



General Certificate of Secondary Education
2023–2024

Centre Number

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Candidate Number

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Single Award Science: Biology

Unit 1



Foundation Tier

[GSA11]

GSA11

MONDAY 13 NOVEMBER 2023, MORNING

TIME

1 hour.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

You must answer the questions in the spaces provided.

Do not write outside the boxed area on each page or on blank pages.

Complete in black ink only. **Do not write with a gel pen.**

Answer **all eleven** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 60.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

Quality of written communication will be assessed in Question 11.



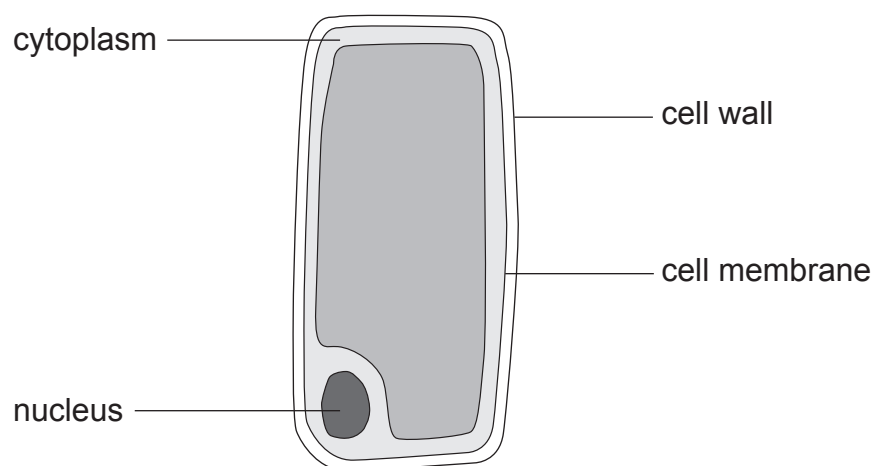
1 Living organisms are made up of cells.

- (a) Shown below are two parts of a cell and some functions.
Use lines to link each part of the cell to its function.

Part of cell	Function
nucleus	forms a boundary around the cell
cytoplasm	control centre of the cell
	chemical reactions take place here

[2]

The diagram below shows some parts of a plant cell.



- (b) Use the diagram to name **one** part of the cell which is **only** found in a plant cell.

_____ [1]



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(Questions continue overleaf)

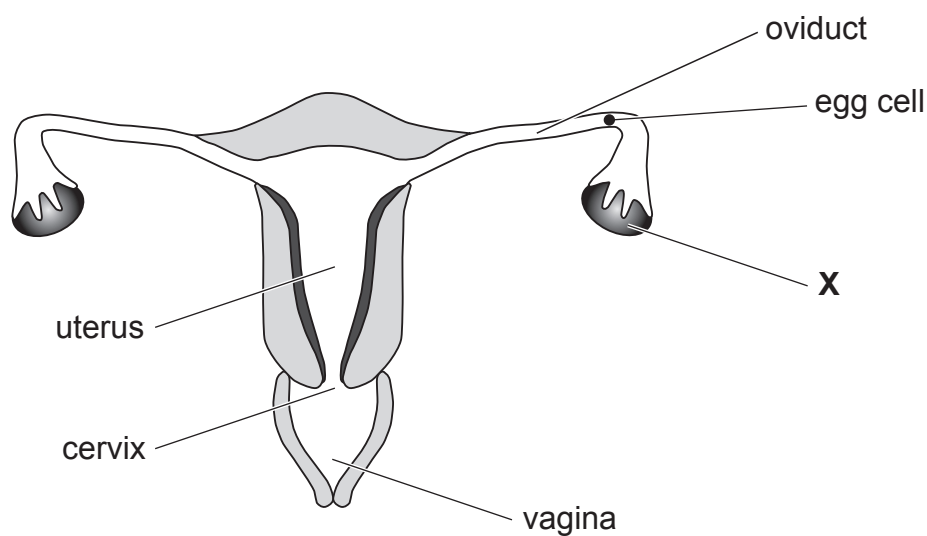
14344

[Turn over



24GSA1103

2 The diagram below shows the female reproductive system.



(a) Name the part of the female reproductive system labelled **X**.

_____ [1]

The statements below describe the journey of a sperm cell from leaving the penis to reaching the egg cell, but they are **not** in the correct order.

- A** swims through cervix
- B** sperm cell enters vagina
- C** swims through uterus
- D** fertilises egg cell
- E** enters oviduct

(b) Use the letters **A**, **B**, **C**, **D** and **E** to place these statements in the correct order. The first one has been done for you.

B _____ [2]



- (c) The table below shows some methods of contraception and how effective each method is at preventing pregnancy.

Method of contraception		Effectiveness/%
A diagram of an intra-uterine device (IUD) with a T-shaped frame and a string.	intra-uterine device	99
A diagram of a combined oral contraceptive pill, showing a rectangular box with a grid of 28 small circles representing the pills.	combined pill	99
A diagram of a box of condoms with the word 'Condoms' written on it.	condom	98
A diagram of a calendar for the month of June, showing the days of the month.	rhythm	96
A diagram of a pair of scissors cutting a piece of vas deferens.	male sterilisation (vasectomy)	99.99

Use this information and your knowledge to answer the following questions.

- (i) Name the method which is the **least** effective at preventing pregnancy.

_____ [1]

- (ii) Name the method which helps prevent the spread of sexually transmitted diseases.

_____ [1]

- (d) Suggest **one** reason why a doctor may advise a 25-year-old male **not** to have a vasectomy.

 _____ [1]

[Turn over]



3 Bacteria and fungi are types of disease-causing microorganisms.

(a) Use lines to link each type of microorganism to the disease it causes.

Type of microorganism	Disease
bacteria	salmonella
fungi	flu
	athlete's foot

[2]

(b) Complete the following sentences.

Choose from:

viruses

bacteria

penicillin

insulin

One type of antibiotic produced by fungi is _____.

Antibiotics are only effective against _____.

[2]





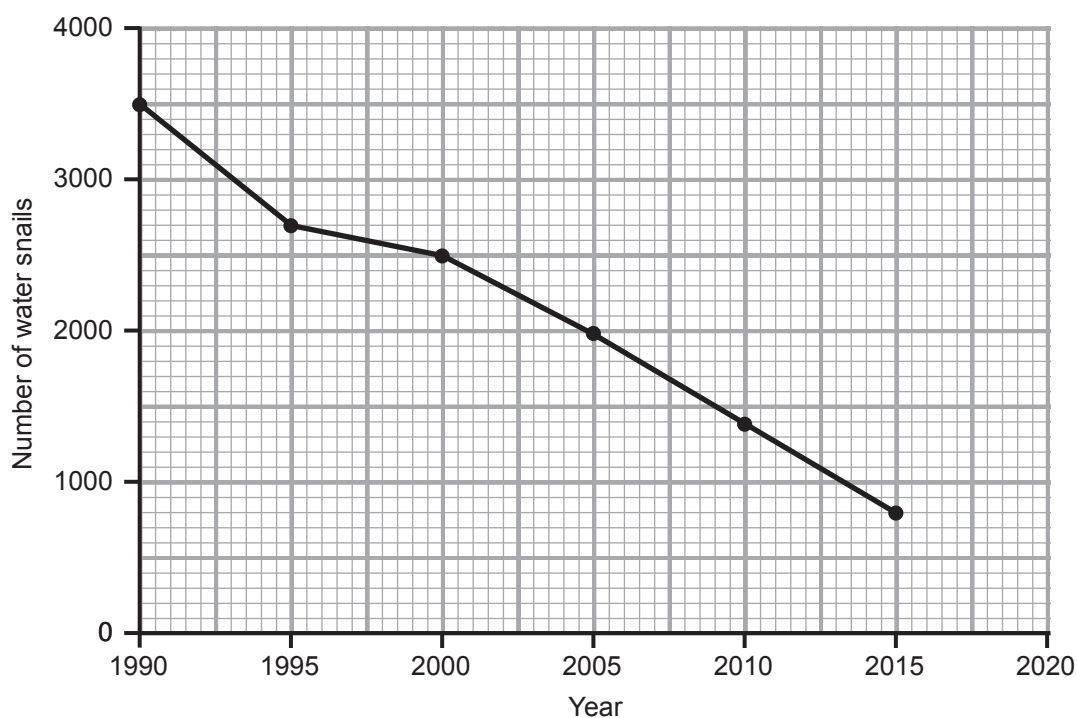
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(Questions continue overleaf)



- 4 (a) The graph below shows the number of water snails in a river in Northern Ireland between 1990 and 2015.



- (i) Describe the trend shown by this graph.

_____ [1]

- (ii) This trend continued for the next five years. Suggest the number of water snails that were in the river in **2020**.

_____ [1]



(b) Calculate the change in the number of water snails from **1990** to **2015**.

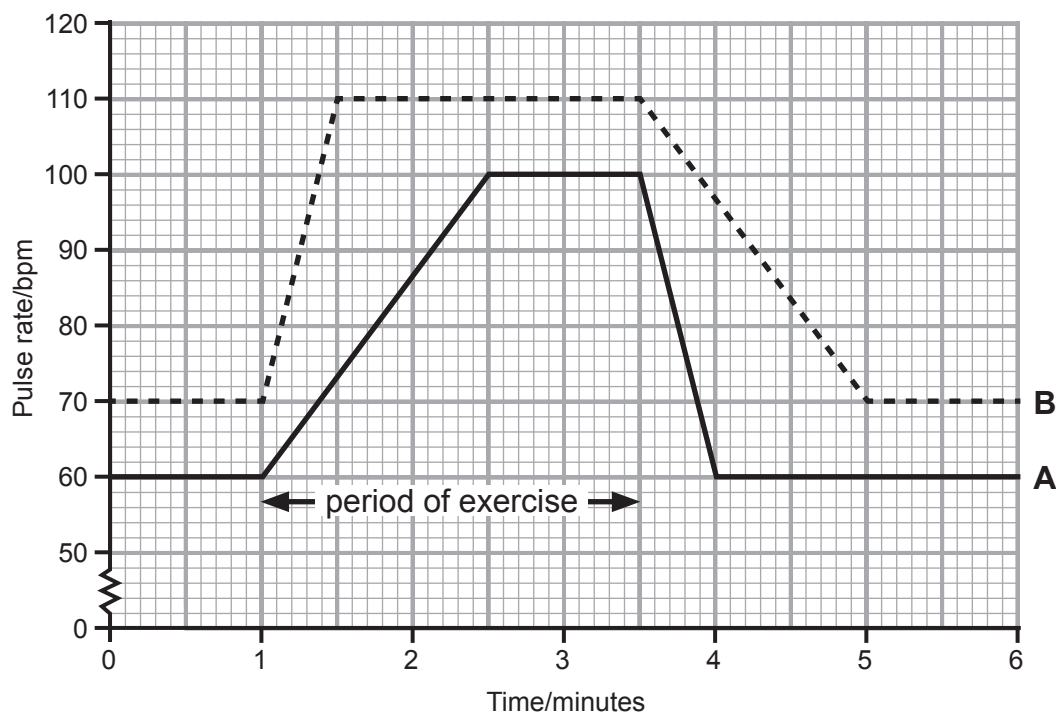
(Show your working out.)

_____ [2]

[Turn over



- 5 The graph below shows the effect of exercise on the pulse rate of two students (**A** and **B**).



- (a) What is the **resting** pulse rate of student **A**?

_____ bpm [1]

- (b) Give **two** differences between the pulse rates of student **A** and student **B** during the period of **exercise**.

1. _____

2. _____

_____ [2]



- (c) How long did it take for student **B**'s pulse rate to return to its resting rate after the exercise finished?

_____ minutes [1]

- (d) The table below shows the average daily energy needed by female teenagers and female adults.

Group	Energy/kJ
teenagers	10 000
adults	8500

- (i) Calculate how much more energy teenagers need compared to adults.

_____ kJ [1]

- (ii) Suggest **two** reasons why teenagers need more energy than adults.

1. _____

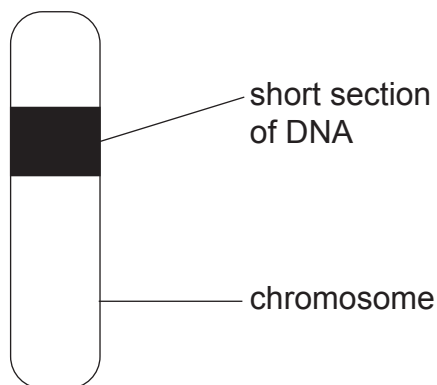
2. _____

_____ [2]

[Turn over



6 (a) The diagram below shows a chromosome.



(i) Name the part of a cell where chromosomes are found.

_____ [1]

(ii) What name is given to a short section of DNA?

_____ [1]

Shown below is part of a DNA molecule.



(b) What name is given to the **shape** of a DNA molecule?

_____ [1]



(c) Complete the following sentence.

The entire genetic material of an organism is called the

_____.

[1]

(d) The table below gives information about some characteristics of five students in a class.

Student	Characteristic			
	Can roll tongue	Height/cm	Mass/kg	Eye colour
Helen	no	141	39	brown
Adrian	yes	152	37	blue
Leanne	yes	155	41	blue
Colin	no	147	46	blue
Lisa	no	152	42	brown

(i) Which **two** characteristics show continuous variation?

_____ and _____

[1]

(ii) Calculate the percentage of students who have **brown** eyes.

(Show your working out.)

_____ % [2]

[Turn over



- 7 Being overweight can increase the risk of developing heart disease and Type 2 diabetes.

A person can reduce this risk by making dietary or lifestyle changes.

- (a) Give one **dietary** change that people could make to help reduce the risk of developing **heart disease**.

_____ [1]

Diabetes is a condition in which the blood glucose control mechanism fails.

- (b) Apart from heart disease, give **two** other long-term effects of diabetes.

1. _____
2. _____ [2]

- (c) Suggest **one** reason why the treatment of diabetes is very expensive to the health service.

_____ [1]



The table below gives the range of blood glucose levels for people with and without diabetes.

	Blood glucose level before meal/ mmol/L	Blood glucose level 90 minutes after meal/ mmol/L
No diabetes	4.0 – 5.9	under 7.8
Type 1 diabetes	4.0 – 7.0	5.0 – 9.0
Type 2 diabetes	4.0 – 7.0	under 8.5

Stewart has diabetes and tests his blood glucose level 90 minutes after eating a meal.

His result is shown below.



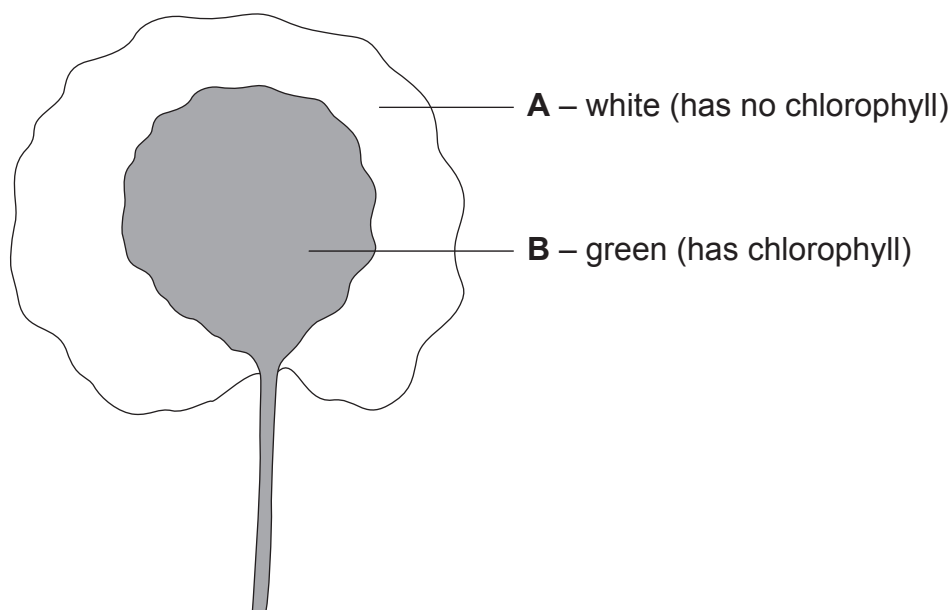
- (d) What type of diabetes does Stewart have? Use data from the table to explain your answer.

[1]

[Turn over



8 Shown below is a leaf from a variegated plant.



This leaf was removed from a variegated plant that had been in bright light for 24 hours.

The leaf was tested for starch.

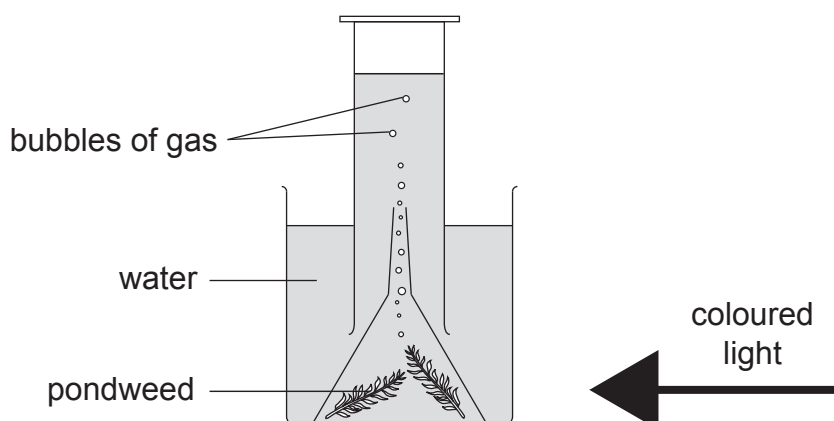
(a) Complete the table below, using ticks (✓), to show the results you would expect for parts **A** and **B**.

Part of leaf	Starch present	Starch not present
A		
B		

[1]



- (b) The apparatus shown below was used to investigate the effect of different colours of light on the rate of photosynthesis.



The number of bubbles of gas produced in one minute was counted for each colour of light.

The results are shown below.

Colour of light	Number of bubbles of gas per minute
red	46
yellow	20
green	16
blue	60
violet	30

- (i) Which colour of light is **least** useful to plants for photosynthesis?

_____ [1]

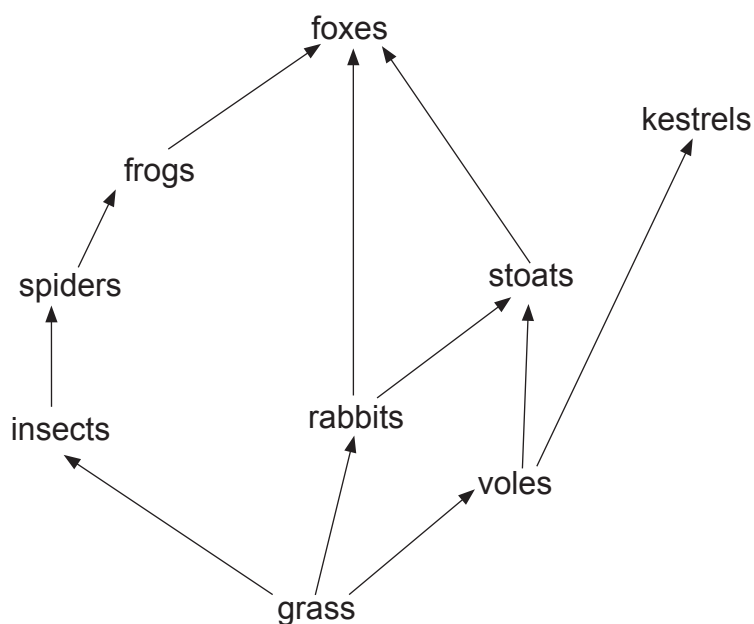
- (ii) Give **one** thing that was done in this investigation to make it valid (fair test).

_____ [1]

[Turn over]



9 (a) Shown below is part of a woodland food web.



Use the food web to answer the following questions.

(i) Complete the food chain below.



[1]

(ii) What effect, if any, would a decrease in the number of kestrels have on the number of stoats? Explain your answer.

[2]



The photograph below shows a hedgerow in a farmer's field.



(b) Give **two** reasons why the hedgerow helps increase biodiversity in this field.

1. _____
2. _____ [2]

The photograph below shows some lichen on a tree. Lichen is a **biotic** pollution monitor.



(c) What is meant by the term **biotic**?

_____ [1]

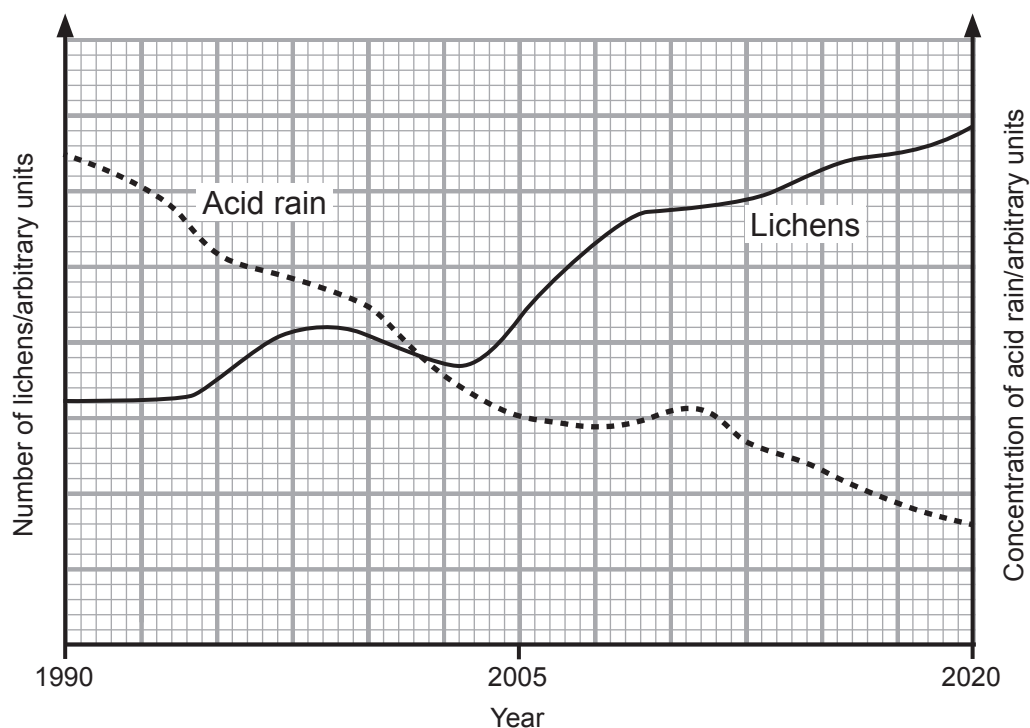
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- (d) Another way to monitor changes in the environment is to measure **abiotic** factors. Give **one** example of an abiotic factor.

[1]

The graph below shows how the concentration of acid rain affected the number of lichens on trees over a 30-year period.

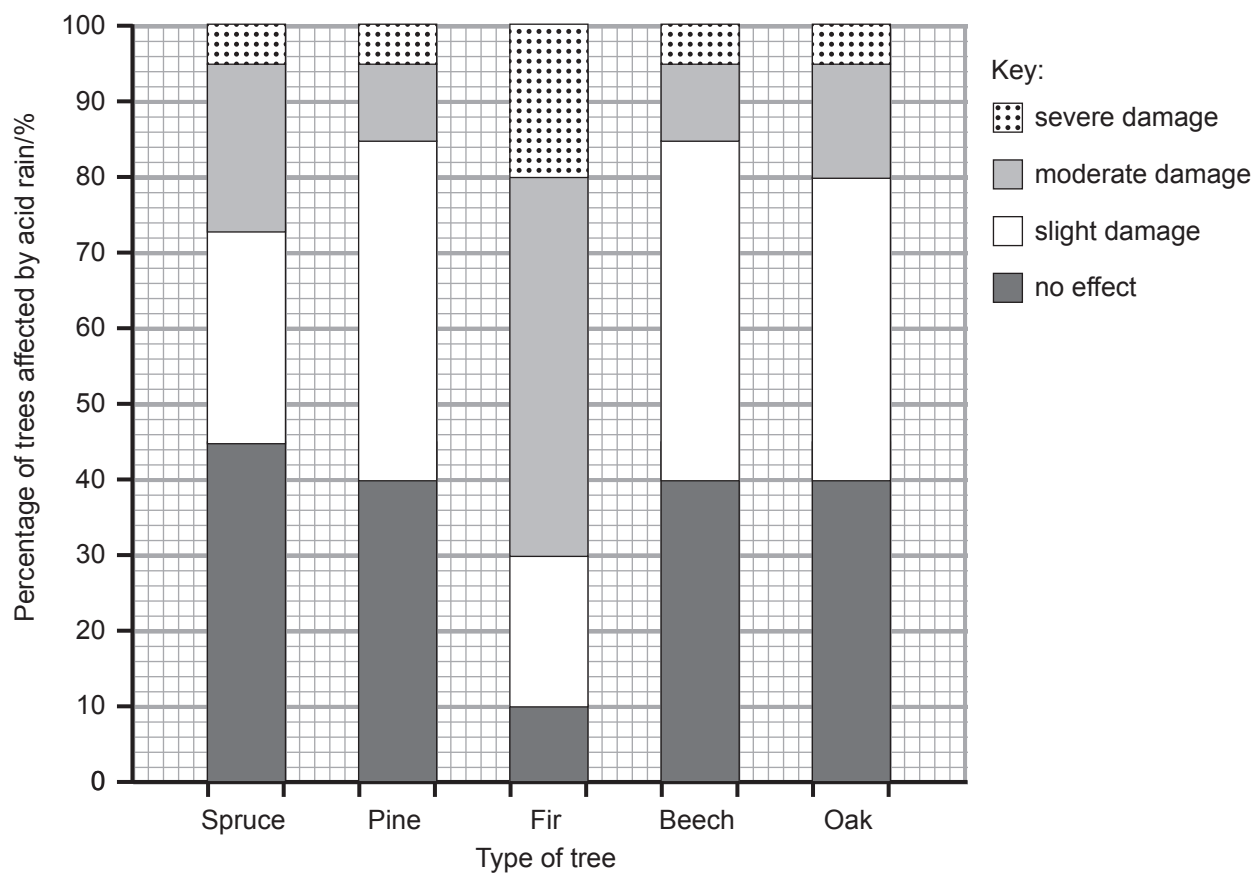


- (e) Describe how the change in the concentration of acid rain affected the number of lichens on trees over this 30-year period.

[1]



- (f) The bar graph below shows the effect of acid rain on different types of trees in a forest.



- (i) Which type of tree is **least** affected by acid rain?

_____ [1]

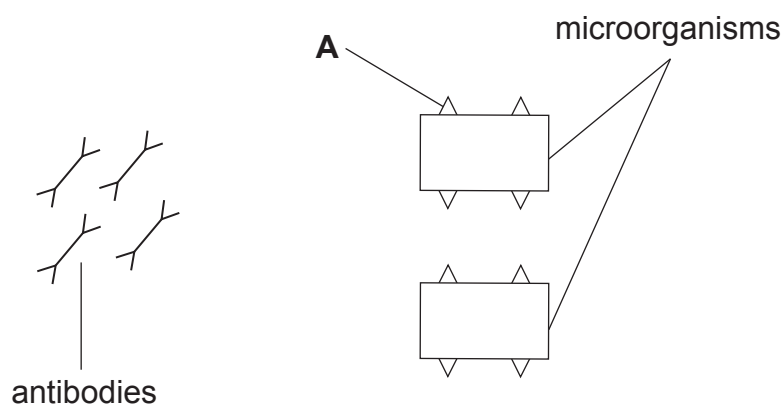
- (ii) What percentage of Fir trees suffered severe damage due to acid rain?

_____ % [1]

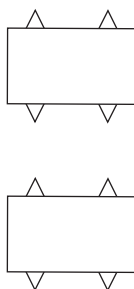
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- 10 (a) The diagram below shows the antibodies produced when microorganisms enter the blood.



- (i) Complete the diagram below to show how the antibodies clump the microorganisms together.



[1]

- (ii) Name the structure labelled **A** on the microorganism.

[1]

- (iii) Name the type of white blood cells that produce antibodies.

[1]

- (b) (i) Name the type of immunity which involves the body producing its own antibodies.

[1]

- (ii) Suggest **one** advantage of this type of immunity.

[1]



[illegible]

- the name of a food which contains protein;
- the function of protein in the body;
- the name of the reagent used to test for protein; and
- the colour change if protein is present.

[illegible]

[6]

THIS IS THE END OF THE QUESTION PAPER

Sources:
Question 1(b) Principal Examiner
Question 2 Principal Examiner
Question 2(c) Principal Examiner × 5
Question 6 Principal Examiner
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Question Number	Marks
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