ELECTRICITY-METRE BRIDGE

You are provided with the following:

- Two wires, one labeled T and the other S each mounted on a piece of wood.
- A dry cell and cell holder.
- A wire W mounted on a mm scale.
- A jockey.
- A centre zero galvanometer.
- Connecting wires (some with crocodile clips).
- A micrometer screw gauge (to be shared).
- A metre rule or half metre rule.
- A switch.

Proceed as follows:

a) Determine the average diameter D, of the wire labeled **T** and the average diameter **d** of the wire labeled **S** using the micrometer screw gauge provided.

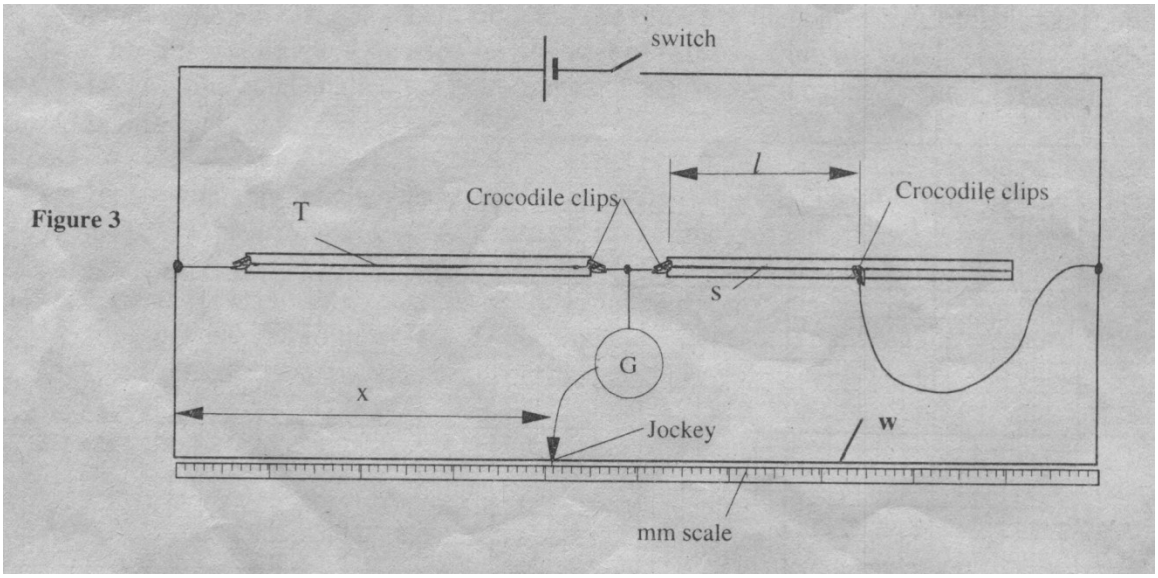
D = ... mm {1 mark}

d = ... mm {1 mark}

Calculate $\frac{D}{d}$

$\frac{D}{d}$ = ... {1 mark}

b) Set up the apparatus as shown in the circuit diagram in figure 3. Use crocodile clips to fix the lengths of **T** and **S** at 50 cm each initially. THIS LENGTH OF T WILL NOT BE CHANGED THROUGHOUT THE EXPERIMENT.



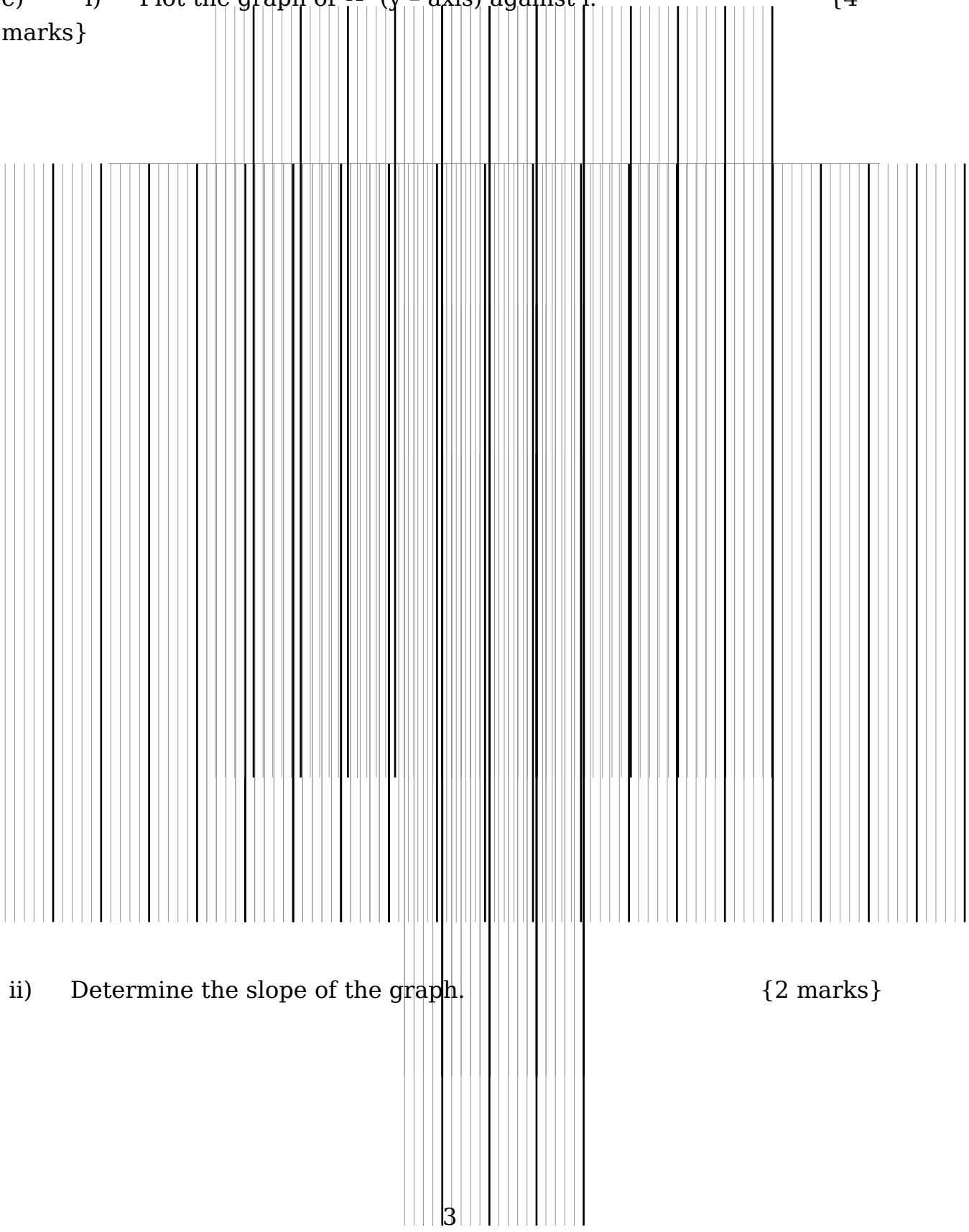
c) Close the switch. Use the jockey to touch one end of the wire **W** and then the other end. THE DEFLECTION OF THE GALVANOMETER SHOULD BE IN THE OPPOSITE DIRECTION IF NOT, CHECK THE CIRCUIT.
Adjust the positions of the Jockey along the wire until there is no deflection in the galvanometer. This is the balance point. Record the value of **X** in cm in the table.

d) Adjust the length **l** of wire **S** to 45 cm. Find the balance point and record the value of X in the table. Repeat for the other values of **l** in the table.

Table 2 {4 marks}

l cm	50	45	40	35	30	25	20
X cm							
$\frac{1}{X}$ (cm^{-1})							

e) i) Plot the graph of $\frac{1}{X}$ (y – axis) against l. {4 marks}



ii) Determine the slope of the graph. {2 marks}

iii) Determine the ratio $\frac{D}{d}$ given that M = $\frac{D^2}{5000d^2}$ {2 marks}