



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

CANDIDATE
NAME

CENTRE
NUMBER

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BIOLOGY

5090/02

Paper 2 Theory

October/November 2007

1 hour 45 minutes

Candidates answer Section A on the Question Paper.

Additional Materials: Answer Booklet/Paper

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use a soft pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.
DO NOT WRITE ON ANY BARCODES.

Section A

Answer **all** questions.
Write your answers in the spaces provided on the question paper.

Section B

Answer **all** the questions including questions 6, 7 and 8 **Either** or 8 **Or**.
Write your answers on the separate answer paper provided.
Write an **E** (for Either) or an **O** (for Or) next to the number 8 in the grid below to indicate which question you have answered.

You are advised to spend no longer than one hour on Section A and no longer than 45 minutes on Section B.
At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [] at the end of each question or part question.

For Examiner's Use	
Section A	
Section B	/
6	
7	
8	
Total	

This document consists of **11** printed pages and **1** blank page.



Section A

Answer **all** questions in this section.

Write your answers in the spaces provided.

- 1 Fig. 1.1 shows a plant in a beaker containing a solution of dye. Fig. 1.2 shows the tissues of the same plant as they would appear if a cross section is taken at X.

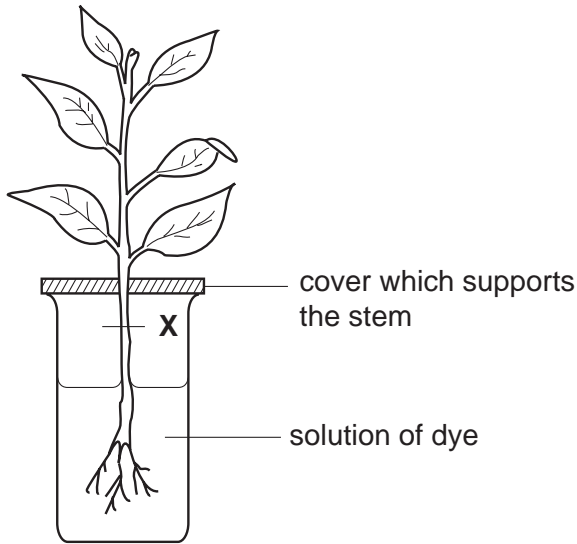
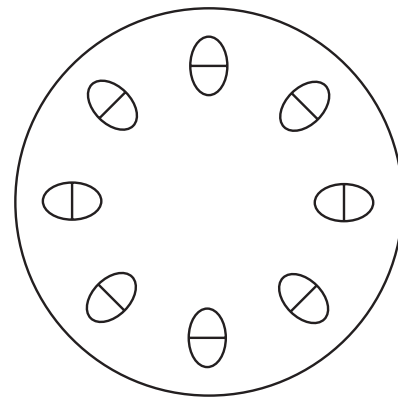


Fig. 1.1



cross section at X, magnified

Fig.1.2

- (a) (i) On Fig. 1.2, shade the tissue that would be most heavily stained by the dye. [1]
- (ii) Name this tissue [1]
- (b) Explain the processes occurring in the plant that cause the dye to move upwards through the stem.

.....

.....

.....

.....

.....

..... [3]

(c) Describe the process responsible for the uptake of the dye into the roots of the plant.

.....
.....
.....
.....
.....[3]

(d) Suggest and explain what would happen to a plant if its roots are submerged in a concentrated salt solution for six hours.

.....
.....
.....
.....
.....[3]

[Total: 11]

2 In living organisms, enzymes may be used in reactions to convert large molecules into smaller ones.

(a) State the term used for all

(i) molecules on which enzymes act,

(ii) molecules that are formed in a reaction.[2]

(b) For a chemical reaction that begins in the stomach, state

(i) the original large molecule,

(ii) the stomach enzyme involved,

(iii) the smaller molecules formed.[3]

Fig. 2.1 is part of a graph showing how the rate of an enzyme-controlled reaction changes with increasing temperature.

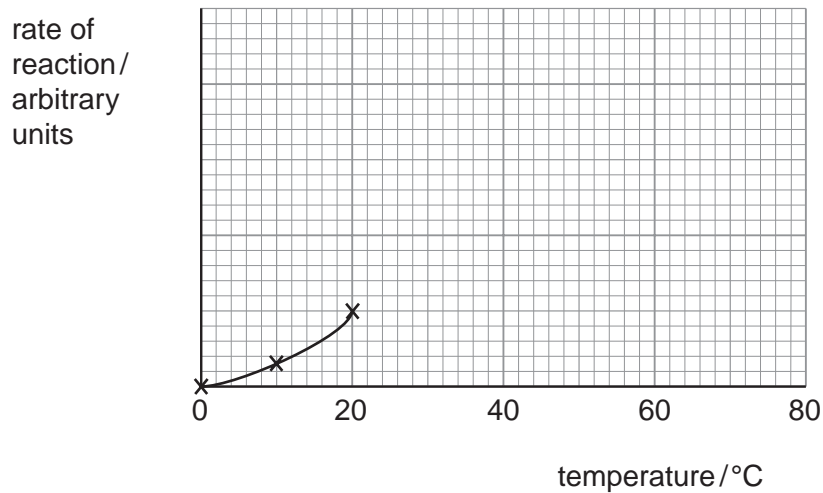


Fig. 2.1

(c) Complete the graph in Fig. 2.1 to show how the rate of this enzyme-controlled reaction changes as the temperature is increased from 20°C to 80°C. [3]

(d) Fig. 2.2 shows diagrammatically how an enzyme-controlled reaction may occur.

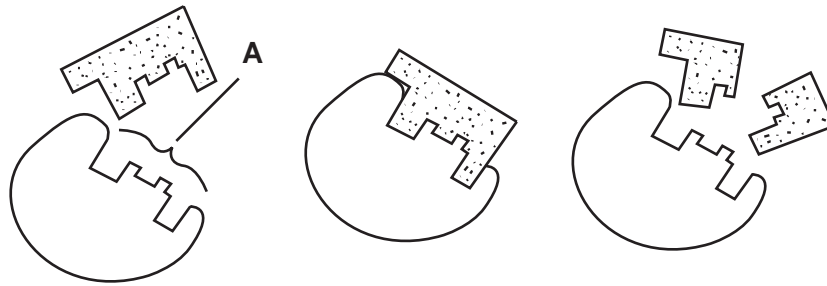


Fig. 2.2

(i) Identify region **A** on Fig. 2.2.[1]

(ii) State the hypothesis illustrated in Fig. 2.2.

.....

.....[1]

[Total: 10]

3 Fig. 3.1 shows a student involved in an experiment on breathing.

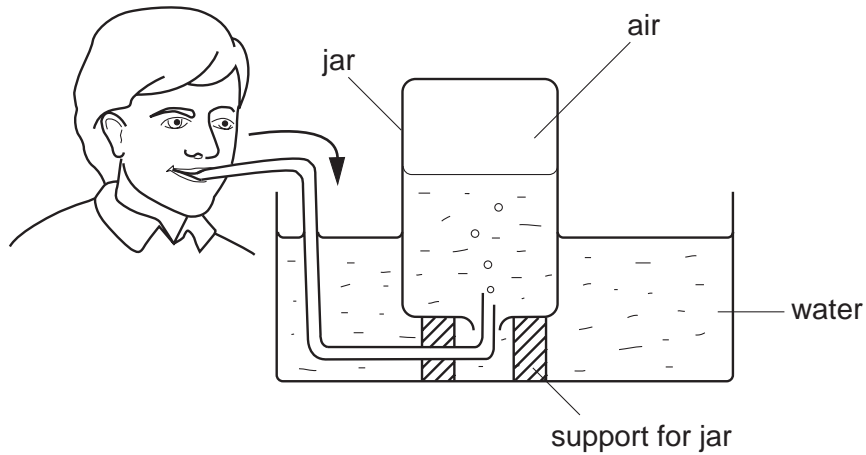


Fig. 3.1

(a) State three ways in which the air in the jar will differ from atmospheric air.

- 1.
- 2.
- 3. [3]

(b) Describe what occurs in the student's thorax to cause air to be breathed out into the jar.

.....
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.....
.....
..... [4]

(c) By referring to the cells in the student's body, suggest how the differences you mention in (a) are brought about.

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

[Total: 9]

4 (a) Name the mineral ion required for the manufacture of the pigment in red blood cells.

.....[1]

Fig. 4.1 shows some red and white blood cells from a bird. (All cells are drawn to the same magnification.)

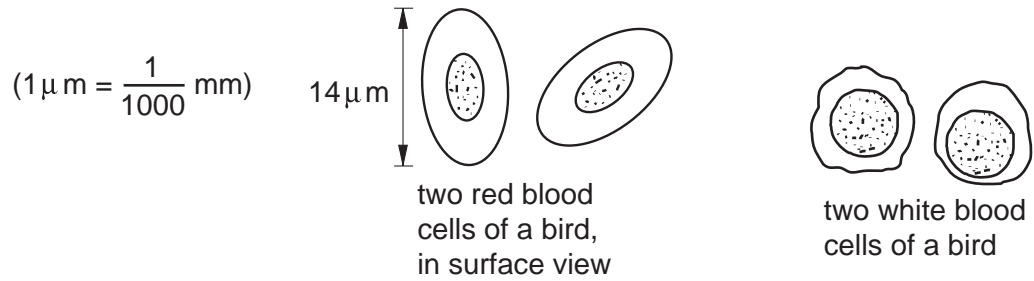


Fig. 4.1

(b) By reference to Fig. 4.1, complete Table 4.2 to show three differences between the red blood cells of birds and mammals.

Table 4.2

	red blood cells	
	birds	mammals
1		
2		
3		

[3]

Fig. 4.3 shows human blood cells in a type of blood vessel (**B**) passing between body cells.

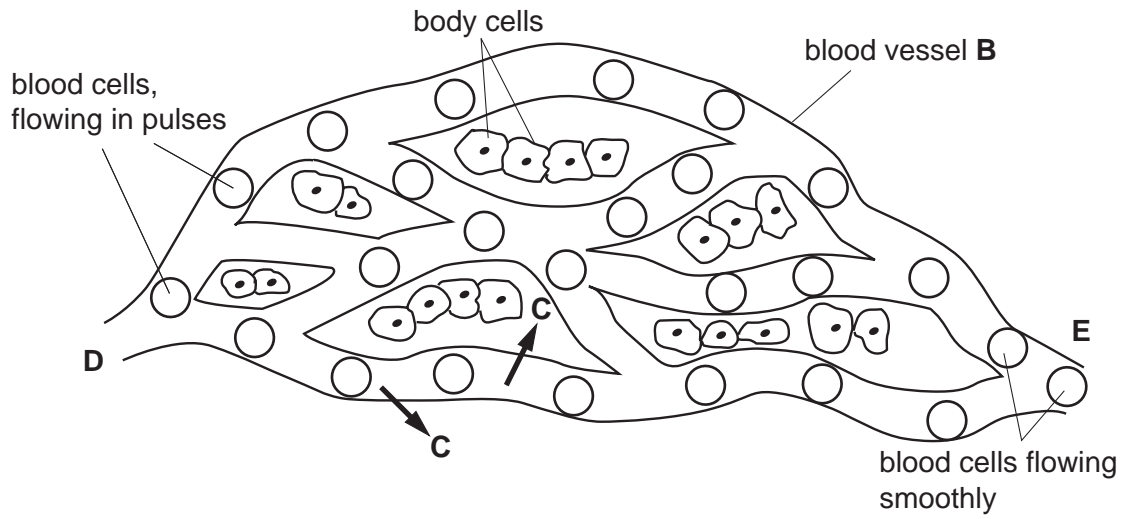


Fig. 4.3

(c) (i) Name the type of blood vessel labelled **B** and give reasons for your answer.

type of blood vessel

reasons

.....
.....[3]

(ii) Name the liquid leaving the blood vessel at **C**. [1]

(iii) Using information from Fig. 4.3, explain why blood is under higher pressure at point **D** than at point **E**.

.....
.....
.....[3]

[Total: 11]

- 5 Fig. 5.1 shows the sequence in which a farmer grows three crops on the same piece of land over a number of years.

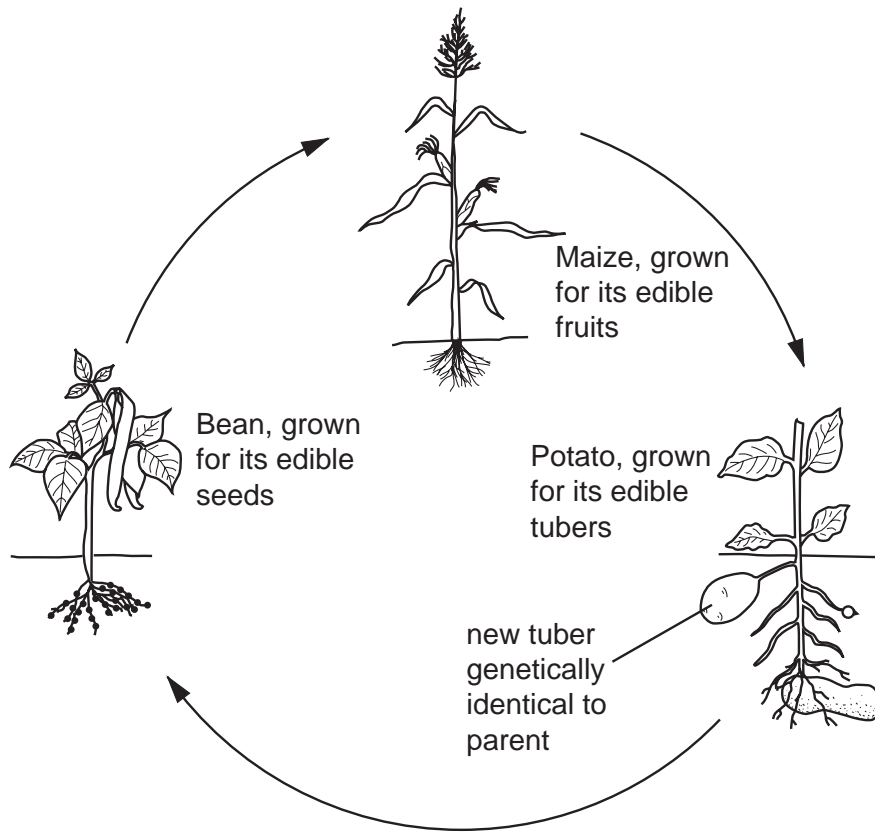


Fig. 5.1

- (a) Name a structure always present as part of a fruit that is never present in a seed.

.....[1]

- (b) Complete Table 5.2 to show whether each crop is produced as a result of asexual or sexual reproduction. In each case, explain your answer by stating how each is formed.

Table 5.2

	type of reproduction	explanation
seeds of bean	
fruits of maize	
tubers of potato	

[4]

- (c) Explain the importance, other than crop production, of including the bean plant in the sequence shown in Fig 5.1.

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

[4]

[Total: 9]

Section B

Answer **all** the questions including questions 6, 7 and 8 **Either** or 8 **Or**.

Write your answers on the separate answer paper provided.

- 6 (a) State the functions of the following structures:
- (i) the kidneys,
 - (ii) the urethra. [5]
- (b) Describe how a kidney dialysis machine performs the functions of the kidneys in a patient with kidney failure. [5]
- 7 (a) Describe the part played in reflex actions by
- (i) sensory neurones,
 - (ii) motor neurones and
 - (iii) relay neurones. [6]
- (b) Describe how a reflex action differs from a deliberate action. [4]

Question 8 is in the form of an **Either/Or** question. Answer only question 8 **Either** or question 8 **Or**.

- 8 **Either** Describe how energy from the sun is trapped by plants and is eventually used for a person to move their arm. [10]
- 8 **Or** Describe the large-scale manufacture of a named antibiotic. State reasons for any procedures you mention. [10]

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