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 **Thursday, 10th November 2016 a.m.**

Instructions

1. This paper consists of **two (2)** questions. Answer **all** the questions.
2. Calculations should be shown 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. The aim of this experiment in Figure 1 is to determine the mass M_0 of the meter rule provided.

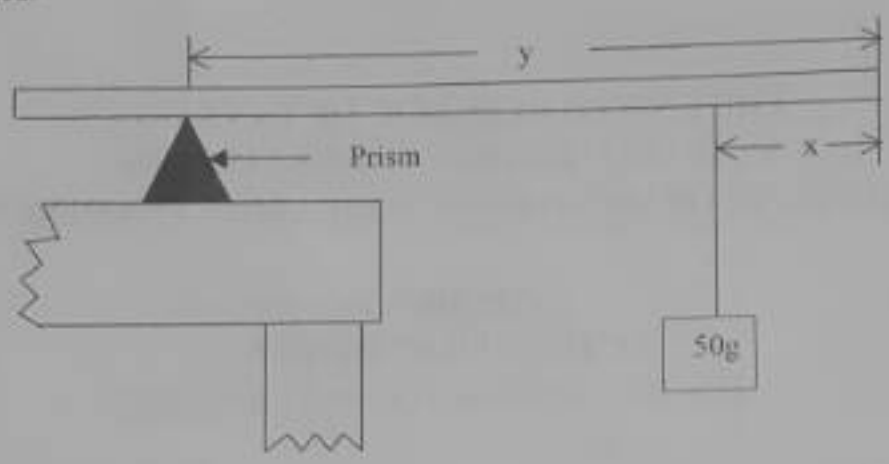

Figure 1

(a) Place the meter rule provided on the edge of a prism. Balance the meter rule and record the value L_0.

(b) Hang a 50g mass on the meter rule as shown above at a point such that x = 5cm. Move the meter rule until it balances. Record the value of y when the meter rule is balanced.

(c) Move the 50g mass to a position where x = 10cm, 15cm, 25cm, 30cm and 40cm. Measure the corresponding values of y for each value of x when the arrangement is balanced.

(d) Plot a graph of y against x.

(e) Determine the slope, s, of your graph and calculate the mass M_0 of the meter rule using the relation, $\frac{sM_0}{50} + s = 1$.

(f) From your graph, find the value of y when x = 0 and call it y_0. Calculate the value of the constant K using the equation $K = \frac{y_0}{L_0}(K + 50)$.

(g) What is the physical meaning of the constant K?

(h) State one source of error and one precaution to be taken in doing this experiment.

(25 marks)

2. You are provided with a potentiometer, a dry cell, a key, a jockey and a voltmeter.

(a) Connect a potentiometer to a cell and key in series.

(b) Connect the zero end of the potentiometer to the positive terminal of the voltmeter.

(c) Connect the negative terminal of the voltmeter to a pencil jockey through a long connecting wire.

(d) Close the key and record potential difference by pressing the jockey at 10cm intervals of length of the potentiometer wire. Record the length L as well as potential difference V.

(e) Repeat the experiment for five (5) different lengths of potentiometer wire and record the corresponding potential difference.

(f) Tabulate your results as shown in the following table:

Potential difference (volts)						
Length (cm)	10	20	30	40	50	60

(g) Plot a graph of potential difference V against L.
(h) Determine the slope of the graph.
(i) What is the nature of the graph?
(j) Show that the slope of the graph represents the current flowing through the circuit.
(k) Give the aim of this experiment and state the method used.
(l) Mention two expected sources of errors and two precautions to be taken in this experiment.

(25 marks)