

FORM THREE END TERM ONE EXAM 2020

PHYSICS PAPER 3

Question 1.

PART A

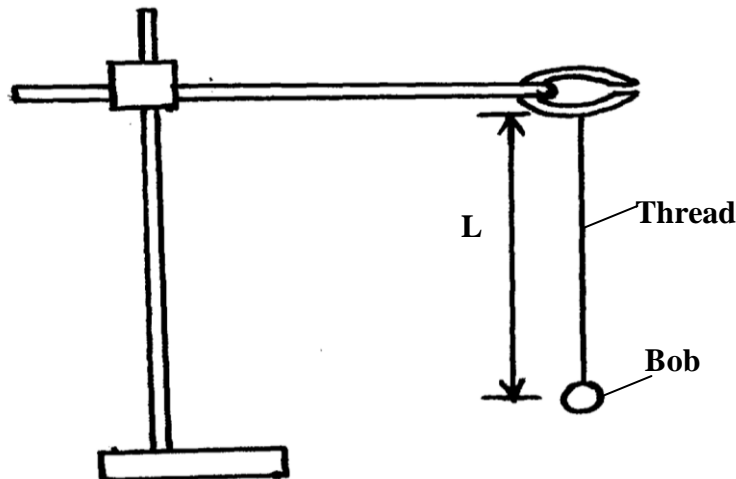
You are provided with the following

- A pendulum bob
- A stop watch
- A metre rule
- A retort stand, boss and clamp
- A piece of thread about 1.1m long

Proceed as follows.

a) Set up the apparatus as shown in figure 1 below.

Fig 1



(b) Set the length, L , to be 1.0m. Displace the bob slightly through a small angle measure and record in table 1 the time, t , for 10 complete oscillations.

(c) Repeat the procedure in (b) for other values of l as shown in table 1. Complete the table

FORM THREE END TERM ONE EXAM 2020
PHYSICS PAPER 3

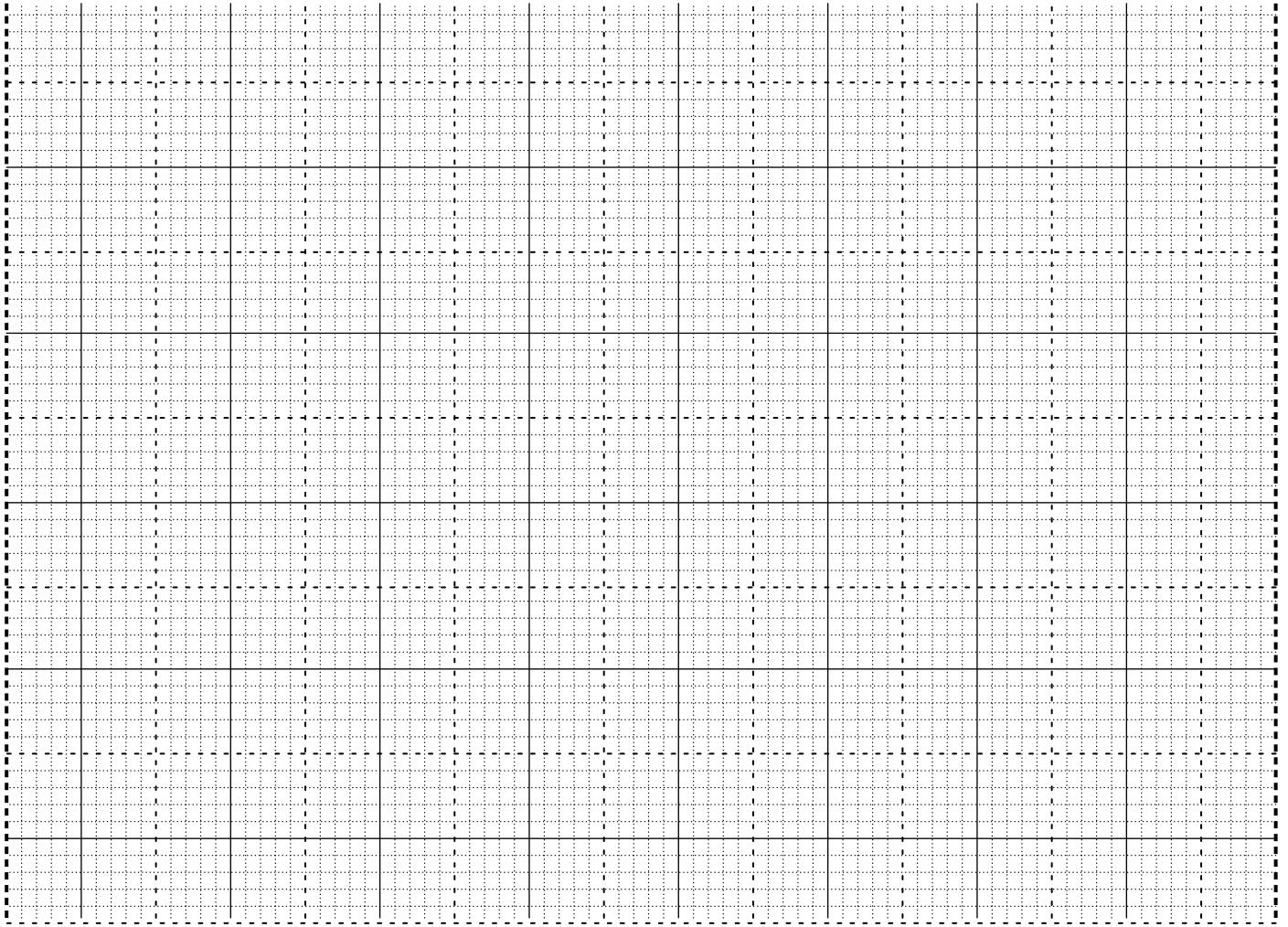
Table 1.

Length, L (m)	1.0	0.9	0.8	0.7	0.6	0.5
Time t for 10 oscillations (s)						
Period, $T = t/10$ s						
Frequency, f (Hz)						
f^2 (Hz) ²						
$\frac{1}{L}$ (m^{-1})						

d(i) plot a graph of f^2 (y-axis) against $1/L$

(4mks)

FORM THREE END TERM ONE EXAM 2020
PHYSICS PAPER 3



(ii) Determine the slope of the graph. (2mks)

(iii) Given that the equation of the graph is

$$F^2 = \frac{g}{4\pi^2 L}$$

Determine the value of g. (2mks)

FORM THREE END TERM ONE EXAM 2020

PHYSICS PAPER 3

(iv) Use your graph to determine the value of T when $I/L = 1.5 \text{ m}^{-1}$ (2mks)

PART B

You are provided with the following

A metre rule

A retort stand, bass and clamp

500ml beaker $\frac{3}{4}$ full of water

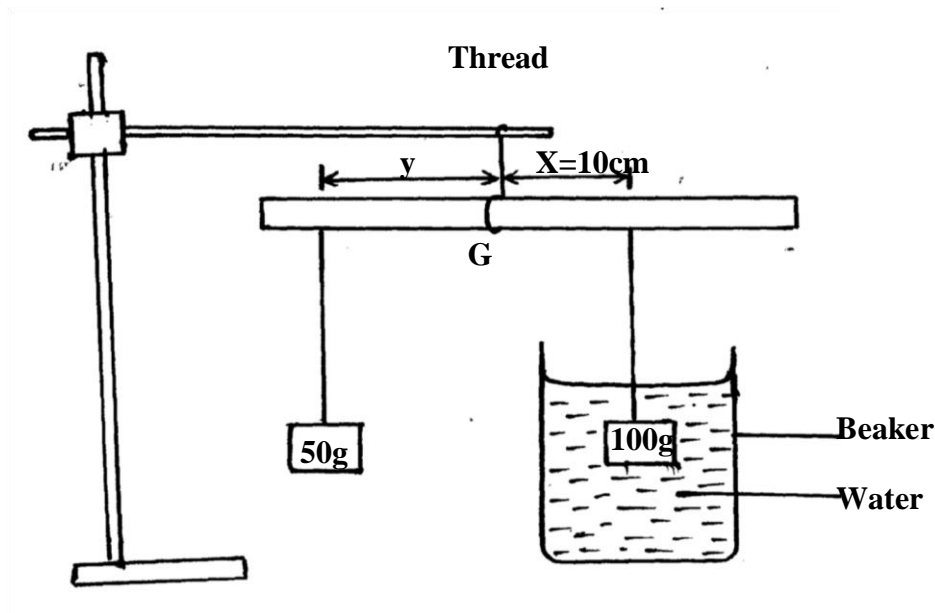
100g mass

50 Mass

Three pieces of thread.

Proceed as follows

- (e) Using a piece of thread suspend the metre rule from the clamp on the stand and adjust the position of the thread until the metre rule balances horizontally. Note this position G of the metre rule.
- (f) Suspend the 100g mass from the metre rule such that $x = 10\text{cm}$ from G . with the 100g hang the 50g mass from the metre rule and adjust its position until the metre rule balances once more.



FORM THREE END TERM ONE EXAM 2020

PHYSICS PAPER 3

Record the value of y

$Y = \dots\dots\dots$ cm (1mk)

(g) Use the principle of moments to determine the weight w_1 of the 100g mass in water hence determine the upthrust U_w in water (Take $g = 10\text{N/Kg}$)

$W_1 = \dots\dots\dots$ (1mk)

U_w (1mk)

Question 2

Part A

You are provided with the following

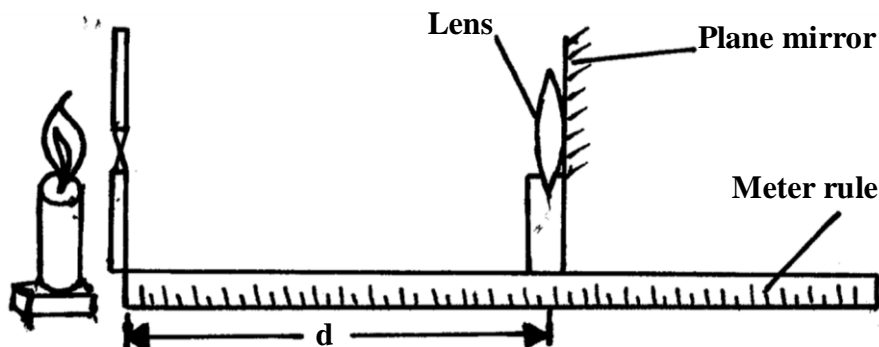
- A candle
- A plane mirror
- A metre rule
- A biconvex lens
- A lens holder
- A cardboard with cross wire at its centre
- A white screen
- Some cellotape

Proceed as follows:

- A (a) Attach the plane mirror to the lens using the cellotape.
Arrange the apparatus as shown in the figure below.

FORM THREE END TERM ONE EXAM 2020

PHYSICS PAPER 3

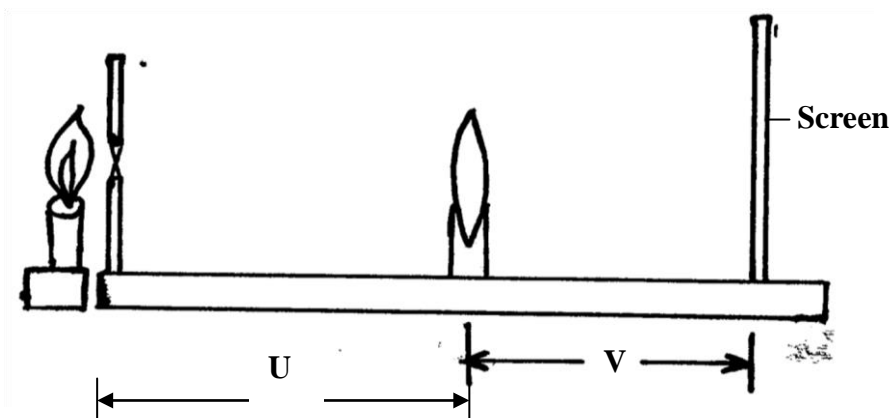


Ensure that the candle flame is at the same height as the cross wires.

- (b) Place the cardboard with the cross wires at the 0 cm mark. Move the lens along the metre rule until a sharp image of the cross wires is formed along side the object cross wires. Measure the length, d

$D = \dots\dots\dots$ cm (1mk)

- (c) Now set the apparatus as shown below



- (d) Set $u = 20\text{cm}$ and adjust the screen until a clear image of the cross wires appears on the screen. Measure the distance, V and record in the table Z below.

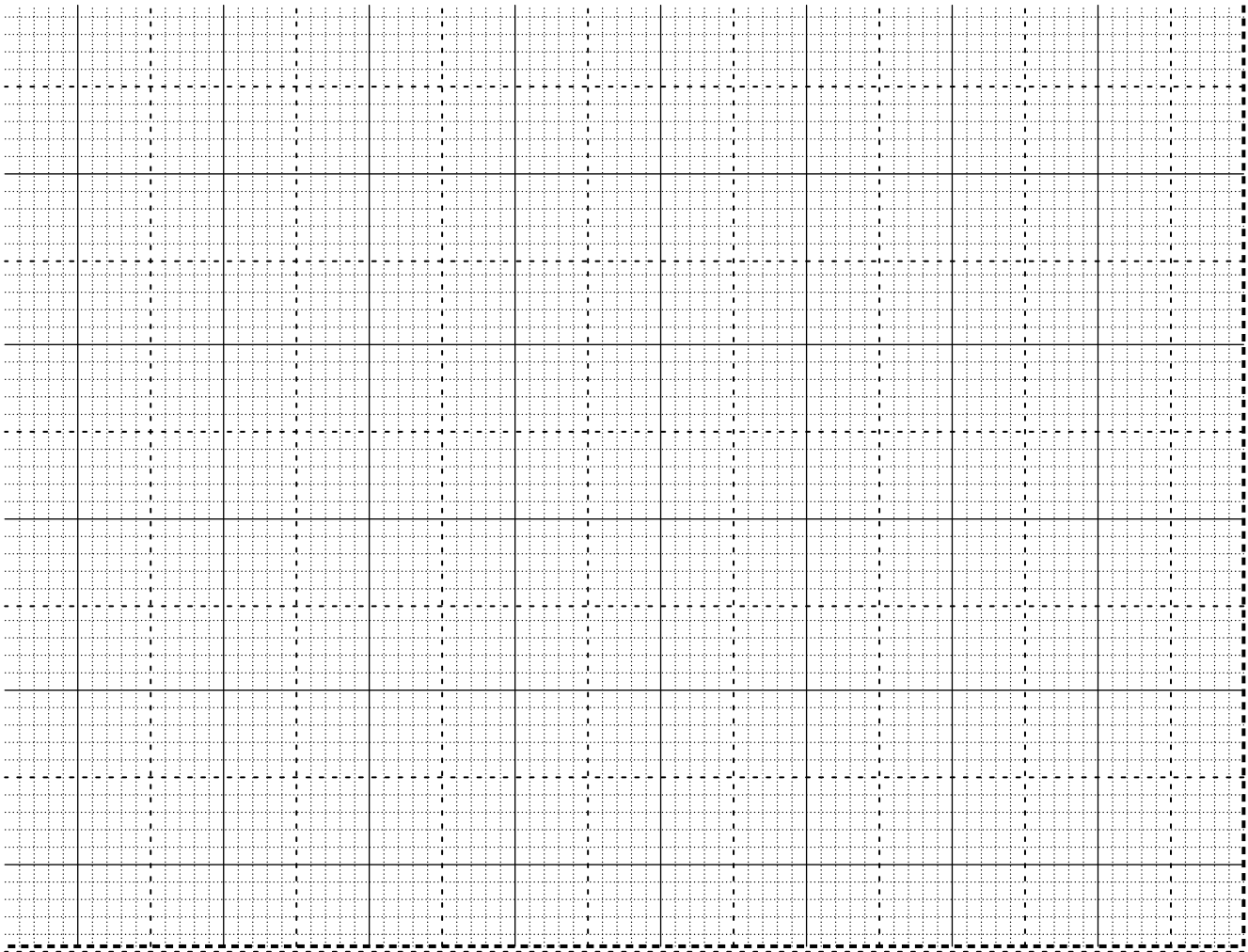
- (e) Repeat the procedure (d) for other values of u and complete the table.

U (cm)	20	25	30	35	40	50
V (cm)						
$M = \frac{v}{u}$						

FORM THREE END TERM ONE EXAM 2020
PHYSICS PAPER 3

(6mks)

(f) Plot the graph of m (y-axis) against V (4mks)



(g) Determine the slope of the graph (2mks)

(h) Given that the equation for the graph is given by the equation
 $m = \frac{y}{n} - 1$ where n is a constant, determine the value of n . (2mks)

FORM THREE END TERM ONE EXAM 2020 PHYSICS PAPER 3

(i) Find the value of n when $m = 0 =$

(1mk)

Part B

You are provided with the following

Resistance wire mounted on a millimeter scale

A voltmeter

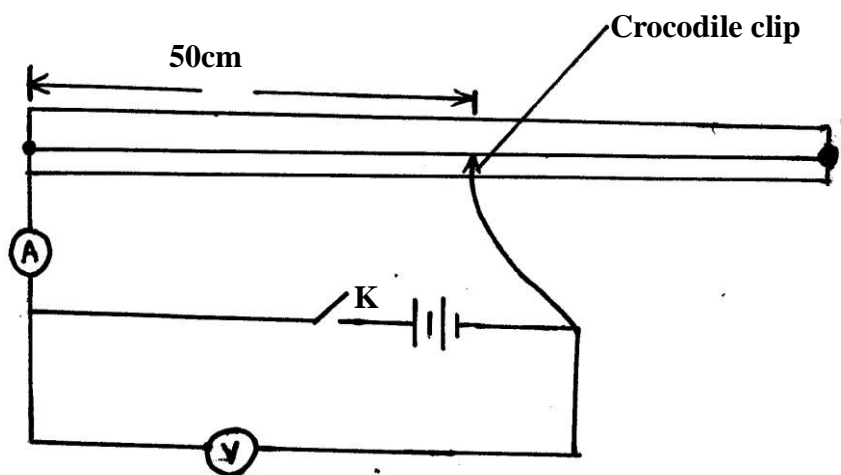
An ammeter

Two new dry cells

Six connecting wires, at least two with crocodile clips A switch.

Proceed as follows

(i) Set up the circuit as shown in the figure below



(a) Remove the crocodile clip from the resistance wire **PQ** and close the switch **k**. Read and record the voltmeter reading **E**

E = volts

(1mk)

(b) Attach the crocodile clip to the resistance wire such that $l = 50\text{cm}$. Read and record the voltmeter and ammeter reading when the switch is closed.

FORM THREE END TERM ONE EXAM 2020
PHYSICS PAPER 3

Voltmeter reading , $V = \dots\dots\dots$ volts (1mk)

Ammeter reading, $I \dots\dots\dots$ (1mk)

(m) Given that $v = \frac{MR}{E-V}$ where $\frac{R}{5} = \frac{V}{I}$ (2mks)

Determine the value of **m**.