# PHYSICS PAPER 3

# KCSE 2011

Coordinated by KENPRO, Macjo Arcade, 4th Floor, Suite 15E, Off Magadi Road, Ongata Rongai
|Tel: +254202319748 | E-mail: infosnkenya@gmail.com | Website: www.schoolsnetkenya.com/

## 2.2.3 Physics Paper 3 (232/3)

### 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 labelled Q mounted on a piece of carton.
- 2 dry cells and a cell holder.
- 6 connecting wires, each with a crocodile clip at one end.
- a switch.

Proceed as follows:

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

$E_o$ = ----------V (1 mark)

(b) Connect the circuit as shown in figure 1.

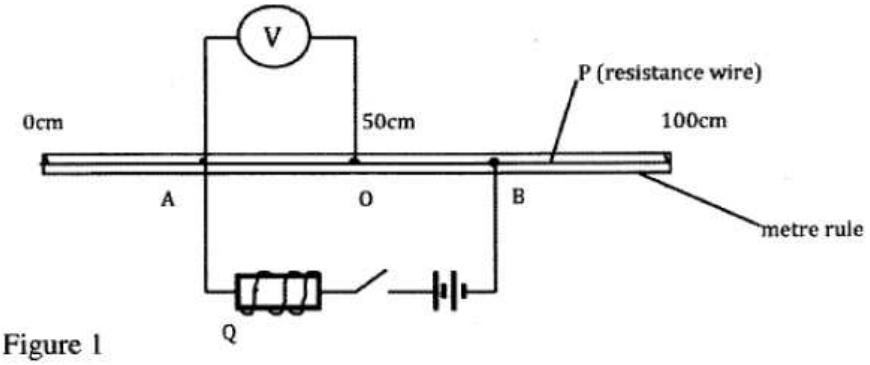



Figure 1

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

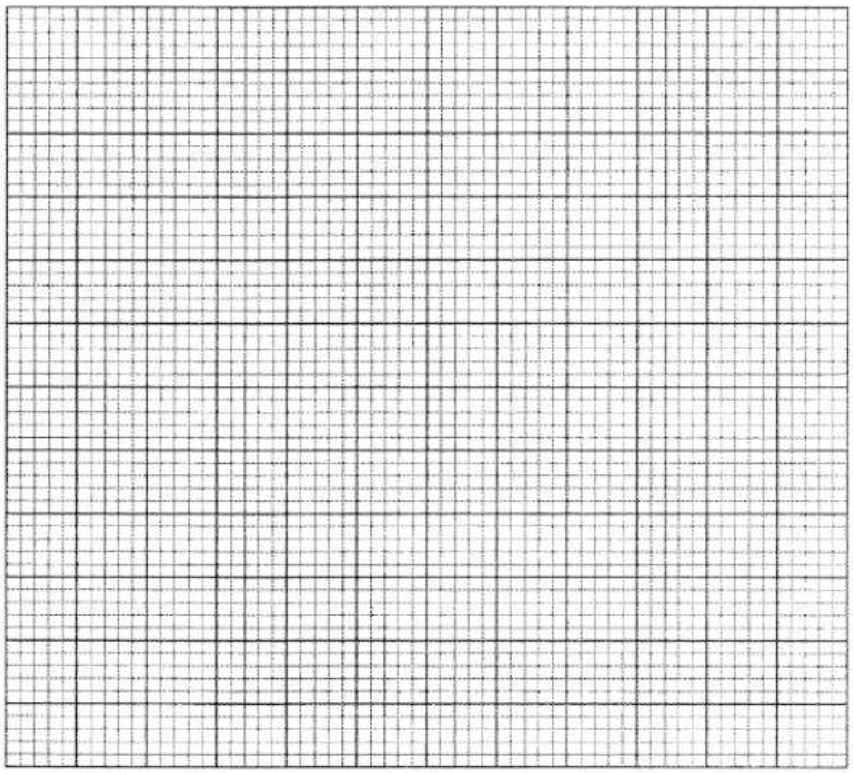
(c) Adjust the positions of the crocodile clips A and B on P such that AO = OB = X = 25cm. Close the switch. Read and record the potential difference (V) across AO in table 1.

(d) Repeat part (c) for other values of X shown in table 1 and complete the table. (5 marks)

**Table 1**

| AO = OB = Xcm | 25 | 30 | 35 | 40 | 45 | 50 |
|---|---|---|---|---|---|---|
| Potential differential. V (V) (2d.p) | | | | | | |
| $1/x\ cm^{-1}(3d.p)$ | | | | | | |
| $1/v(v^{-1})(2d.p)$ | | | | | | |

(e) On the grid provided, plot a graph of $\frac{1}{v}$ (y - axis) against $\frac{1}{x}$ (5 mark



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

(g) Use the slope to determine the constant h, given that $h = \frac{8}{E_o S}$. (2 marks

**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 O. Also mark a point X approximately at the centre of the curved edge of the outline as shown in the figure 2.

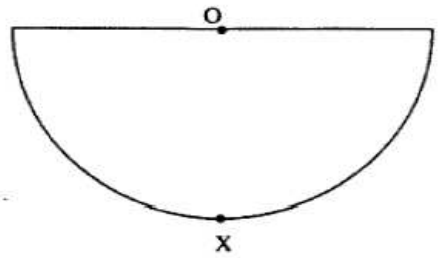



**Figure 2**

(j) Place the semicircular glass block on the outline. Push a drawing pin vertically through O 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**)

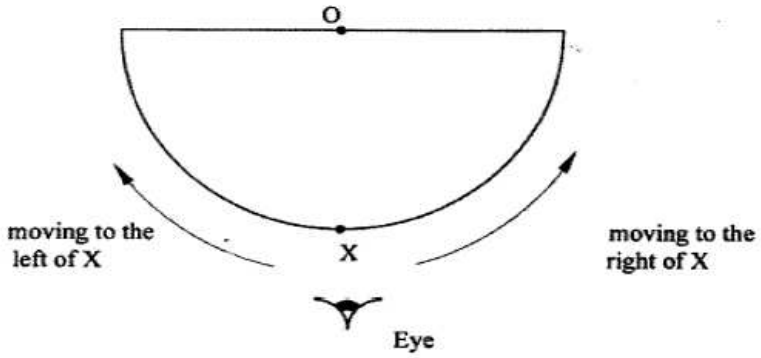



**Figure 3**

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.

(n) (i) Measure and record angle MON. (2 marks)

$\angle MON$ = .....

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

*(The drawing bearing the candidates index number must be attached to the script).*

**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 $M_1$ of the empty beaker.

$M_1$ .....g (1 mark)

(b) Measure and pour 2ml of liquid L into the beaker. Measure and record the mass $M_2$ of the beaker + liquid L.

$M_2$ .....g (1 mark)

(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. Set up the apparatus as shown in figure 4.

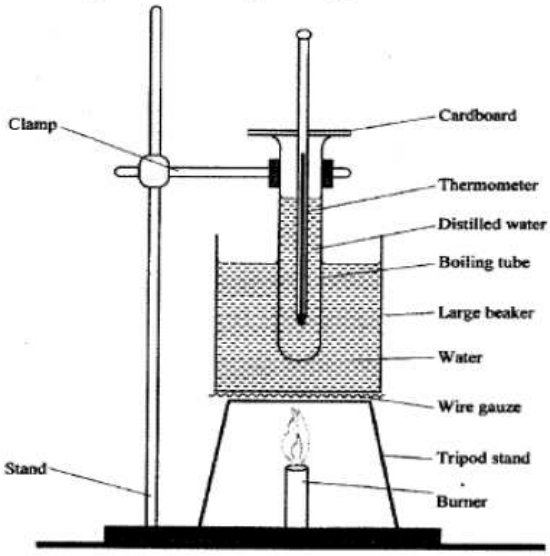



**Figure 4**

(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 to 60°C. *(Stir the distilled water before taking any reading).*

**Table 2**

| Time in minutes | 0 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 |
|---|---|---|---|---|---|---|---|---|---|---|
| Temperature of W (°C) (to the nearest 0.5) | | | | | | | | | | |
| Temperature of L (°C) (to the nearest 0.5) | | | | | | | | | | |

| Time in minutes | 5.0 | 5.5 | 6.0 | 6.5 | 7.0 | 7.5 | 8.0 | 8.5 | 9.0 | 9.5 | 10.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Temperature of W (°C) (to the nearest 0.5) | | | | | | | | | | | |
| Temperature of L (°C) (to the nearest 0.5) | | | | | | | | | | | |

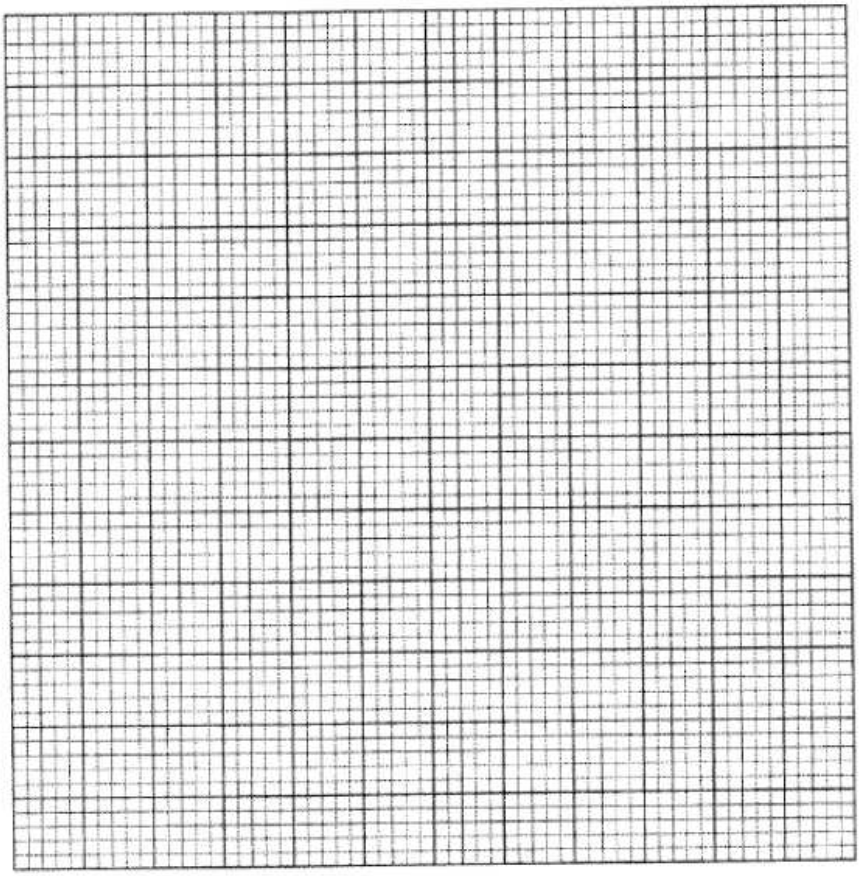
(g) Using the second boiling tube, repeat the procedure in (d), (e) and (f) using 45ml of liquid L instead of distilled water. Record your results in the same table. (4 marks

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

(i) distilled water W. (5 marks)

(ii) liquid L. (3 marks)

(Lable the graphs of L and W).



(i) From the graphs determine:

(i) the time $t_w$ taken for the distilled water to cool from 75°C to 65°C.

$t_w$ = ..... minutes (1 mar

(ii) The time $t_L$ taken for liquid L to cool from 75°C to 65°C.

$t_L$ = ..... minutes (1 mar

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