UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

2400485727

BIOLOGY **5090/22**

Paper 2 Theory **October/November 2011**

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** questions.
Write your answers in the spaces provided on the Question Paper.
Section C
Answer **either** question 8 **or** question 9.
Write your answers in the spaces provided on the Question Paper.

You are advised to spend no longer than one hour on Section A.
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	
Section C	
Total	

This document consists of **12** printed pages.

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Section A

Answer **all** questions in this section.

Write your answers in the spaces provided.

1 A student was asked to make a model of a plant cell. She took a length of tubing made from a substance that allows only water molecules to pass through and enclosed it in a flexible permeable membrane as shown in Fig. 1.1.

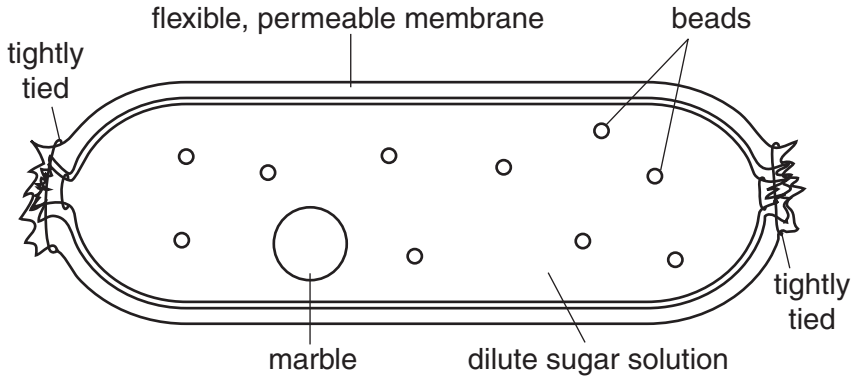


Fig. 1.1

(a) Name the structures found in a plant mesophyll cell that are best represented by the following items used in her model:

the marble .....

the beads .....

the tubing .....[3]

(b) State a structure found in a plant cell that is **not** represented in the student's model.

.....[1]

(c) The student then placed her model into a concentrated sugar solution for half an hour.

State and explain the similarities between what might happen to her model during that time and what would happen to a plant cell placed in the same solution.

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.....[6]

[Total: 10]

2 Fig. 2.1 shows the chromosomes present in the nucleus of a human cell.

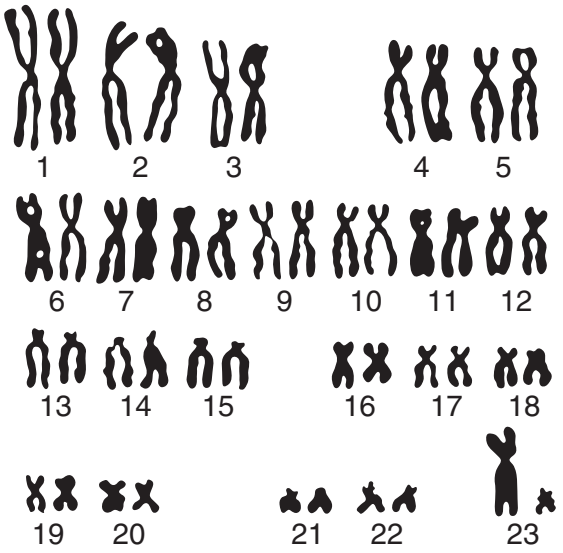


Fig. 2.1

(a) Name the chemical contained within a chromosome that is responsible for inheritance.

.....[1]

(b) **(i)** Name the type of cell division that occurs only in the sex organs to produce gametes.

.....[1]

(ii) State how many chromosomes would be present in a gamete from this person.

..... [1]

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Fig. 2.2 shows the chromosomes present in the nucleus of a cell from a different person.

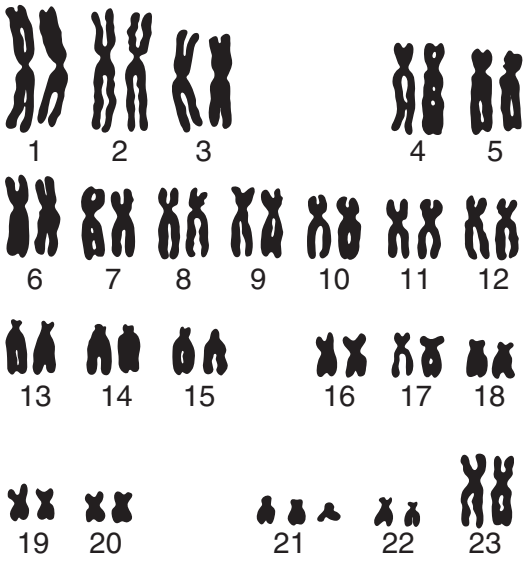


Fig. 2.2

(c) State the sex of this person and explain your answer.

sex .....

explanation .....[2]

(d) Suggest a condition which the person whose chromosomes are shown in Fig. 2.2 has and explain your answer.

condition .....

explanation .....

.....[3]

(e) Suggest why offspring that are produced by crossing two different species are usually infertile.

.....

.....

.....

.....[2]

[Total: 10]

3 The following is a list of terms associated with a person's responses. Each term is identified by a letter.

A – brain	**F** – motor neurone
B – contraction	**G** – muscle
C – gland	**H** – receptor
D – hormone	**I** – sensory neurone
E – impulse	**J** – spinal cord

(a) **Using their identifying letters only**, place the terms in the order in which they are involved in the following:

(i) Peeling an onion causes a student's eyes to water.

.....[2]

(ii) A student decides to open a book.

.....[1]

(iii) A student hears a sudden loud noise and, shortly afterwards, his heart beats faster.

.....

.....[2]

(b) Name the type of response involved in **(a)(i)** and **(a)(ii)**.

(a)(i) .....

(a)(ii) .....[2]

(c) Describe how responses involving the nervous system differ from those that involve the effects of hormones.

.....

.....

.....

.....[3]

[Total: 10]

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4 Fig. 4.1 shows a flower with some of its parts removed.

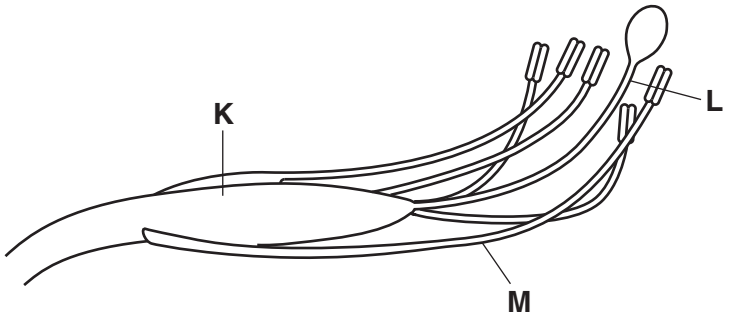


Fig. 4.1

(a) Identify structures **K**, **L** and **M** on Fig. 4.1.

K .....

L .....

M ..... [3]

(b) Name two different structures that have been removed from the flower.

1. .....

2. .....[2]

(c) Use a line labelled **X** to indicate where the pollen is deposited when pollination occurs. [1]

(d) **(i)** Suggest the most likely method by which pollination in carried out in this flower.

.....[1]

(ii) State two features **not shown in Fig. 4.1** that would confirm your answer to **(d)(i)**.

1. .....

2. .....[2]

[Total: 9]

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5 Table 5.1 shows the relative amounts of fatty acids and amino acids found in a person's alimentary canal as the contents of a meal, that contained neither of these chemicals, pass through.

Table 5.1

region of alimentary canal	fatty acids	amino acids
oesophagus	low	low
stomach	low	increasing
duodenum	increasing	increasing
ileum	decreasing	decreasing
colon	low	low

(a) Name the process that causes food to move through the alimentary canal.

.....[1]

(b) Name the constituent of a healthy diet that provides the greatest amount of energy per unit mass.

.....[1]

(c) Explain the changes in the amounts of fatty acids

(i) in the duodenum,

.....

.....

.....[3]

(ii) in the ileum.

.....

.....[2]

(d) (i) Explain why the amount of amino acids began to decrease in the ileum.

.....

.....[1]

(ii) Suggest why the amount of amino acids continued to increase in the duodenum.

.....

.....

.....[3]

[Total: 11]

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Section B

Answer **all** questions in this section.

Write your answers in the spaces provided.

6 Explain the importance to a plant of

(a) the distribution of its chloroplasts

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.....[4]

(b) the presence of stomata

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.....[3]

(c) the position of its vascular bundles

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.....

.....[3]

[Total: 10]

7 Describe how blood is made to flow in a continuous circulation around the body with reference to

(a) the heart

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.....[4]

(b) the arteries

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.....[3]

(c) the veins

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.....

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.....[3]

[Total: 10]

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Section C

Answer **either** question 8 **or** question 9.

Write your answer in the spaces provided.

8 **(a)** Describe how anaerobic respiration in muscles differs from anaerobic respiration in yeast.

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.....[3]

(b) Describe the part played by the cells lining the trachea.

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.....[3]

(c) Explain what may happen to the cells lining the trachea in a smoker, and how this may affect the person's health.

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.....[4]

[Total: 10]

9 **(a)** Describe how energy enters and then flows through a biological system.

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.....[4]

(b) **(i)** Explain how energy is made available in cells.

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.....[2]

(ii) State the uses of energy in the human body.

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.....[4]

[Total: 10]

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