THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL
CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

031/2B

PHYSICS 2B
ACTUAL PRACTICAL B
(For Both School and Private Candidates)

Time: 2:30 Hours **Tuesday, 23rd October 2012 a.m.**

Instructions

1. This paper consists of **two (2)** questions. Answer **all** questions.
2. Where calculations are involved show your work clearly.
3. Marks for questions are indicated at the end of each question.
4. Calculators and cellular phones are **not** allowed in the examination room.
5. Write your **Examination Number** on every page of your answer booklet(s).
6. Use $\pi = 3.14$.

1. You are provided with a Pendulum bob, Stop watch/clock, Thread, Tape measure, Retort stand and clamp. Proceed as follows:

(a) Set the apparatus as shown in Figure 1.

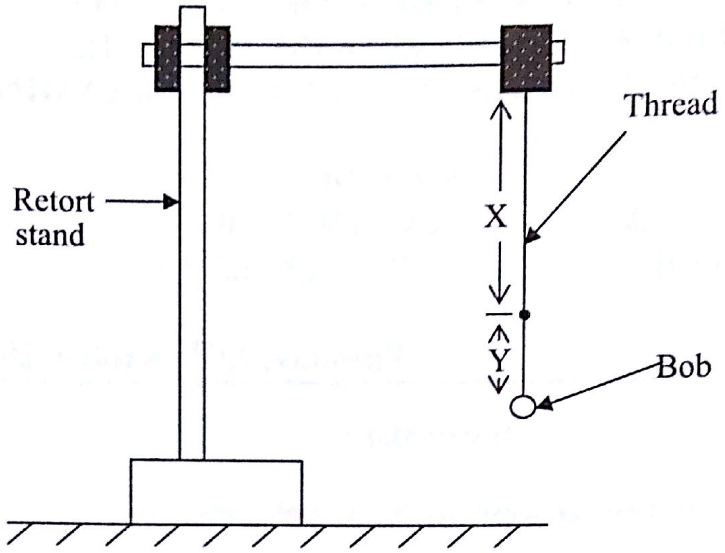


Figure 1

Note: Y is a distance from a knot to the bob which is equal to 10cm.

(b) Measure X = 60cm, then set the bob into oscillations by displacing it to a small angle and releasing it. Record the time (t) taken for 20 complete oscillations.

(c) Repeat (b) above for the length of X = 50cm, 40cm, 30cm, and 20cm.

(d) Record your results in a suitable table including periodic time T and T^2.

(e) Plot a graph of T^2 against X.

(f) Calculate the slope (S) of your graph.

(g) Read and record the T^2-intercept

(h) (i) Compute the value of $\frac{4\pi^2}{S}$

(ii) Comment on the value obtained in (h) (i).

(i) (i) Calculate the value of Z where $S = \frac{T^2}{Z}$.

(ii) How is Y related to Z?

(j) State any two (2) sources of error.

(k) Suggest the aim of this experiment.

2. You are provided with a rectangular glass block, optical pins, office pins, drawing board, a white sheet of paper and a protractor. Proceed as follows:

(a) Place a glass block on a white sheet of paper with its largest face upper most and trace its figure ABCD. Remove the block; mark the centre of the face AB as O.

(b) Draw a line at O making an angle of 30^0 to the normal 'N' which is representing the incident ray.

(c) Erect two pins P_1 and P_2 on the 30^0 line. Return the glass block on the rectangle ABCD.

(d) View P_1 and P_2 through face CD of the block and erect sighting pins Q_1 and Q_2 in line with the images P_1 and P_2 respectively. Remove the block and draw a line to the rectangle joining points Q_1 and Q_2 to represent an emergent ray. Finally draw a line joining point O and the point of contact E of line Q_1Q_2 with CD to represent refracted ray.

(e) Measure the angle of refraction, r, between the normal at O and OE.

(f) Draw the diagram for this experiment.

(g) Repeat the procedures in 2 (c), (d) and (e) for the angle of incidence of 40^o 50^o, 60^o and 70^o

(h) Tabulate your results as follows:

Angle of incidence, i^o	Angle of refraction, r^o	Sin i^o	Sin r^o
30			
40			
50			
60			
70			

(i) Plot a graph of Sin i^o against Sin r^o.

(j) What is the nature of the graph?

(k) Find the slope of the graph.

(l) What does the slope of the graph represent?

(m) Read and record Sin i^o intercept of the graph.

(n) State the relationship between Sin i^o and Sin r^o.

(o) State a possible source of error in this experiment.

(p) How can you minimize the error in 2 (o)?

(q) Suggest the aim of this experiment.

Note: Attach with your answer booklet diagrams drawn on a single sheet of paper.