PHYSICS PRACTICALS 2011

PAPER 3

Question 1

Part A

You are provided with the following: .

- a voltmeter
- a resistance wire labelled P mounted on a metre rule.
- a resistance wire labella Q mounted on a piece of carton.
- 2 dry cells at dea cell holder
- 6 connecting wires each with a crocodile clip at one end.

Proceed as follows:

(a) Place the dry cells in series in the cell holder. Measure and. record the total emf E of the cell.

$E_0 = 3.0 +- 0.2$ V (1 mark)

2.8 to 3.2V

(b) Connect the circuit as show in figure 1

O is a point on P at the 50cm mark of the metre rule. A and B are points on P such

(c) Adjust the positions of the crocodile clips A and B on. P such that. AO = OB = X - 2.5cm; Close the switch. Read and record the potential difference (V) across AO in table 1

(d) Repeat. part (c) for other values of X shown in table 1 and complete the table.

(e) On the grid provided, plot a graph of — (y - axis) against (5 marks)

(f) ***Determine the slope S of the graph. (3 marks)***

(g) ***Use the slope to determine the constant h, given that h = <u>8</u>*** ***(9 marks)***

E_0S

Part B

You are provided with the following:

- a soft drawing board.
- a semicircular glass block.
- three drawing pins;
- a white paper:
- a liquid labelled L
- a dropper.

Proceed as follows;

(h) Place the white paper on the drawing board. Place the semicircular glass block on the paper and trace its outline using a pencil. ; .

(i) At the centre of the straight edge of the outline mark a point 0. Also mark a point X approximately at the centre of the curved edge of the outline as shown in the figure 2.

(j) Place the semicircular glass block on the outline. Push a drawing pin vertically through 0 into the drawing board. Ensure the pin is in .contact with the glass block. Using a dropper, place two or three drops of liquid L on the pin, so that the liquid flows down the pin forming a thin film between the pin and the vertical face" of the glass block.

(k) View the image of the pin from point X through the glass block and move the eye round the curved surface to the right side of X until the image of the pin just disappears from view, **(see figure 3)**

Using a second pin locate and mark a point N on the curved outline at the point where the image just disappears.

(l) Repeat part (k) with the eye moving to the left side of X. Locate and mark the point M on the curved outline where the image just disappears from view.

(m) Draw the lines OM and ON on the outline.

(i) Measure and record angle MON

(ii) If MON = 2A, determine q given that Sine A = $\frac{2}{3}$ q

Question 2

Part A

You are provided with the following:

- a 100ml glass beaker.
- a weighing balance (to be shared).
- a liquid labelled L.
- a measuring cylinder.

Proceed as follows:

(a) Measure and record the mass M: of the empty beaker.

M_1

(b) Measure and pour 2ml of liquid L into the beaker. Measure and record the mass of the beaker + liquid L.

(c) Determine the density d: of the liquid L (2 marks)

d =

Part B

You are provided with the following:

- a retort stand, boss and clamp.
- 2 boiling tubes
- a thermometer.
- some distilled water in a beaker labelled W.
- some liquid in a beaker,labelled L
- a large beaker containing some water.
- a measuring cylinder
- a stopwatch

- a tripod stand and wire gauze.
- a cardboard with a hole in the middle.
- a burner.

Proceed as follows:

(d) Clamp one boiling tube on the retort stand. Measure and pour 45ml of the distilled water (W) into the boiling tube. Setup the apparatus as shown in figure 4.

(e) Heat-the water in the large beaker until/the' temperature- of the distilled water reaches 85°C. Remove the boiling tube from the 'hot water by lifting up the retort stand and placing it a way from the burner.

(f) Stir the water in the boiling tube using the thermometer. Record in the table 2 the temperature of the distilled water at intervals of 30 seconds starting at 80°C until it drops to60°C. *(Stir the distilled water before taking any reading).*

(g) Using the second boiling tube; repeat the procedure in (d), (e) and (f) using 45ml of liquid L instead of distilled water. Record; your results in the same table.

(h) Using the same axes on the grid provided, plot a graph of temperature (y - axis) against time f or :

(i) distilled water W

(ii) liquid L.

(Lable the graphs of Land W).

(i) From the graphs determine (1 mark)

(i) the time *t* taken for the distilled water to cool from 75°C to 65°G.

t_w = minutes

(ii) The time *t* taken for liquid L to cool from 75^0 to 65^0C

t_L = minutes

both time to come from candidate work / graph within

(j) Determine the constant r given that $r = \frac{4.2\, t_L}{d t_w}$ where d is the density of the liquid L in part (A). (2marks)

- Correct substitution in right = 1mk
- Correct evaluation to 1 d.p