Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2011

Science: Double Award (Non-Modular)

Paper 1
Foundation Tier

[G8401]

G8401

THURSDAY 19 MAY, AFTERNOON

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
Total Marks	

TIME

1 hour 30 minutes.

INSTRUCTIONS TO CANDIDATES

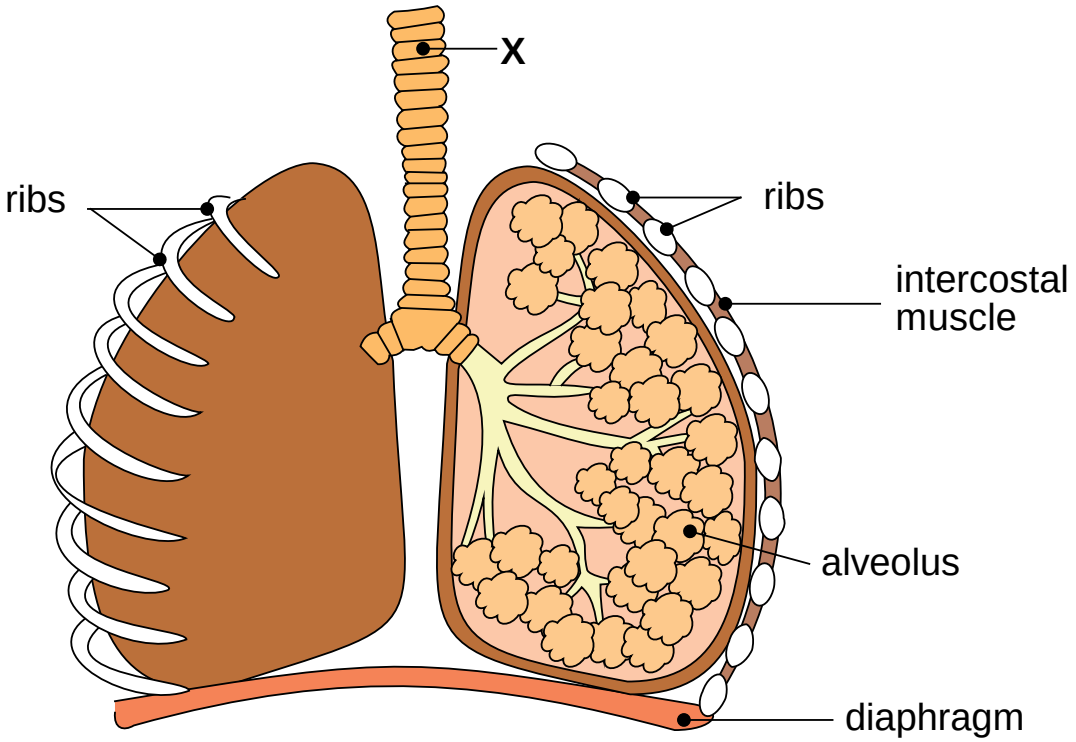
Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all fifteen** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 110.
Quality of written communication will be assessed in question **6(d)**.
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.

Examiner Only	
Marks	Remark

1 The diagram shows the respiratory system.



(a) Name part **X**.

_____ [1]

(b) Name the structure, labelled in the diagram, where gas exchange takes place.

_____ [1]

(c) On the diagram, draw an arrow to show the direction that the diaphragm moves during inspiration (breathing in). [1]

(d) Name the substance, found in cigarette smoke, that causes lung cancer.

_____ [1]

2 After eating a meal the blood sugar level changes.

Examiner Only	
Marks	Remark

(a) Will the blood sugar levels increase, decrease or stay the same after eating a meal?

_____ [1]

(b) Name the chemical that the pancreas produces to control the blood sugar level.

_____ [1]

(c) What type of chemical is this?

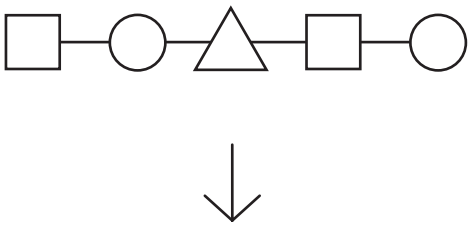
_____ [1]

(d) Name the condition that people suffer from if they can't produce this chemical.

_____ [1]

Examiner Only	
Marks	Remark

3 The diagram shows how amino acids link together to form a protein molecule.



(a) Complete the diagram above to show what happens to this protein molecule during digestion in the stomach and small intestine. [2]

(b) The amino acids will then be absorbed into the blood. Name the process involved.

_____ [1]

(c) Give **two** ways the small intestine is adapted for the process of absorption.

1. _____

2. _____ [2]

4 Melanie is trying to recycle more.

(a) How could she recycle vegetable peelings?

_____ [1]

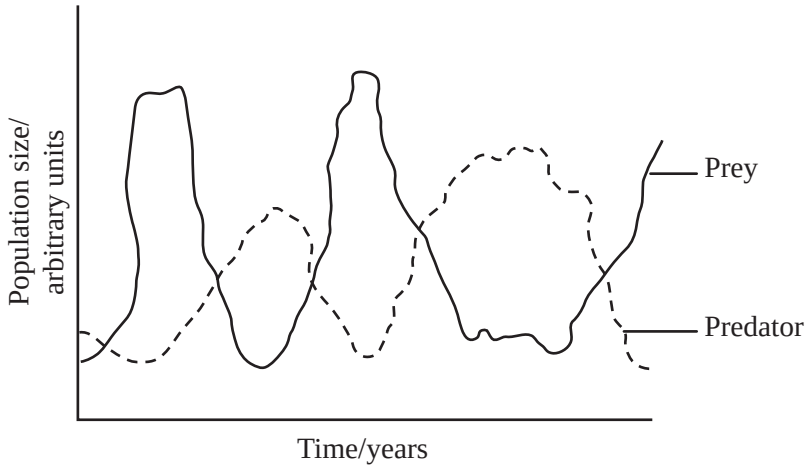
(b) Suggest **two** benefits, to the environment, of recycling.

1. _____

2. _____ [2]

Examiner Only	
Marks	Remark

5 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 question.

(a) 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 lead to a change in population size.

(b) 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

6 The diagram shows a baby just before it is born.

Examiner Only	
Marks	Remark

(a) Where in the body does the baby develop?
Choose your answer from the list below.

Uterus Ovary Vagina Cervix

_____ [1]

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

_____ months [1]

Before it is born, a baby depends on its mother for nutrients and oxygen.

(c) Name one nutrient that the baby receives from its mother.

_____ [1]

Examiner Only	
Marks	Remark

(d) 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

7 The photograph shows the result of plants grown in different light conditions.

The plants in Pot B were grown in the dark.

(a) State **one** difference, shown in the photograph between the plants in Pot A and Pot B.
Explain your answer.

Difference _____ [1]

Explanation _____

_____ [1]

(b) What is the plants' growth response to light called?

_____ [1]

8 The table gives some information about food tests. Complete the table to give the colour of a positive test for simple sugars and protein.

Food	Name of Reagent	Colour at start	Colour of positive test
Starch	Iodine	Brown	Blue-black
Simple sugars	Benedict's	Blue	
Protein	Biuret	Blue	

[2]

9 Explain why, as part of a healthy diet, we should eat more fibre and less saturated fat.

Fibre _____

Saturated fat _____ [2]

10 Water has several functions in a plant. Give **three** functions of water in a plant.

1. _____

2. _____

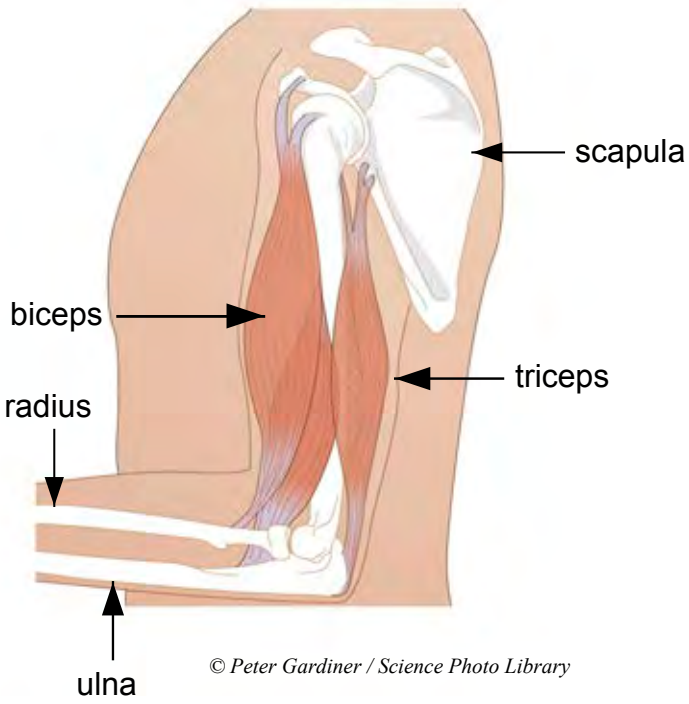
3. _____ [3]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

11 The diagram shows the bones and the biceps and triceps muscles of the arm.



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

(a) Name the **two** bones that the biceps muscle is attached to.

_____ and _____ [2]

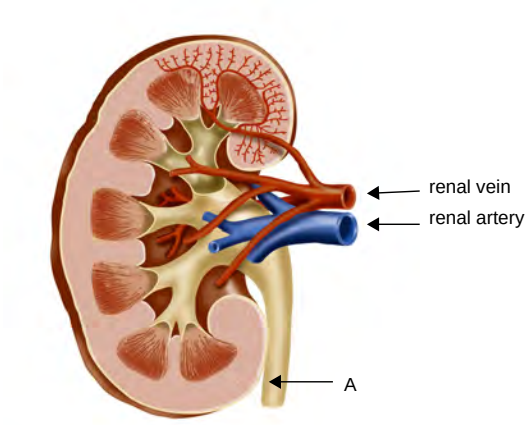
(b) Which muscle must be contracted in order to raise the lower arm?

_____ [1]

(c) What type of cell carries the electrical impulse to the muscle to make it contract?

_____ [1]

12 The diagram shows a section through a kidney. The function of the kidney is to filter waste substances from the blood.



(a) Name part **A**. _____ [1]

(b) Name **two** waste substances filtered from the blood by the kidney.

1. _____

2. _____ [2]

Dialysis is used to treat a person with kidney failure.

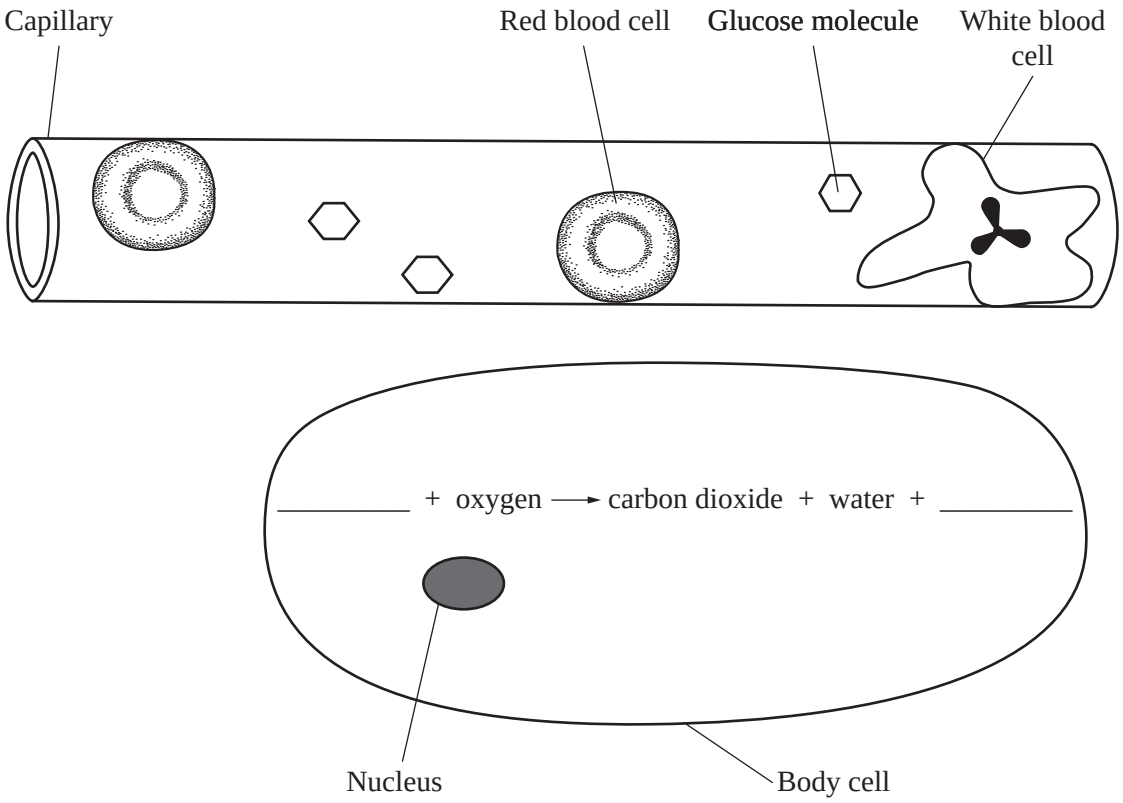
(c) Apart from dialysis, what other treatment may be available to a person with kidney failure?

_____ [1]

Examiner Only

Marks	Remark

13 (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]

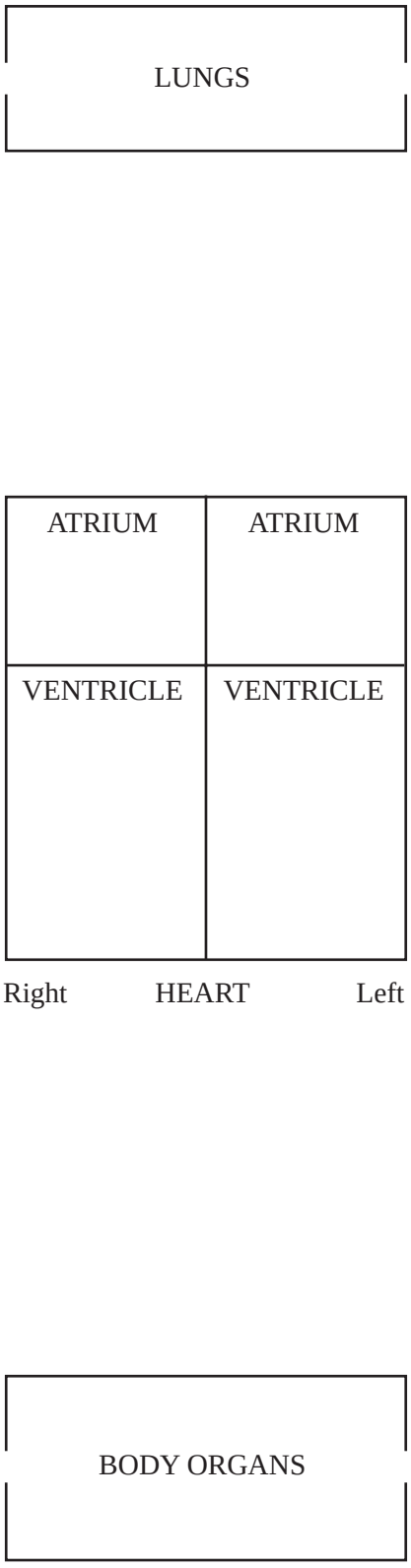
(iii) What happens to the carbon dioxide immediately after it has been produced in the body cell?

_____ [1]

Examiner Only

Marks	Remark

(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]

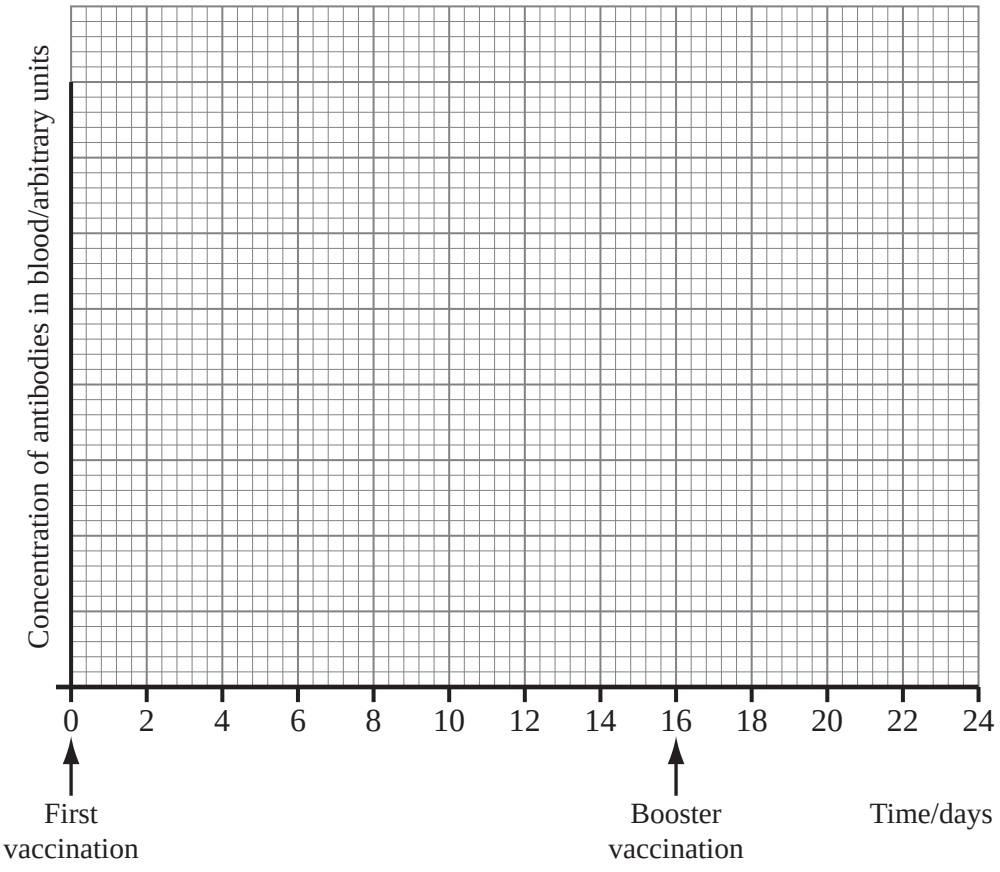
(ii) Name the largest artery in the body. _____ [1]

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

_____ [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.



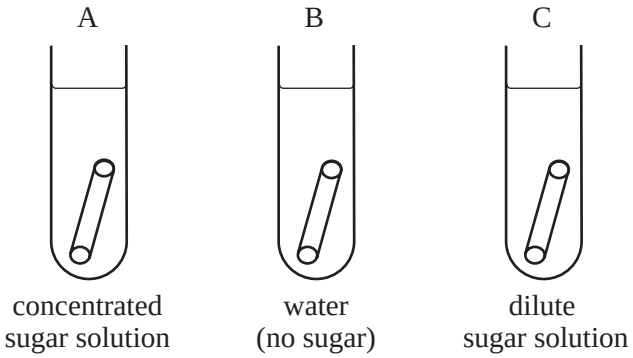
[5]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

(d) An investigation into osmosis was carried out with potato cylinders. Three test tubes A, B and C were set up each with a potato cylinder of 50 mm length and a different concentration of sugar solution. The potato cylinders were left for several hours, removed and their final length recorded. The results are given in the table.



Test tube	Solution	Length of potato cylinder at the start/mm	Length of potato cylinder at the end/mm
A	Concentrated sugar solution	50	48
B	Water (no sugar)	50	53
C	Dilute sugar solution	50	50

(i) Why was it **not** necessary to work out the percentage change in length in this experiment?

_____

_____ [1]

(ii) Give **one** factor that should have been kept constant in this experiment.

_____ [1]

(iii) Explain the results for the potato cylinder in test tube A.

_____

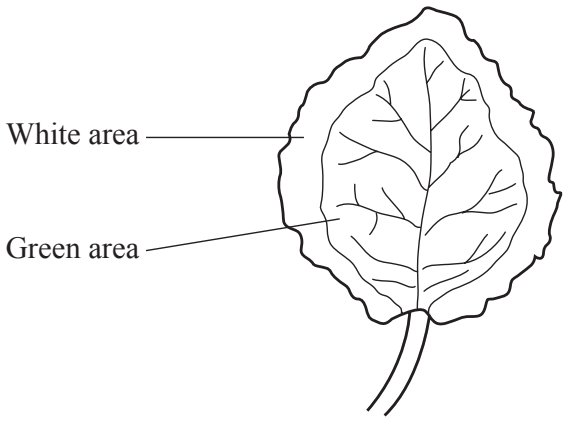
_____ [2]

(iv) Draw a diagram of one potato **cell** from the potato cylinder in test tube A as it would appear at the end of the investigation.

Label the cell membrane, cell wall and vacuole on your diagram.

[4]

14 (a) The diagram shows a variegated leaf.



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

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

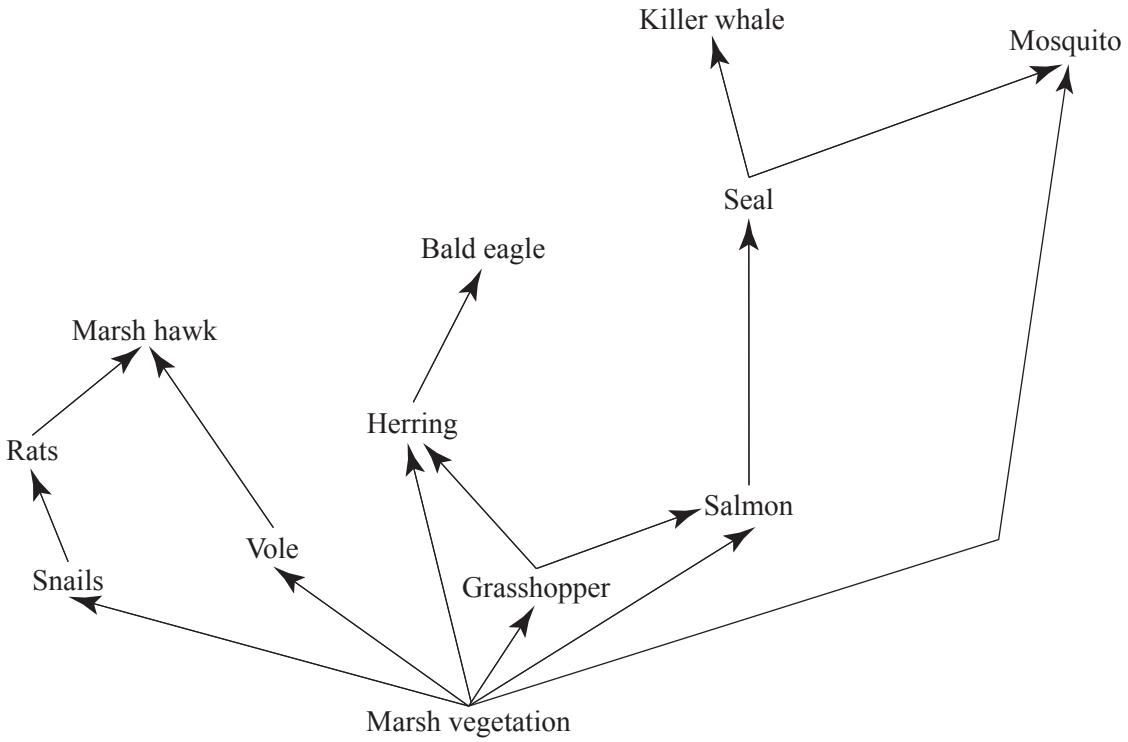
_____

_____ [2]

Examiner Only

Marks	Remark

(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]

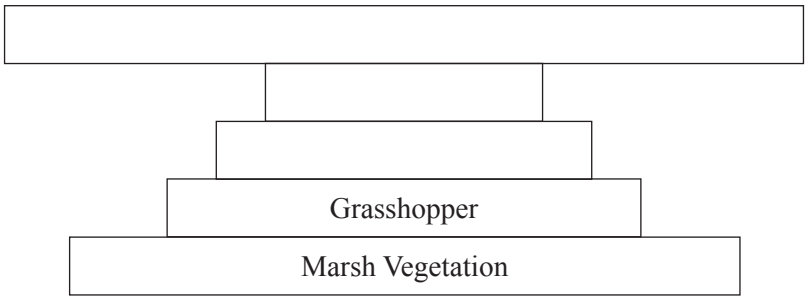
(iii) Draw the food chain from the food web where the bald eagle is acting as a tertiary consumer.

[2]

Examiner Only

Marks	Remark

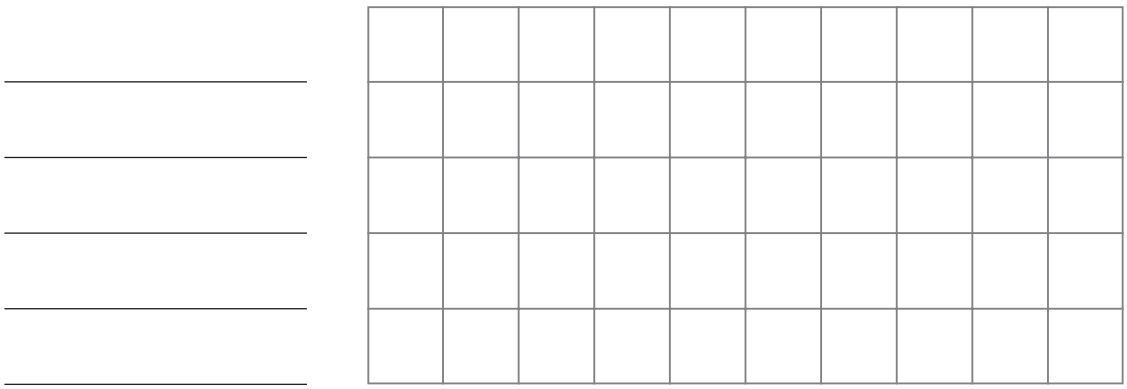
A pyramid of numbers for one of the food chains in the food web is shown below.



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

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

Beside each level write the name of the organism.

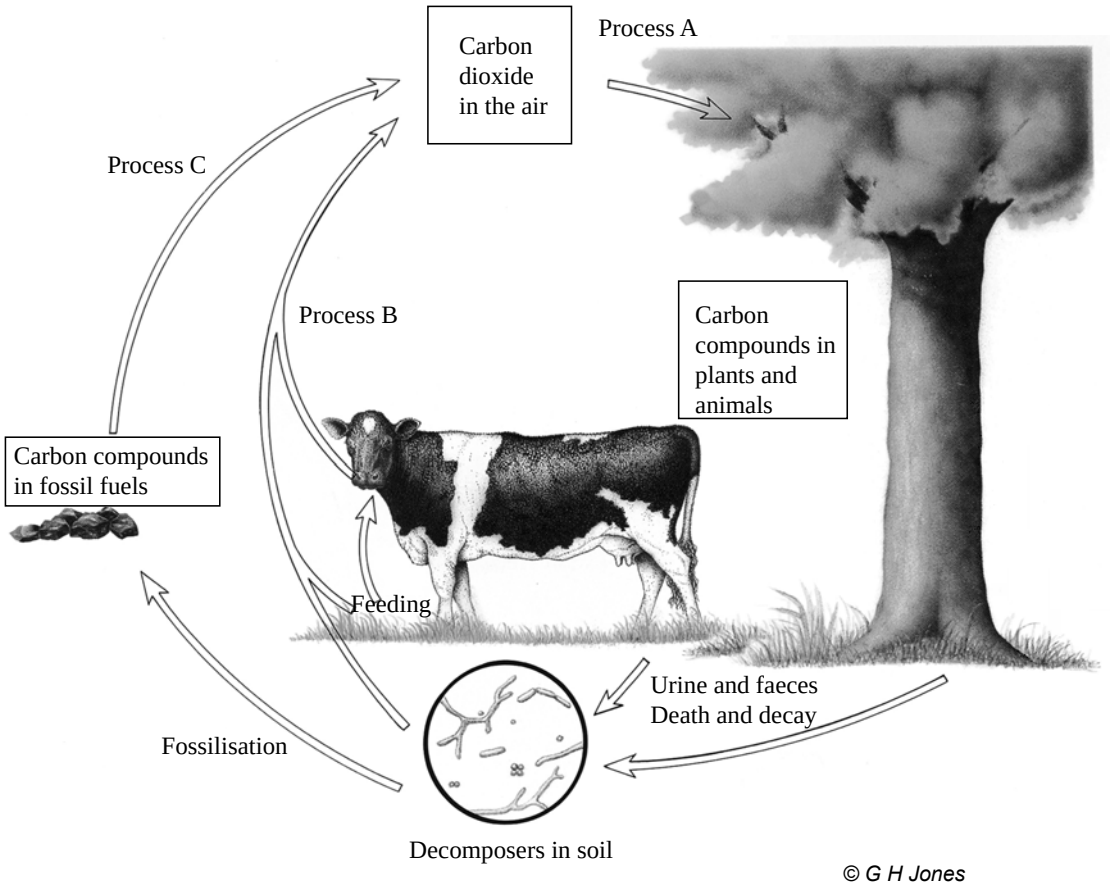


[4]

Examiner Only

Marks	Remark

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



(i) 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]

Process C causes pollution.

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

1. _____

2. _____ [2]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

15 (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) Describe and explain **one** way in which cell A is adapted for its function.

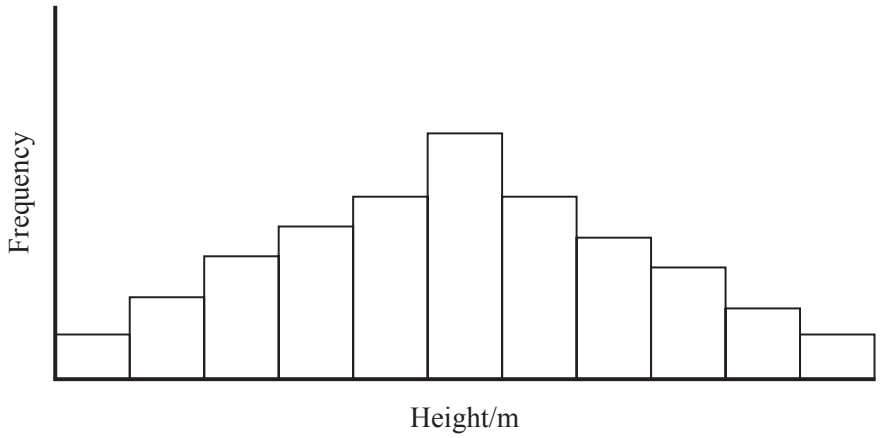
_____

_____ [2]

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

_____ [1]

(b) 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]

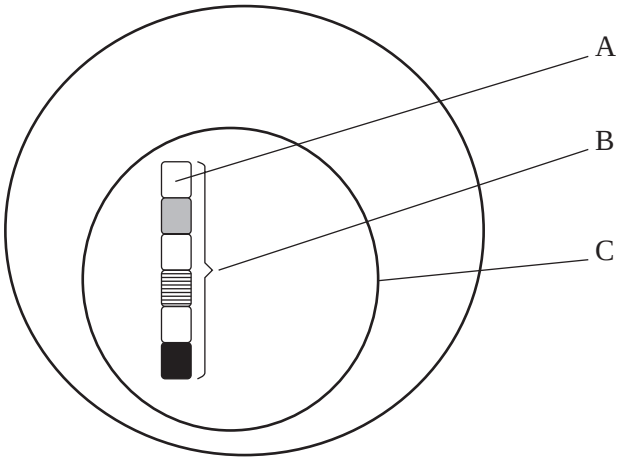
(ii) Suggest the effect on the average height of future populations if the smallest animals couldn't compete for food.

_____ [1]

Examiner Only

Marks	Remark

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.



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

A _____

B _____

C _____ [3]

(d) 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

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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