

PRESIDENT'S OFFICE

REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT - RALG

COAST REGION

REGIONAL FORM FOUR SECONDARY EDUCATION MOCK EXAMINATION 2020

031/2A

PHYSICS 2A

ACTUAL PRACTICAL A

Time: 2:30 Hours

Friday, 21<sup>st</sup> August 2020 a.m

**Instructions:**

1. This paper consists of **two (2)** questions.
2. Answer **all** questions.
3. Each question carries 25 marks.
4. Cellular phones and any unauthorized materials are not allowed in the examination room.
5. Non-programmable calculators may be used.
6. Write your examination number on every page of your answer booklet(s).

The following information may be useful;

Use Pie,  $\pi = 3.14$

Acceleration due to gravity,  $g = 10 \text{ m/s}^2$

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This paper consists of three printed pages

1. You are provided with iron metal ball, inextensible string of 2 m, stopwatch, retort stand, clamp and cork pads. Set up the apparatus as shown in figure 1.

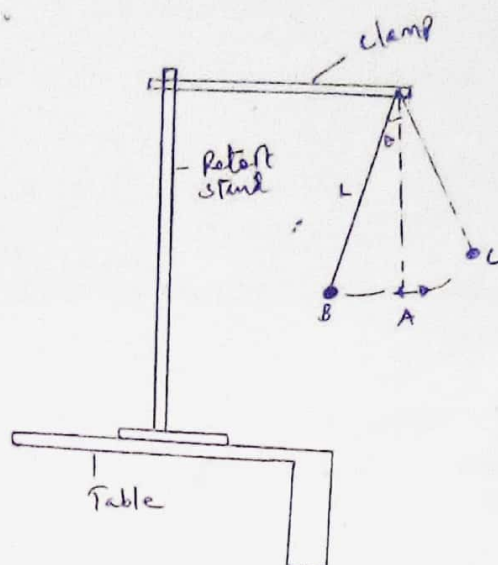


Fig 1

Proceed as follows;

- Tie a piece of thread to an iron metal ball to form a pendulum.
- Suspend the pendulum from two clamped pieces of wood.
- Adjust the length  $L$  of the pendulum to 120 cm.
- Displace and set the ball to start oscillating through a small angle.
- Record the time  $t$  taken for 10 complete oscillations by using a stopwatch.
- Repeat this experiment for values of  $L$  equal to 100 cm, 80 cm, 60 cm, 40 cm and 20 cm and record your data as shown in the table below.

Length $L$ (cm)	120	100	80	60	40	20
Time ( $t$ ) for 10 oscillations						
Period time $T$ (s)						
$T^2$ ( $s^2$ )						

### Questions;

- Complete a table with data from the experiment.
  - Plot the graph of  $T^2$  against  $L$ .
  - Find the slope.
  - From the relation  $T = 2\pi\sqrt{L/g}$
  - Give the physical meaning of  $G$ .
  - Mention two sources of errors and any precaution taken in this experiment.
  - Mention two effects of  $G$ .
2. You are provided with rectangular glass block, soft board, drawing pins, optical pins, white sheets of paper and drawing equipments.

### Proceed as follows;

- Fix the white sheet of paper on the drawing board using drawing pins.
- Put the glass block with one of its largest surface top most on top of the plane paper.

- (c) Trace the outline of the glass block on the paper by using a pencil. Remove the glass block and draw a normal line extending to opposite sides as shown in figure 2.

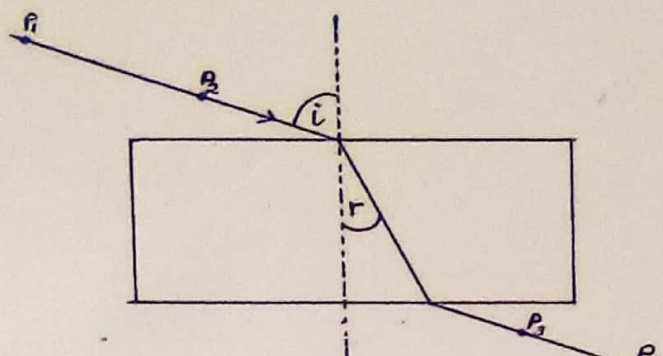


Figure 2

- (d) Draw a line making an angle of incidence  $i = 20^\circ$ . Stick two pins **P1** and **P2** in a reasonable distance apart on a drawing line.
- (e) Replace the glass block on the outline and stick two more pins, **P3** and **P4** at positions which will make all the pins **P1**, **P2**, **P3** and **P4** appear to be in a straight line as seen when observed through the glass block from opposite side.
- (f) Remove the glass block and draw the completed path of the ray through the block. Measure and record the angle of refraction " $r$ ".
- (g) Repeat the procedures in part (a) to (f) for angles  $i = 30^\circ, 40^\circ, 50^\circ$ , and  $60^\circ$  and record your data as shown in the table below.

$i$	$r$	$\sin i$	$\sin r$
$20^\circ$			
$30^\circ$			
$40^\circ$			
$50^\circ$			
$60^\circ$			

### Questions;

- Plot a graph of  $\sin I$  against  $\sin r$
- Determine the gradient of the graph.
- Explain what the value of the gradient means
- Calculate the critical angle " $C$ " of this glass block given that  $\sin C = 1/\text{slope}$
- State three sources of errors in this experiment and suggest the precautions to avoid stated errors.
- State one application of this experiment in daily life.