

FOR OFFICIAL USE

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G

KU	PS

Total Marks

0300/401

NATIONAL
QUALIFICATIONS
2007

MONDAY, 21 MAY
9.00 AM – 10.30 AM

BIOLOGY
STANDARD GRADE
General Level

Fill in these boxes and read what is printed below.

Full name of centre

Town

Forename(s)

Surname

Date of birth

Day Month Year

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Scottish candidate number

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Number of seat

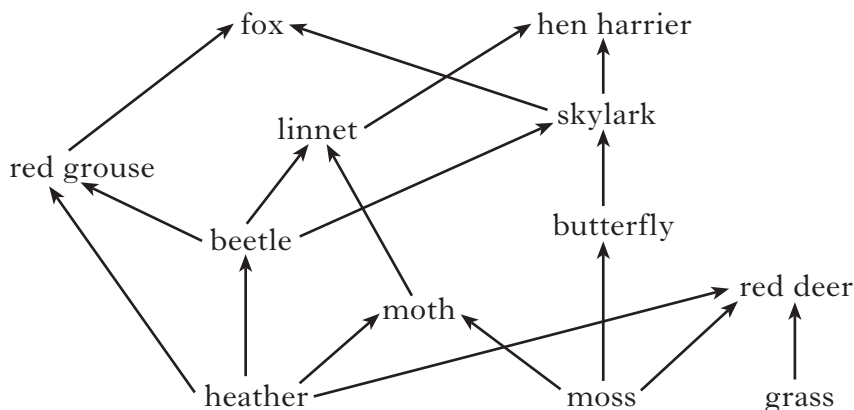
- 1 All questions should be attempted.
- 2 The questions may be answered in any order but all answers are to be written in the spaces provided in this answer book, and must be written clearly and legibly in ink.
- 3 Rough work, if any should be necessary, as well as the fair copy, is to be written in this book. Additional spaces for answers and for rough work will be found at the end of the book. Rough work should be scored through when the fair copy has been written.
- 4 Before leaving the examination room you must give this book to the invigilator. If you do not, you may lose all the marks for this paper.



Marks

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1. The diagram shows a food web from a moorland ecosystem.



(a) The following statements refer to the food web.

Complete the table by entering “**T**” when the statement is true, and “**F**” when the statement is false.

<i>Statement</i>	<i>T or F</i>
Linnets are eaten by beetles and moths.	
Foxes and hen harriers are not eaten by anything.	
Butterflies are eaten by skylarks which are eaten by foxes.	

(b) Give an example of a producer and a consumer from the food web.

Producer _____

Consumer _____

(c) Which plant provides energy for the greatest number of different species in this food web?

(d) Give **two** ways in which energy can be lost from this food web.

1 _____

2 _____

Marks

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2. (a) The phrases below refer to man's influence on natural resources.

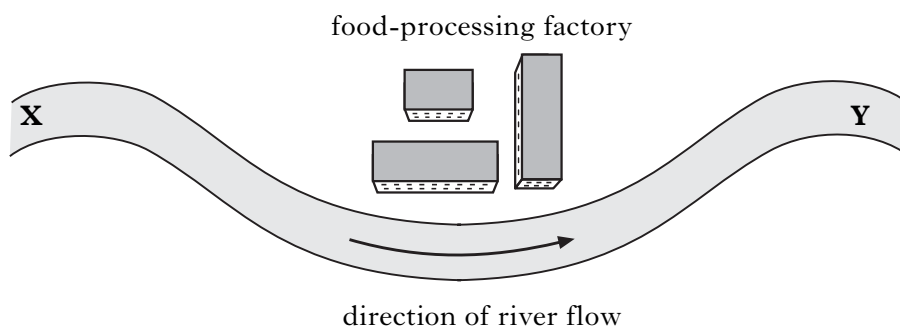
- 1 Overgrazing by too many animals in one area
- 2 Air pollution by sulphur dioxide released by burning fossil fuels
- 3 Overfishing by modern fishing boats

Choose **one** of the phrases and describe a problem which may result from it.

Phrase number _____

Problem _____

(b) The diagram shows the position of a food-processing factory beside a river.



The factory accidentally released organic waste into the river.

Water samples were taken from points **X** and **Y** and analysed for the numbers of micro-organisms and oxygen concentration.

(i) Complete the following sentence by underlining the correct word in each bracket.

Water samples from point **X** had $\left\{ \begin{array}{l} \text{more} \\ \text{fewer} \end{array} \right\}$ micro-organisms and a $\left\{ \begin{array}{l} \text{higher} \\ \text{lower} \end{array} \right\}$ oxygen concentration than samples from point **Y**.

(ii) What does the organic waste provide for the micro-organisms in the river?

[Turn over

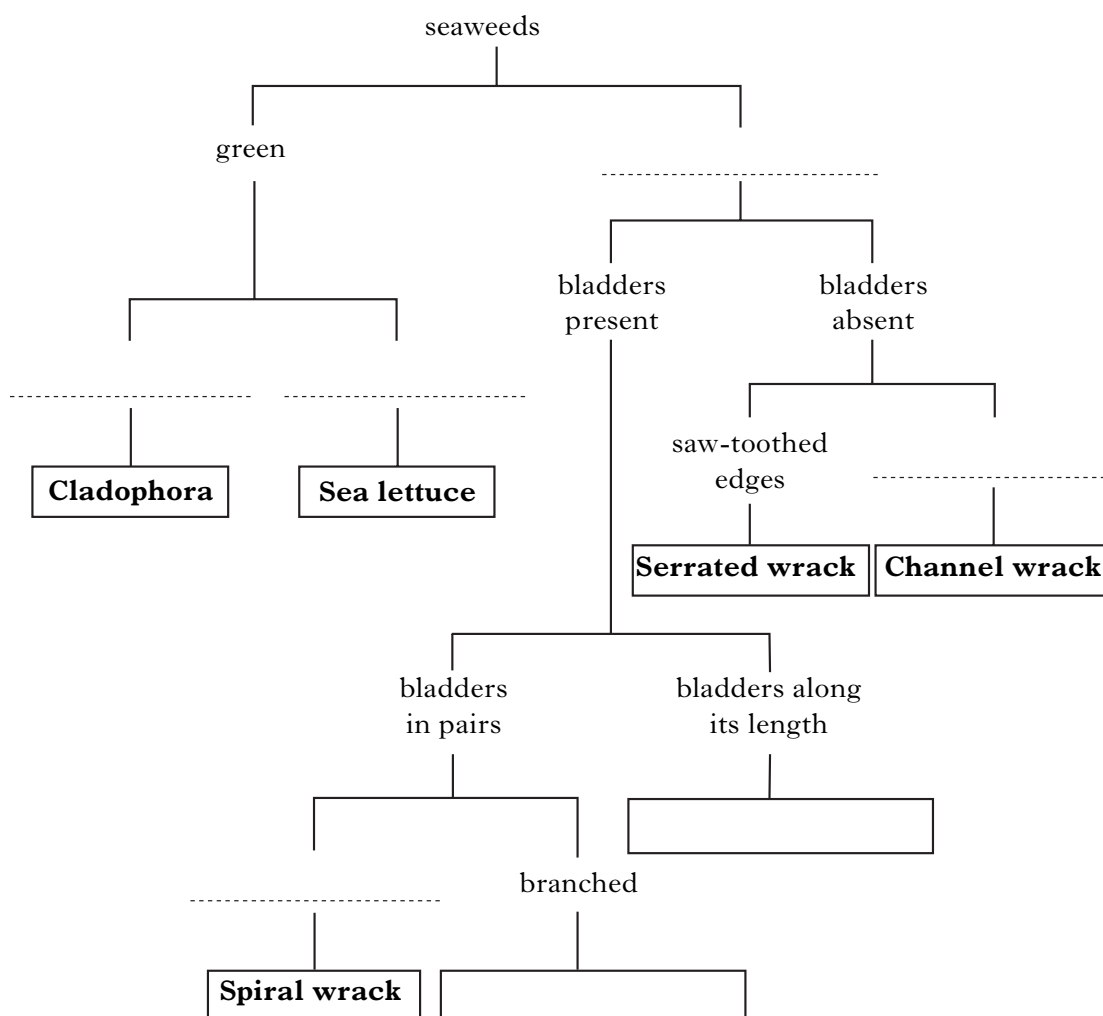
Marks

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3. Some features of common seaweeds are shown in the table below.

<i>Seaweed</i>	<i>Colour</i>	<i>Shape</i>	<i>Bladders</i>
Bladder wrack	brown	branched	in pairs
Channel wrack	brown	grooved	absent
Cladophora	green	long and thin	absent
Egg wrack	brown	branched	along its length
Sea lettuce	green	flat	absent
Serrated wrack	brown	saw-toothed edges	absent
Spiral wrack	brown	twisted	in pairs

(a) (i) Use the information in the table to complete the key below by writing the correct feature on each dotted line and the correct seaweed names in the empty boxes.



3

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1		

3. (a) (continued)

(ii) Describe **two** differences between Sea lettuce and Spiral wrack.

1 _____

2 _____

(iii) Describe the features which Bladder wrack and Spiral wrack have in common.

(b) Abiotic factors can affect the community of seaweeds that grow on a rocky shore.

Identify **two** abiotic factors from the list below.

Tick (✓) the correct boxes

temperature

competition

light intensity

grazing by limpets

disease

[Turn over

Marks

4. There are four major groups of plants. Features used to identify members of each group include the presence of a transport system, the shape of their leaves and their method of reproduction.

Flowering plants and the conifers reproduce using seeds. They both have transport systems but they differ in the shape of their leaves. Conifers have needle-like leaves whereas the leaves of flowering plants are either narrow or broad. Mosses don't have any true leaves or transport systems. Ferns have transport systems and feathery leaves but they reproduce using spores, as do the mosses.

- (a) Use the information above to complete the table about the plant groups.

<i>Plant group</i>	<i>Transport system</i>	<i>Leaves</i>	<i>Structures used in reproduction</i>
	absent	no true leaves	
Ferns			spores
Conifers			seeds
	present	narrow or broad	

- (b) One type of transport system in plants carries water from the roots to the leaves.

- (i) Name the type of tissue involved in this transport system.

- (ii) Describe a function of a different transport system in plants.

- (c) Some plants are useful to humans.

State a use by humans of a named plant.

Plant _____

Use _____

3

1

1

1

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9. Read the following passage and answer the questions based on it.

Alexis St. Martin – Human Guinea Pig

In 1822, a 20 year old Canadian fur trapper called Alexis St. Martin was accidentally injured by a shotgun. His abdomen and stomach were blasted open. He survived thanks to prompt treatment by a local doctor. His stomach did not fully heal and Alexis was left with an opening to his stomach which the doctor covered with a leather flap.

The doctor was a keen scientist and carried out more than 60 experiments on his patient. In one experiment he tied lumps of food to a silk thread and pushed them into Alexis’ stomach. Each hour he pulled them out to see what the stomach juices had done to the food, carefully recording the results. A piece of boiled beef was half the original size after 1 hour and completely gone after 2 hours. A piece of raw beef was digested in exactly the same manner.

In another experiment, the doctor removed some of the digestive juices from Alexis’ stomach and put them into a glass tube. A piece of boiled beef was put into the tube and kept at body temperature. It showed little change after 1 hour, was only half gone in 2 hours and disappeared after 4 hours.

Despite his injuries Alexis led a long and healthy life. He married and had six children. He survived to the age of 86, outliving the doctor by many years.

(a) What was the purpose of the silk thread?

1

(b) Why did the doctor keep the experiment in the glass tube at body temperature?

1

(c) How long did Alexis live after the shotgun accident?

Space for calculation

_____ years

1

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1		
1		
1		

10. (a) (i) What effect does cell division have on the number of cells in the human body?

(ii) What part of a cell controls cell division?

(b) The following phrases describe stages in cell division.

Stage P—Chromosomes line up at the equator of the cell.

Stage Q—Nuclear membranes form and cytoplasm divides.

Stage R—Chromatids separate and move to opposite ends of the cell.

Stage S—Each chromosome doubles itself and appears as coiled threads.

Use the letters to arrange the stages into the correct order.

First stage _____

Second stage _____

Third stage _____

Fourth stage _____

(c) A cell divides every 20 minutes. How many cells would be produced from one original cell at the end of two hours?

Space for calculation

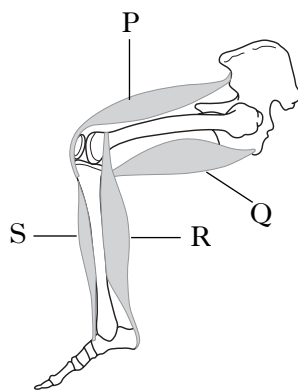
_____ cells

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1	
	1

13. (continued)

(c) The diagram shows some of the muscles in a human leg.



(i) Which muscle contracts to straighten the leg?

(ii) What is the name of the structures which attach the muscles to bones?

[Turn over

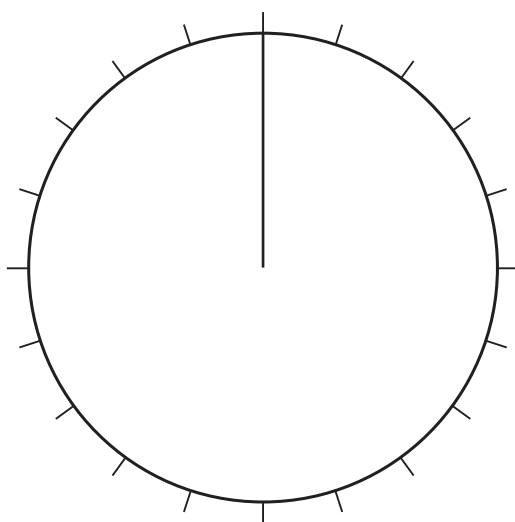
Marks

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1		

18. The eye colours of 160 school pupils are shown in the table below.

<i>Eye colour</i>	<i>Number of school pupils</i>
brown	80
green	24
blue	48
grey	8

- (a) Complete the pie chart to show this information.
(An additional chart will be found, if needed, on page 29.)



- (b) What type of variation is shown by eye colour?

- (c) What percentage of the school pupils had green eyes?

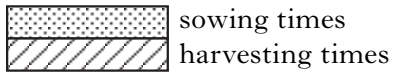
Space for calculation

_____ %

[END OF QUESTION PAPER]

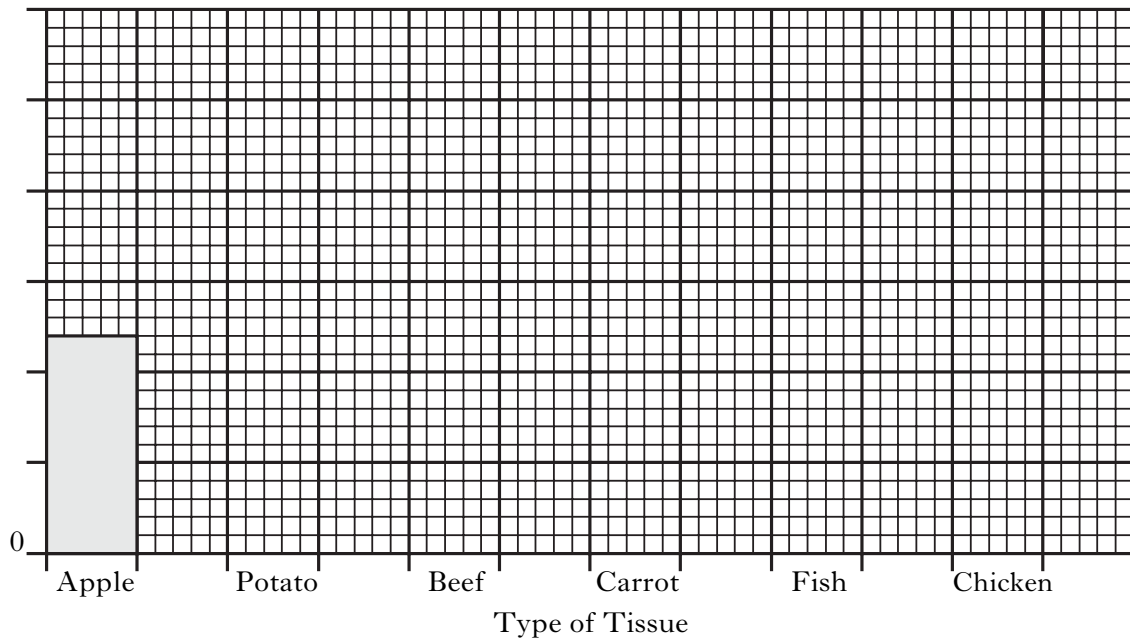
SPACE FOR ANSWERS
AND FOR ROUGH WORKING

ADDITIONAL CHART FOR QUESTION 6(a)



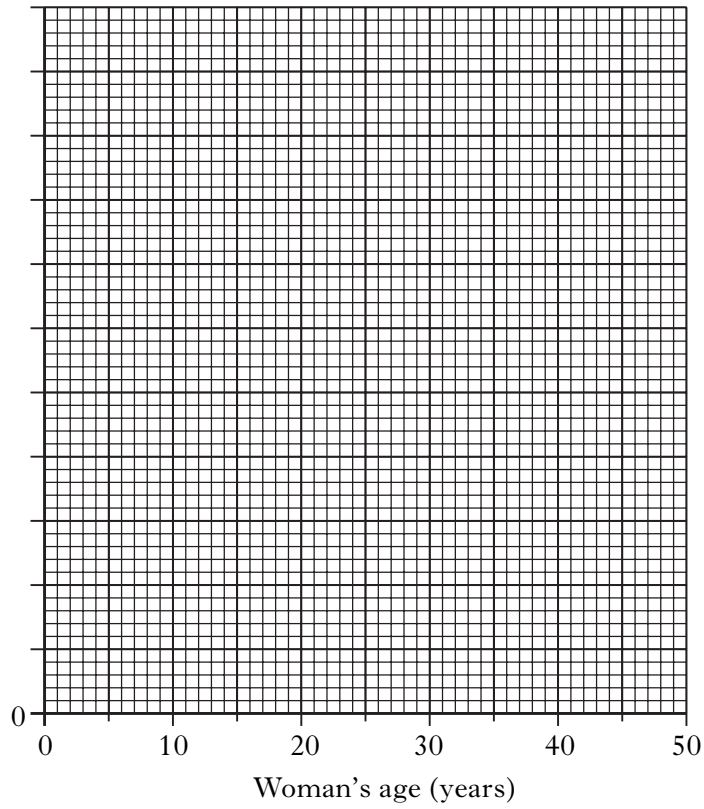
Vegetable	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Beetroot			[Dotted]			[Hatched]						
Carrot	[Hatched]		[Dotted]					[Hatched]				
Cauliflower		[Hatched]			[Dotted]							
Leek	[Hatched]		[Dotted]					[Hatched]				
Onion			[Dotted]			[Hatched]						
Parsnip												

ADDITIONAL GRAPH PAPER FOR QUESTION 12(c)(ii)

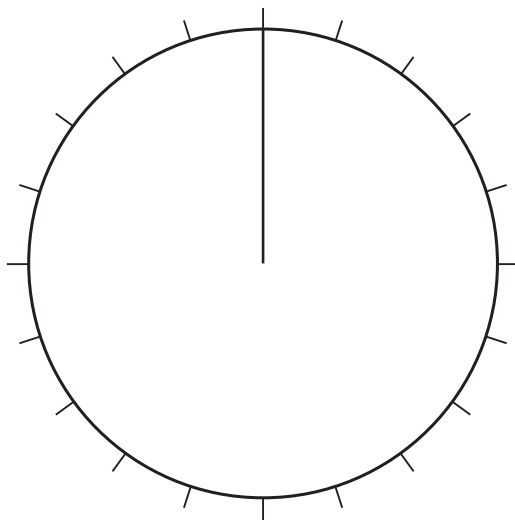


SPACE FOR ANSWERS
AND FOR ROUGH WORKING

ADDITIONAL GRAPH PAPER FOR QUESTION 15(d)(ii)



ADDITIONAL CHART PAPER FOR QUESTION 18(a)



SPACE FOR ANSWERS
AND FOR ROUGH WORKING

SPACE FOR ANSWERS
AND FOR ROUGH WORKING

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