NAME……..…… **INDEX NO.:**……...

STREAM: ……..…… **ADM NO:** ……

DATE: ……..……

232/3
PHYSICS
Paper 3(PRACTICAL)
Time: 2 .5 Hours

KCSE 2023 TOP PREDICTION MASTER CYCLE 10

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

INSTRUCTIONS TO CANDIDATES:-

- *Write your **name**, **index number** and **school** in the spaces provided above.*
- *Answer all the questions in the spaces provided above.*
- *You are supposed to spend the first 15 minutes of the 2 ½ hours allowed for this paper reading the whole paper carefully before commencing your work*
- *Marks are given for a clear record of the observations actually made their suitability, accuracy and the use made of them.*
- *Candidates are advised to record their observations as soon as they are made.*
- *Non- programmable silent calculators and KNEC Mathematical tables may be used.*

QUESTION	PART	MAXIMUM SCORE	CANDIDATE'S SCORE
1	A	05	
	B	15	
2	A	10	
	B	10	
		40	

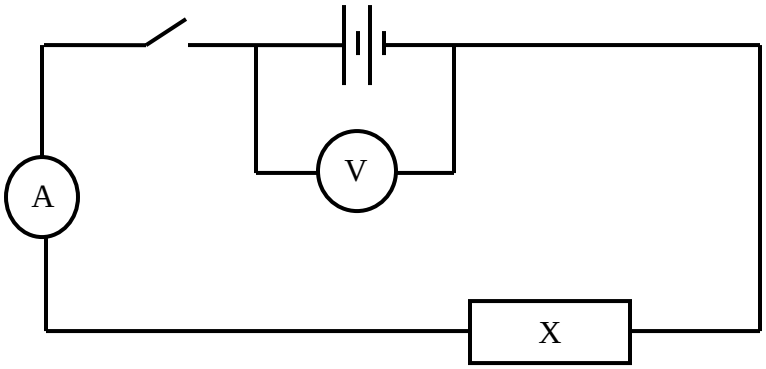
QUESTION 1

You are provided with the following apparatus;

- A carbon resistor labelled X .
- A carbon resistor labelled Z
- A voltmeter (0 – 5V)
- An ammeter (0 – 1A)
- 5 10Ω carbon resistors.
- Centre zero galvanometer.
- 2 new dry cells and cell holder.
- 8 connecting wires at least 4 with crocodile clips at one end.
- Jockey
- A resistance wire labelled AB mounted on mm scale.
- A switch.

PART A

a) Set up the circuit below.



b) Record the voltmeter reading E when the switch is open.

E = ……V (1mk)

c) Close the switch and record the voltmeter and Ammeter readings V and I respectively.

V = ……V (1mk)

I = ……A (1mk)

d) Account for the difference between E and V. (1mk)

……

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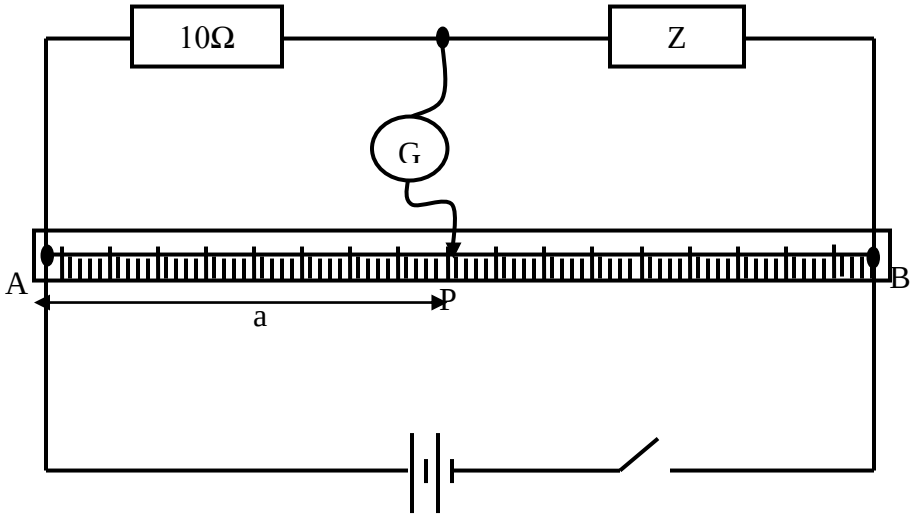
e) Calculate the resistance R for resistor X. (1mk)

PART B

a) Set up the circuit as shown in the figure below.



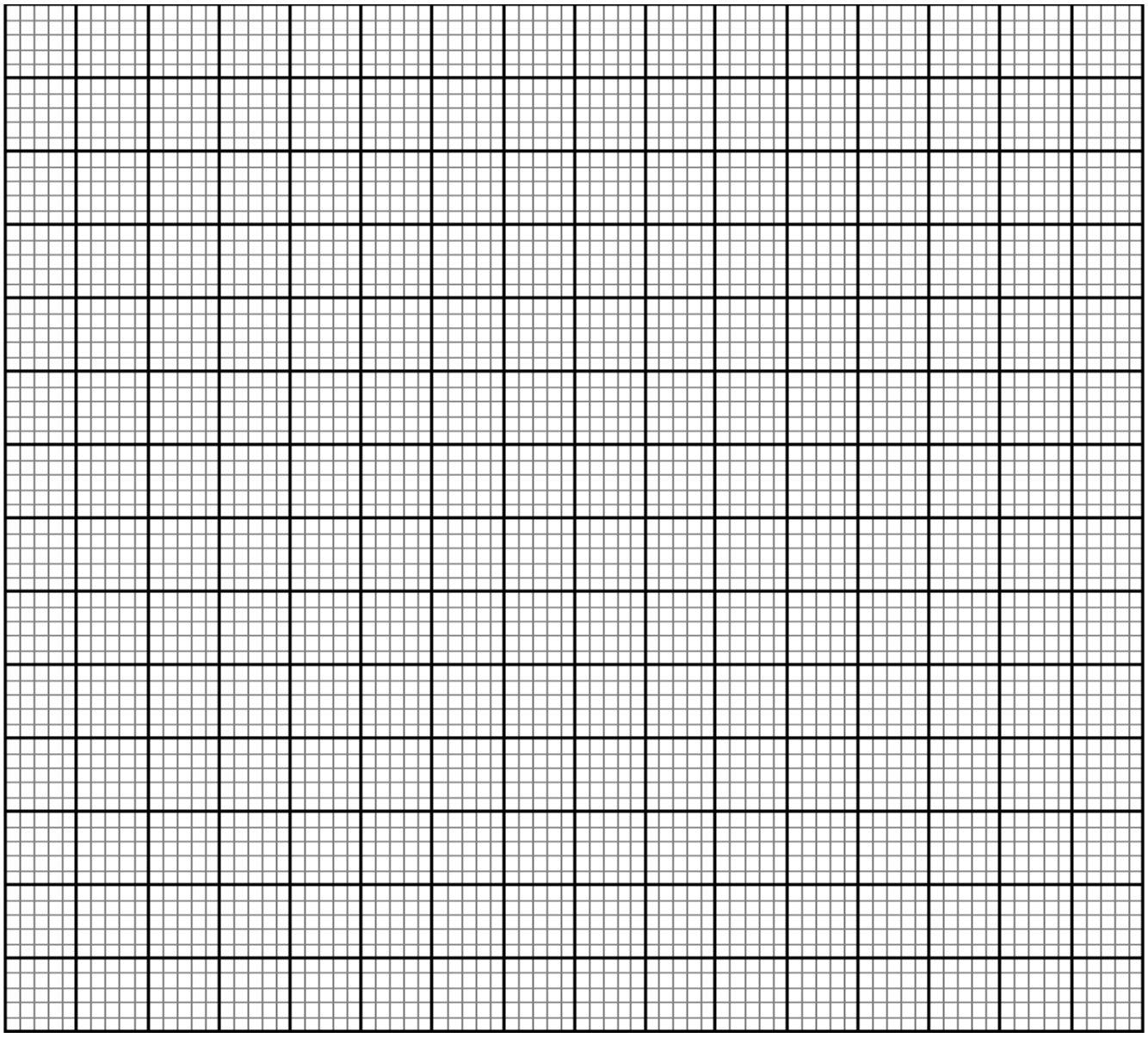
b) Close the switch. Tap the jockey at various points on the wire AB and locate point P at which the galvanometer shows zero deflection. Measure and record in the table below the length a where a = AP.

c) Repeat procedure b) using two 10Ω resistors in series, then three resistors in series, then four resistors in series and five resistors in series.

d) Record your readings in the table below and complete the table where X is the effective resistance for the series combination. (5mks)

Number of 10Ω carbon resistors	**One**	**Two**	**Three**	**Four**	**Five**
X (Ω)					
a (cm)					
$^1/_X$ (Ω^{-1})					
$^1/_a$ (cm^{-1})					

e) Plot a graph of $^{1}/_{a}$ (cm^{-1}) against $^{1}/_{X}$ (Ω^{-1}) (5mks)



f) Determine the slope m of the graph. (3mks)

g) Given that $\frac{1}{a} = \frac{R}{K} \cdot \frac{1}{X} + \frac{1}{K}$ where K = 100cm, use the graph to determine R. (2mks)

QUESTION B

PART A

You are provided with the following;

- Metre rule.
- Screen
- Glass beaker (250ml)
- Water plasticine.
- A candle.

Proceed as follows;

a) Add a volume V= 200ml of water into the beaker.

b) Measure the value of h, the height of water in the beaker.

h = ……cm (1mk)

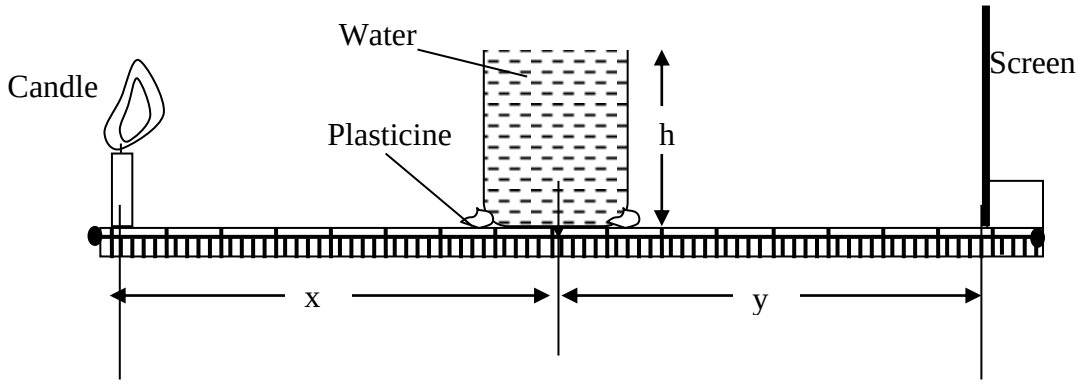
c) Calculate the value of internal radius R of the beaker using the formula $\boldsymbol{R} = \sqrt{\frac{\boldsymbol{V}}{\pi \boldsymbol{h}}}$ where

$\pi = {}^{22}/_{7}$

(2mks)

R = ……

d) Fill the beaker with water and set the apparatus as shown below.



e) Position the candle which acts as an object above the metre rule and 10R from the centre of the water 'lens'.

f) Measure the object distance x. (1mk)

x = ……cm

g) Move the screen towards or away from the water lens to obtain a sharp and focused bright image (line) on the screen.

h) Measure the value of image distance y. (1mk)

y = ……..cm

i) Repeat the experiment for the other values of x in the table below and note and record the corresponding values of y. Complete the table.

Beaker position	**10R**	**9R**	**8R**
x			
y			
$S = \frac{xy}{x+y}$			

I. Determine the average value of S. (2mks)

II. What does S represent. (1mk)

PART B

You are provided with the following;

- Vernier calipers. (can be shared)
- Micrometer screw gauge (can be shared)
- Boiling tube.
- Test tube.
- Some water in a beaker
- Half metre rule.
- 2 ball bearings.
- Some sand.
- Spatula
- Complete retort stand.

i. Measure and record the diameter of one ball bearing using the micrometer screw gauge.

d = ……mm ($^1/_2$mk)

ii. Determine the volume V of the ball bearing. (1mk)

V = ……..cm^3

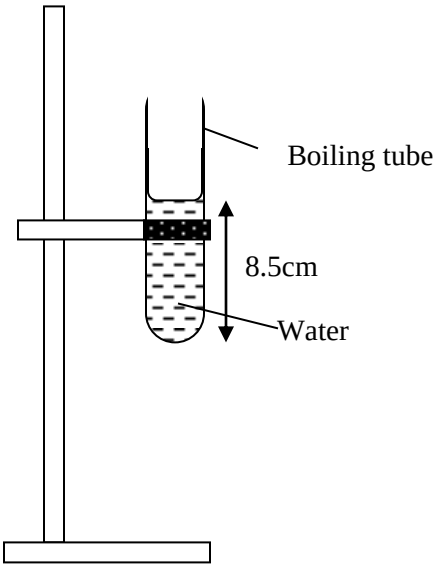
iii. Measure and record the outer diameter D of the test tube using the vernier calipers.

D = …….. ($1/2$mk)

iv. Calculate the cross-sectional area A of the tube. (1mk)

A ……..cm^2

v. Mount the boiling tube on the clamp as shown below and put some water to a height of about 8.5cm from bottom.



vi. Gently lower the test tube into the water in the boiling tube.

vii. Add some sand into the test tube bit by bit until the test tube floats upright in the water.

viii. Note and record height ho of the water in the boiling tube from the bottom.

ho = ……cm (1mk)

ix. Gently lower one ball bearing into the test tube and note and record the new level h in the table below.

x. Add the other ball bearing and note and record the corresponding height h.

xi. Compute the values of h- ho and complete the table. (2mks)

No. of ball bearings (N)	Height h (cm)	h – ho (cm)
1		
2		

xii. Calculate S the average value of X where $\boldsymbol{X = \frac{h - ho}{N}}$ (1mk)

xiii. Given that $$\boldsymbol{S = \frac{V\ell s}{A\ell e}}$$

where $\underline{\ell}s$ is the density of steel and $\underline{\ell}e$ the density of water, determine the ratio of

$$\boldsymbol{\frac{\ell s}{\ell e}}$$ *(2mks)*

xiv. What is the significance of the ratio $\boldsymbol{\frac{\ell s}{\ell e}}$ *(1mk)*

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