

FORM FOUR CLUSTER KCSE MODEL13

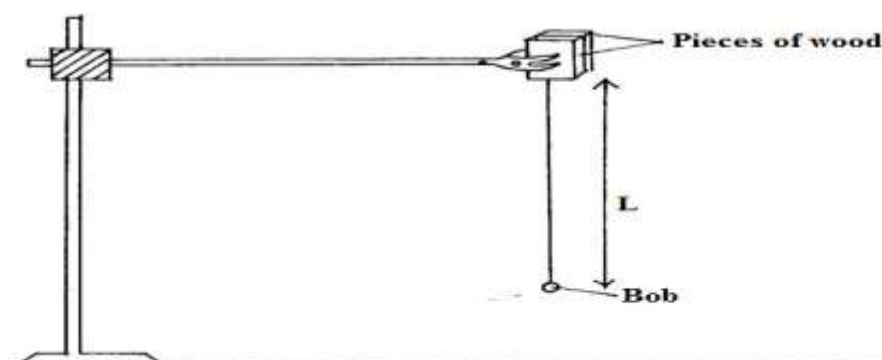
PHYSICS PAPER 3 QUESTIONS

1. You are provided with the following apparatus.

- A pendulum bob.
- A cotton thread 1m long.
- Two small pieces of wood.
- A retort stand and clamp.
- A metre rule.
- A stop watch.
- Some cellotape.

Proceed as follows.

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

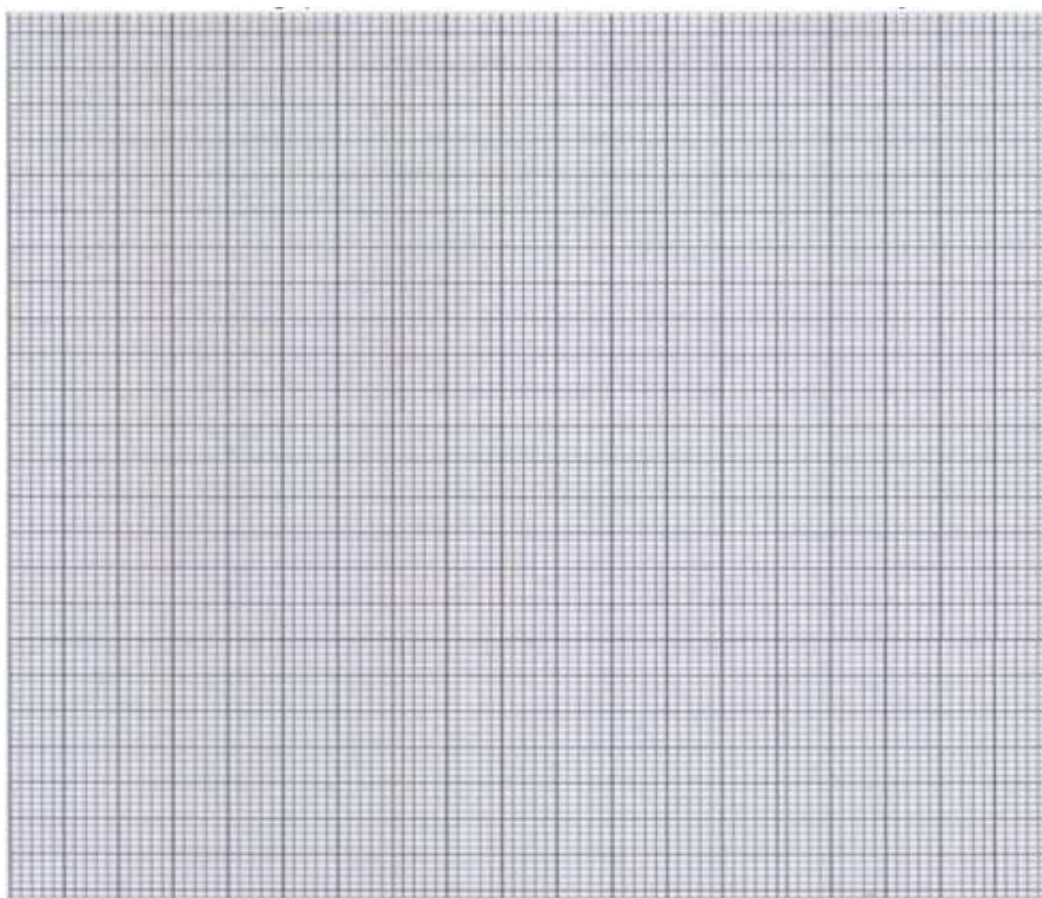


b) Give the bob a small displacement and record the time t for 20 complete oscillations.

c) Repeat the procedure above for values of L as shown in the table. Complete the table.

Length $L(\text{m})$	Time for 20 oscillations	Period T	$T^2(\text{s}^2)$
0.8			
0.7			
0.6			
0.5			
0.4			
0.3			
0.2			

d) Plot the graph of T^2 against $L(\text{m})$.



e) Determine the slope of the graph and state its SI units.

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f) The equation for the graph is given by

$$T^2 = \frac{4\pi^2}{P} L + C$$

Where P and C are constants. Determine the value of P stating its significance.

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2. You are provided with the following apparatus.

- A rectangular glass block.
- 4 optical pin.
- A piece of plain paper.
- 30cm plastic ruler.

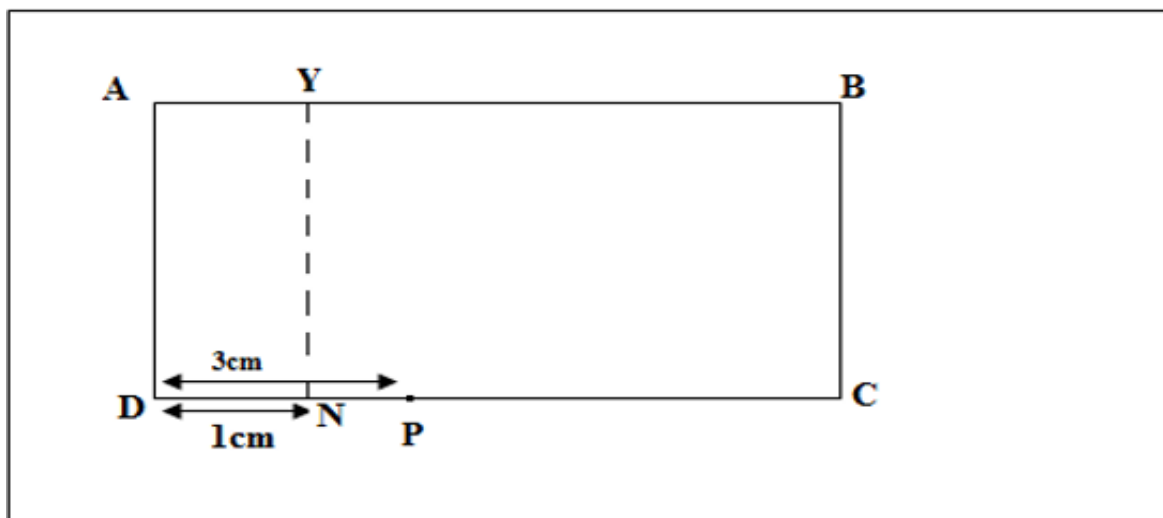
- 4 thumb pins.

a)

i) Place the plain paper on the soft board and fix it at the vertices using thumb pins.

ii) Put the glass block at the centre of the paper and mark its outline ABCD.

iii) Mark a point Y on AB such that AY is 1cm and draw a line perpendicular to AB through Y to meet DC at N.



iv) Measure the length of YN and record it as L in cm.

L =cm

v) Mark a point P on DC such that DP is 3cm. Mark also points Q, R, S and T at equal intervals of 1cm from P towards C i.e. PQ = QR = RS = ST = 1cm.

vi) Replace the glass block. Fix an optical pin vertically at the point Y in contact with the edge of the block. Fix another optical pin at P.

b) Looking from side CD of the glass block, fix a third pin L such that L and P appear to be in line with the image of Y seen through the glass block.

c) Remove the glass block and pins P and L. Join points L and P and produce the line to cut the line YN at X. Also join P to Y with a straight line.

d) Measure y, the length of YP and x the length of XP.

y =cm

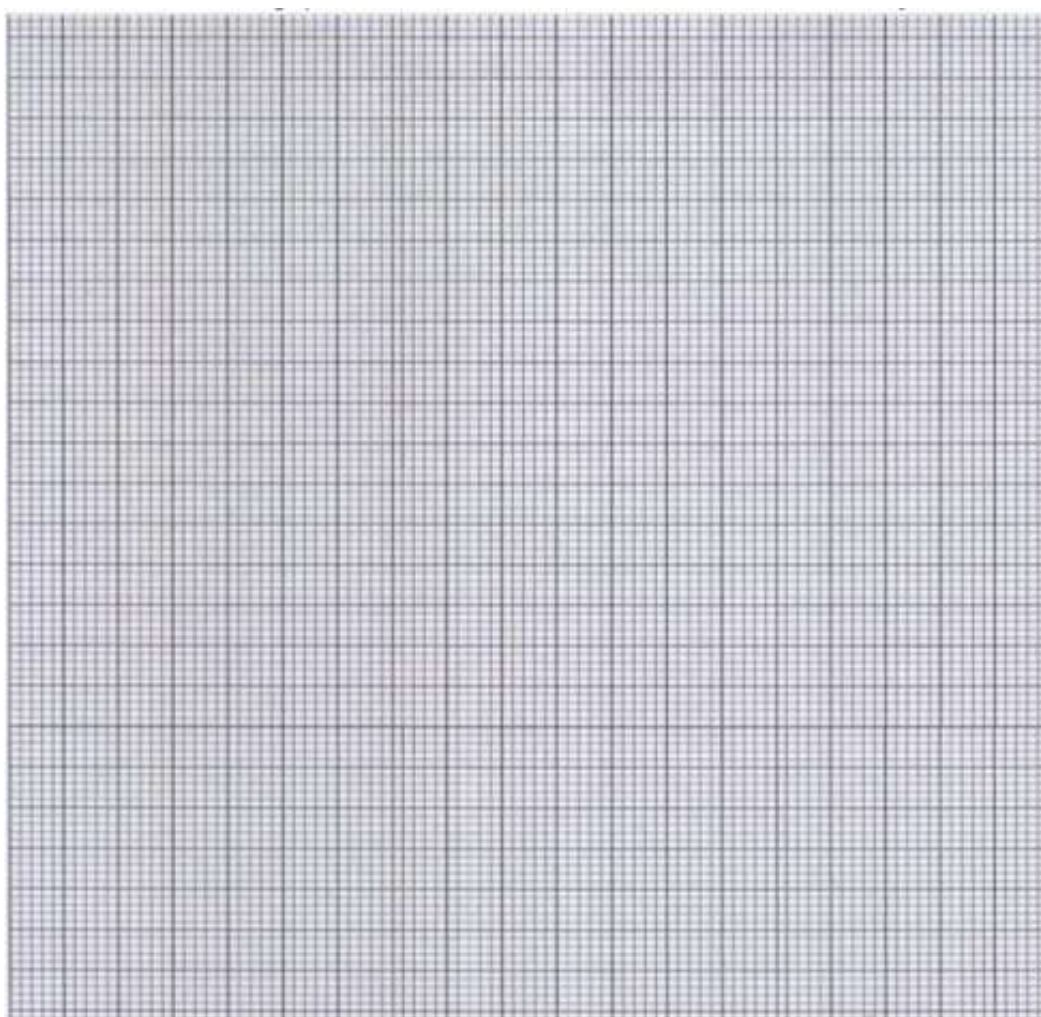
x =cm

e) Keeping the first pin Y fixed at its original position, repeat the experiment with second pin (initially at P) at positions Q, R, S and T.

Each time measure x and y and record your results in the table below.

Second position	Length of 'y'	Length of x
P		
Q		
R		
S		
T		

f) Plot a graph of y against x.



g) Find the slope of the graph.

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h) From your graph find y when x = 1cm.

Collect the plain paper together with the answer sheet for marking. (Correct use of the plain paper.)