Rewarding Learning

Centre Number	
71	

Candidate Number

General Certificate of Secondary Education
2011

Science: Double Award (Modular)

Paper 1
Foundation Tier

[G8201]

G8201

THURSDAY 19 MAY, AFTERNOON

TIME

1 hour.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all five** questions.

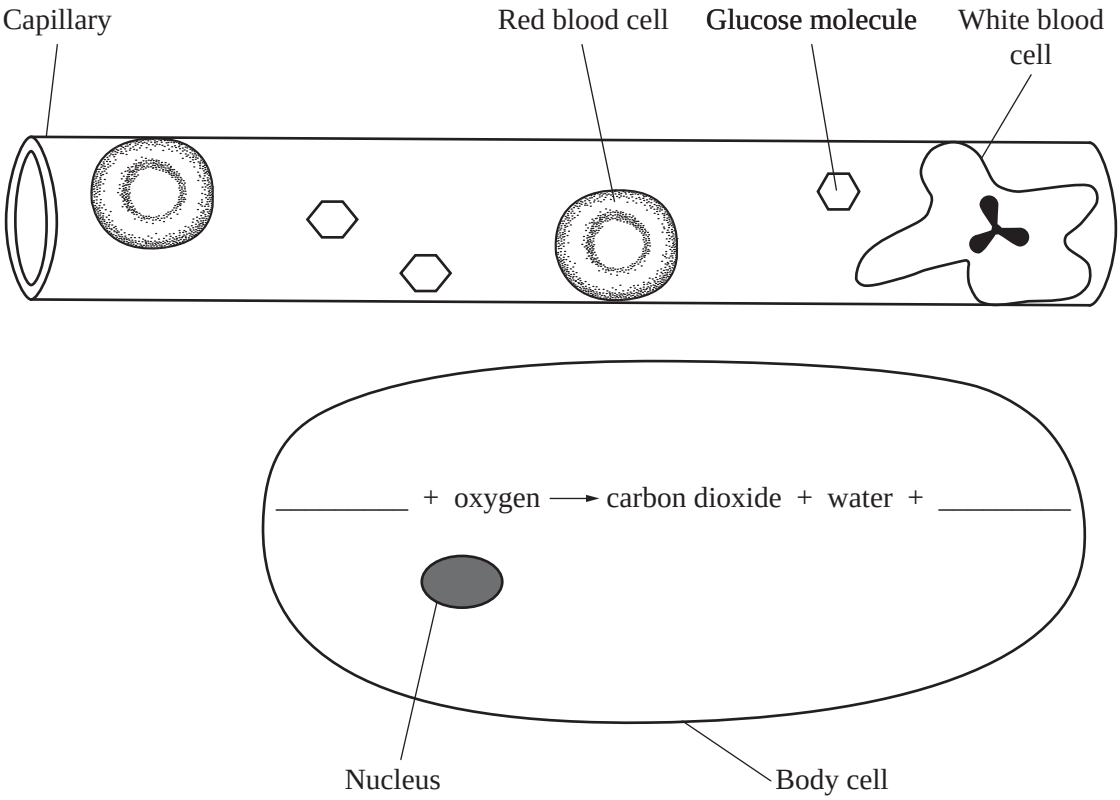
INFORMATION FOR CANDIDATES

The total mark for this paper is 80.
Quality of written communication will be assessed in question **2(c)**.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
Details of calculations should be shown.
Units must be stated in numerical answers where appropriate.

For Examiner's use only	
Question Number	**Marks**
1	
2	
3	
4	
5	
Total Marks	

Examiner Only	
Marks	Remark

1 **(a)** The diagram shows a blood capillary and a body cell.



(i) Complete the word equation for respiration in the body cell. [2]

(ii) How is oxygen carried in the blood capillary?

_____ [1]

(iii) What happens to the carbon dioxide immediately after it has been produced in the body cell?

_____ [1]

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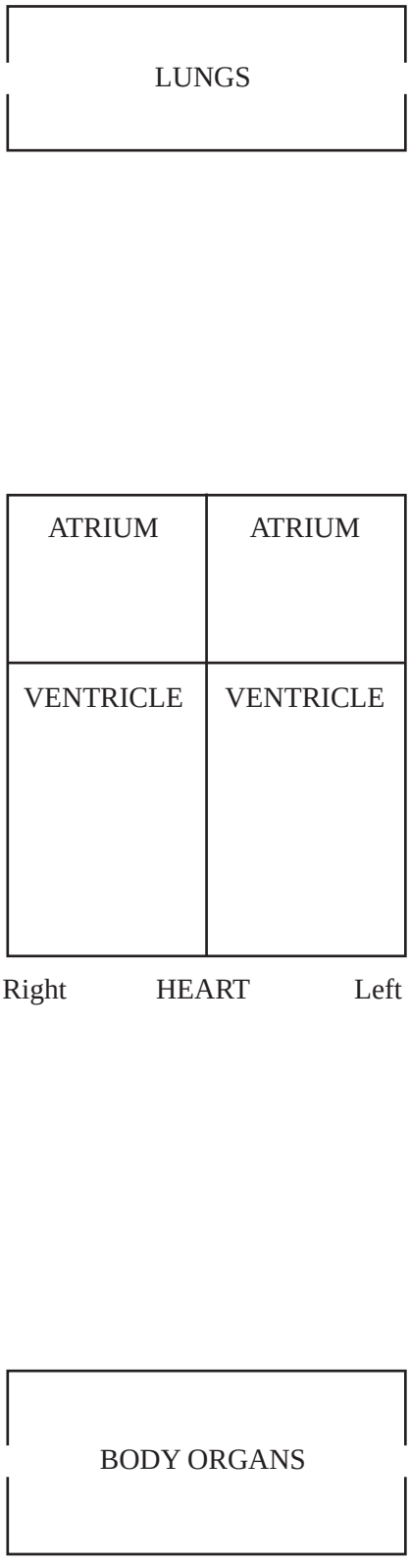
(Questions continue overleaf)

(b) The diagram shows the lungs, heart and body organs of a mammal.



Examiner Only	
Marks	Remark

(i) Complete the diagram by drawing four blood vessels to show the circulation of blood from:

- the body organs to the heart – label as A
- the heart to the lungs and back – label both as B
- heart to the body organs – label as C. [4]

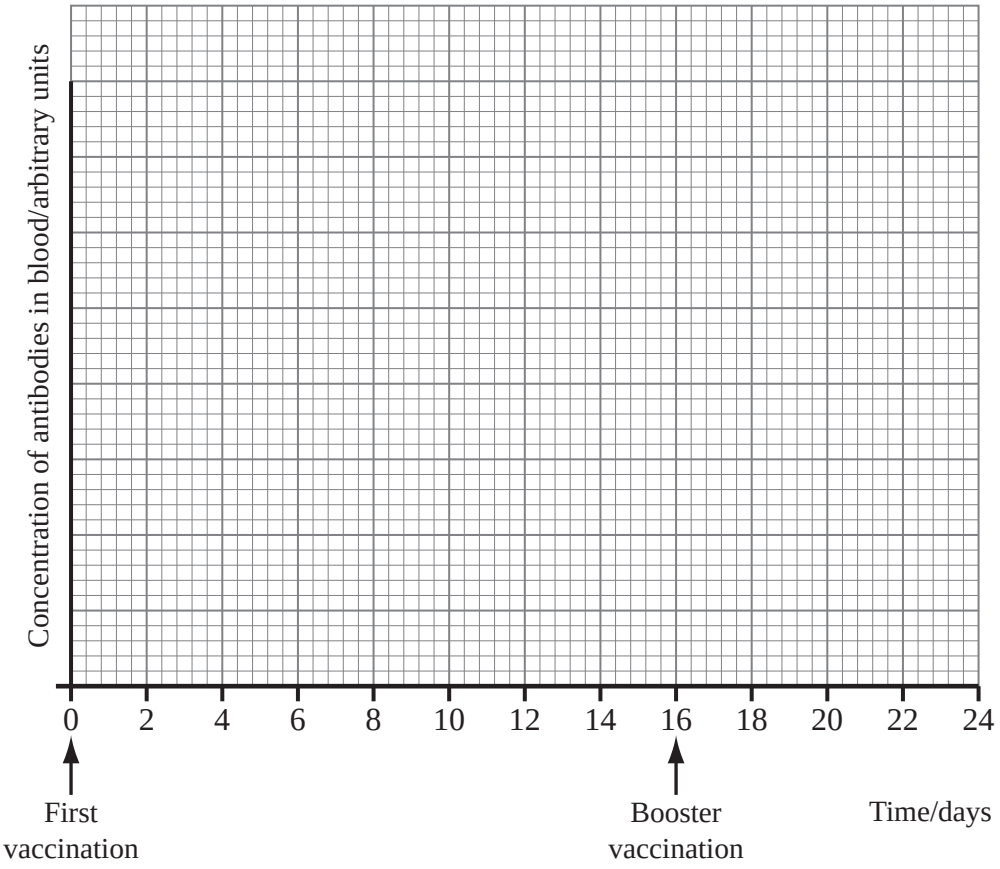
(ii) Name the largest artery in the body. _____ [1]

(iii) Explain why the left ventricle has the thickest muscular wall.

_____ [1]

(c) Some white blood cells in the body provide immunity by producing antibodies. Most vaccinations introduce a modified disease-causing organism into the body.

Draw a line to show what happens to the concentration of antibodies following a vaccination and a subsequent booster vaccination.



[5]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

2 **(a)** The diagrams below show a reproductive cell from a male and a reproductive cell from a female.

Cell A

Cell B

(i) Name each type of cell.

Cell A _____

Cell B _____ [2]

(ii) Where in the human body is each type of cell produced? Choose your answers from the list below.

Uterus, Ovary, Penis, Vagina, Scrotum, Testes.

Cell A _____

Cell B _____ [2]

(iii) Name the process that occurs when cell A and cell B join.

_____ [1]

(b) When the nucleus of cell A has joined with the nucleus of cell B, the cell undergoes division and develops into a baby.

(i) Where in the body does the baby develop? You can choose your answer from the list in **(a) (ii)**.

_____ [1]

(ii) Approximately how long does it take for a baby to develop fully?

_____ months [1]

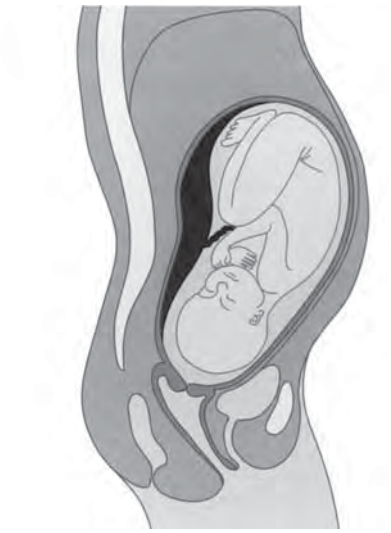
(iii) Before it is born, a baby depends on its mother for nutrients and oxygen. Name one type of nutrient that the baby receives from its mother.

_____ [1]

Examiner Only	
Marks	Remark

(c) The diagram shows a baby just before it is born.

Examiner Only	
Marks	Remark



Use the diagram and your knowledge to describe the process of birth.

The quality of written communication will be assessed in this question.

_____

_____

_____

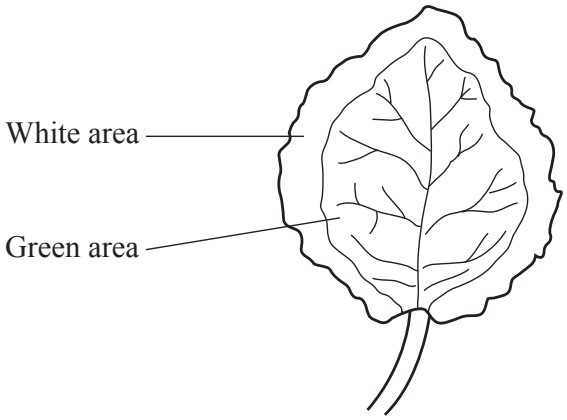
_____

_____ [3]

Quality of written communication [2]

Examiner Only	
Marks	Remark

3 **(a)** The diagram shows a variegated leaf.



(i) Name the chemical that is used to test for starch. _____ [1]

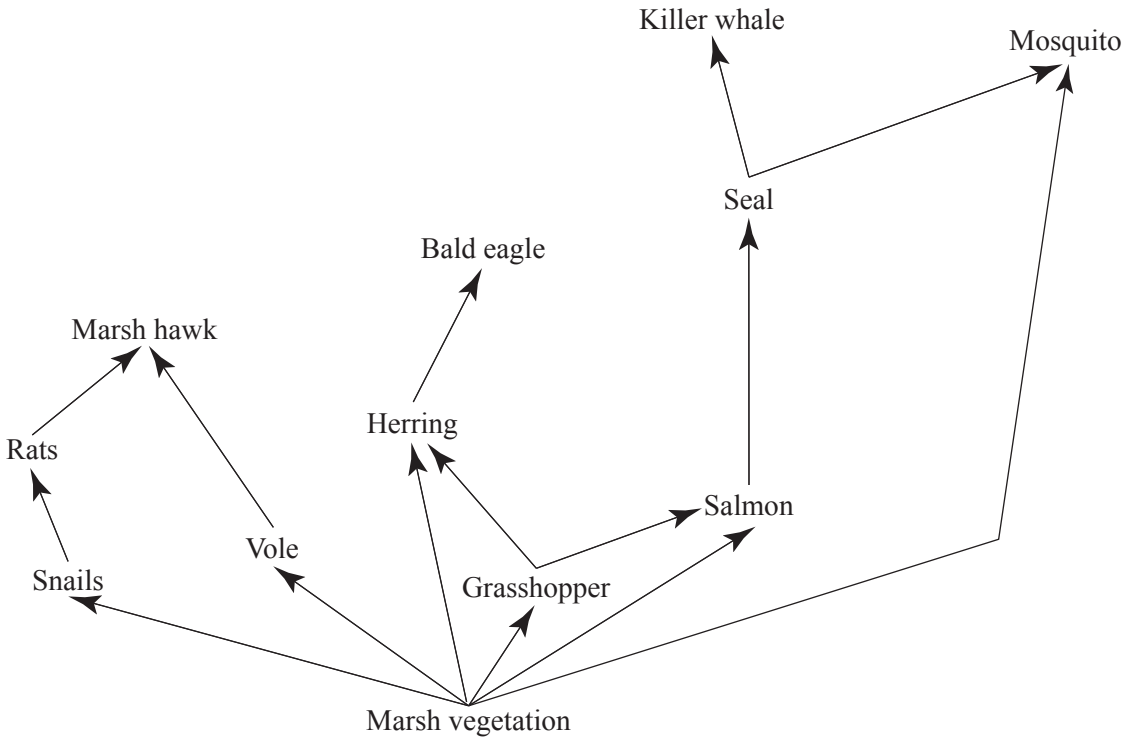
(ii) Complete the diagram by shading the area where you would expect to find starch. [1]

(iii) Explain why you would expect to find starch in this area.

_____

_____ [2]

(b) The diagram shows a food web.



http://www.acklamgrange.org.uk/science/topics/food_web3.jpg

(i) What is the source of energy for this food web?

_____ [1]

(ii) At what two trophic levels is the herring feeding?

_____ and _____ [1]

(iii) Draw the food chain from the food web where the bald eagle is acting as a tertiary consumer.

[2]

Examiner Only

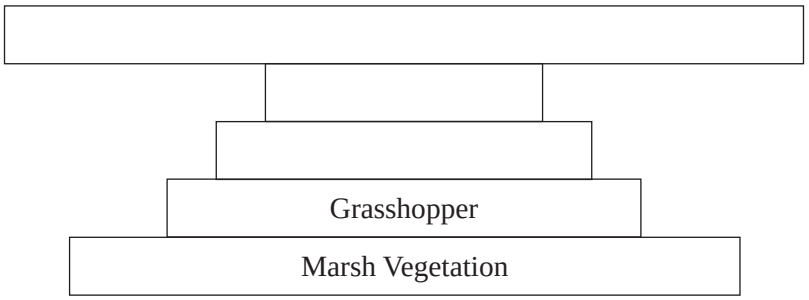
Marks	Remark

(iv) Suggest how the population of salmon might be affected if the herring population was wiped out by overfishing. Explain your answer.

Effect _____ [1]

Explanation _____ [1]

A pyramid of numbers for one of the food chains in the food web is shown below.



(v) Complete the labels on the pyramid with the correct name of the organisms in the food chain. [2]

(vi) On the grid, draw a pyramid of biomass from the pyramid of numbers above.

Beside each level write the name of the organism.

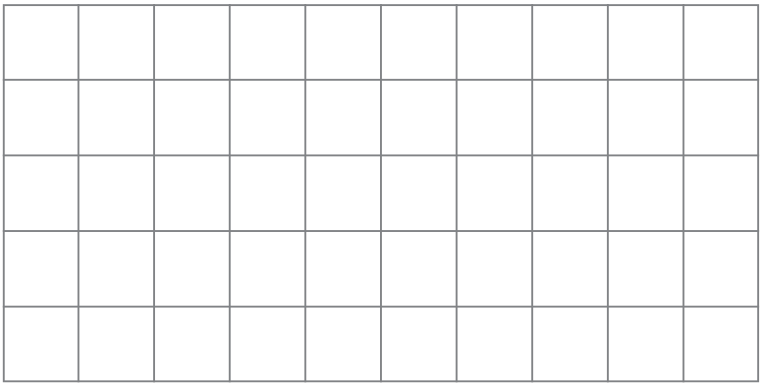
_____

_____

_____

_____

_____

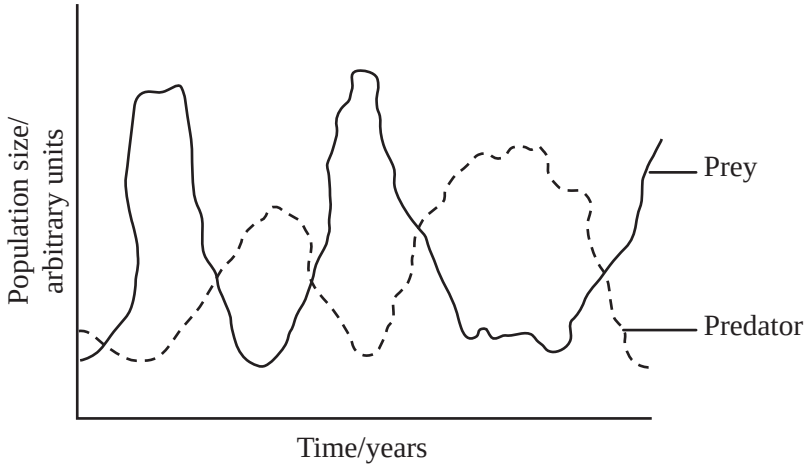


[4]

Examiner Only

Marks	Remark

(c) The graph shows the population size of a predator and its prey, over a number of years.



© http://scienceaid.co.uk/biology/ecology/predation.html

Use the graph and your knowledge to answer the following questions.

(i) What effect does an increase in the predator population have on the population of the prey? Explain your answer.

Effect on prey population _____ [1]

Explanation _____ [1]

There are a number of factors that can lead to a change in population size.

(ii) Complete the table to show how each factor will affect the population size.

Factor	Effect on population size
Immigration	
Birth rate higher than death rate	
Disease	

[3]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

4 **(a)** Burning of fossil fuels is known to cause pollution.

(i) Some types of pollution caused by fossil fuels are listed below. Draw lines to match the type of pollution to the correct effect.

Type of pollution	Effect
Carbon dioxide	Acid rain
Soot	Reduces photosynthesis in plants
Sulphur dioxide	Global warming

[3]

(ii) Name **two** alternative energy sources that could be used instead of fossil fuels, to help reduce pollution.

1. _____

2. _____ [2]

(b) Melanie would like to recycle more.

(i) Suggest how Melanie could recycle

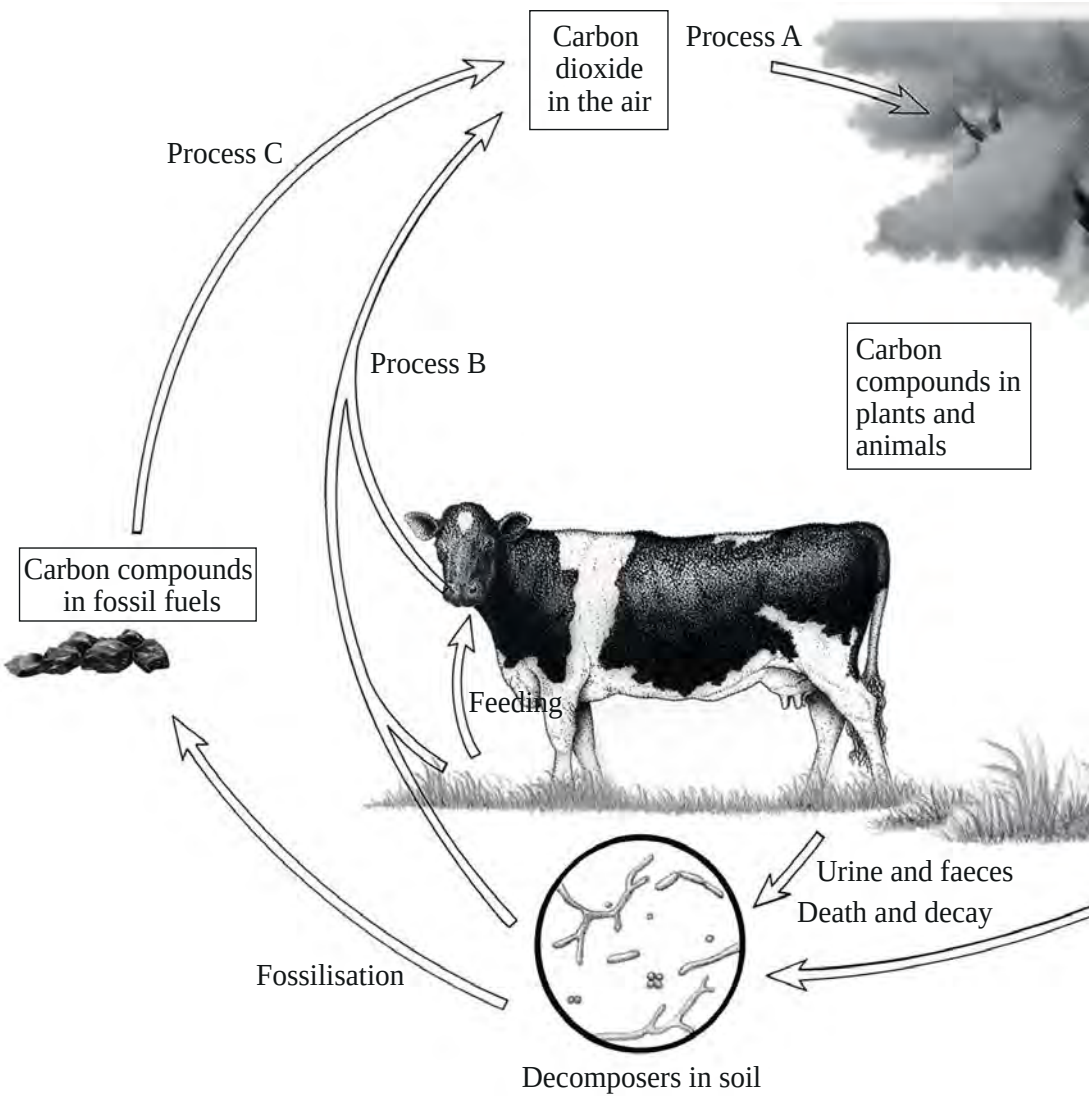
- glass bottles _____
- vegetable peelings _____[2]

(ii) Suggest **two** benefits, to the environment, of recycling.

1. _____

2. _____ [2]

(c) The diagram shows part of the carbon cycle.



Use the diagram to give the correct name of the processes A, B and C from the list below.

- Combustion (burning)
- Photosynthesis
- Respiration

Process A _____

Process B _____

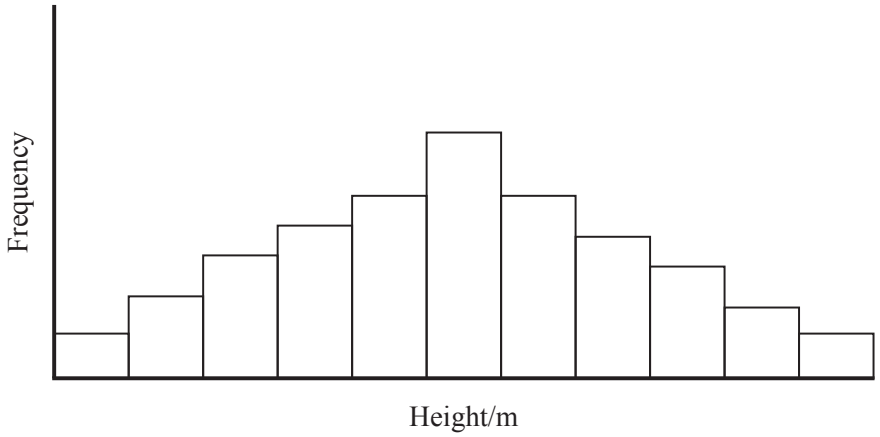
Process C _____ [3]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

5 **(a)** The graph shows how height in a population of animals varies. Height is an example of continuous variation.



(i) State the **two** causes of height variation in this population

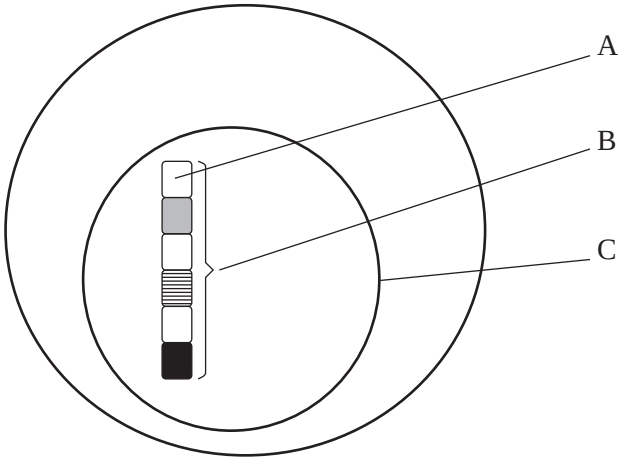
_____ and _____ [2]

(ii) Suggest the effect on the height average of future populations if the smallest animals couldn't compete for food.

_____ [1]

Examiner Only	
Marks	Remark

(b) Genes are short lengths of DNA that control a characteristic.
A number of genes make up a chromosome.
Chromosomes are found in the nucleus of a cell. The diagram shows these structures in a cell.



Use this information and your knowledge to name structures A, B and C.

A _____

B _____

C _____ [3]

(c) Some genes control cell division. If these genes are damaged, cancer may result.

(i) What type of cancer is caused when ultra-violet light damages genes?

_____ [1]

(ii) Suggest **two** ways of reducing the risk of developing this type of cancer.

1. _____

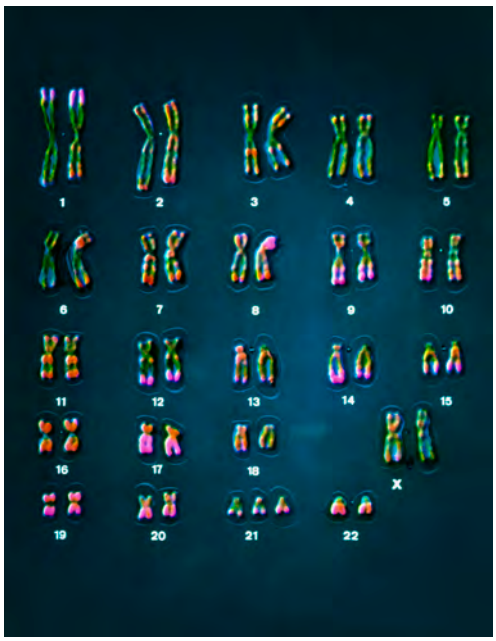
2. _____ [2]

Examiner Only	
Marks	Remark

(d) Some conditions such as Down's syndrome are inherited.

(i) Name **one** other inherited condition. _____ [1]

The photograph shows chromosomes from a cell of a child with Down's syndrome.



Use the information in the photograph and your knowledge to answer the following questions.

(ii) How can you tell that this child has Down's syndrome?

_____ [1]

(iii) What is the gender (sex) of this child? Explain your answer.

Gender _____

Explanation _____ [2]

Examiner Only	
Marks	Remark

(e) The colour of the spots in Dalmatian dogs is determined by a gene. The allele (gene) for black spots is dominant to the allele (gene) for brown spots.

© iStockphoto / Thinkstock

Let B represent the allele (gene) for black spots.
Let b represent the allele (gene) for brown spots.

A Dalmatian which is heterozygous for black spots is crossed with a Dalmatian with brown spots.

(i) Give the genotypes for this cross.

Heterozygous Black spotted Dalmatian	×	Brown spotted Dalmatian
_____		_____ [2]

(ii) Use a Punnett square to show the possible genotypes of the offspring.

[2]

(iii) Give the phenotypes of the offspring and the ratio of the phenotypes.

Phenotypes _____ and _____

Ratio _____ [2]

THIS IS THE END OF THE QUESTION PAPER

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