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

031/2A **PHYSICS 2A**

ACTUAL PRACTICAL A

(For Both School and Private Candidates)

Time: 2:30 Hours **Wednesday, 12th November 2014 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 acceleration due to gravity, $g = 10ms^{-2}$.

1. You are provided with a metre rule, a knife edge, two strings of length 100cm each, weight A of masses 20g and weight B of unknown mass. Proceed as follows:

(a) Locate and record the centre of gravity G of the metre rule by balancing on the knife edge.
(b) Suspend the 20g mass on the left hand side at 10cm mark and adjust the position of weight B on the right hand side of the knife edge until the metre rule balances horizontally.
(c) Read and record the values of distance of 20g mass and weight B as 'a' and 'b' respectively.
(d) Repeat the procedure in 1 (b) when the 20g mass is at 15cm, 20cm, 25cm and 30cm.
(e) Draw the diagram for your experiment.
(f) Tabulate your results.
(g) Plot a graph of 'a' against 'b'.
(h) What is the nature of the graph?
(i) Determine the slope of your graph.
(j) Use the slope to calculate the mass of B.
(k) Name and state the principle governing this experiment.
(l) Suggest the aim of this experiment.

(25 marks)

2. You are provided with a white sheet of paper, drawing board, plane mirror with holders, transparent ruler, protractor, optical pins, office pins and thumb pins. Proceed as follows:

(a) Put the drawing paper on the drawing board using thumb pins and draw two straight lines AB and CD to enclose an angle of $\alpha = 10^0$. Draw the line through O making 75^0 with AB. Then insert two optical pins P and Q on this line (see Figure 1).

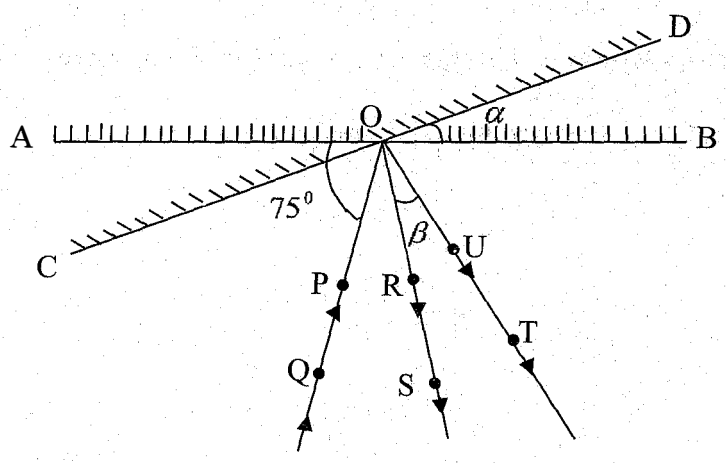

Figure 1

(b) Place the reflecting surface of the mirror along AB. Place other optical pins R and S to appear in straight line with images of P and Q. Remove the pins R and S and join the line ORS.

(c) Turn the mirror through an angle $\alpha = 10^0$ so that its reflecting surface lies along CD. Stick pins T and U to appear in line with the images of P and Q. Join the line OUT. Record the angle β^0 formed by RS and UT.

(d) Repeat the experiment for $\alpha = 15^0, 20^0, 25^0$ and 30^0.

(e) Tabulate your results.

(f) Plot a graph of β^0 against α^0.

(g) Determine the slope of your graph.

(h) Find the reciprocal of the slope.

(i) What does the answer in 2 (h) represent?

(j) From your graph, deduce the relationship between α^0 and β^0.

Note: Attach your diagrams with the answer booklet.

(25 marks)