Name……Index No…….

School…… Date……

Candidate's signature……..CLASS:……..

232/3
PHYSICS
PAPER 3
SEPTEMBER 2021
TIME: 2 HOURS 30MINUTES

MOMALICHE JOINT EXAMINATION

INSTRUCTIONS TO THE CANDIDATES:

1.This paper consists of two questions both of which are compulsory.
2.Marks are awarded for the observations actually; made, accuracy, suitability and correct use made with them.
3.Electronic calculations and mathematical tables may be used.
4. All the workings must be clearly shown.

FOR EXAMINER'S USE ONLY

QUESTION I

	II	IV	V	VI
MAXIMUM SCORE	1	1	1	2
CANDIDATES SCORE				

TOTAL

QUESTION 2

PART I	a	b	c	d	e
MAXIMUM SCORE	1	2	4	3	1
CANDIDATES SCORE					
PART II	b	c	d	e	f
MAXIMUM SCORE	1	1	2	4	1

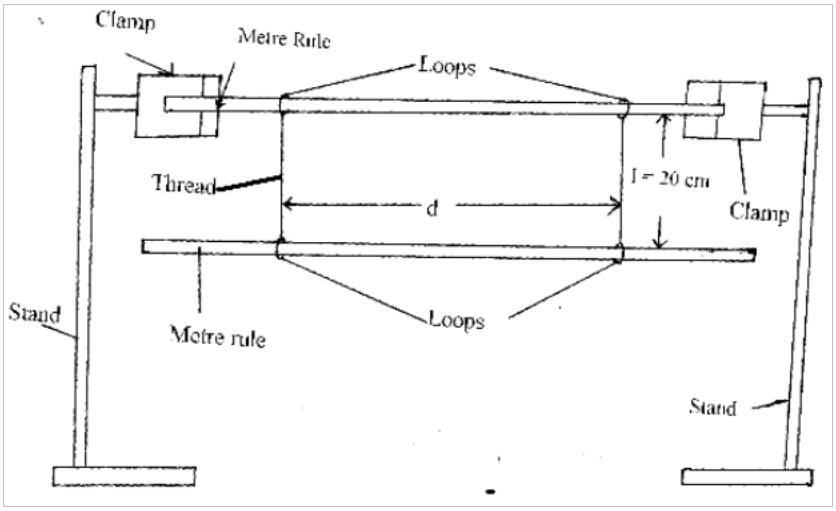
TOTAL

GRAND TOTAL

This paper consists of 6 printed pages.
Candidates should check the question paper to ensure that all pages are printed as indicated
and no questions are missing

1. You are provided with the following apparatus
   - Two metre rules
   - One half metre rule
   - Two pieces of cotton thread.
   - Two heavy stands and two clamps
   - One stop watch.

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



N/B:- Ensure the loops on the upper and lower metre rule are loose to enable easy sliding of the threads along the rules. Also the separation between the two rules must be 20cm throughout the experiment.

b) Adjust the position of the threads such that one is on the 10 cm mark and the other on the 90 cm. Mark on the lower metre rule. i.e d = 80 cm.

N/B: Maintain the threads vertical by making same adjustment on the upper metre rule. Displace one end of the lower metre rule. Slightly on a horizontal plane so that when released it oscillated about a vertical axis as shown by the arrows In fig(b). Measure the time for 20 Oscillations and record in the table below.

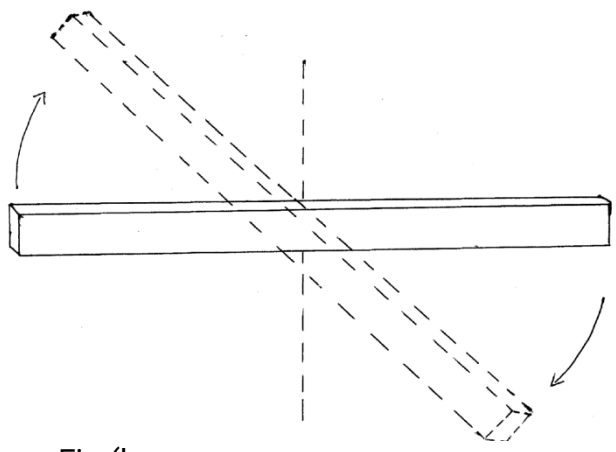


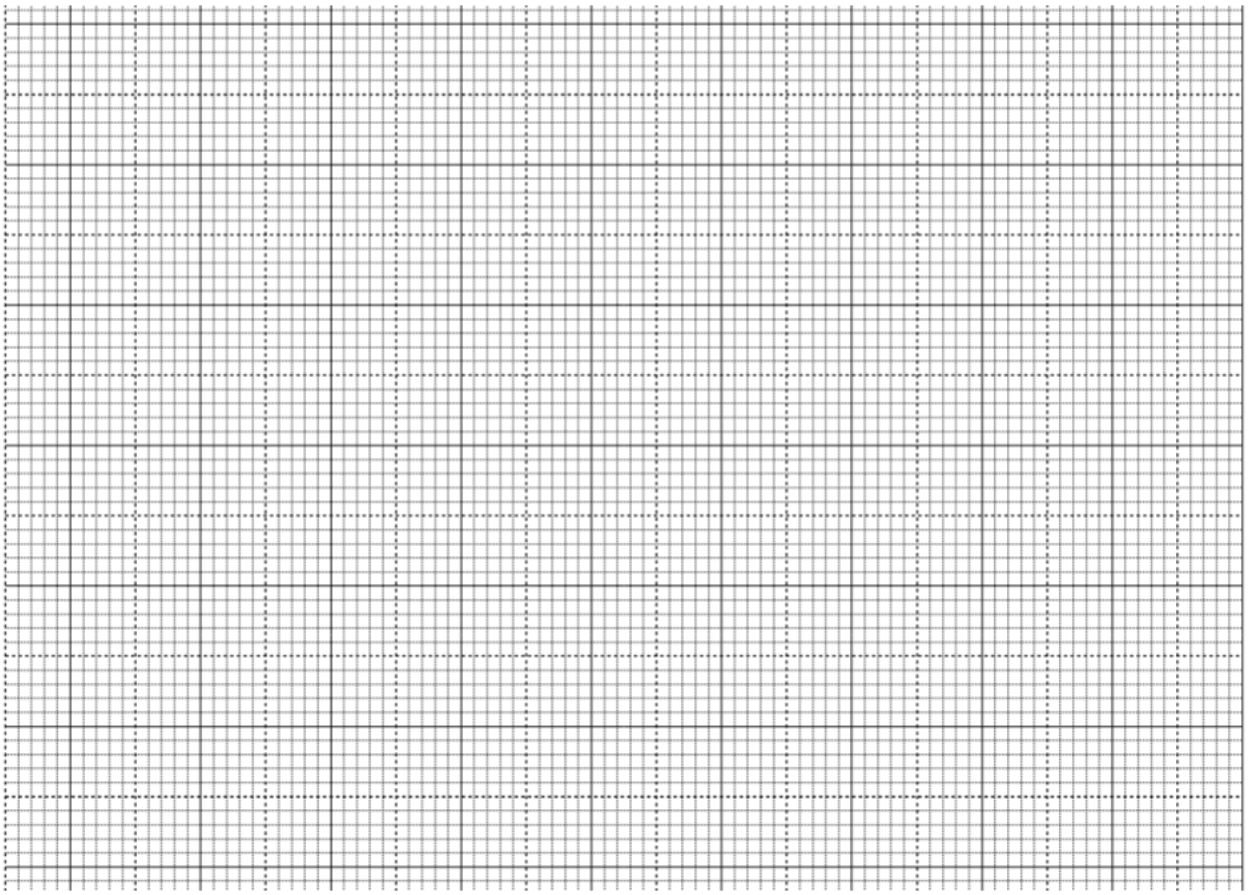
Fig (b

c) Repeat the procedure in (b) for other values of d shown in the table below (Set the values of d by adjusting the positions of the loops in steps of 5cm on both sides)
Complete the table

d (cm)	80	70	60	50	40	30
d (m)						
$1/d^2$ (m^{-2})						
Time for 20 Osc. (s)						
Period T (s)						
T^2 (s^2)						

(9 marks)

d) Plot a graph of T^2 (y – axis) against $1/d^2$. (5 marks)



e)i)Determine the slope of your graph. (3 marks)

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ii)Given that $T^2 = \frac{16K^2}{5d^2}$ where K is a constant; determine the value of k. (3 marks)

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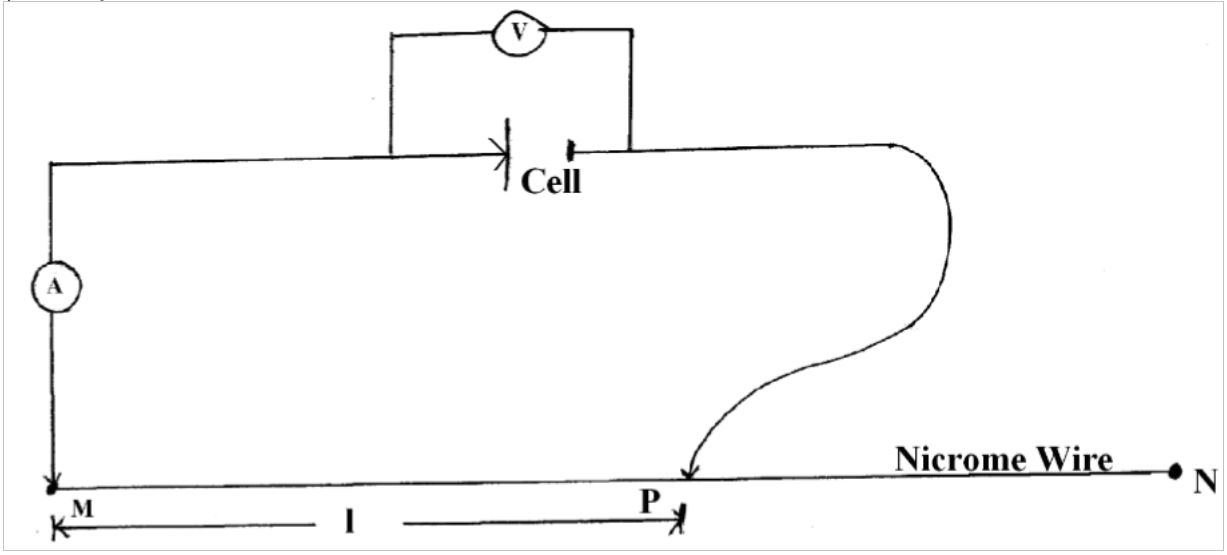
QUESTION 2

PART I

You are provided with the following apparatus:
One voltmeter (0 – 3V or) -5v)
One ammeter (0 – 1A)
Six connecting wires, each at least 30 cm long. Three of which are connected to crocodile clips at one end.
One new dry cell placed in a cell holder.
One metre long nicrome wire mounted on a table and labeled MN
a) Set up the circuit shown below.



N/B: The arrows in the diagram indicate crocodile clips. The crocodile clip next to the cell should be used as a switch.

Connect the crocodile clip next to the cell and disconnect the one at P.
Record the voltmeter reading V_0.
V_0 = _____ (1 mark)
b) Connect the crocodile clip at p, at a distance L = 50 cm from m.
Record the reading of both the ammeter and the voltmeter when the crocodile clip next to the cell is connected.
Reading of ammeter I = ...A
(1 mark)
Reading of voltmeter V= V
(1 mark)

c) Determine the quantity ρ, given the following relationship. (4 marks)

$$\rho = \frac{I}{V_0 - V}$$

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d) Given the equation $K\rho = 1$, determine the value of K. (3 marks)
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e) What physical quantity does K represent. (1 mark)
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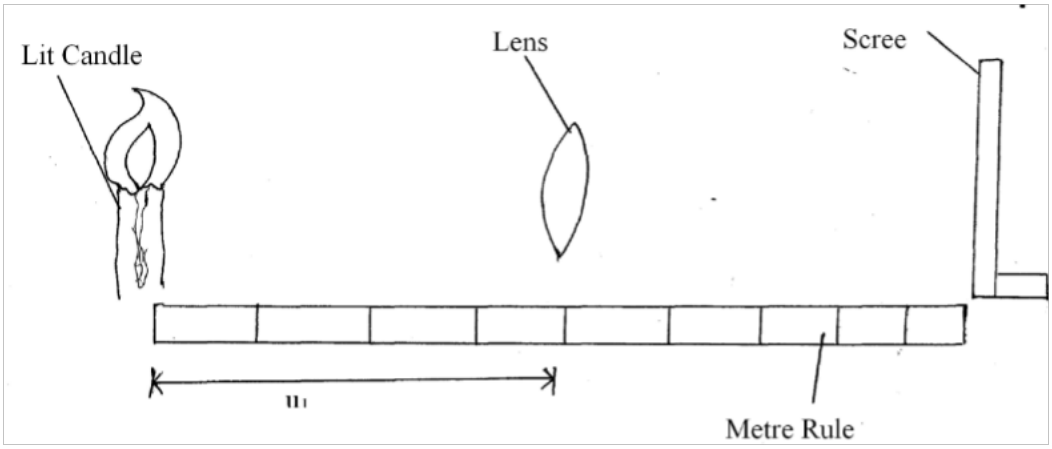
PART II
You are provided with the following apparatus.

Lit candle
One biconvex lens mounted on a lens stand
Small amount of plasticine
One metre rule
One white screen

a) Arrange the lit candle and the white screen on the bench at a distance of 100 cm from each other. Mount the metre rule on the bench as shown so that its zero mark coinside with the point of the lit candle and the 100 cm mark coincide with the point of the screen.



b) Place the lens between the screen and the lit candles at a point near the candle. Move the lens systems together with it holder towards the screen until you obtain a sharp magnified inverted image of the flame of the lit candle on the screen.
Record distance U_1 between the lens and the lit candle.
U_1 = ...cm (1 mark)

c) Move the lens system further towards the screen until you obtain another position where sharp diminished inverted image of the flame is formed on the screen.
Record the new distance u_2 of the lens u_2 .....cm (1 mark)

d) Determine displacement d of the lens system. (2 marks)

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e) Determine the constant θ given that $\theta = \frac{1+m}{mu_1}$ and $m = \frac{100 - u_1}{u_1}$ (4 marks)

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f) State what the quantity θ in the above equation gives. (1 mark)

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