MARANDA HIGH SCHOOL

Kenya Certificate of Secondary Education
MOCK EXAMINATIONS 2021

232/3 **PHYSICS** **Paper 3**

December 2021 – TIME $2\frac{1}{2}$ Hours

Name: ..... Adm No: .....

Class: .....Candidate's Signature: .....Date: ...../12/2021.

INSTRUCTIONS TO CANDIDATES:

*(a) Answer **ALL** the questions in spaces provided in the question paper.*
*(b) You are supposed to spend the first **15 minutes of 2½ hours** allowed for this paper reading the whole paper carefully before commencing the work.*
(c) Marks are given for clear record of the observations actually made, their suitability, accuracy and the use made of them.
(d) Candidates are advised to record their observations as soon as they are made.
(e) Non-programmable silent electronic calculators and KNEC Mathematical table may be used.
(f)All questions must be answered in English

FOR EXAMINER'S USE ONLY:

Question	Maximum Score	Candidates score
1	20	
2	20	
Total	40	

QUESTION 1

1. **(a)** ***You are provided by the following:-***

One concave mirror
One mirror holder
White screen
Metre rule
Some plasticine
One candle

(b) Procedure:-

i. find the focal length of the mirror provided ……. Cm (1mark)

ii. Set the apparatus as shown in the diagram below

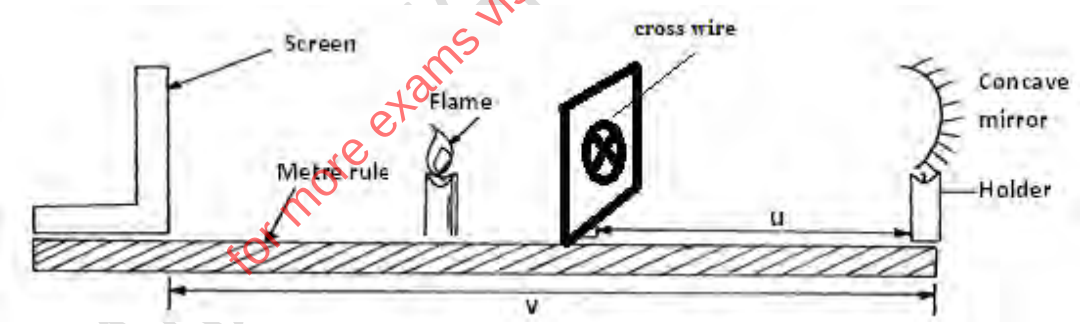
iii. Place the mirror from one end of the metre rule as shown on the diagram

iv. Place the lit candle in front of the mirror at a distance **u** = 22.0cm (Note: The cross wire becomes the object)

v. Place the screen from the other end as shown then vary the screen to and fro until a sharp inverted image of the candle flame is obtained on it.(Note: you can displace the screen alittle so that reflected rays from the mirror are not blocked by the object)

vi. Now measure distance **V**, between the mirror and the screen

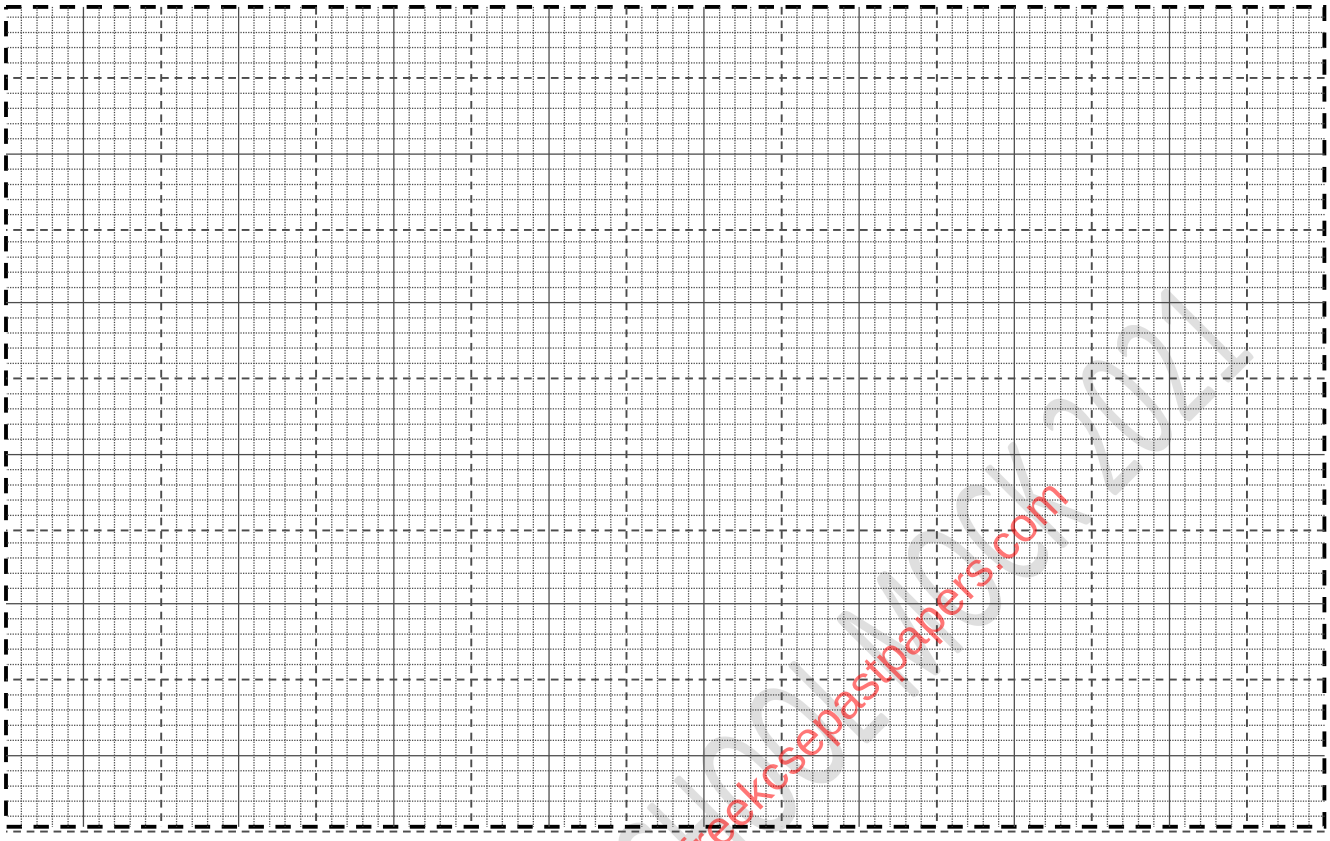
vii. Repeat the procedure in **(v)** above with distance u equal to 26cm, 30cm, 34cm, 38cm and 42cm; each time recording the corresponding distance **V** in the table below:



Ucm	22	26	39	34	38	42
Vcm						
M						

viii. Calculate the value of magnification **M** and compete the table above (8marks)

ix. Plot a graph of **M** on vertical axis against **V** (5marks)



x. From your graph, determine the value of M when **V** = 40cm

M = ... (1mark)

xi. Determine the slope of your graph (3marks)

.....

.....

.....

.....

xii. Given that the equation of the above graph is: $\mathbf{M = \frac{V}{F} - 1}$

Determine the value of **F** (2marks)

.....

.....

.....

.....

QUESTION 2

This question has two parts A and B. Answer all the parts

PART A

You are provided with the following:

A metre rule
Two identical 100g masses (labelled A and B)
Liquid L in 250ml beaker, $\frac{3}{4}$ full.
Three pieces of thread, each 30cm long.
Stand with clamps
Tissue paper.
Vernier calipers

Proceed as follows:

a. Take one 100g mass and measure the diameter d and height h using the Vernier calipers

d=……..m

h=……..m (1mark)

b. Determine the volume V given that $V = \pi(\frac{d}{2})^2 h$

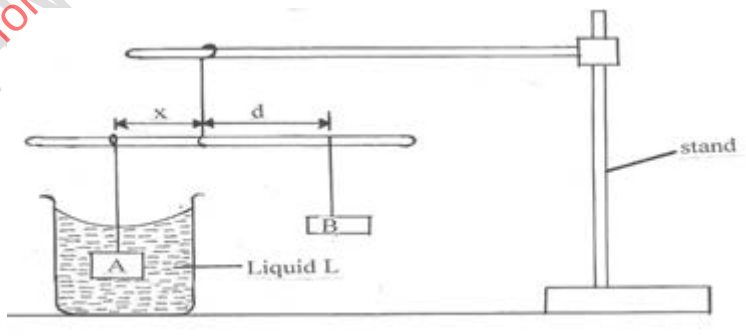
V……m^3 (1mark)

c. Using a stand and one piece of thread, suspend the metre rule in air such that it balances horizontally. Record the position of the centre of gravity. G.

G = _____ **cm** (1mark)

NOTE: The metre rule should remain suspended at this point throughout the experiment.

d. Set up the apparatus as shown in the figure below;



- Suspend the mass A at a distance x = 30cm and completely immerse it in liquid L without touching the sides of the beaker.

- Hang mass B and adjust its position such that the rule is balanced and measure the distance d cm. Tabulate your results in table 1 below;

$x\ (cm)$	30	35	40
$d\ (cm)$			
$\frac{d}{x}$			

(2marks)

e. Determine the weight F of one of the masses A or B in air. Given that

$g = 10N/Kg$ and A =B

Weight F in air =…… (1mark)

f. Using the principle of moments, determine the apparent weight P of A when completely immersed in liquid L.

Apparent weight P =

……

…….... (2marks)

g. Find the upthrust U on A when completely immersed. (1marks)

Upthrust; U =…….

h. Determine the density of liquid L, given that; (1mark)

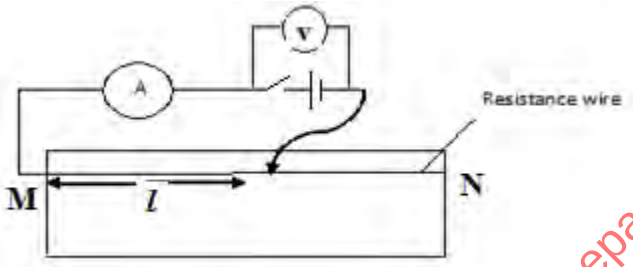
$$\boldsymbol{\rho = \frac{Un}{V}} \quad \boldsymbol{where\ n = 0.1Kg/N}$$

PART B

You are provided with the following apparatus:

Resistance wire fitted on a millimeter scale labeled MN
Switch
Voltmeter
Ammeter
One dry cells in a cell holder
Six connecting wires
Micrometer screw gauge

i. Set –up the apparatus as shown in the Figure 2 below;



ii. Remove the crocodile clip from the resistance wire MN and close the switch. Record the voltmeter reading $\mathbf{V_0}$.

$\mathbf{V_0}$ = …… (1mark)

iii. Attach the Jockey to the resistance wire such that ***l*** **= 50cm**

iv. Record the voltmeter and ammeter readings as $\mathbf{V_1}$ **and** $\mathbf{I_1}$ respectively

$\mathbf{V_1}$ =……..... (1mark)

$\mathbf{I_1}$ =…… (1mark)

v. Determine the value of $\emptyset$ given that $\emptyset = \frac{\mathbf{V1}}{\mathbf{I_1}}$ (1mark)

vi. Use the equation below to determine the value of **k , where m = 2.549Ω** (2marks)

$$\frac{V_1}{V_0 - V_1} = \frac{m\emptyset}{5} + k$$

vii. Measure the diameter **d** of the of the wire on the millimeter scale using the micrometer screw gauge

d = ……mm =……m (2marks)

viii. Determine the resistivity ρ of the wire used in this experiment given that

$$\emptyset = \frac{\rho l}{A}$$ (2marks)