Name……**Strm**…….**Adm. No:**…….....

232/3
PHYSICS
Paper 3
(PRACTICAL)
Oct 2022
2 1/2 hours

School……

Date……

NYAHOKAKIRA JOINT EXAMINATION

Kenya Certificate of Secondary Education

CLUSTER 3 PHYSICS EXAMINATION

Paper 3
(PRACTICAL)
2 1/2 hours

(a) Write your name, admission number and the name of your school in the spaces provided above.
(b) Sign and write the date of examination in the spaces provided above.
*(c) This paper consists of **two** questions; **1** and **2**.*
*(d) Answer **all** the questions in sections **1** and **2** in the spaces provided.*
*(e) **All** working **must** be clearly shown.*
(f) Silent non programmable electronic calculators may be used.
(g) This paper consists of 9 printed pages.
(h) Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.
(i) Candidates should answer the questions in English.

For Examiners Use Only

Question		Maximum Score	Candidate's Score
1		20	
2	Part A	12	
	Part B	08	
	Total Score	**40**	

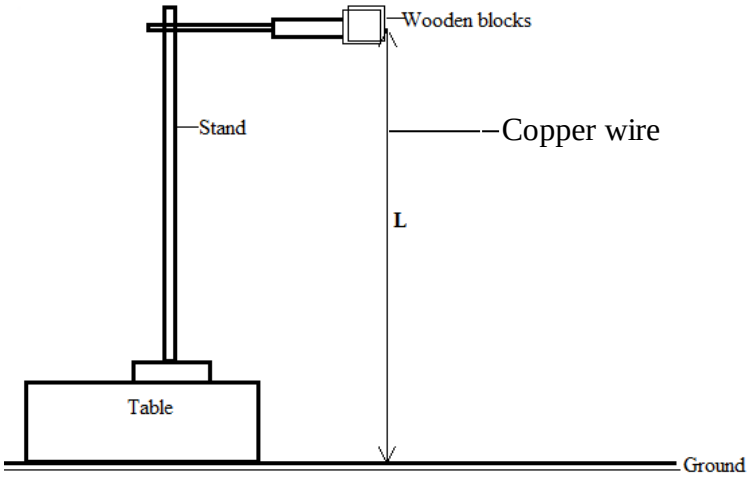
QUESTION ONE

You are provided with the following:

- A 100g mass.
- A copper wire of about 120cm long.
- Stop watch
- Metre rule
- Two small woooden blocks.
- A complete retort stand.

Proceed as follows:

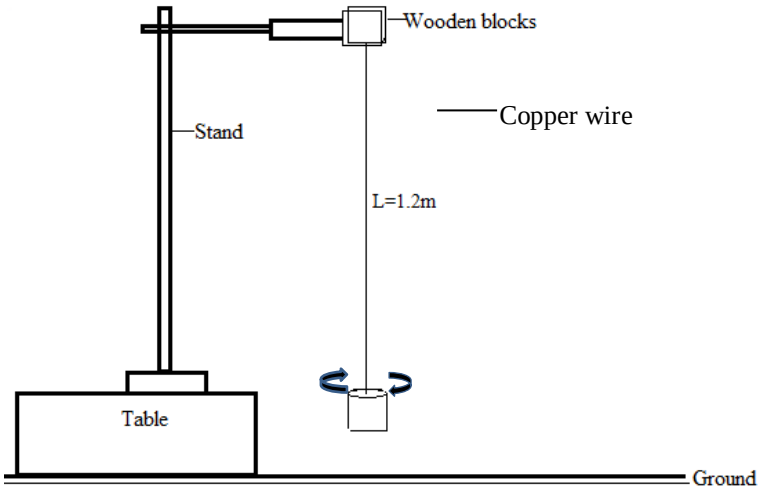
a) Fix the two pieces of wooden blocks on the clamp so that the distance **L** between the wooden blocks and the floor is **140cm** as shown in the figure below**.**
(THIS DISTANCE SHOULD REMAIN FIXED THROUGHOUT THE EXPERIMENT)



b) Tie one end of the wire firmly to the hook of provided mass and fix the other end between the two wooden blocks.

c) Adjust the length of the wire such that the distance, **L** is **1.2m**.

d) Give the mass a slight twist in a horizontal plane (about one turn) so that when released it oscillates about its center. Measure the time taken for **10 oscillations.**



t …… (1mk)

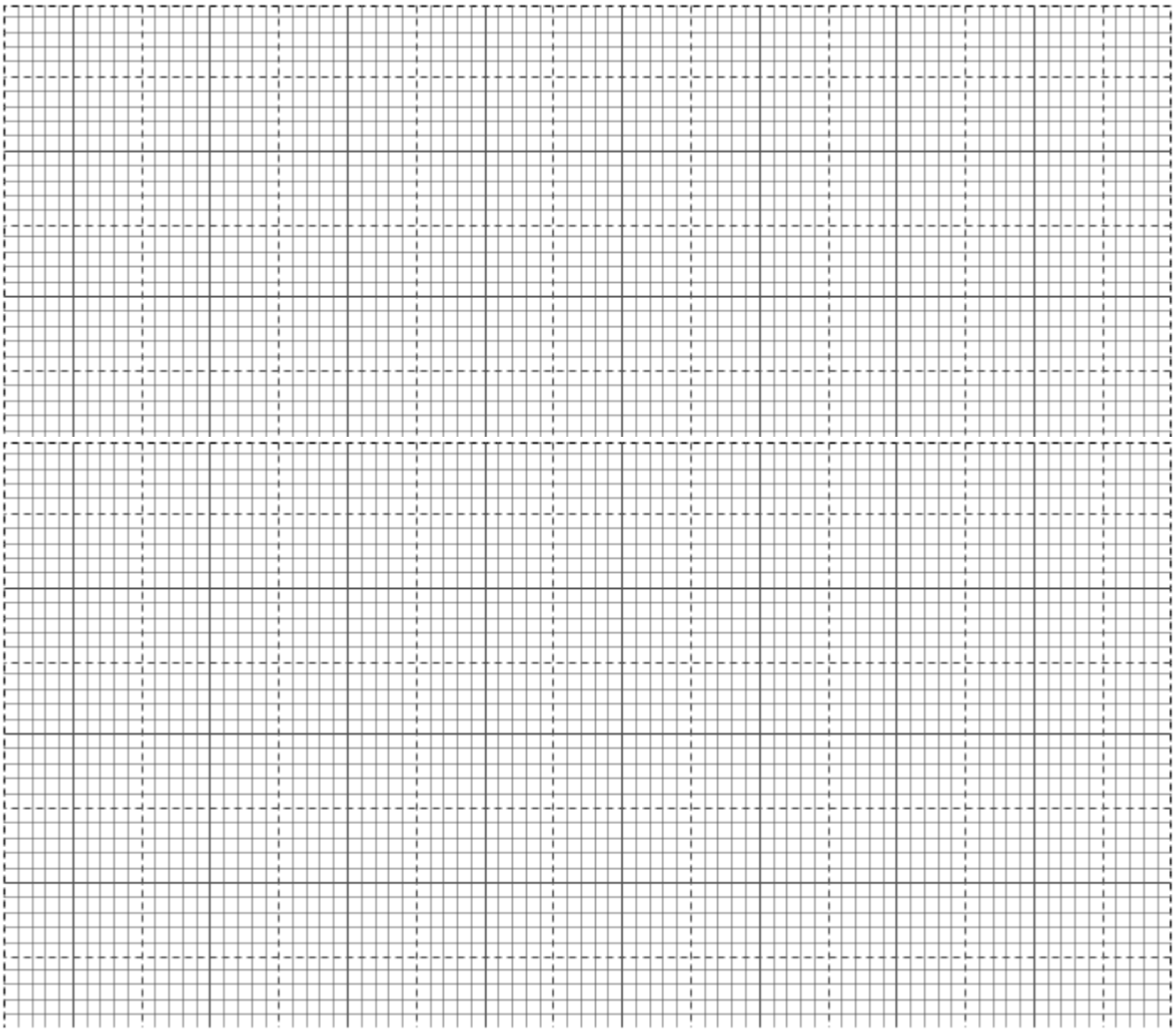
Period,**T**…….. (1mk)

e) Repeat the procedure in d) above for other values of **L** as indicted in table 1. (6mks)

Table. 1

Length L(m)	**1.1**	**1.0**	**0.9**	**0.8**	**0.7**	**0.6**
$\boldsymbol{d = 1.4 - L}$						
Time for 10 oscillations, t,(s)						
Period, T,(s)						
T^2 ,(S^2)						

f) Plot the graph of **T^2** (s^2)against reduced distance **d** (m), (5mks)



g) ***Determine*** slope, **G**, of your graph (2mks)

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h) Given that;

$$\boldsymbol{T^2 = -\frac{39.478d}{n} + W}$$, where **W** and **n** are constant,

(i) Determine the value of **n** (3mks)

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(ii) Given that, $\boldsymbol{W = \frac{39.478L}{n}}$, determine the value of **L** (2mks)

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2. QUESTION TWO

PART A.

You are provided with;

- Voltmeter
- Ammeter
- Nichrome wire labeled K (10cm long gauge32)
- One cell and cell holder.
- A switch
- Micrometer screw gauge(shared)

Procedure:

a) Measure;

i) The diameter of the wire K using the micrometer screw gauge. (1mk)

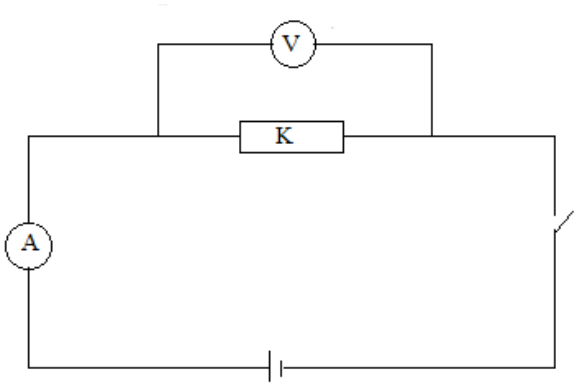
d = ……mm

d = ……m

ii) The length of the wire K

L = ……m (1mk)

Set up the apparatus as shown in the figure below.



i) Record the voltmeter reading when the switch open,

$\mathbf{V_0}$ = …… (1mk)

ii) With the switch closed, complete the table below for the values of the current passing through K and the pd across it.

I = …… (1mk)

V = …….. (1mk)

iii) Determine the internal resistance, **r**

given that; $\mathbf{V_o = V + Ir}$ (2mks)

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iv) Use the recorded values of **I** and **V** to determine the conductance, **G** of the wire. (2mks)

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v) Given that; $L = \frac{\pi d^2}{4\rho G}$ determine the value of ρ. (3mks)

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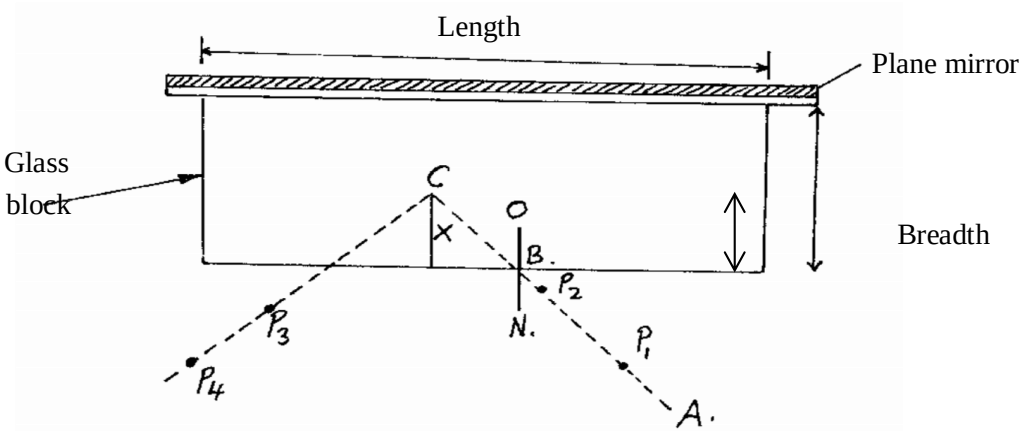
PART B

a) You are provided with the following apparatus

- a glass block (10.2 x 6.5 x 1.8)cm
- a plane mirror (10 x 10)cm
- 4 optical pins
- a soft board
- A cellotape (about 15cm long)
- 2 white – plain sheets of paper
- a ruler or half metre rule
- a protractor
- 4 office pins

Proceed as follows:-

(i) Using the cello tape provided fix the plane mirror to the glass block alongside as shown in the figure below. The reflecting surface to face the glass block.



(ii) With the use of the office pins, secure firmly a white plain paper on the board and place the block together with attached mirror.

(iii) Draw the outline of the glass block together with the mirror

(iv) Remove the block and the mirror and draw a normal at **B** somewhere **a quarter- way the length** of the outline you drew in (iii) above.

(v) Draw four (4) different rays **AB** incident at **B** and extended to **C**. The incident rays should make angles 10^0, 20^0, 30^0, and 40^0.

(vi) Replace the glass block together with the attached mirror so as exactly fit the outline in(iii)

(vii) Place two object pins $\mathbf{P_1}$ and $\mathbf{P_2}$ along the 10^0 line. Locate the images of pins $\mathbf{P_1}$ and $\mathbf{P_2}$ as they appear by non-parallax (the images of the pins appear to be in a straight line when viewed through the glass block).

Place pins $\mathbf{P_3}$ and $\mathbf{P_4}$ so that the images of pins $\mathbf{P_1}$ and $\mathbf{P_2}$ are not seen.

(viii) Remove the glass block together with the attached mirror from the outline and produce the lines joining $\mathbf{P_1}$ to $\mathbf{P_2}$ and $\mathbf{P_3}$ to $\mathbf{P_4}$ so that they intersect at **C**.

Measure and record the distance, **x** in the table 2 below**.**

NB. It may be necessary for you to draw another outline so as to avoid congestion of (construction) lines.

Angle i ^{0}	**10**	**20**	**30**	**40**
Distance, x(cm)				
Distance, x(m)				

Table 2 (3mks)

(ix) Now measure the breadth, **b** of the glass block. (1mk)

b = ……..

(x) Calculate the average $\mathbf{A_x}$ of the values of **x** in table 3 above (2mks)

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(xi) Determine the refractive index of the glass block using the formula.

Refractive index of glass $n = \frac{b}{A_x}$ (2 marks)

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