UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

BIOLOGY **5090/21**

Paper 2 Theory **October/November 2010**

1 hour 45 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

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 pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.
DO **NOT** WRITE IN 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 in the spaces provided on the Question Paper.
Write an **E** (for Either) or an **O** (for Or) next to the number 8 in the Examiner's 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 **14** printed pages and **2** blank pages.

Section A

Answer **all** questions in this section.

Write your answers in the spaces provided.

1 Fig. 1.1(a) shows a flower very shortly after it has opened and Fig. 1.1(b) shows the same flower when it is several days older.

Fig. 1.1(a)

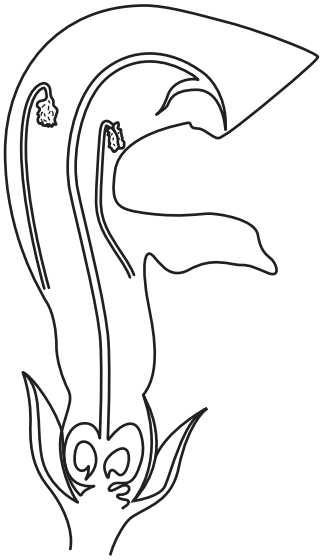

Fig. 1.1(b)

(a) On Fig. 1.1(b), label a filament and a sepal. [2]

(b) State two features of the flower in Fig. 1.1(a) that could have attracted the insect.

1. .....

2. ..... [2]

Using information in Fig. 1.1(a) and Fig. 1.1(b)

(c) **(i)** explain why flowers of this plant are rarely self-pollinated

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..... [4]

(ii) suggest how the insect brings about pollination in this species of plant.

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..... [5]

[Total: 13]

2 Fig. 2.1 shows components of the faeces of a cow, an herbivorous mammal.

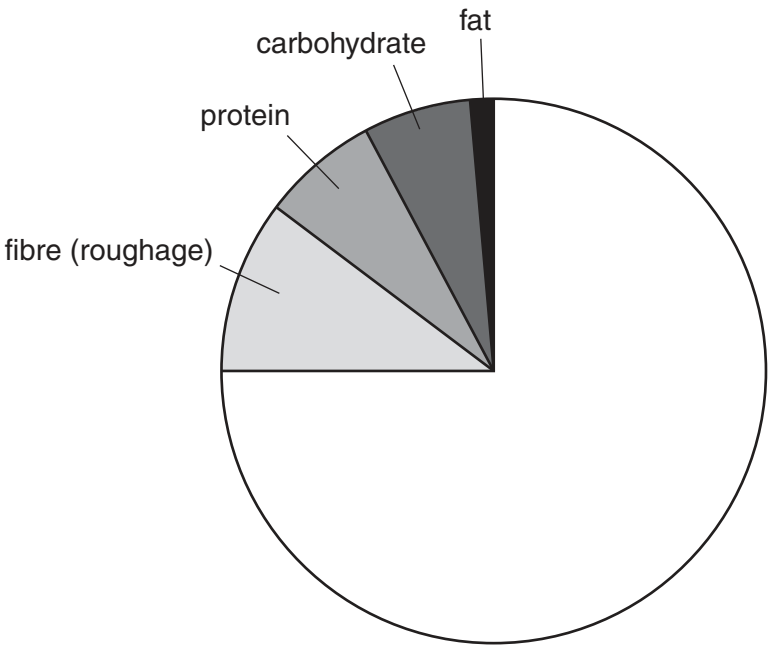

Fig. 2.1

(a) Name the component that makes up 75% of the faeces.

..... [1]

(b) Suggest what makes up a major part of the fibre in the faeces.

..... [1]

If used as a fertiliser, faeces will eventually increase the nitrates in the soil.

(c) Identify the component in faeces that is responsible for this increase in nitrates and describe its conversion into nitrates.

component ..... [1]

how it is converted .....

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..... [6]

(d) Explain why a mixture of faeces and urine is a better fertiliser than faeces alone.

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..... [2]

[Total: 11]

3 Fig. 3.1 shows the human digestive system.

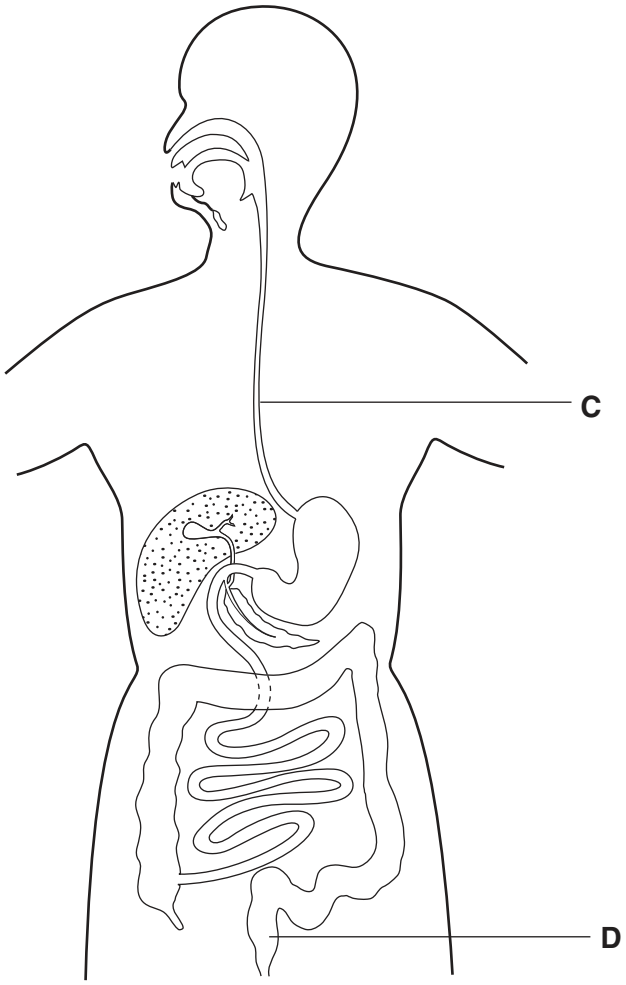

Fig. 3.1

(a) Identify parts **C** and **D** on Fig. 3.1.

C .....

D ..... [2]

(b) **(i)** Use a label line on Fig. 3.1, marked '**X**', to indicate where fat digestion begins. [1]

(ii) Explain your reasons for selecting this region.

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..... [4]

(c) Adrenaline reduces the secretion of mucus in the body. Suggest why a person who suffers from stress may also suffer from damage to the lining of their stomach wall.

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..... [2]

[Total: 9]

4 Fig. 4.1 shows the blood groups of the members of two families.

		Family 1					Family 2		
blood groups of parents :		**B** and **A**					**O** and **B**		
blood groups of children:		**A**	**O**	**AB**	**B**		**B**	**AB**	**B**
child number	:	1	2	3	4	x	5	6	7
grandchild	:					8			

Fig. 4.1

The alleles responsible for blood groups are I^A, I^B and I^o.

(a) State the term used to describe the relationship between alleles I^A and I^B.

..... [1]

(b) Identify, by number, which one of the children had been adopted by their family and could not be the genetic offspring of the parents. Explain your answer.

child number .....

explanation .....

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..... [2]

(c) When children 4 and 5 grow up, they have a child of their own, child 8, as shown in Fig. 4.1. Using a genetic diagram, explain the possible genotypes and phenotypes of child 8.

[4]

[Total: 7]

5 Fig. 5.1 shows the rate of water uptake and of water loss for a plant over a 24-hour period.

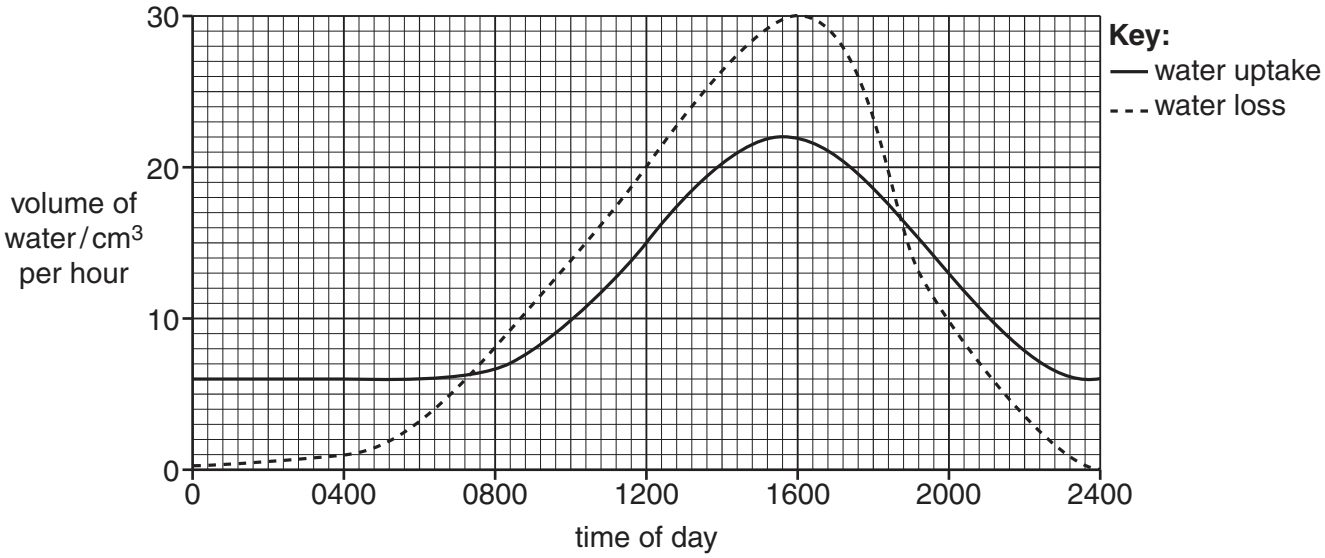

Fig. 5.1

(a) Determine the rate of water uptake at 1200 hours. ..... [1]

(b) **(i)** Name the cells through which water is absorbed from the soil.

..... [1]

(ii) Name the cells between which water vapour passes to the atmosphere.

..... [1]

(c) **(i)** State three uses of water within a plant between midnight and 0400 hours.

1. .....

2. .....

3. ..... [3]

(ii) State two additional uses of water between 0800 and 1900 hours.

1. .....

2. ..... [2]

(d) Explain what may happen to the plant between 1400 and 1800 hours.

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..... [2]

[Total: 10]

Section B

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

Write your answers in the spaces provided.

6 **(a)** Explain how chromosomes are involved in the process of inheritance.

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..... [5]

(b) Explain why a kidney transplant from a member of the same family is more likely to be successful than from someone who is unrelated.

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..... [5]

[Total: 10]

7 A person is stung on the hand by an insect and automatically withdraws their hand rapidly.

(a) Describe the part played by the nervous system in this action.

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..... [7]

(b) Explain why the heart then beats faster.

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..... [3]

[Total: 10]

8 **Either** With reference to photosynthesis,

(a) Explain what is meant by the term *limiting factors.*

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..... [5]

(b) Describe the ways in which a plant obtains its oxygen for respiration.

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[Total: 10]

8 **Or** With reference to a human being, explain

(a) what is meant by a *cell*

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..... [3]

(b) how tissues and organs work together in the circulatory system.

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..... [7]

[Total: 10]

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