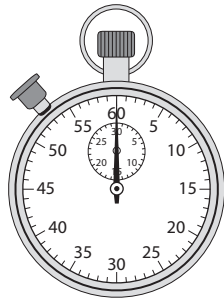


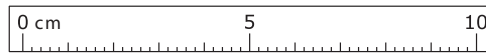
Answer ALL questions. Write your answers in the spaces provided.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

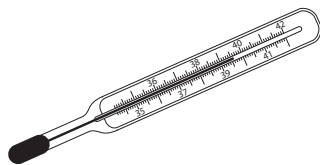
1



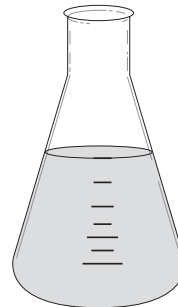
A



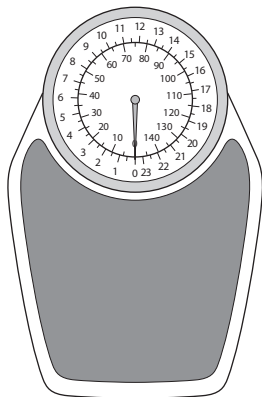
B



C



D



E

Complete the table to show the apparatus you would use for each investigation.

Write **one** letter in each row.

	Letter of apparatus
To measure body mass	
To measure how quickly an athlete runs 100 m	

(Total for Question 1 = 2 marks)

2



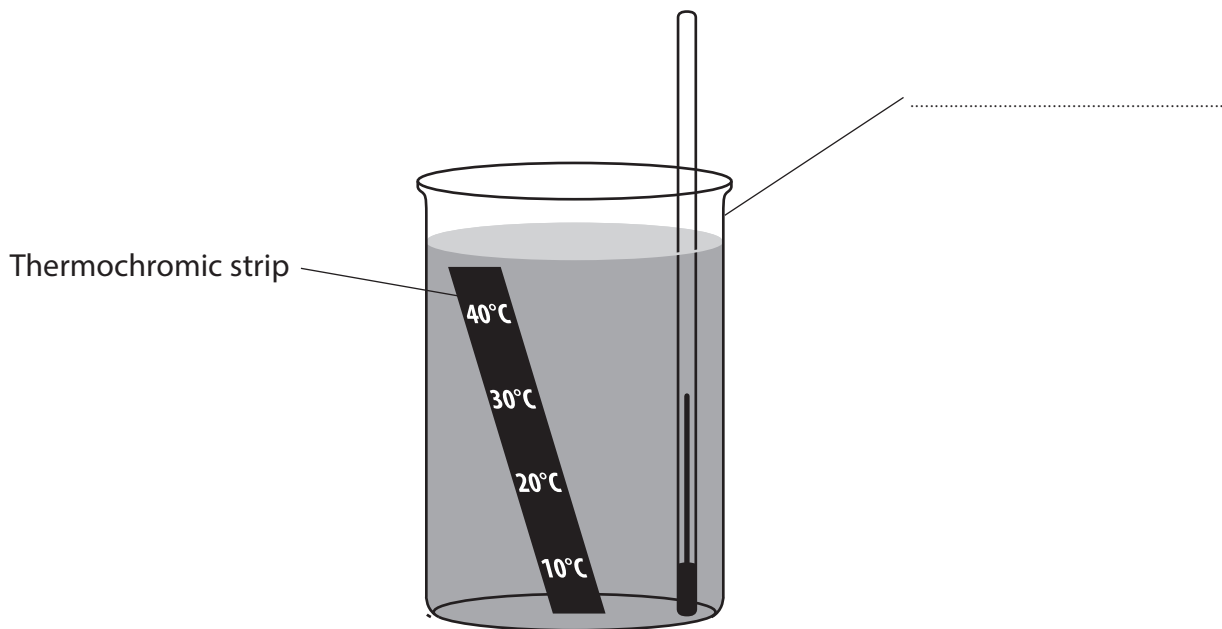
2 Thermochromic materials change colour at different temperatures.

Jane and Lukas are going to investigate the different colours that are visible on a thermochromic strip at different water temperatures.

They investigated between 10°C and 40°C.

(a) Complete the missing label from the diagram.

(1)



(b) It is important to be safe when carrying out an investigation.

Explain why the temperature of the water in this investigation does **not** present a safety risk.

(2)

.....

.....

.....

.....

(c) The temperature of the water is a variable that is changed.

State **two** variables that need to be kept the same during this investigation.

(2)

1

2

(Total for Question 2 = 5 marks)



4 Alfie and Tony investigated the mass of sugar found in cans of drink. Mass is measured in grams.

Here are their results.

Orangeade 35.5g	Lemonade 34.6g	
Cola 37.2g	Cream soda 38.8g	Ginger beer 36.1g

Put these results in the table with appropriate column headings and units.

(3)

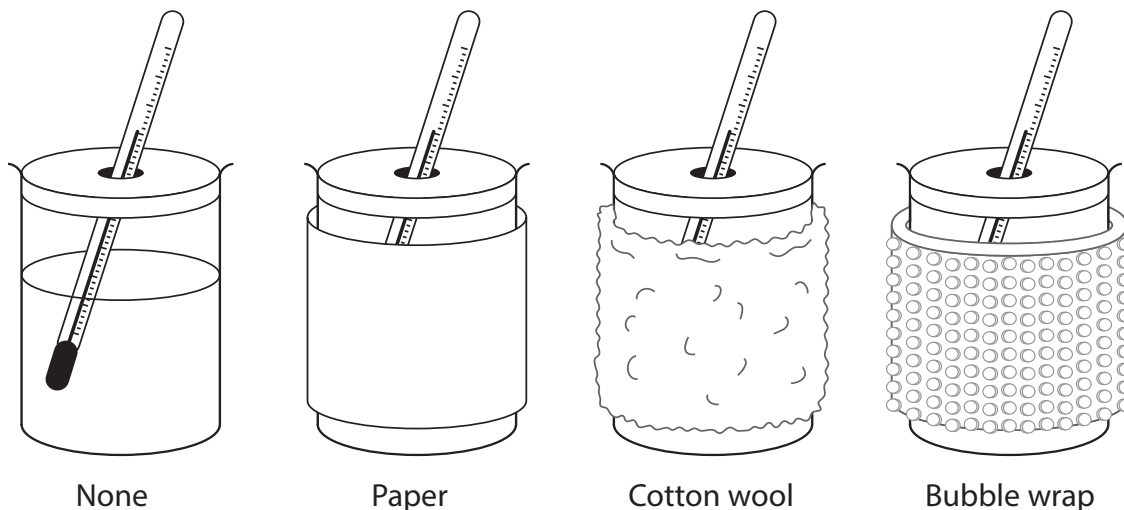
(Total for Question 4 = 3 marks)



5 Alec was investigating different insulating materials.

He poured hot water into some beakers that were wrapped with different insulating materials.

He measured the temperature every two minutes for 10 minutes.



Here are his results.

Time (minutes)	Temperature of water °C			
	None	Paper	Cotton wool	Bubble wrap
0	85	85	85	85
2	80	81	82	84
4	75	77	79	83
6	70	74	25	81
8	66	71	74	80
10	63	69	72	79
Temperature loss over 10 minutes	22	16	13	6

(a) State which insulating material was the best insulator.

(1)

(b) State how the results show that this material was the best insulator.

(1)



(c) Alec realises that he has recorded an anomalous result in the table.

(i) Identify the anomalous result in the table by circling it.

(1)

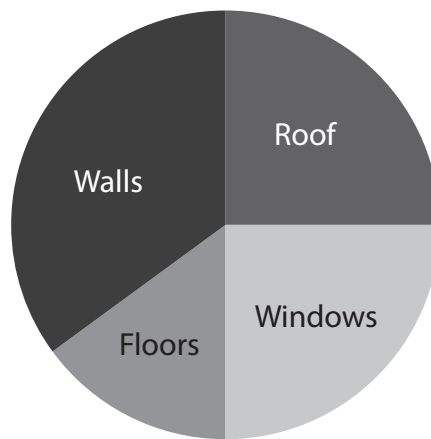
(ii) State why Alec thinks this result is anomalous.

(1)

(d) Alec looked at the energy loss from different parts of a house.

Part of the house	Energy loss from 1000 J of energy put into the house (J)
Roof	250
Windows	250
Floors	150
Walls	350

Alec put this data into a pie chart of energy lost from the different parts of the house.



Energy loss from the house

(i) State from which part of the house the most energy is lost.

(1)

(ii) State approximately what fraction of the energy is lost through the roof.

(1)

(Total for Question 5 = 6 marks)



6 Zoey is studying sound and light.

She carried out an investigation into how effective different materials are at soundproofing. She placed different materials over an electric buzzer and measured the sound level produced for each material.

Her results are shown in the table.

Material used as soundproofing	Sound level (decibels)
No material	94
Paper towel	90
Cotton wool	80
Newspaper	88
Fabric	86

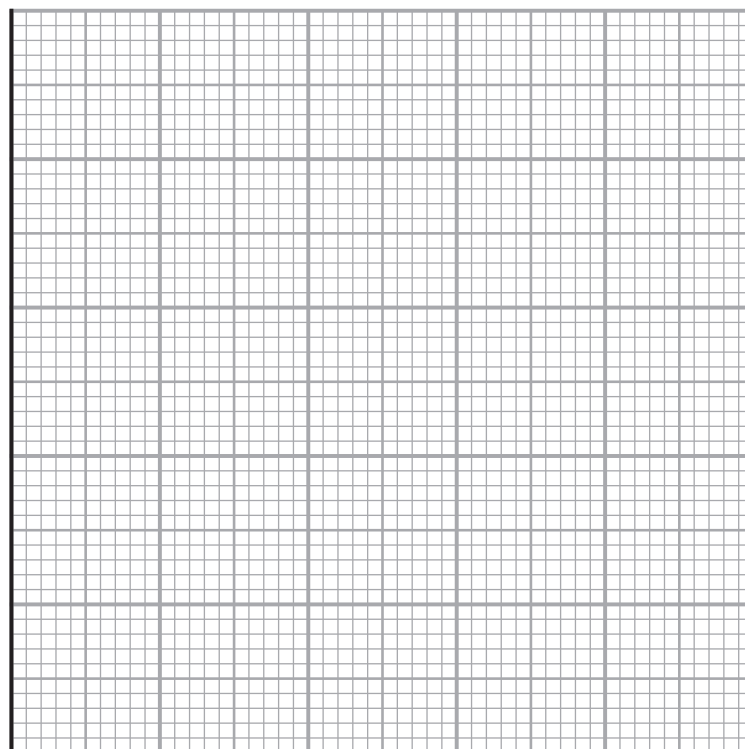
(a) Using the table, identify the material that is the **most** effective at soundproofing.

(1)

(b) Plot a bar graph of the results in the table.

Use the graph paper below.

(6)



(Total for Question 6 = 7 marks)



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7 Zoey is watching a firework display.

She starts a timer when she sees the flash of the firework and stops her timer when she hears the bang.

She takes these measurements 5 times.

Zoey's results are shown in the table.

Measurement	Time (s)
1	6.1
2	6.5
3	5.8
4	6.0
5	6.2

(a) Calculate the average of Zoey's results.

(2)

..... S



The speed of sound can be calculated using the following formula.

$$\text{Speed (m/s)} = \frac{\text{distance (m)}}{\text{time (s)}}$$

The average speed of sound is 340 m/s.

(b) Calculate how long it would take for the sound to reach Zoey if the fireworks are 300 m away.

(2)

..... S

(Total for Question 7 = 4 marks)

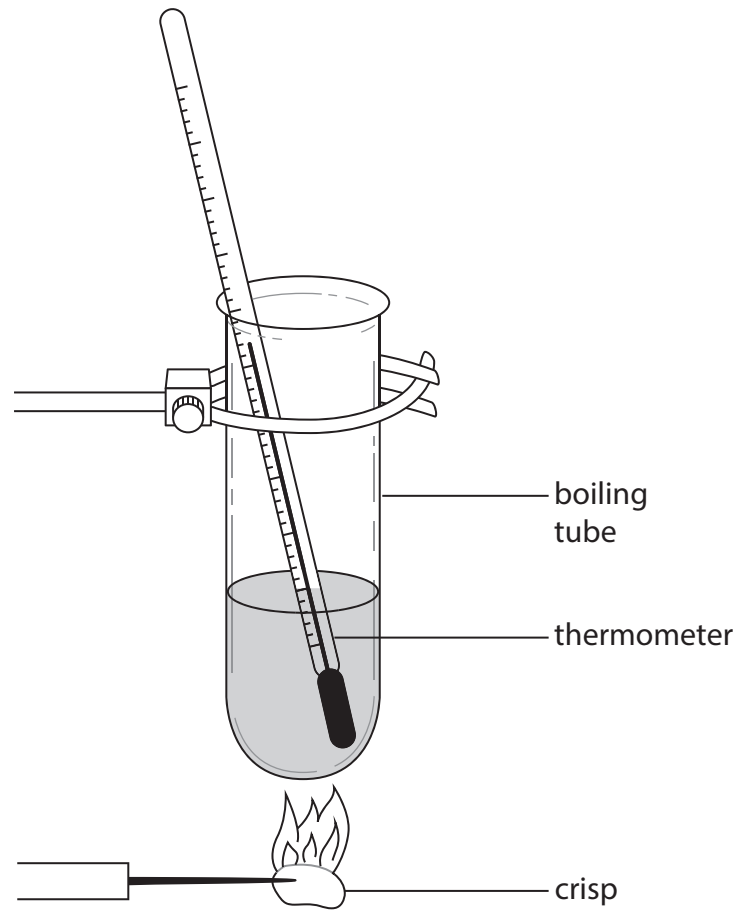




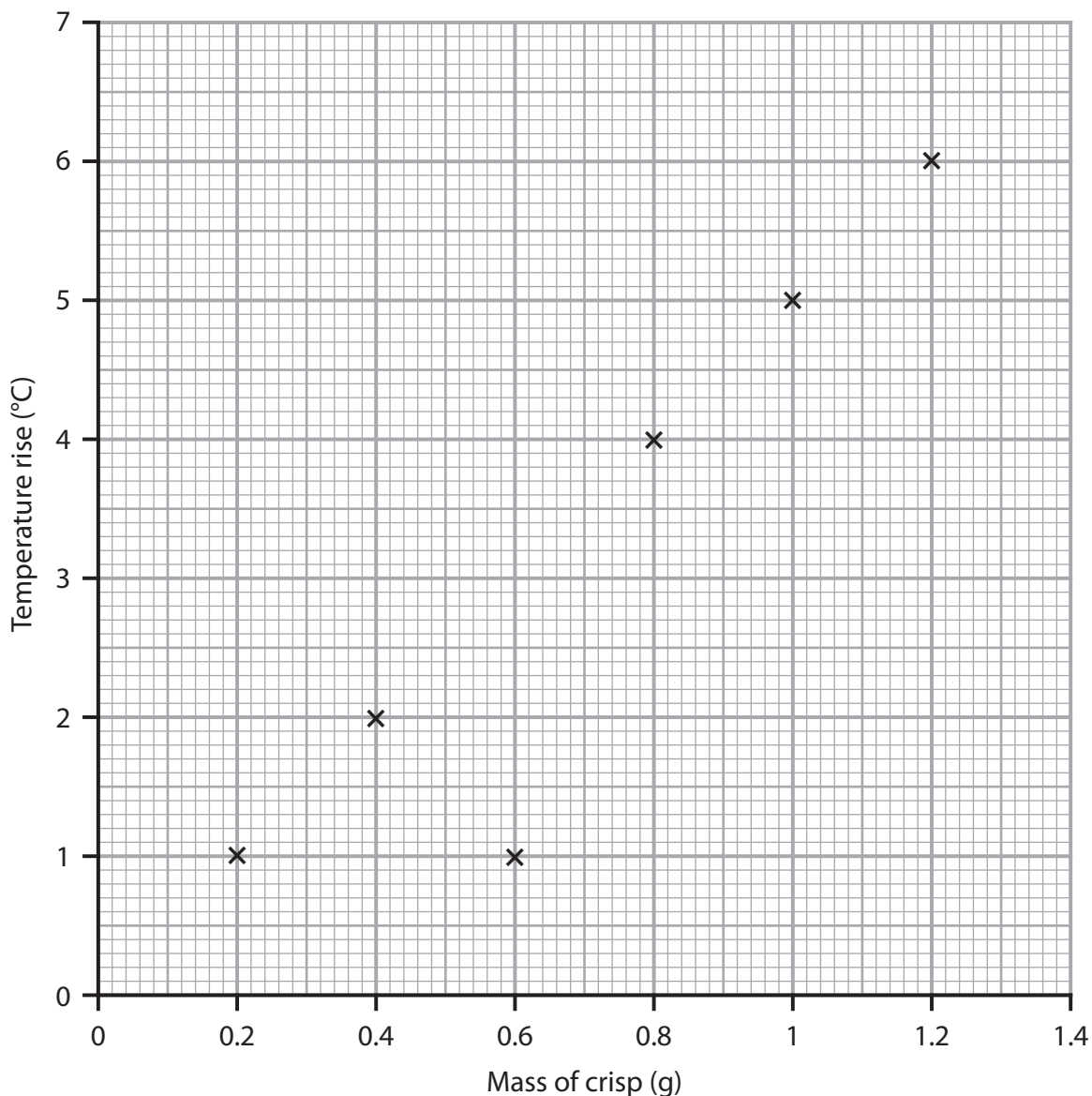
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- 8 Sebastian and Callum were investigating the energy produced by burning crisps. They measured the mass of a crisp. They burnt the crisp under some water. They measured the temperature change in the water. They repeated this for different masses of crisps.



Here is a graph of their results.



(a) (i) One of the results is anomalous. Circle this result on the graph. (1)

(ii) Identify **two** possible reasons for the anomalous result. (2)

- A** The temperature reading was higher than expected
- B** The thermometer was read incorrectly
- C** There was too little water being heated
- D** The mass of the crisp was less than 0.6g
- E** The thermometer was accurate to 0.1°C



(iii) Draw a straight line of best fit to show the trend in the results.

(1)

Use the graph to answer the following question.

The crisp with a mass of 1.0 g burned for 2 minutes.

(b) Calculate the temperature rise per minute for this crisp.

(2)

..... °C/min

(Total for Question 8 = 6 marks)



9 Laura investigated reactions between metals and metal salt solutions.

She measured the temperature rise for each metal and metal salt solution reaction.

Here is a table of her results.

Metal + metal salt solution	Temperature rise (°C)
zinc + copper sulfate	2.5
zinc + magnesium sulfate	0.0
magnesium + copper sulfate	12.1
magnesium + zinc sulfate	7.6
copper + zinc sulfate	0.0
copper + magnesium sulfate	0.0

(a) Laura does not think that copper reacts with zinc sulfate.

State why she thinks this.

(1)



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