**General Certificate of Secondary Education
2015**

Double Award Science: Physics

Unit P2

Foundation Tier

ML

[GSD61]

FRIDAY 12 JUNE, AFTERNOON

TIME

1 hour 15 minutes, plus your additional time allowance.

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 blue or black ink only.
Answer **all nine** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 90.
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 **9**.

1 Static electricity can be very dangerous. It can also be very useful.

(a) (i) What is one danger of static electricity?

_____ [1]

(ii) What is one use of static electricity?

_____ [1]

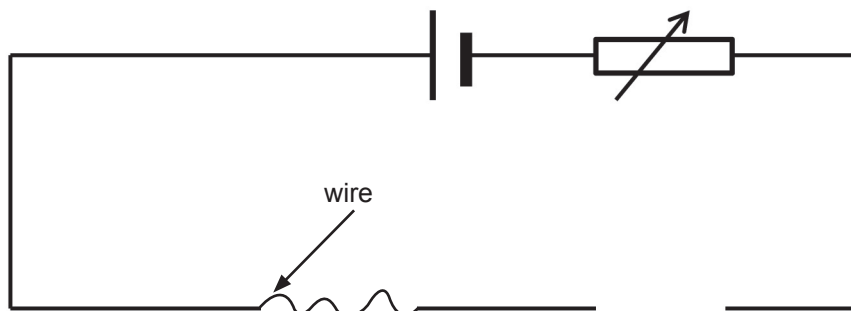**(b)** A charge of 6 C passes through a resistor in 2 seconds.

What current passes through the resistor?

You should show your working out.

Current = _____ A [3]

(c) Mary sets up a circuit to find the resistance of a length of wire.

(i) Draw an ammeter and voltmeter on the diagram above to complete the circuit. Mary will then be able to calculate the resistance of the wire. [3]
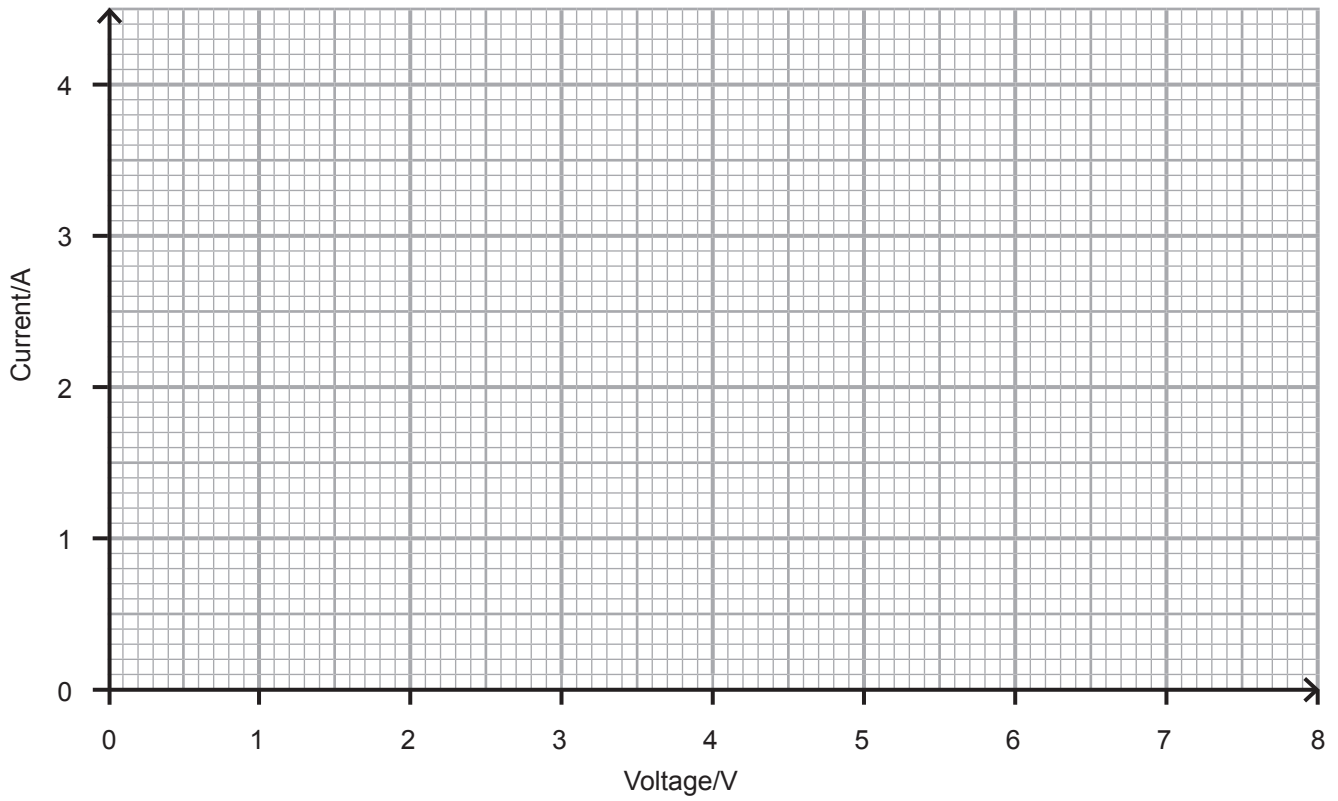
(ii) What should Mary do to be sure her results are reliable?

_____

_____ [1]

(d) Mary got the following results.

Voltage/V	0	2	4	6	8
Current/A	0	1	2	3	4

(i) Plot the points on the grid. [2]

(ii) Draw a straight line through the points. [1]

(iii) Calculate the resistance of the piece of wire.
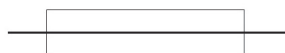
You should show your working out.

Resistance = _____ Ω [3]

2 What do each of the following symbols mean?

Write your answers in the spaces below. One has been done for you as an example.

(a)

Fuse

_____   _____   _____

[3]

Look at the diagram below. This shows cells combined to form a battery. Each cell has a voltage of 1.5 V.
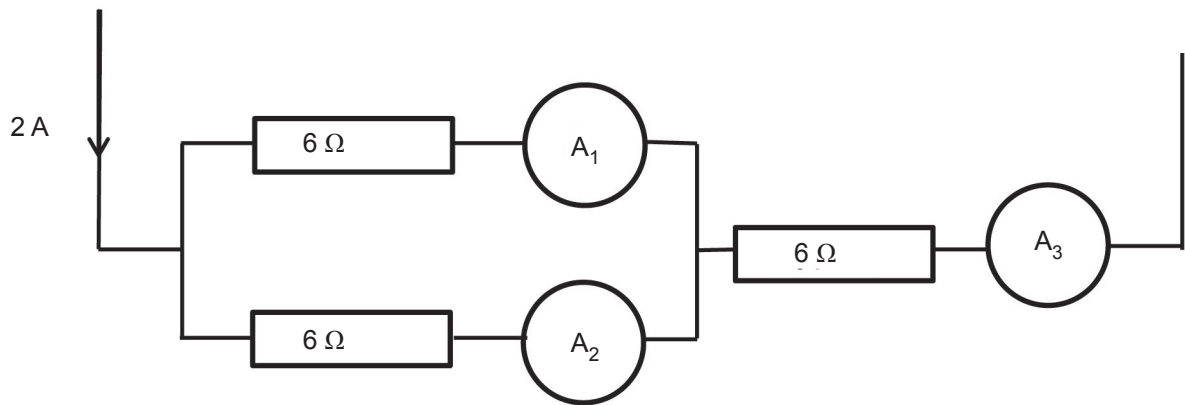
(b) (i) On the diagram mark the polarity of the battery in the boxes. [1]

(ii) What is the total voltage of the battery?

Voltage = _____ V [1]

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Look at the diagram below. It shows part of a circuit.

(c) Write down the readings on the three ammeters A_1, A_2 and A_3.

Reading on A_1 = _____ A   Reading on A_2 = _____ A   Reading on A_3 = _____ A

[3]

(d) (i) When we use electricity we pay for the number of units used.
What is another name for a 'unit of electricity'?

_____ [1]

(ii) An immersion heater, rated at 2.0 kW, is switched on for three hours.

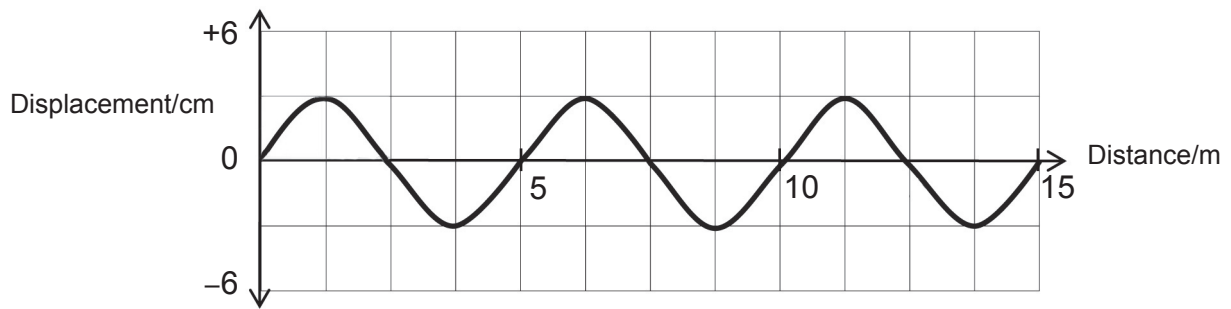How much will this cost if one unit of electricity costs 16 p?

You should show your working out.

Cost = _____ p [5]

[Turn over

3 Look at the graph below. It shows the outline of a water wave.

(i) What type of wave is a water wave?

Tick (✔) the appropriate box.

Transverse ☐

Longitudinal ☐

Electromagnetic ☐

[1]

(ii) What do water waves transfer as they move along?

_____ [1]

(iii) What is the wavelength of the water wave? Use the graph to help you.

Wavelength = _____ m [1]

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(iv) The frequency of the wave is 2.0 Hz. Calculate the speed of the water waves.
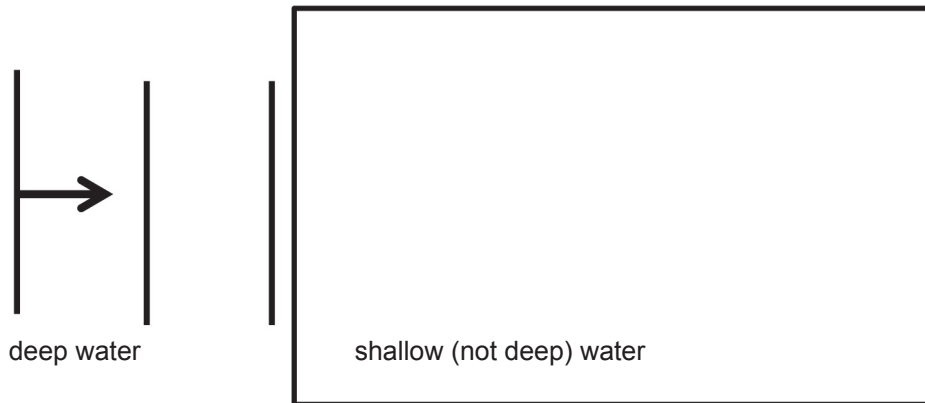
You should show your working out.

Speed = _____ m/s [3]

(v) What is the amplitude of the water wave? Use the graph to help you.

Amplitude = _____ cm [1]

4 Look at the diagram below. It shows water waves entering shallow (not deep) water.

deep water   shallow (not deep) water

(a) (i) Draw three more waves in the shallow water. [3]

(ii) Read the three sentences below.
Which sentence is correct? Tick(✔) **one** box.

The speed of the waves in the shallow water is **greater than** the speed of the waves in the deep water. ☐

The speed of the waves in the shallow water is **less than** the speed of the waves in the deep water. ☐

The speed of the waves in the shallow water is **equal to** the speed of the waves in the deep water. ☐
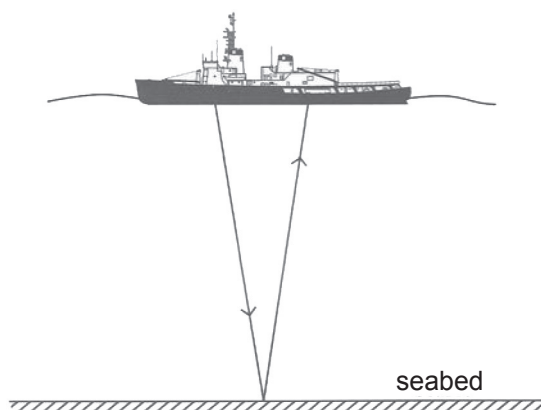
[1]

(b) How can ultrasound be used in health care?

_____

_____ [1]

The speed of ultrasound waves in water is 1500 m/s. A ship sends out a pulse of ultrasound. This pulse is reflected from the seabed and is sent back to the ship. This takes 0.9 seconds.

seabed

(c) Calculate the distance from the ship to the seabed.
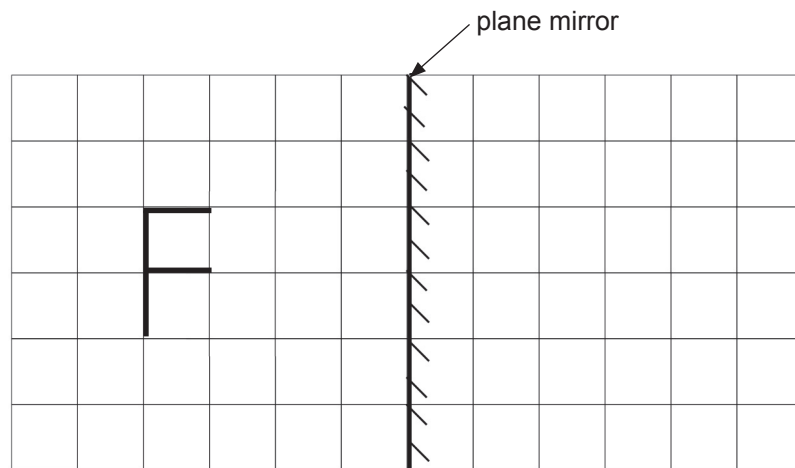
You should show your working out.

Distance = _____ m [4]

5 The letter F is placed in front of a plane mirror.

(a) (i) Draw the image of the letter F in the mirror. [3]

The letter F is 0.4 m from the mirror. The mirror is moved 0.1 m to the right.
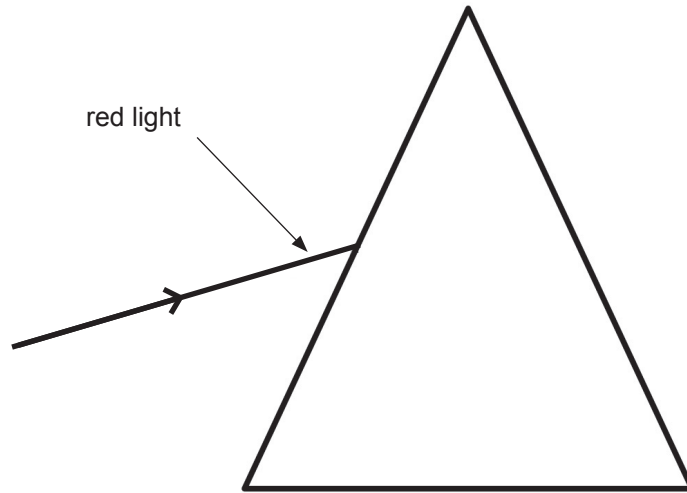
(ii) How far is the letter F from its image?

You should show your working out.

Distance = _____ m [2]

Look at the diagram below. It shows a ray of red light entering a glass prism.

red light

(b) (i) Draw the path of the red ray through the glass and back into the air.
Do this on the diagram above. [2]

(ii) Which colour is refracted most when **white** light is incident on the prism?

_____ [1]

(iii) Why do different colours travel in different directions in the prism?
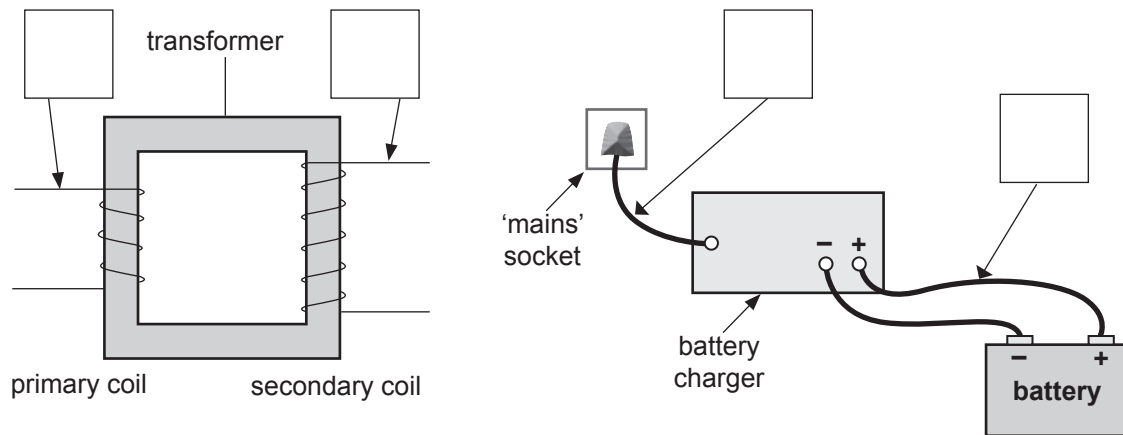
_____

_____ [1]

[Turn over

**6** Electricity can be either direct current (d.c.) or alternating current (a.c.).

(a) (i) Look at the examples below. Write either (d.c.) or (a.c.) in the boxes to show which type of electricity is flowing.

transformer

primary coil   secondary coil

'mains' socket

battery charger

− +

− +
battery

[4]

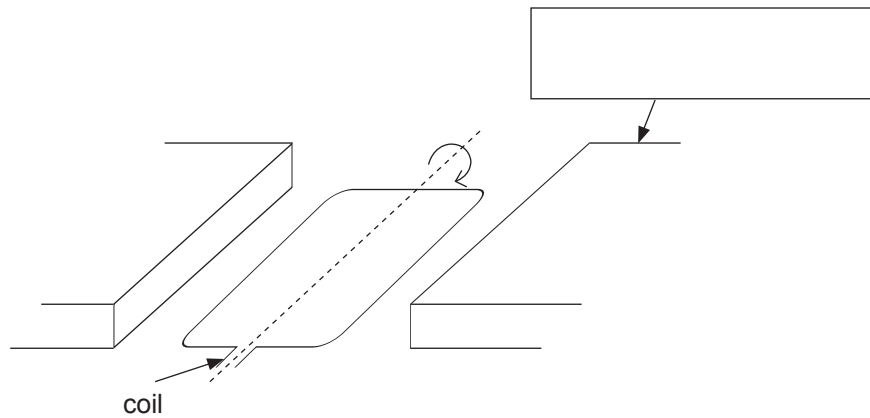To test whether electricity is (d.c.) or (a.c.) we could connect the source to a cathode ray oscilloscope (CRO).

(ii) Under each diagram write down whether the electricity is (d.c.) or (a.c.). The centre dotted line represents zero volts.

0 V

0 V

0 V

_____   _____   _____

[3]
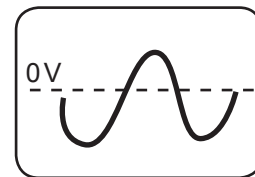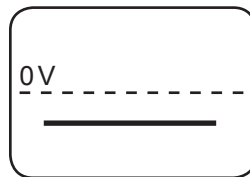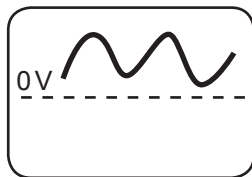
Look at the diagram below. It shows a simple a.c. generator.

coil

(b) (i) One part has been labelled. Label the other part in the box. [1]

(ii) What physical principle does the a.c. generator depend on?

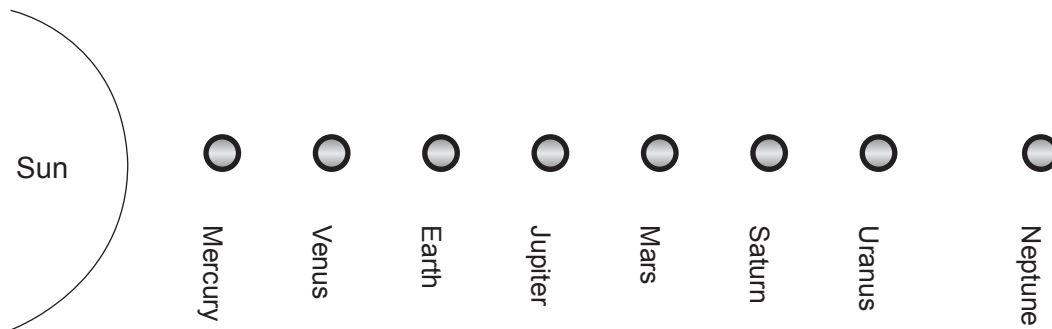Tick (✔) the correct box.

Electromagnetic waves ☐

Electromagnetic induction ☐

Electromagnetic spectrum ☐

[1]

[Turn over

7 Look at the diagram below. It shows a view of the Sun and planets. The view is **not correct**. The diagram is not to scale.

Sun | Mercury | Venus | Earth | Jupiter | Mars | Saturn | Uranus | Neptune

(a) (i) Two planets are in the wrong positions.

Write down the names of these two planets.

_____ and _____ [2]

(ii) Some planets are known as rocky planets and some are known as gas planets.

Write down two examples of each.

Two rocky planets: _____ and _____

Two gas planets: _____ and _____ [4]

(iii) Write down the names of two bodies that orbit the Sun.
Do not write the names of planets in your answer.

_____ and _____ [2]

(iv) What force keeps the planets orbiting the Sun?

_____ [1]

There are two models of the Solar System.

(b) (i) What is the name of the first model?

_____ [1]

(ii) What is at the centre of the Solar System in this first model?

_____ [1]

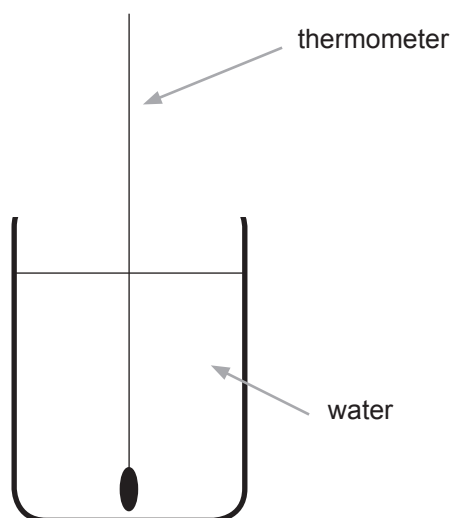**(iii)** What is the name of the model with the Sun at the centre?

_____ [1]

8 Water is heated to 100 °C and then allowed to cool.

A thermometer records the temperature of the water every 5 minutes.

thermometer

water

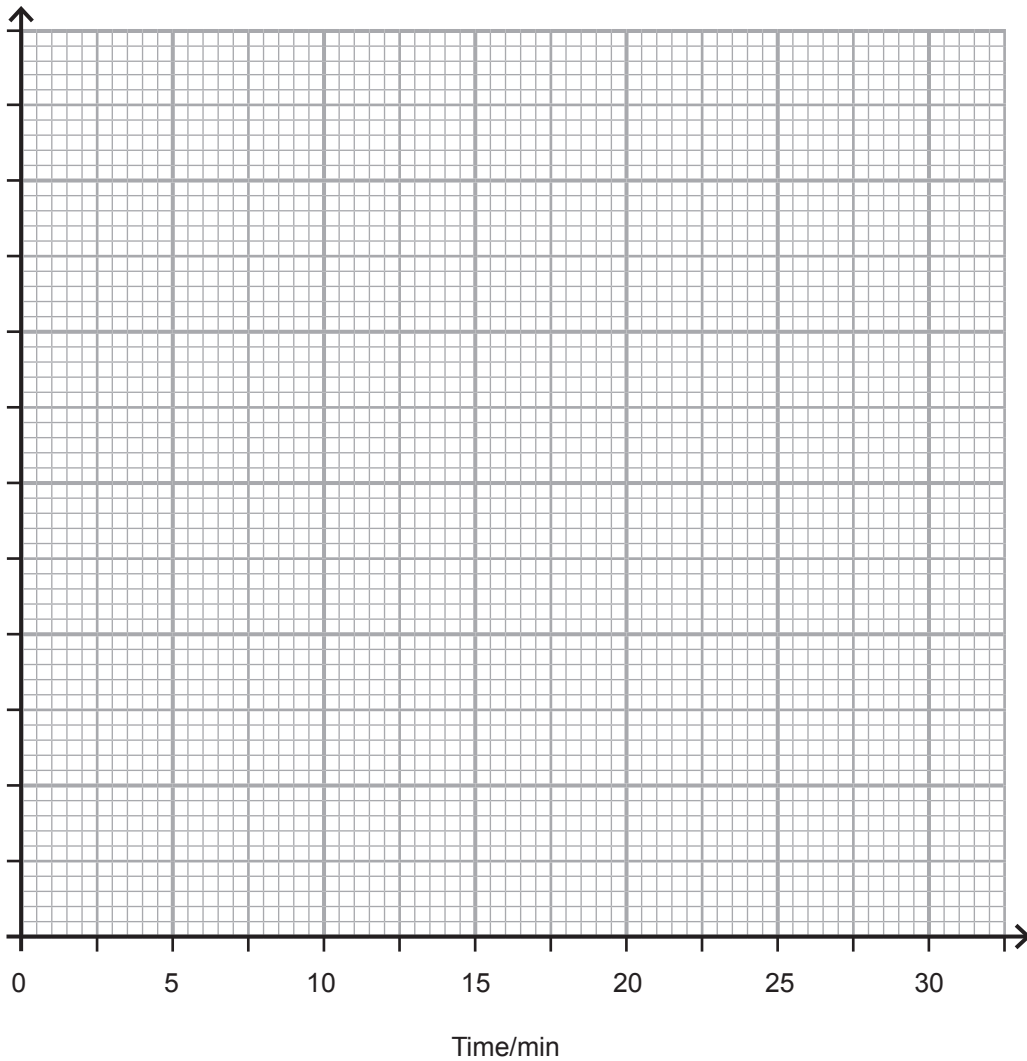The table below shows the results of the experiment.

Temperature/°C	100	66	45	30	22	18	18
Time/min	0	5	10	15	20	25	30

Draw a graph of temperature against time for the cooling water.

(i) Choose a suitable scale for the temperature and label it. [2]

(ii) Plot the points on the grid. [2]

(iii) Draw the best fit curve. [1]

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Time/min

(iv) Why do you think the last two readings of temperature are the same?

_____ [1]

(v) Write about and describe how the temperature of the water changes with time.

_____

_____ [2]

(vi) Use the graph to find the temperature of the water at 12 minutes.

_____°C [1]

[Turn over

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9 Many scientists believe that the Universe began a long time ago.

Write about and describe the modern scientific theory for the formation of the Universe.

You should write about:

- the name of the theory and what happened at the beginning;
- when the Universe began;
- the evidence and explanation for this theory.

You will be assessed on your written communication skills including the use of specialist scientific terms.

_____

_____

_____

_____

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_____

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_____

_____ [6]

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