone (FSH) and luteinising hormone (LH)?

.....

Use the following diagram to respond to questions 17 and 18.



Question 17

State the number which represents the glomerulus.....

Question 18

Explain why structure 4 is so long.

.....

.....

Question 19

Briefly describe biological succession.

.....

.....

.....

Question 20

An unfavourable variation arises in a population. Predict what would happen to this characteristic over a period of time.

.....

.....

.....

End of Part B

End of Paper One

Planning space

Planning space

Standards associated with exit criteria (Paper One)

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>