THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL
DIPLOMA IN SECONDARY EDUCATION EXAMINATION

731/2A

PHYSICS 2A
(ACTUAL PRACTICAL A)

Time: 3 Hours **Thursday, 10th May 2012 a.m.**

Instructions

1. This paper consists of **three (3)** questions.
2. Answer **all** questions.
3. Question number one carries 40 marks, question number two and three carries 30 marks each.
4. Mathematical tables and non-programmable calculators may be used.
5. Cellular phones are **not** allowed in the examination room.
6. Write your **Examination Number** on every page of your answer booklet(s).

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1. **The aim of this experiment is to determine the force constant of the spring k.**

Apparatus:

You are provided with a weight pan, meter rule, pointer, spiral spring, slotted weights, stop watch and two retort stands with clamps.

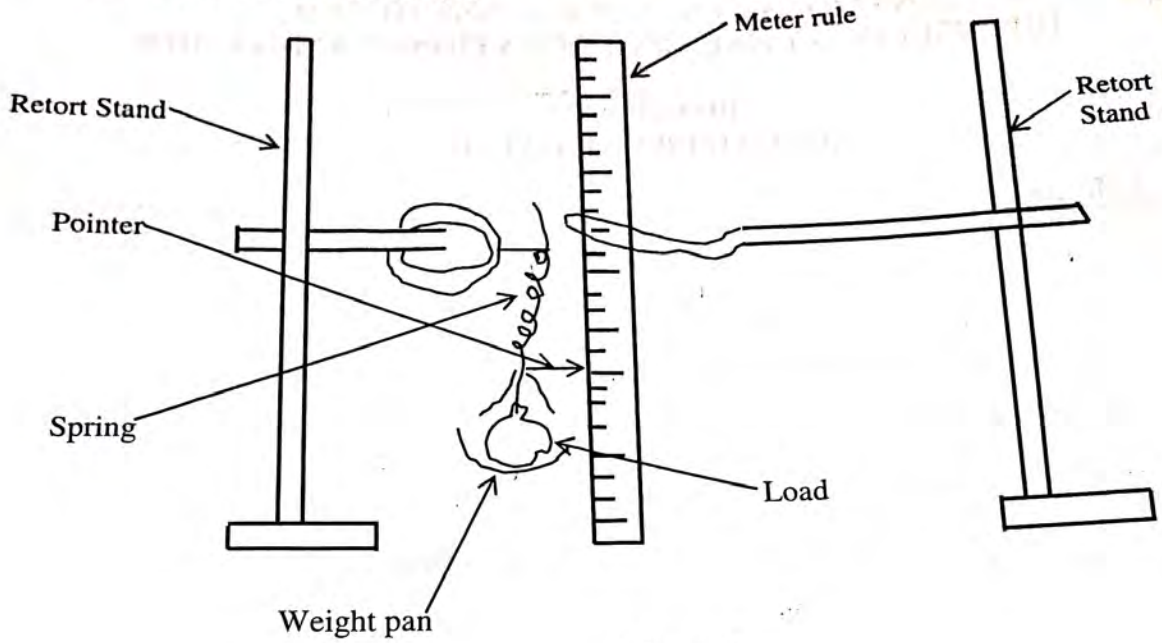


Figure 1

Procedures:

(a) Set up the apparatus provided for this experiment as shown in Figure 1 above.

(b) Record the scale reading s_0.

(c) Add 50 gm on the weight pan and record the new scale reading s.

(d) Calculate the extension ($e = s - s_0$) caused by the weight.

(e) Repeat with different load of 100 gm, 150 gm, 200 gm, 250 gm, until 600 gm.

Questions:

(i) Tabulate your results.

(ii) Sketch a well labeled diagram of the experiment.

(iii) Plot a graph of load against extension.

(iv) Find the gradient G of your graph.

(v) What is the physical meaning of the gradient?

(vi) State four sources of errors and suggest the ways to minimize.

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2. **The aim of this experiment is to determine the rate of cooling of liquid B.**

Apparatus:

You are provided with a thermometer, a calorimeter, a stirrer, a stopwatch/stop clock, beaker and a liquid labeled B.

Procedures:

(a) Using a beaker, take about $200cm^3$ of the liquid B and heat until it boils.

(b) Quickly transfer the boiling liquid B from a beaker to the calorimeter provided. Record the temperature and immediately start the watch.

(c) While stirring the liquid and constantly fanning with the piece of paper provided, note and record the temperature of the liquid as it cools at intervals of 2 minutes. Continue with reading the temperature for 20 minutes.

Questions:

(i) Tabulate your results for θ and t, where θ is the temperature in °C and t is the time in minutes.

Time t (Minute)											
Temperature θ°C											

(ii) Draw a well labeled diagram of the experiment.

(iii) Plot a graph of θ against t.

(iv) Determine the rate of cooling of liquid B at 70^0C, 60^0C, 50^0C

(v) Mention four sources of error in this experiment.

3. The aim of this experiment is to determine the electromotive force (E) and internal resistance (r) of a cell.

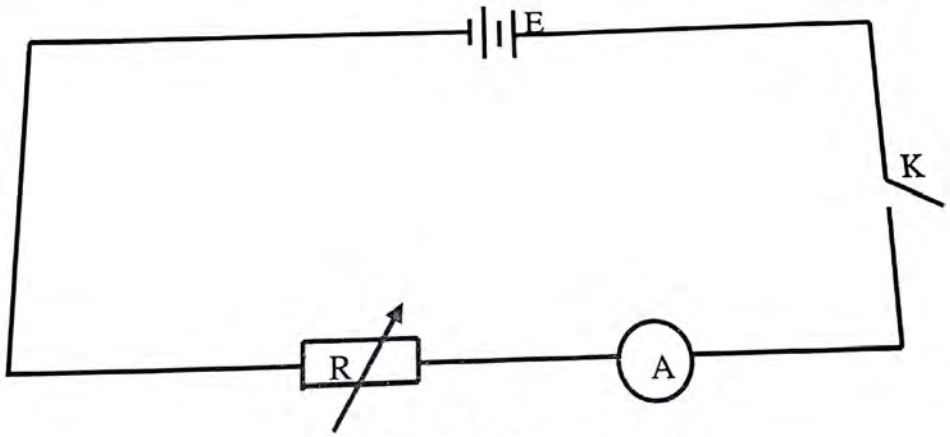


Figure 2

Procedures:

(a) Connect the circuit as shown in Figure 2 above.

(b) Put R=1Ω and quickly read the value i on the ammeter.

(c) Repeat the procedure in 3(a) above for values of R=2Ω, 3Ω, 4Ω, 5Ω and 6Ω.

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Questions:

(i) Tabulate your results and complete the following table

Resistance R(Ω)	Current i(A)	$\frac{1}{i}(A^{-1})$
1		
2		
3		
4		
5		
6		

(ii) Plot the graph R against $\frac{1}{i}$.

(iii) Using the graph and the equation $R = \frac{E}{i} - r$. Find the value of E.

(iv) Suggest how E and r may be evaluated from your graph.

(v) Evaluate E for one cell.

(vi) Evaluate r for one cell.

(vii) State the source of error and suggest one way of minimizing it.

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