

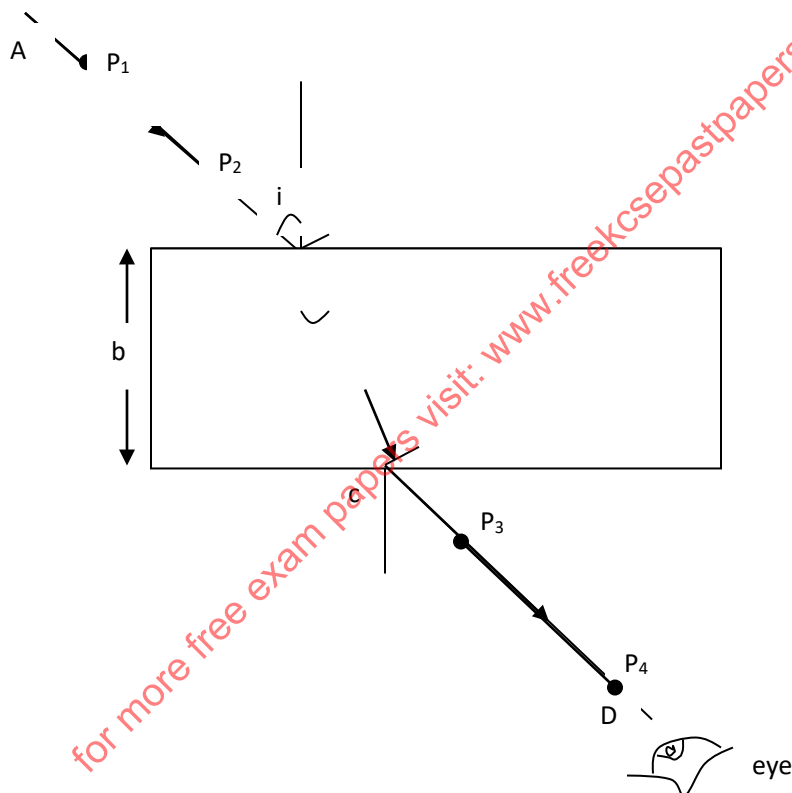
PHYSICS FORM THREE PRACTICAL PAPER 3
TIME: 2HRS; 15MINS

1. You are provided with the following;

- a rectangular glass block
- 4 optical pins
- a soft board
- a plain paper

Proceed as follows:

- (a) Place the glass block on the plain paper with one of the largest face upper most. Trace round the glass block using a pencil as shown below.



- (b) Remove the glass block and construct a normal at B. Construct an incident ray AB of angle of incidence, $i = 20^\circ$.
- (c) Replace the glass block and trace the ray ABCD using the optical pins.
- (d) Remove the glass block and draw the path of the ray ABCD using a pencil. Measure length L and record it in the table below.

Angle i°	L (cm)	L^2 (cm ²)	$\frac{1}{L^2}$ (cm ⁻²)	$\text{Sin}^2 i$
20				0.1170
30				0.2500
40				0.4132
50				0.5868
60				0.7500
70				0.8830

(6 marks)

(e) Repeat the procedure above for the angles of incidence given.

(f) Calculate the value of L^2 and $\frac{1}{L^2}$; Record in the table.

(g) Plot a graph of $\frac{1}{L^2}$ (y-axis) against $\text{Sin}^2 i$.

(5 marks)

(h) Calculate the gradient, S.

(3 marks)

Given that the equation of that graph is: $\frac{1}{L^2} = -\left\{\frac{1}{n^2 b^2}\right\} \text{Sin}^2 i + \frac{1}{b^2}$

(i) Determine the $\frac{1}{L^2}$ – intercept C and the $\text{Sin}^2 i$ – intercept B.

C = _____

(1 mark)

B = _____

(1 mark)

(j) Calculate the value of Q given by;

(2 marks)

$$Q = -\left(\frac{C}{S}\right) \div B$$

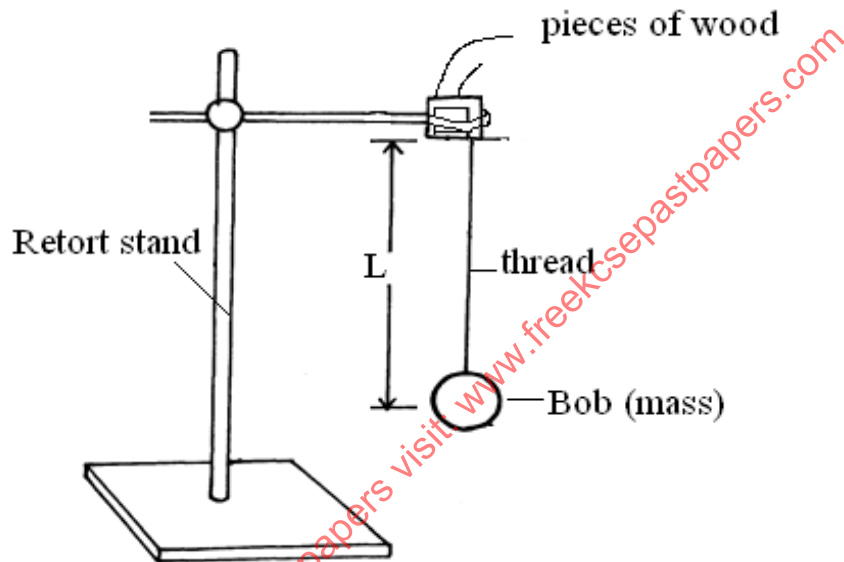
(k) Hand in your constructions on the plain paper together with the answer script. (2 marks)

2. You are provided with the following;

- A pendulum bob
- Two pieces of wood
- A retort stand
- A boss
- A clamp
- A stop watch
- A metre rule/or half metre rule
- A piece of thread

Proceed as follows;

a) Suspend a pendulum bob on a retort stand as shown below.



b) Displace the bob for a small angle. As it is oscillating time ten oscillations for every length of the string shown in the table below (9marks)

Length, $l(m)$	0.4	0.6	0.8	1.0	1.2	1.4
Time ,t, for 10 oscillations(s)						
Periodic time, T(s)						
$F=1/T$ (Hz)						
$F^2(Hz^2)$						
$1/L(m^{-1})$						

C) Plot a graph of F^2 against $1/L$.

(5 marks)

d) Determine the slope, S , of the graph.

(3 marks)

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e) Given that the relationship between F and L is given by, $F^2 = \frac{g}{4\pi^2 L}$, use the graph to determine the value of g giving its units . (3marks)

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