

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

131/3C

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

Time: 3:20 Hours

Wednesday, 20th May 2015 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:

$$\pi = 3.14$$



1. The aim of the experiment is to determine the radius of gyration, K of the circular sheet of hard-board provided and acceleration due to gravity, g .

Proceeds as follows:

- (a) Set up- the apparatus as shown in Figure 1, where G is the centre of gravity of the hard board. Suspend the hard board from the hole nearest G and record the distance l between the point of suspension and G .

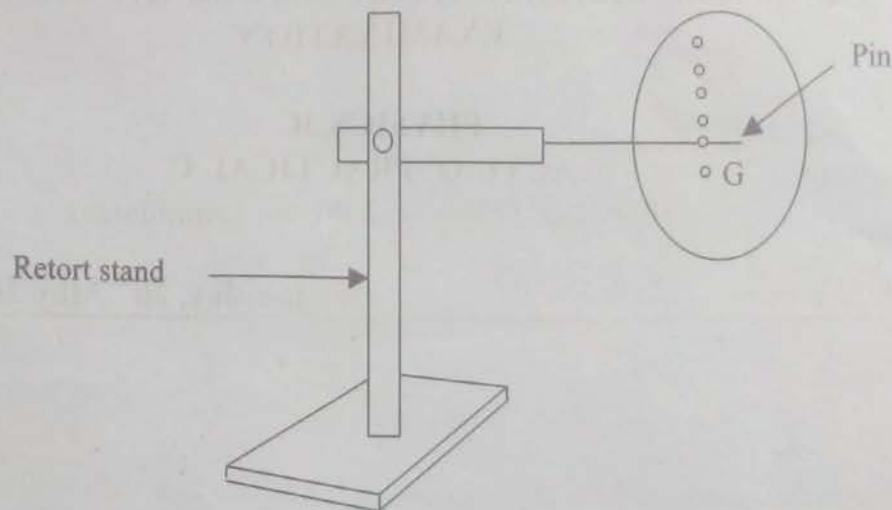


Figure 1

- (b) Using the stopwatch or stop clock provided obtain the time, t for 10 complete oscillations of the hard board and hence calculate the periodic time, T .
- (c) Repeat the procedure in 1 (b) with four (4) other values of l and obtain the corresponding values of T . Tabulate your results.
- (d) Plot a graph of l^2 against T^2/l , with both axes starting at the origin.
- (e) Given that $T^2/l = \frac{4\pi^2}{g}(K^2 + l^2)$, determine the;
- Radius of gyration, K .
 - Acceleration, g due to gravity.

2. In this experiment you are required to compare the time taken for cooling through a fixed temperature range for a blackened calorimeter and the same calorimeter covered with metal foil.

Proceed as follows:

- (a) You are provided with a container labelled HOT WATER and blackened calorimeter. Nearly fill the blackened calorimeter with hot water whose initial temperature should be about 80°C and put this calorimeter on a wooden slab placed on the bench.

- (b) Stir the hot water in the blackened calorimeter constantly and record the temperature θ of the water at one minute interval. Continue recording the temperature θ until it has fallen to about 60°C .
- (c) Empty the water in the calorimeter into the measuring cylinder and record its volume as V_0 .
- (d) Cover the outer surface of the calorimeter (not blackened) with a metal foil provided by using rubber bands. Use the same volume V_0 , of hot water at about 80°C as in 2 (c) to fill the calorimeter covered with the metal foil. Then repeat the procedures outlined in 2 (b).
- (e) Using the same axes, draw the cooling curves for the blackened calorimeter with its contents and calorimeter with metal foil together with its contents.
- (f) From each curve, estimate the time taken to cool from 80°C to 60°C . Comment on your results.

3. The aim of this experiment is to determine the e.m.f of the given cell.

- (a) Carefully set up the circuit illustrated in Figure 2 where $R = 5\Omega$; E is a series connection of any two dry cell and K is a key. Make sure that the connections are tight enough.

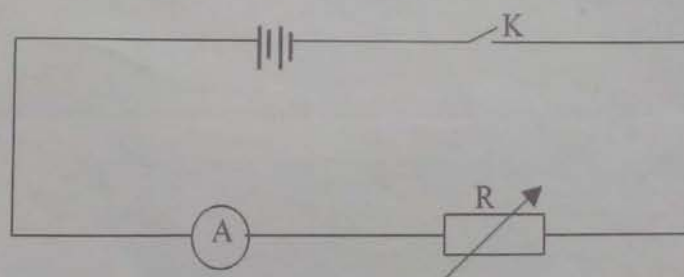


Figure 2

- (b) With the key closed, note and record the reading I of the ammeter.
- (c) Repeat the procedure in 3 (b) for the values of R equal to 10Ω , 15Ω , 20Ω , 25Ω and 30Ω . Record your results as shown in Table 1

Table 1

$R(\Omega)$	5	10	15	20	25	30
$I(\text{A})$						
$\frac{1}{I} (\text{A}^{-1})$						

- (d) Plot a graph of R against $\frac{1}{I}$ and determine:
- (i) Slope.
 - (ii) E.m.f.
 - (iii) The value of R for which $\frac{1}{I}$ equals to zero and state what the value represents.
- (e) State any two sources of error.