

NAME.....ADM NO.....CLASS.....

232/3

**PHYSICS**

**PAPER 3**

**END OF TERM 1 EXAM 2023**

**TIME: 2  $\frac{1}{2}$  HOURS.**

**Instructions to candidates**

- a) Write your name and admission number in the space provided above
- b) Answer all questions on the question paper
- c) You are supposed to spend the first 15 minutes allowed for this paper reading the whole paper carefully before commencing your work and confirming your apparatus.
- d) Marks are given for a clear record of the observations actually made, (or their suitability and accuracy and or the use made of them)
- e) Candidates are advised to record observations as soon as they are made.
- f) Mathematical tables or electrical calculators may be used
- g) Candidates should answer all the questions in English

For examiner use only.

Question	Maximum	Candidates score
1	20	
2	20	
Total	40	

### QUESTION 1

You are provided with following apparatus

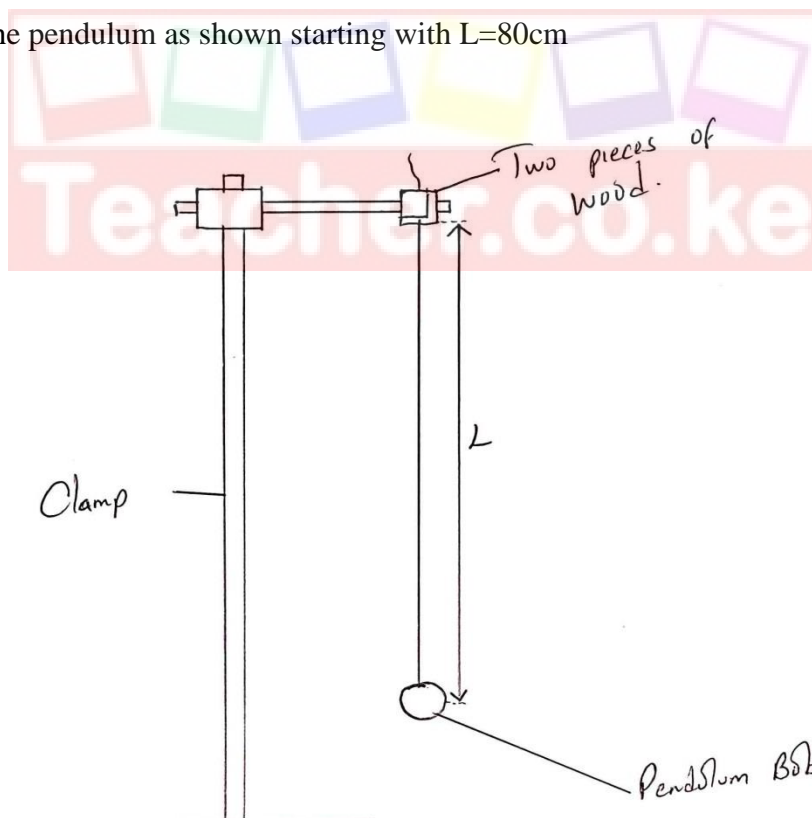
- A pendulum bob
- A cotton thread about 1m long
- A retort stand and clamp
- A metre rule
- A stopwatch
- Two pieces of wood
- Vernier calipers(to be shared)

Proceed as follows

- a) Using the vernier calipers measure the diameter of the pendulum bob. (1mk)

.....cm

- b) Clamp the pendulum as shown starting with  $L=80\text{cm}$



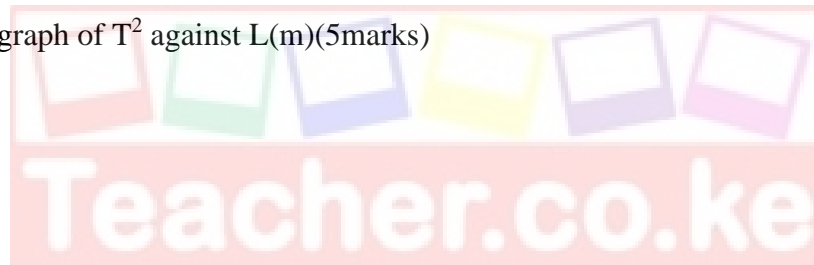
**Figure 1**

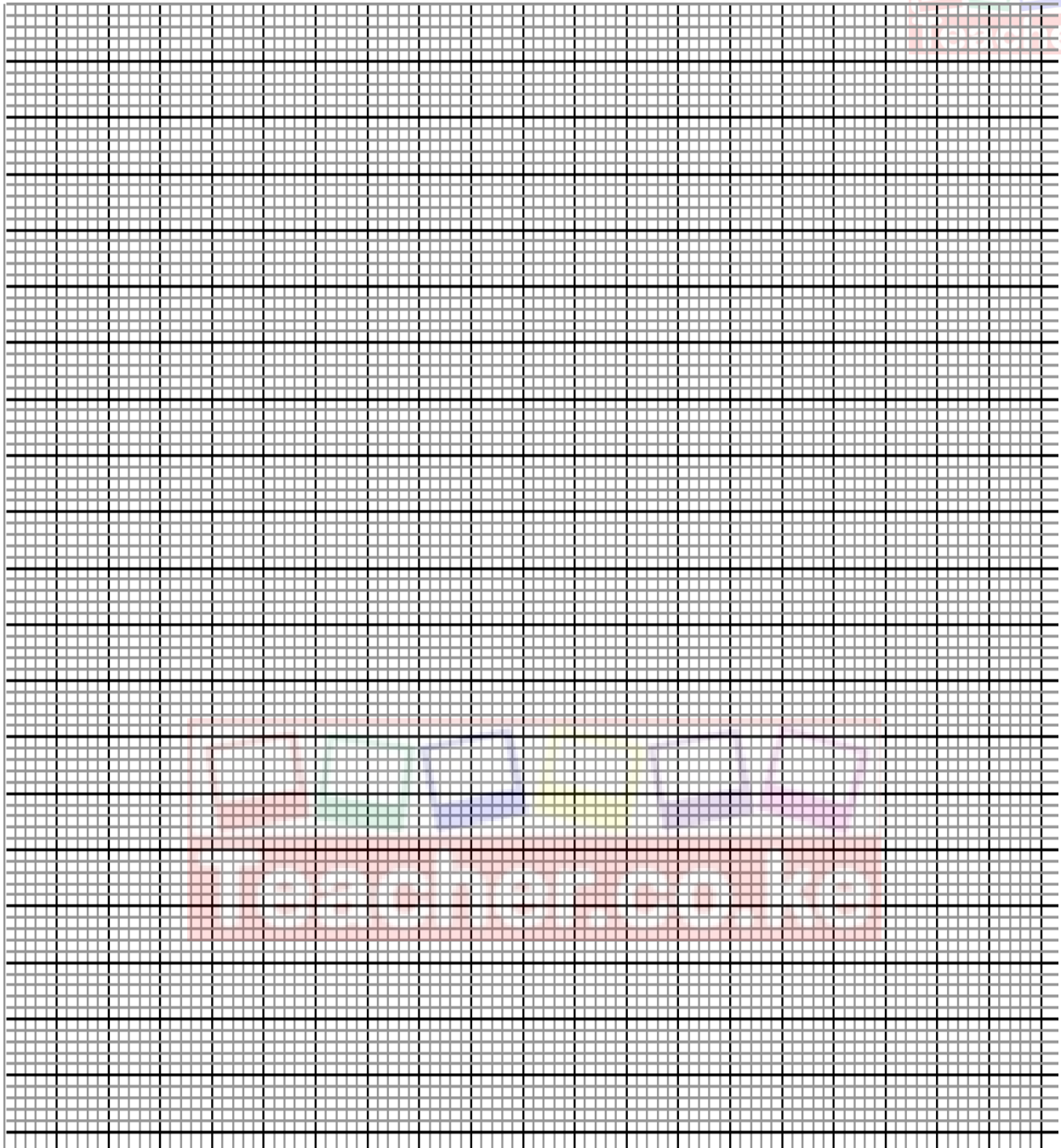
- c) Give the bob a small displacement and record the time  $t$  for 20 complete oscillations. Record also periodic time  $T$  for one complete oscillation.

d) Repeat the procedure above for values of L as shown in the table. Record and complete the table.(8marks)

Length L (cm)	L (m)	Time for 20 oscillations	Period T	(T <sup>2</sup> ) (s <sup>2</sup> )
80		34.75		
70		32.81		
60		29.66		
50		27.50		
40		24.47		
30		21.50		
20		17.68		

e) Plot the graph of T<sup>2</sup> against L(m)(5marks)





f) Determine the slope of the graph(3marks)

g) The equation for the graph is given by  $T^2 = \frac{4\pi^2 L}{g}$  where  $g$  is a constant. From the graph find the value of  $g$ .(2marks)

h) What is the significance of  $g$ .(1mark)

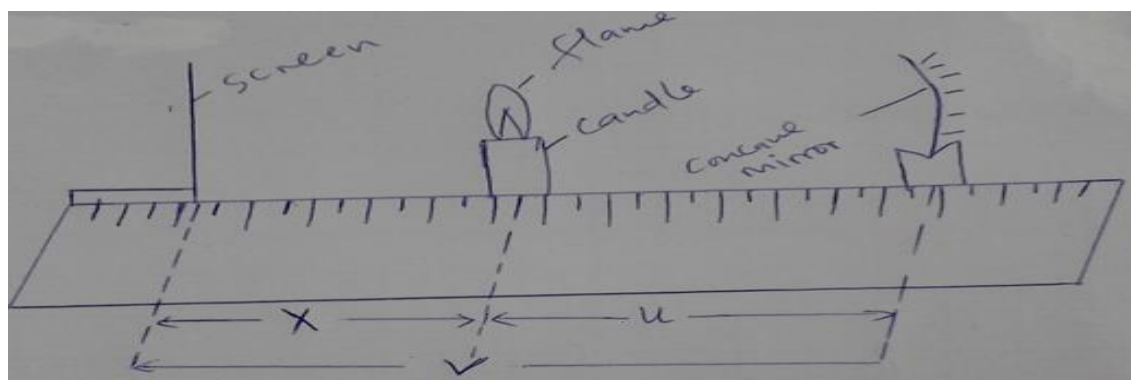


## **QUESTION 2**

### **APPARATUS**

- concave mirror

- lens holder
- screen
- candle
- proceed as follows;



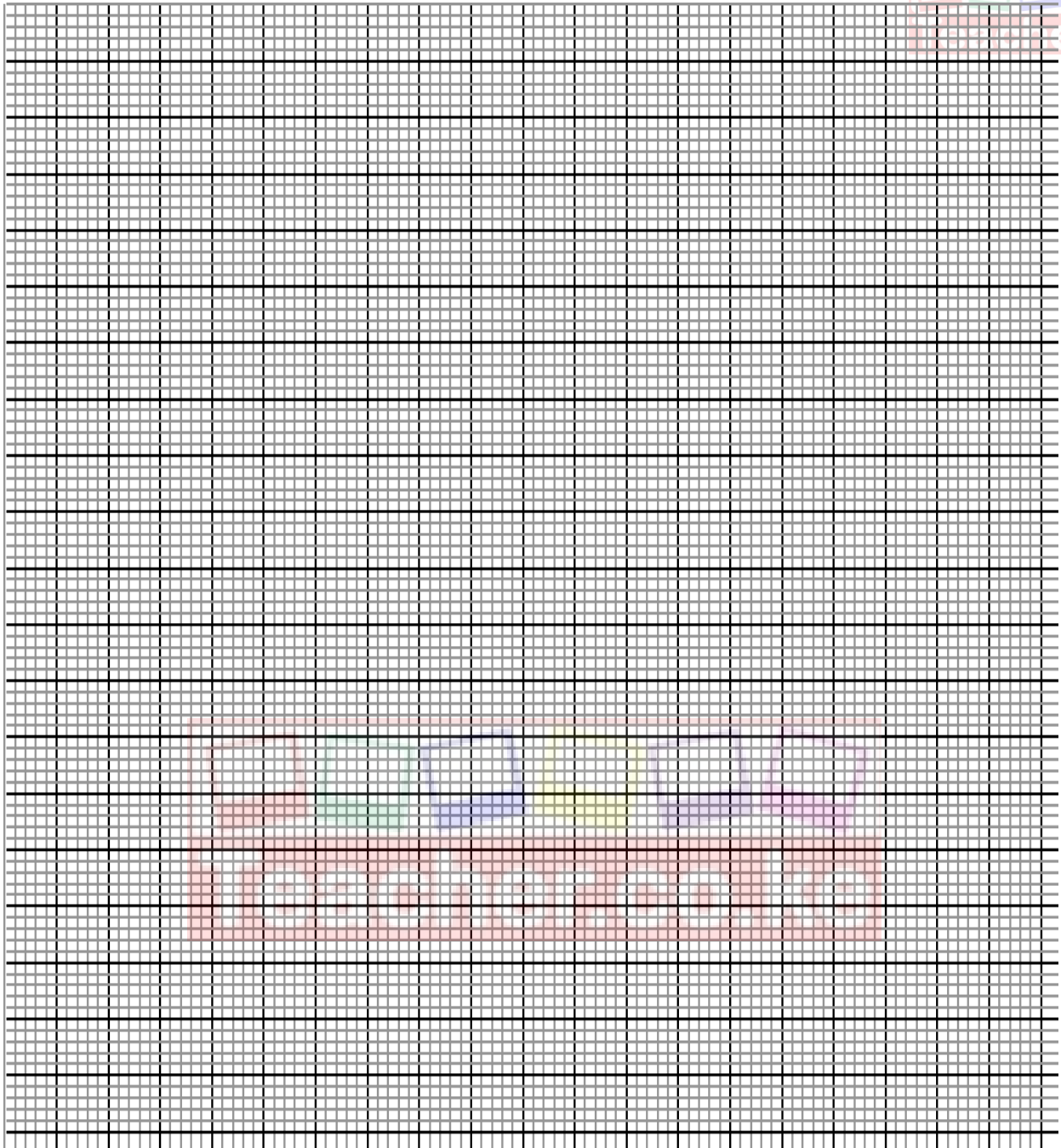
**Figure 2**

### Procedure

- I. Set the apparatus as shown in figure 2
- II. Place the candle at a distance  $X=5.0\text{ cm}$  from the screen
- III. Move the mirror to and fro to focus a clear; sharp image of the candle on the screen
- IV. Measure and record the distance  $u$  between the mirror and the candle and the distance  $v$  between the screen and the mirror.
- V. Repeat the experiment for other values of  $x$  and complete the table below (8MKS)

<b>x (cm)</b>	<b>5.0</b>	<b>10.0</b>	<b>15.0</b>	<b>20.0</b>	<b>25.0</b>	<b>30.0</b>
<b>u (cm)</b>	18.0	16.0	15.0	14.5	14.0	13.0
<b>v (cm)</b>	23	26	30	34.5	39.0	43.0
<b>( u + v ) (cm)</b>						
<b>uv (cm)</b>						

Vi) Draw a graph of  $( u + v )$  cm against  $u v$  (cm) (5MKS)



Vii) Determine the slope **S** of the graph

3mks

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viii) Using the value of **S** obtained above in (viii); determine the value of **f**, the focal length of the mirror, 2mks

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Given that **R = 4f/s<sup>2</sup>** 2mks

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