**Name…… Index No…….....**

Candidate's signature.....
Date.....

**232/3**
**PHYSICS PRACTICAL**
**Paper 3**
**Nov/Dec 2020**
**$2\frac{1}{2}$ hours**

# SUKELEMO MOCK EXAMINATIONS

***Kenya Certificate of Secondary Education (K.C.S.E)***

PHYSICS
(PRACTICAL)
Paper 3

**Instructions to Candidates**

*(a) Write your name and index number in the spaces provided above.*
*(b) Sign and write the date of examination in the space provided above.*
*(c) Answer **all** questions on the question paper.*
*(d) You are supposed to spend the first 15 minutes allowed for this paper reading the whole paper carefully before commencing your work and confirming your apparatus.*
*(e) Marks are given for a clear record of the observations actually made, their suitability, accuracy and for the use made of them.)*
*(f) Candidates are advised to record observations as soon as they are made*
*(g) Mathematical tables and Electronic calculators may be used*
***(h) Candidates should answer the questions in English***

**For Examiner's Use Only**

| Question | Maximum | Candidates Score |
|---|---|---|
| 1 | 20 | |
| 2 | 20 | |
| | Total | |

**QUESTION ONE**

**Part A**

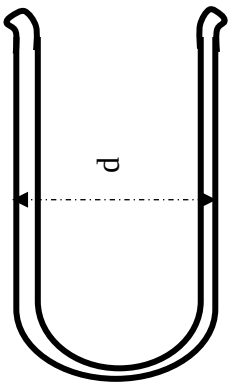
You are provided with the following apparatus.

- meter rule.
- electronic beam balance ( shared)
- vernier callipers ( shared)
- measuring cylinder
- boiling tube.

Proceed as follows;

(a) Measure the length $l$ of the boiling tube provided using a metre rule

$l$ = ……..(1mark)




(b) Measure the external diameter d of the boiling tube at the middle using a Vernier callipers.

. d=…… (1mark)

(c) Calculate the external volume of the boiling tube. $V_1 = \frac{11d^2l}{14}$ (1mark)

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(d) Completely fill the boiling tube with water. Pour the water into the measuring cylinder Read and record the volume $V_2$ of the water.

$V_2$ = …….. ……. (1mark)

(e) Calculate the volume $V_3$ of the glass used to make the boiling tube. (1mark)

……

(f) Using the electronic balance measure the mass of the boiling tube

Mass =……kg (1mark)

(e) Determine the density of the glass. (1mark)

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**PART B**

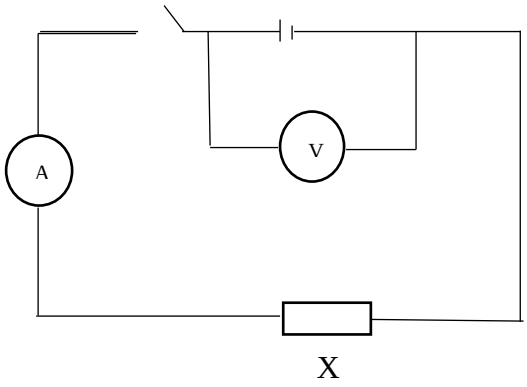
You are provide with the following

- A wire mounted on a millimetre scale labelled AB

- A galvanometer.
- Jockey
- A carbon resistor labelled X .
- 8 Connecting wires, 4 with crocodile clips at both ends.
- A resistance wire labelled R mounted on a half meter rule
- Ammeter
- Voltmeter
- One dry cell in a cell holder
- Micrometer screw gauge

Proceed as follows:

(a ) Set up the circuit as shown below.




(i) Record the voltmeter reading when the switch is open.

E = …… (1mark)

(ii) Close the switch and record the voltmeter and ammeter readings V and I.

V = …… (1mark)

I = …… (1mark)

(iii) Explain why V is less than E . (1mark)

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……
……

(iv) Now connect the voltmeter across the carbon resistor X and record voltmeter reading $V_1$ when the switch is on.

$V_1$ = ……. (1mark)

(v) Determine X given that $X = \frac{V_1}{I}$ (1mark)

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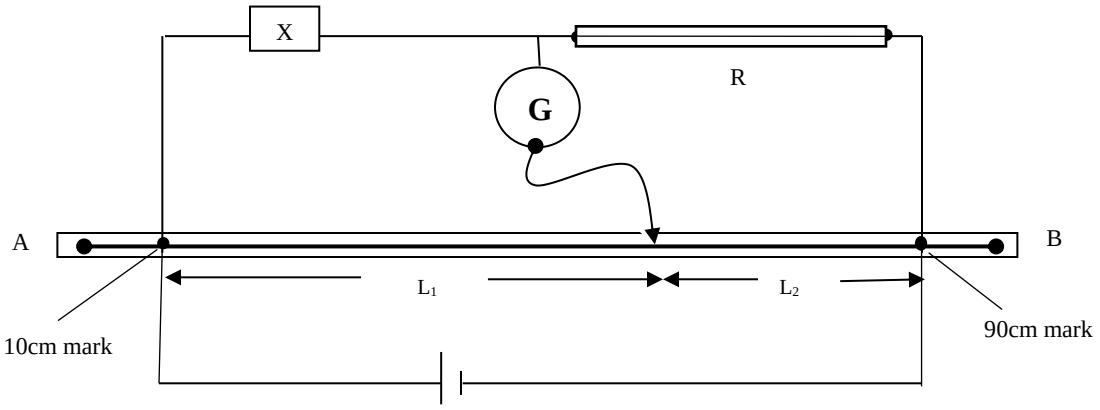
……..

(b) Using the micrometre screw gauge, measure and record the diameter D of the resistance wire R provided

D =……m (1mark)

(c) Now connect another circuit as shown in the figure below.



Touch the 10cm mark and the 90 cm mark and see that the galvanometer deflects in opposite direction in each case.
(i)Move the sliding jockey along the resistance wire AB and note the length $L_1$ and $L_2$ where the galvanometer pointer points at the zero mark. Record the values of $L_1$ and $L_2$.

$L_1$ =……m (1mark)

$L_2$ =…… m (1mark)

(ii) Determine the resistance of the resistance wire R using the relationship,
(2marks)

$$\frac{R}{L_1} = \frac{X}{L_2}$$

……

……

……

(iii)Determine the resistance of the wire R per metre. (1 mark)

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(iv)Given that, R = $\frac{0.1114S}{D^2}$ determine the value of S , where R is the resistance per metre. (1mark)

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**QUESTION TWO**

## PART A

You are provided with the following;

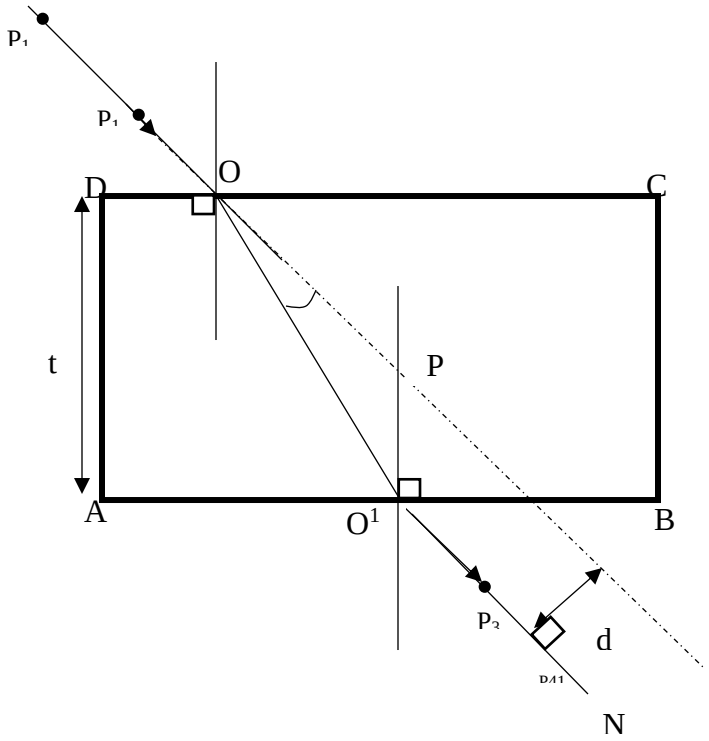
- Soft board
- Vernier calipers.
- Rectangular Glass block
- Four optical pins.
- Plain sheet of paper.
- Two thumb tacks
- Protractor

Procedure;

(a) Measure and record the width $t$ of the glass block using the vernier calipers provided.

$t$ = …… (m) (1 mark)

Fix the white plain paper on the soft board using the two thumb tacks.
Place the glass bock on the paper, trace its outline and label it ABCD ,as shown.
Remove the glass block and draw a normal, say at point O.
Draw a line making an angle of $30^0$ with the normal to represent the incident ray.
Replace the glass block carefully to its original position.
Fix two pins $P_1$ and $P_2$ on the line in such a way that they are vertical and at least 4cm apart.
Looking through the glass block through face AB, fix two pins $P_3$ and $P_4$ so that they are exactly in line with the $P_1$ and $P_2$. Mark the positions of $P_3$ and $P_4$




Join $P_3$ and $P_4$ and produce the line to meet face AB of the block at $O^1$. Join O and $O^1$. Measure angle $O^1OP$.
Also, Measure anlge $OO^1P$.

(b) $O^1OP$ =
……
(1mark)

(c) $OO^1P$ =
……...
(1mark)

Measure the perpendicular distance d from the line $O^1N$ to OP produced.

(d) d = …… (m)
(1mark)

(e) Determine $t_1$ given that ,$t_1 = \frac{dcos\ angle(OO^1P)}{\sin angle(O^1OP)}$ .

(2marks)

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(f) How do the values of $t$ and $t_1$ compare .

(1mark)

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***NB. The worksheet should be handed in with the question paper.***

**PART B**

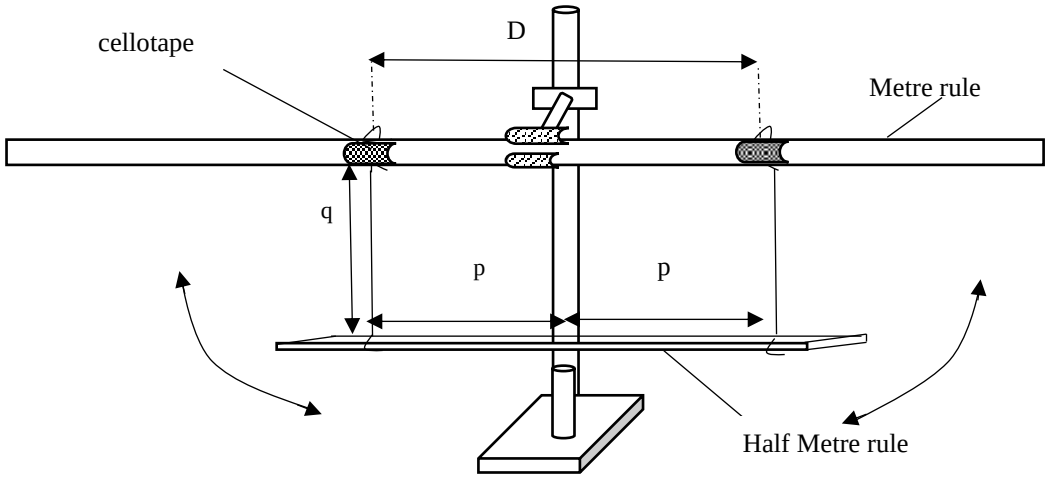
You are provided with the following:

- A metre rule
- Two Half metre rules
- Stop watch
- A complete retort stand
- Two pieces of thread.
- Some cellotape

Proceed as follows:

(a) Set up the apparatus as shown in figure below such that D = 2p = 20cm and q = 20cm.

**Ensure that D is kept constant throughout the experiment.** (use a piece of cellotape to fix the threads).
*Make sure that the loops of thread on the half metre rule can slide along the half metre rule.* This would enable easy adjustments of distance p later in the experiment. The scale of the half metre rule should be kept in a horizontal plane.




The distance p is measured from the centre of the half metre rule.

(b) Adjust the position of the loops on the half metre rule so that p = 21cm. (ie 2p = 42cm). You may use a cellotape to keep the loop in position. Measure and record in table 1 the value of q.

**N.B q is the vertical distance between the half metre rule and the metre rule.**

(d) Slightly displace one end of the half metre rule towards you and the other end away from you in a horizontal plane such that when released, it oscillates in the same plane. Measure time t for 10 oscillations. Repeat the procedures (c) and (d) for other values of p .

(e) Complete the table.

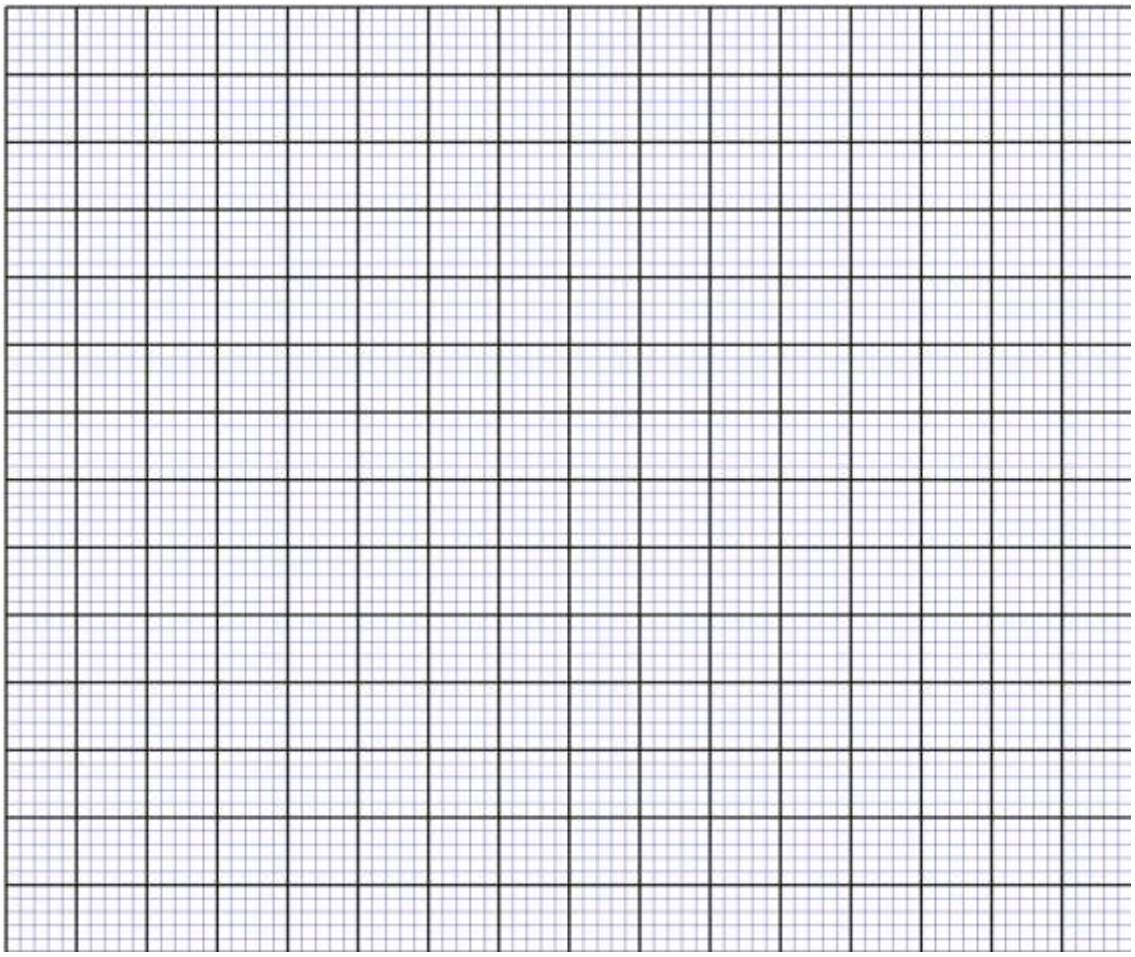
(8marks)

| p(cm) | 21.0 | 19.0 | 17.0 | 15.0 | 13.0 | 10.0 | 8.0 |
|---|---|---|---|---|---|---|---|
| q(cm) | | | | | | | |
| Time t for 10 oscillations (s) | | | | | | | |

| Periodic time T (s) | | | | | | | |
|---|---|---|---|---|---|---|---|
| $\frac{p}{q}$ | | | | | | | |

(g) (i) Plot a graph of T (y axis) against $\frac{p}{q}$

(4marks)



(ii) Determine the slope S of the graph when $\frac{p}{q} = 2.0$

(2marks)

……

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……

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(iii) Determine the constant $k$ given that $k = \frac{s}{\pi}\sqrt{D\text{g}}$ where g = 10m/s$^2$

(2marks)

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***End***