**ZIMBABWE SCHOOL EXAMINATIONS COUNCIL**
General Certificate of Education Ordinary Level

**PHYSICS**
PAPER 3 Practical Test

**4023/3**
2 hours

**JUNE 2025 SESSION**

Candidates answer on the spaces provided on the question paper.

Additional materials:
As listed in Instructions to Supervisors
Mathematical set
Electronic calculator

**INSTRUCTIONS TO CANDIDATES**

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Record all your observations and answers in the spaces provided on the question paper.

**INFORMATION FOR CANDIDATES**

The number of marks is given in brackets [ ] at the end of each question or part question.

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[Turn over

**1** In this experiment, you will determine the mass of a uniform metre rule.

    **(a)**     **(i)**     Balance the metre rule horizontally on the pivot and record the position of the centre of mass.

             position of the centre of mass _____ [1]

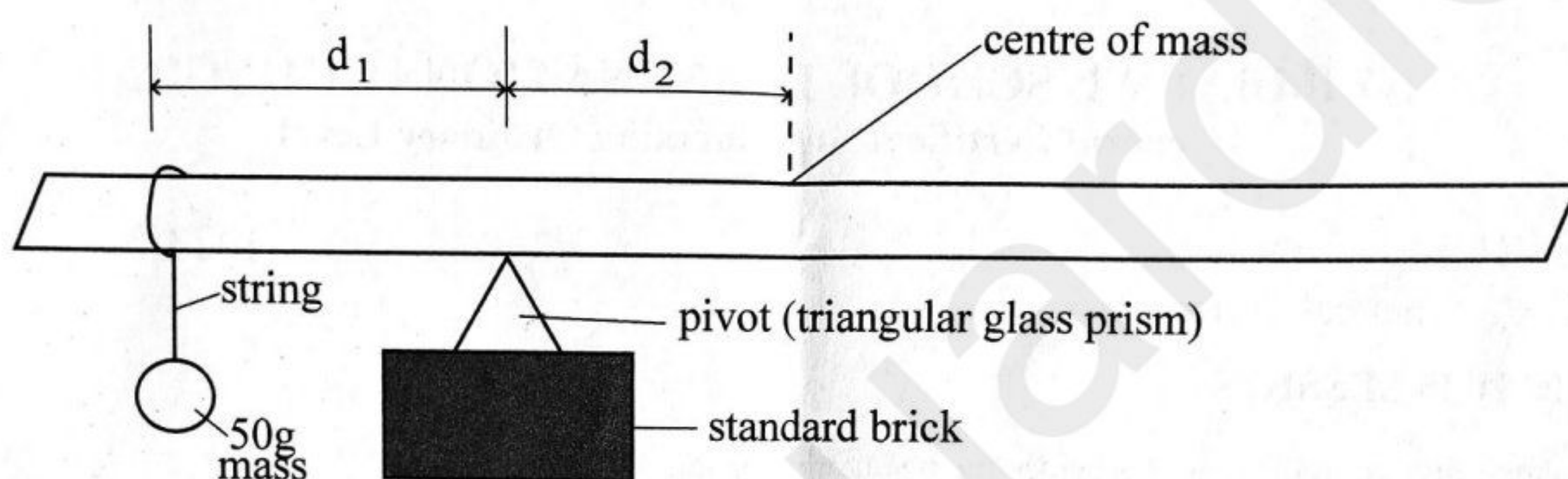    **(ii)**     Set up the apparatus as shown in **Fig 1.1.**



**Fig 1.1**

    **(b)**     **(i)**     Place the 50 g mass on the 5 cm mark of the metre rule. Slide the metre rule on the pivot until it balances horizontally.

    **(ii)**     Measure distance $d_1$ and $d_2$ and record the readings in **Table 1.1.**

(iii)     Repeat **b(i)** and **b(ii)**, placing the 50 g mass on the positions shown in **Table 1.1**.

**Table 1.1**

| Position to hang 50g mass | $d_1(\ldots)$ | $d_2(\ldots)$ |
|---|---|---|
| 5 cm mark | | |
| 10 cm mark | | |
| 15 cm mark | | |
| 20 cm mark | | |
| 25 cm mark | | |
| 30 cm mark | | |

[8]

**(c)**    **(i)**     Calculate the average of values of $d_1$ ($d_{1av}$).

[2]

       **(ii)**     Calculate the average of values of $d_2$($d_{2av}$) .

[2]

**[Turn over**

**(d)** It is given that, $d_{1\,av} = \dfrac{m}{50}\, d_{2\,av}$, where m is a constant.

**(i)** Calculate the value of *m*.

[2]

**(ii)** State the significance of *m*.

_____ [1]

**(e)** State **one** source of error in this experiment and explain how it can be reduced.

_____

_____ [2]

**(f)** **(i)** Measure and record the mass of the metre rule using an electronic balance.

Record the mass of the metre rule.

mass of metre rule _____ [1]

**(ii)** Comment on the values obtained in **d(i)** and **f(i).**

_____

_____ [1]

**2** **(a)** In this experiment, you will investigate how the resistance, R, of a thermistor depends on its temperature, θ.
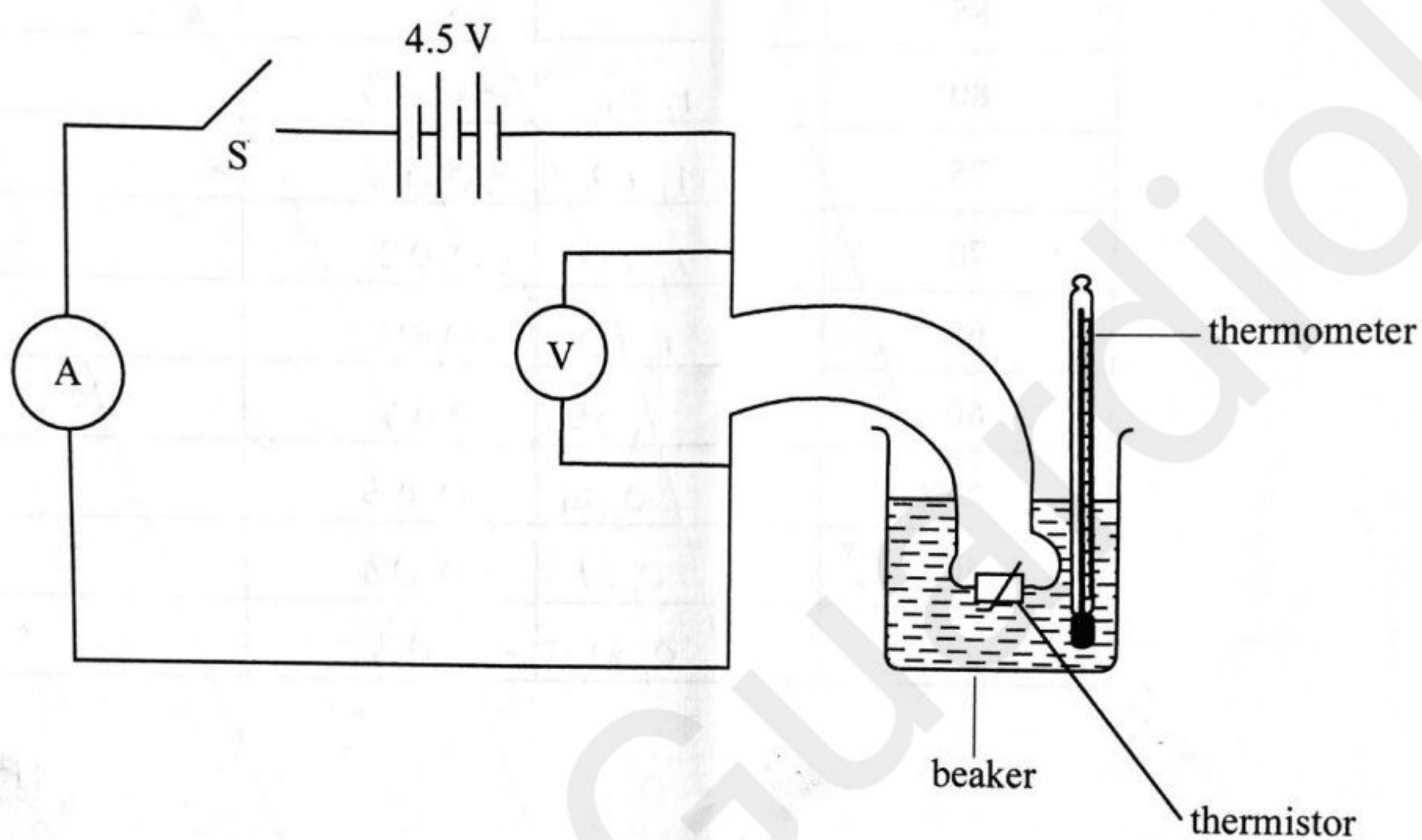
Pour the hot water into the beaker.



**Fig.2.1**

**(b)** **(i)** Connect the circuit as shown in **Fig.2.1.**

**(ii)** Stir the water continuously using a thermometer and record the values of I and V in Table 2.1 when the temperature is at 85 °C.

**(iii)** Repeat **b(ii)** at 5 °C interval as the temperature falls until it gets to 45 °C.

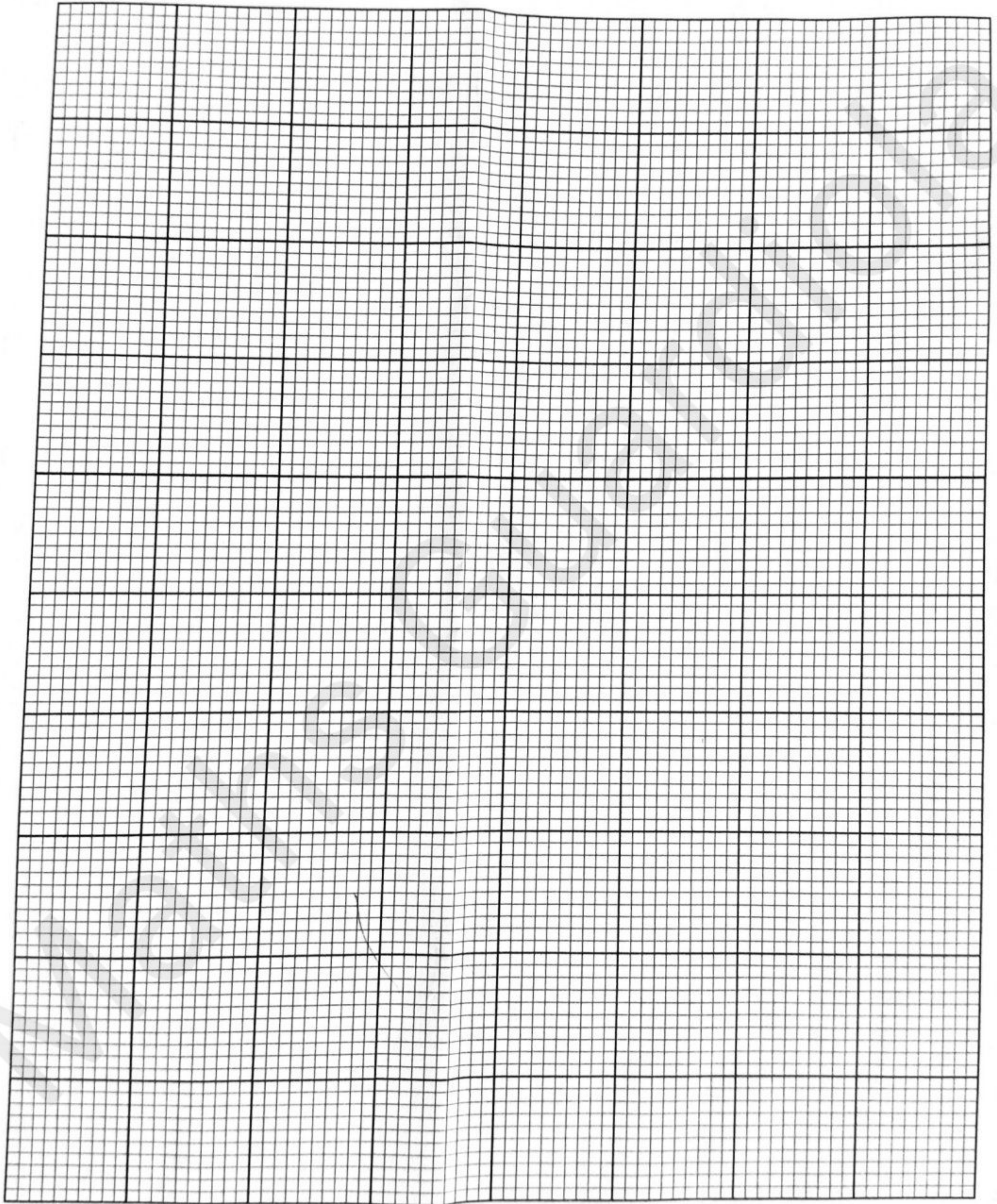**(c)** **(i)** Calculate the values of resistance, R to complete Table.2.1.

**Table.2.1**

| θ/°C | I/mA | V/V | R/Ω |
|------|------|-----|-----|
| 85 | | | |
| 80 | | | |
| 75 | | | |
| 70 | | | |
| 65 | | | |
| 60 | | | |
| 55 | | | |
| 50 | | | |
| 45 | | | |

[10]

**(ii)** Plot a graph of R (y-axis) against $\theta(x-axis)$.

[5]

**[Turn over**

**(iii)** Using the graph, find the resistance when the temperature is $62^\circ$ C.

R = _____ [2]

**(d)** Draw a conclusion from this experiment.

_____ [1]

**(e)** State any **two** precautions made during the experiment.

_____

_____ [2]

**399**#