**KAMDARA JET-2015**
**232/3**
**PHYSICS PRACTICAL**
**CONFIDENTIAL**

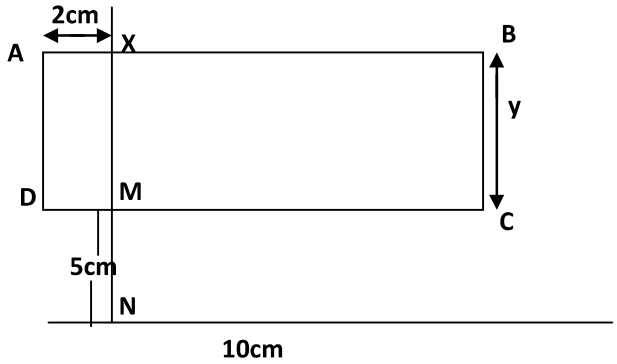
**QUESTION 1**
- A glass block (rectangular)
- Soft board
- Plane mirror
- Four optical pins
- Four thumb pins
- A protractor
- A ruler

**QUESTION 2**
- A voltmeter
- Ammeter
- Two dry cells
- Six connecting wires
- Nichrome wire (SWG 28) on a metre scale labeled AB

**KAMDARA JET-2015**
***Kenya Certificate of Secondary Education (K.C.S.E.)***
**232/3**
**PHYSICS**
**PRACTICAL**
**PAPER 3**
**JULY/AUGUST 2015**

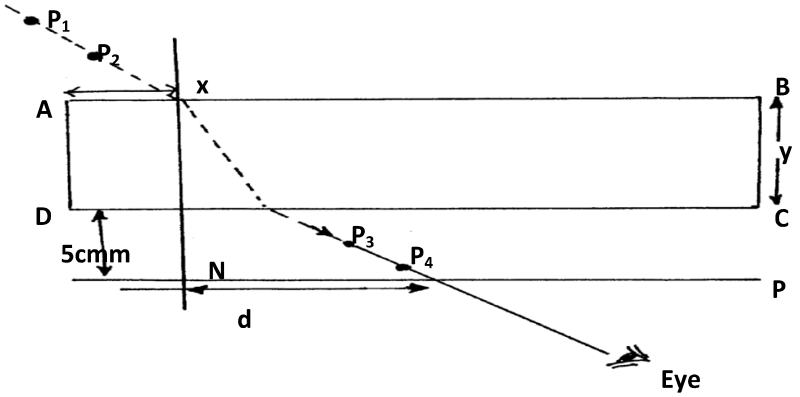
1. You are provided with the following apparatus
   - A glass block (rectangular)
   - Soft board
   - Plane mirror
   - Four optical pins
   - Four thumb pins
   - A protractor
   - A ruler

***Proceed as follows***
a) Fix the plane paper on the soft board using the four thumb pins
b) Place the glass block on the plane paper (fixed on the soft board). Let the glass block rest on the paper from the broader face
c) Trace the glass block using a pencil
d) Remove the glass block
e) Mark point X on the one of the longer side of the traced glass block a shown below. Point X should be 2cm from edge A




(e) Construct a normal at **x** to emerge through line **DC**. Let this normal meet line **DC** at point **M.**
(f) Mark point **N** along the emergent normal. 5cm from **M**
(g) Construct line **NP** to meet the normal at **N** at $90^o$. Line **NP** can be about 10cm
(h) Using a protractor, construct an incident ray Rx at an angle of incidence c=$10^o$. Fix two pins **P1** and **P2** along **RX**.

(i) Replace the glass block to the traced figure
(j) View the path of the incident ray **RX** through the glass block using the other two pins **P3** and **P4.** This can be done by ensuring that the images of pin **P1** and **P2** are in line with **P3** and **P4**
(k) Remove the glass block and draw the emergent ray through **P3** and **P4**
(l) Measure the distance of the emergent ray from point **N** along line **NP** as shown below




(m) Record the corresponding values of d in the table below
(n) Repeat the procedure for other values of i

| Angle of incidence $i^o$ | 10 | 20 | 30 | 40 | 50 | 60 |
|---|---|---|---|---|---|---|
| Distance d(cm) | | | | | | |
| Sin i | | | | | | |
| Sin $^2$i | | | | | | |

(12marks)

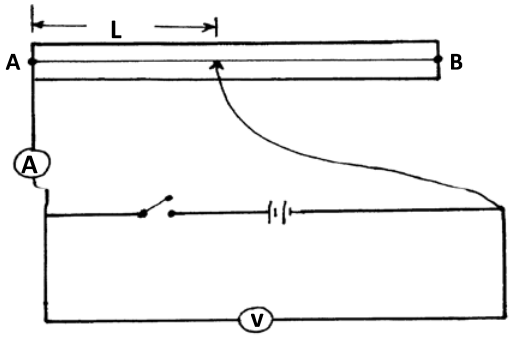
(o) (i) Plot the graph of sin2i against d (5marks)

(ii) Calculate the gradient of the graph (3marks)

2. You are provided with the following apparatus
- Resistance wire fitted on a scale labeled **AB**
- Switch
- Voltmeter
- Ammeter
- Two dry cells
- Six connecting wires

***Proceed as follows:-***

(i) Set up the apparatus as shown below




(ii) Remove the crocodile clip from resistance wire **AB** and close the switch. Record the voltmeter reading
X=_____volts (1mark)
(iii) Attach the crocodile clip to the resistance wire such that L=10cm
(iv) Record the voltmeter and ammeter reading in the table below

(v) Repeat the procedure in iii and iv for L=20cm, 30cm, 40cm, 50cm,60cm,70c, and 80cm
(vi) Complete the table below

| **Length L(cm)** | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
|---|---|---|---|---|---|---|---|---|
| **Current I (A)** | | | | | | | | |
| **p.d V (v)** | | | | | | | | |
| **X-V(V)** | | | | | | | | |
| $\frac{\mathbf{V}}{\mathbf{X-V}}$ | | | | | | | | |
| $\frac{\mathbf{V}}{\mathbf{I}}$**=R(Ω)** | | | | | | | | |

(10marks)

(vii) (a) Plot the graph of $\frac{v}{x-v}$ against **R** (5marks)

(b) Determine the slope **S** of the graph (2marks)

(c) The graph is given by the equation

$\frac{V}{x-v} = \frac{mR}{5} + d$

Determine the value of **m** and **d** (2marks)

**KAMDARA JET-2015**
**MARKING SCHEME**
**PHYSICS 232/3**
**JULY/AUGUST 2014**

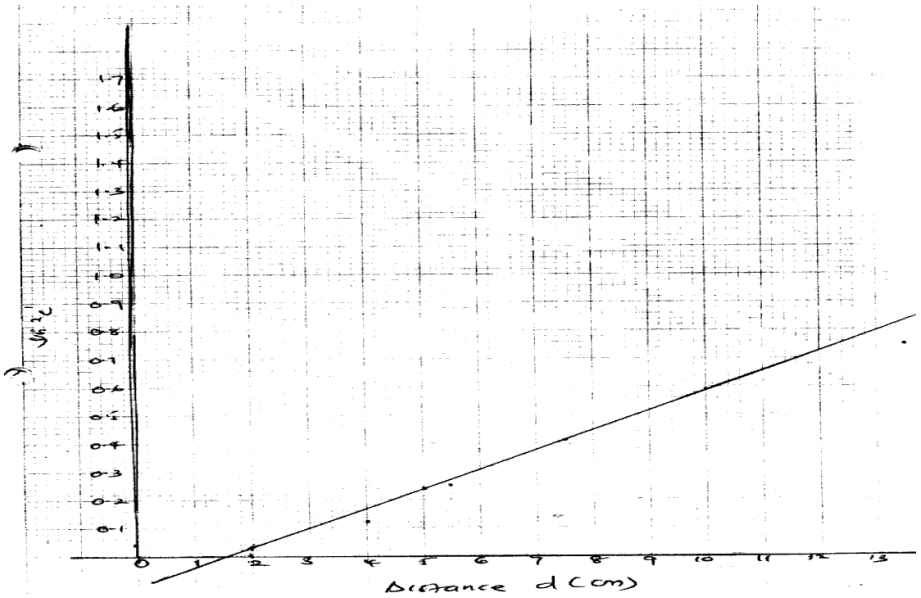
| Angle of incidence $C^o$ | 10 | 20 | 30 | 40 | 50 | 60 |
|---|---|---|---|---|---|---|
| Distance d (cm) | 2.0 | 4.0 | 5.5 | 7.5 | 10.0 | 13.5 |
| Sin i | 0.1784 | 0.3420 | 0.500 | 0.643 | 0.766 | 0.866 |
| $Sin^2 i$ | 0.030 | 0.117 | 0.25 | 0.413 | 0.587 | 0.75 |

8 pairs and above =12mks
6-8 pairs =10mks
5-6 pairs =8mks
3-5 pairs =6mks
Below 3 pairs =no marks
Graph on the graph paper
Scale =1mk
Plotting =2mks
Line=1mk
Axes=1mk
Total=5mks

(ii) Slope = $\frac{\Delta \sin 2\ i}{\Delta d}$ √1

$=\frac{0.24-0}{5-1.6} = \frac{0.24}{3.4} = 0.0706cm^{-1}$

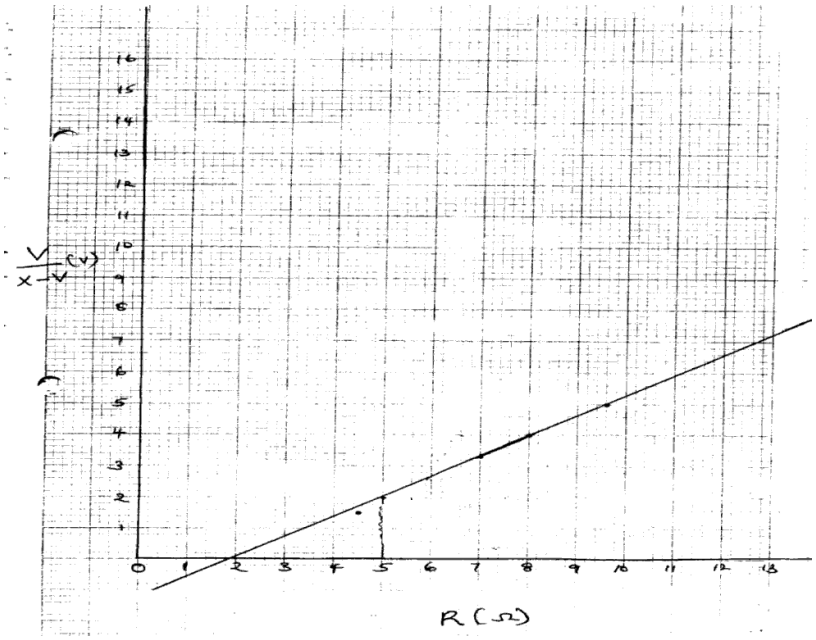
$=0.0706cm^{-1}$√1




2 (ii) =3.0 volts ±0.1

| Length L(cm) | 10 | 20 | 30 | 50 | 80 | | | |
|---|---|---|---|---|---|---|---|---|
| Current I (A) | 0.40 | 0.33 | 0.30 | 0.26 | 0.19 | | | |
| p.d V (v) | 1.8 | 2.3 | 2.4 | 2.5 | 2.7 | | | |
| X-V(V) | 1.2 | 0.7 | 0.6 | 0.5 | 0.3 | | | |
| $\frac{V}{X-V}$ | 1.5 | 3.29 | 4.0 | 5.0 | 9.0 | | | |
| $\frac{V}{I}$=R(Ω) | 4.5 | 7.0 | 8.0 | 9.6 | 14.2 | | | |

(ii) (a) on the graph paper
Scale=1mk
Plotting=2mks
Line=1mk
Axes=1mk
Total=5mks




(b) Slope S=S=$\frac{2.0}{5-2}\sqrt{=}\frac{2}{3}$= $0.67\Omega^{-1}$

S=$0.67\Omega-1\sqrt{}^{-1}$

(c) d=$2.0\Omega\sqrt{1}$

M=Gradient x $5\sqrt{}$

=$(0.67x5)\Omega^{-1}$

M=$3.35\Omega^{-1}\sqrt{}$