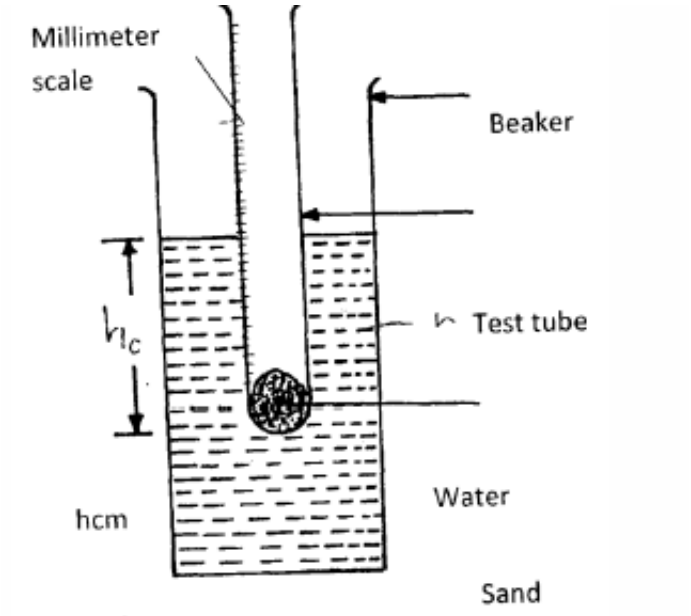
1. **You are provided with the following apparatus:-**

- Micrometer screw gauge
- Vernier caliper
- Water in a beaker 1000ml (should be ½ full)
- Long test-tube
- Some dry sand
- Spatula
- Millimeter scale marked on a paper strip.
- Some cellotape
- 6 ball bearings

a)
(i) Measure one ball bearing using micrometer screw gauge
d= .....cm (1mk)
ii) Determine the volume V of the spherical ball bearing
V=.....cm3 (2mks)
iii) Measure the inside diameter d of the test-tube using vernier caliper. Record it below:
d=.....cm (1mk)
iv) Find the cross-section area A of the test tube
A.....cm2 (1mk)
b) i) Place the millimeter scale along the height of the test tube so
that the zero is at the bottom.
ii) Place the test tube in the water carefully and add sand bit by bit until it floats while vertically upright in the water as shown:-

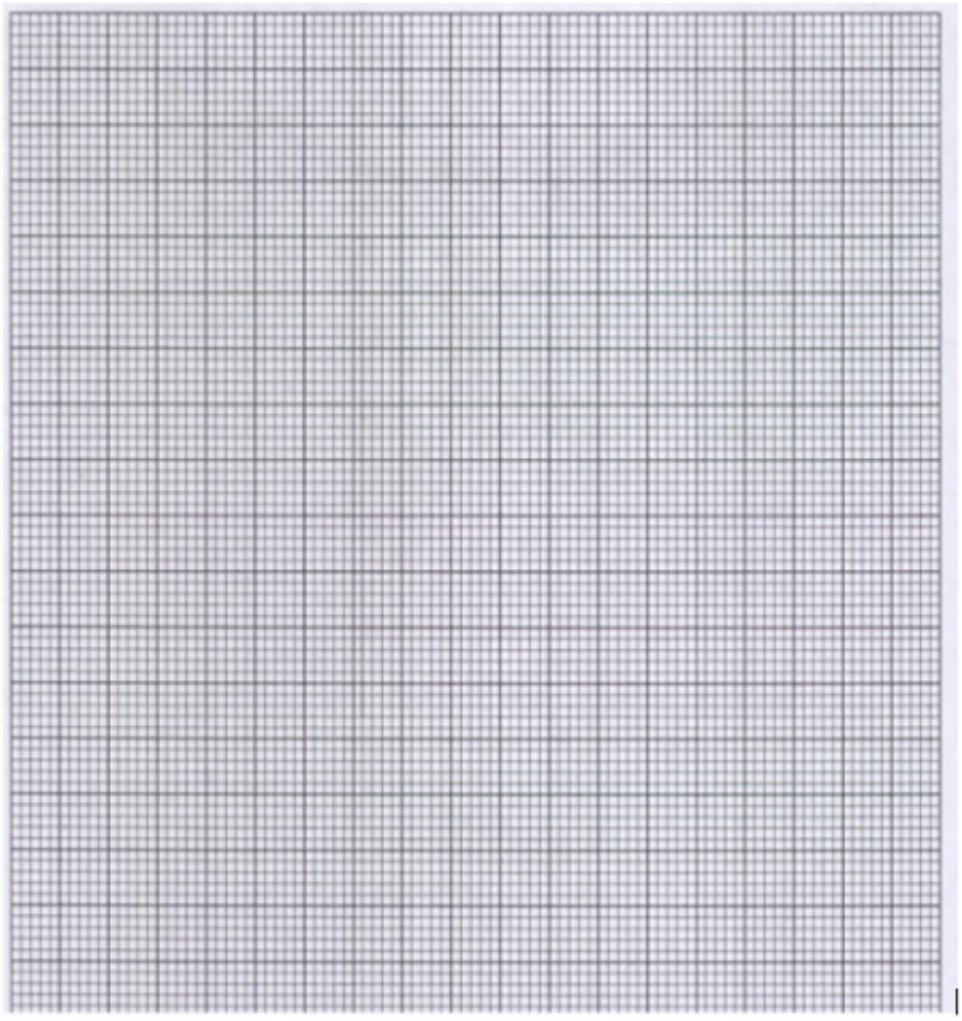


iii) Note and record the height h0 of water level by use of attached millimeter scale
h0=.....cm (1mk)

c) Add one ball bearing into the tube, note and record the new level h in the table of results below:
d) Repeat step (c) with two, three, four, five & six ball bearings and record their corresponding h(c).
Compute values of h-h0(cm) in the table below:-

No. of ball bearing (N)	Floating level h(cm)	h-h0(cm)
1		
2		
3		
4		
5		
6		

Plot a graph of h-h0(cm) against the number of ball bearings (N)(5mks)



f) Determine the slope S, of the graph (2mks)
S.....
.....
.....
g) Relative density Ps, of ball bearing is given by: (2mks)

$$P_s = \frac{SA}{V} \quad Find\ P_s$$

$$p_s = \frac{SxA}{V}$$

2. The following are the apparatus provided.

- 2 dry cells and a switch
- A cell holder
- An ammeter
- A voltmeter
- A jokey
- Nichrome wire mounted on a metre scale
- 7 connecting wires

Proceeds as follows
a) With the apparatus provided draw a circuit diagram you can use to measure the current through the resistance wire potential difference across it. (2mks)

b) Set up the circuit you have drawn record the ammeter reading and voltmeter reading when L=100cm. V= I= A (1mk)
c) Using a micrometer screw gauge measure the diameter d of the wire.
d=.....cm (1mk)
Calculate the quantity y=0.785 (V/I)d2 and give its SI unit. (3mks)
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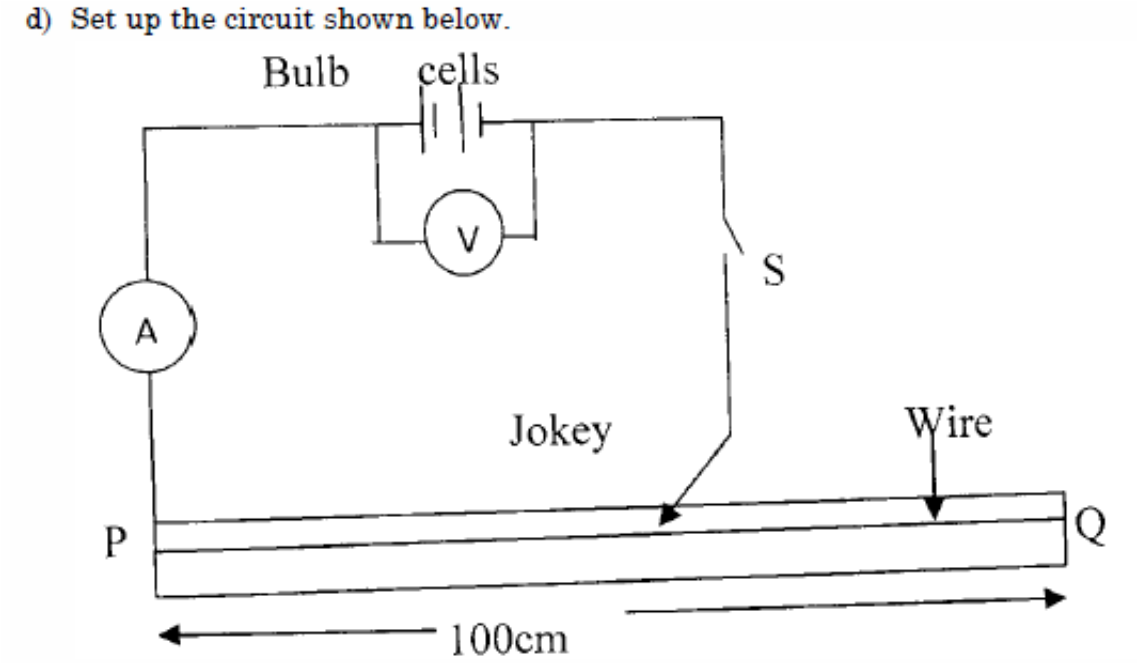
d) Set up the circuit shown below.



i) With the jokey at P (0cm) switch the current and record the both the voltmeter and the ammeter reading. (1mk)
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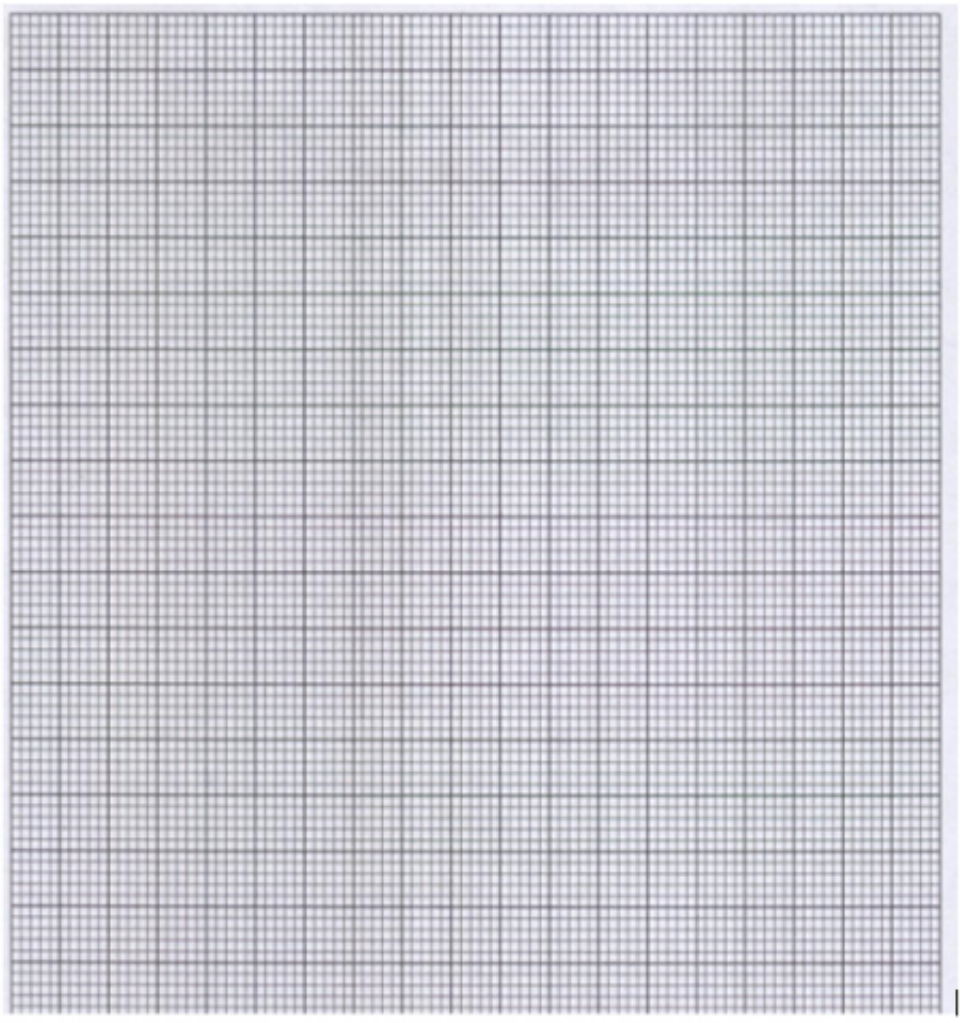
.....
.....
Then switch of the current after readings.
ii) Repeat the procedure for the length PQ as in the table below.

Length of wire L	Voltmeter reading V	Ammeter reading A
100		
80		
60		
40		
20		
0		

iii) Plot a graph of V (y-axis) against I. (5mks)



iv) Determine the slope of the graph. (3mks)
v) What does this quantity represent? (1mk)
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