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

131/3B

PHYSICS 3B
ACTUAL PRACTICAL B
(For Both School and Private Candidates)

Time: 3:20 Hours **Friday, 16th May 2014 a.m.**

Instructions

1. This paper consists of **three (3)** questions.
2. Answer **all** questions.
3. Question **Number 1** carries 20 marks and the other **two (2)**, 15 marks each.
4. Calculations should be clearly shown.
5. Mathematical tables and non-programmable calculators may be used.
6. Cellular phones are **not** allowed in the examination room.
7. Write your **Examination Number** on every page of your answer booklet (s).
8. Use the following:

   $\pi = 3.14$

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1. The aim of the experiment is to determine the acceleration due to gravity at your school.

Proceed as follows:

(a) Using a G-clamp fix metres rule horizontally on the bench such that its projection from the fixed point is 80cm.

(b) By means of the string, suspend the pendulum bob from the hole at the free end of the fixed metre rule.

(c) Starting with length of thread equals to 80cm, displace the bob through a small angle and release it so that its plane of swing is perpendicular to the rule.

(d) Record the time t in seconds for 15 complete oscillations. Hence determine the period T.

(e) Without altering the length of the fixed metre rule, repeat the procedures in part (c) and (d) above for values of the length of thread 70cm, 60cm, 50cm and 40cm.

(f) Plot a graph of T^2 against pendulum length, l.

(g) Given that $T = \left(\frac{39.49}{g} l + \alpha\right)^{\frac{1}{2}}$, obtain the values of g and α.

(h) What is the significance of the constant α in this experiment?

2. You are provided with a calorimeter with its stirrer, thermometer, source of water, stop watch, 250cc of water and a beaker.

Proceed as follows:

(a) Read and record the room temperature θ_R.

(b) Heat some water in the beaker until the temperature reaches about 95^0C.

(c) While water is being heated, put the calorimeter with its stirrer on a wooden base.

(d) When the temperature of water reaches about 95^0C, transfer some of it to the calorimeter till the level reaches about one centimetre from the top.

(e) When the temperature of water in the calorimeter has dropped to about 85^0C, start the stopwatch while stirring.

(f) Record the temperature θ in ^{0}C after every time interval of 2 minutes. Continue doing this for about 18 minutes.

(g) Plot a graph of $\log_{10}(\theta - \theta_R)$ against time t in minutes.

(h) Write down the equation of your graph.

(i) State two possible sources of error in this experiment.

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3. The aim of this experiment is to determine the electrical resistivity of wire Y.

Proceed as follows:

(a) Set up a slide-wire metre bridge such that wire Y is connected across the right hand gap of the bridge, while a parallel combination of standard resistor of 4Ω and resistor box R is across the left hand gap.

(b) Connect the zero centred galvanometer at its usual terminal whereas its jockey is placed at 50cm mark on the slide-wire. Complete the metre bridge circuit.

(c) With R = 30Ω, find the length l of wire Y when the galvanometer read zero and the jockey is still at 50cm mark.

(d) Repeat the procedures in part 3 (c), find the length l of the wire which balances with the left hand combined resistance for values of R = 20Ω, 10Ω, 5Ω, 2Ω and 1Ω.

(e) Tabulate your results.

(f) Sketch the circuit diagram for your experiment.

(g) Plot a graph of $\frac{1}{R}$ against $\frac{1}{l}$.

(h) Derive equation of your graph.

(i) Measure the diameter of wire Y.

(j) From the graph, determine the resistivity of wire Y.

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