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

031/2A

PHYSICS 2A
(PRACTICAL A)

(For Both School and Private Candidates)

Time: 2:30 Hours **Year: 2022**

Instructions

1. This paper consists of **two** (**2**) questions.
2. Answer **all** the questions.
3. Each question carries **twenty five** (**25**) marks.
4. Non-Programmable calculators may be used.
5. Cellular phones and any unauthorised materials are **not** allowed in the examination room.
6. Write your **Examination Number** on every page of your answer booklet(s).

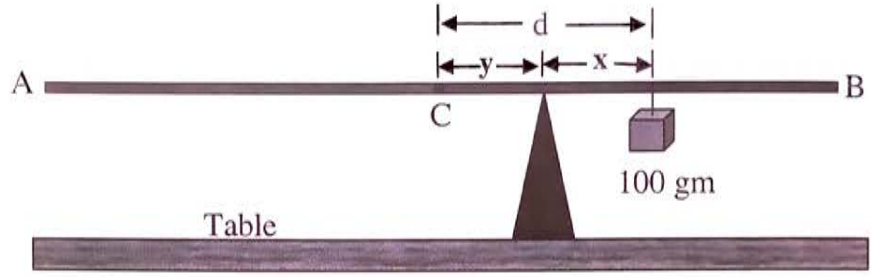
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1. The aim of this experiment is to determine the density of a metre rule.

Proceed as follows:

(a) Locate the centre of gravity C of the metre rule AB by balancing freely at the knife edge.

(b) Suspend 100 g mass on the ruler with distance d = 10 cm from C, adjust the position of the knife edge to get a balance, as shown in the following figure:



(c) Record the distance **y** from the centre of gravity to a knife edge and distance **x** from knife edge to the known mass of 100 g.

(d) Repeat the procedures in 1 (b) and (c) by increasing the distance of 100 g to d = 15 cm, 20 cm, 25 cm and 30 cm.

Questions

(i) Tabulate your results in a suitable table showing the values of d, **x** and **y**.

(ii) Plot a graph of **y** (cm) against **x** (cm).

(iii) Determine the slope of the graph.

(iv) Describe how the slope obtained from the graph is related to the mass of the metre rule provided and hence determine the mass of a ruler.

(v) Measure and record the length, width and the thickness of the metre rule provided.

(vi) Determine the density of a metre rule.

(25 marks)

2. You are provided with a dry cell, resistance box, switch, an ammeter and a set of connecting wires.

Proceed as follows:

(a) Connect the given electrical components in series, switch must be open. Draw and label clearly your circuit.

(b) Set resistance R = 1 Ω, then close the switch. Read and record the ammeter reading. Open the switch immediately after taking the readings.

(c) Repeat the procedures in 2 (b), setting the value of R = 2 Ω, 3 Ω, 4 Ω and 5 Ω.

Questions

(i) Tabulate your results including the values of $\frac{1}{I}$.

(ii) Plot a graph of R against $\frac{1}{I}$.

(iii) From the graph, determine the slope and the vertical intercept.

(iv) Use the results obtained in 2 (iii) to determine the internal resistance and e.m.f of a given dry cell.

(v) What is the aim of doing this experiment?

(25 marks)