THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

031/2C **PHYSICS 2C**

(ACTUAL PRACTICAL C)

(For Both School and Private candidates)

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

Instructions

1. This paper consists of **two (2)** questions**.**
2. Answer **all** questions**.**
3. Each question carries twenty **five (25)** marks**.**
4. All writing must be in **blue** or **black** ink **except** drawing which must be in pencil.
5. Cellular phones, and any unauthorized 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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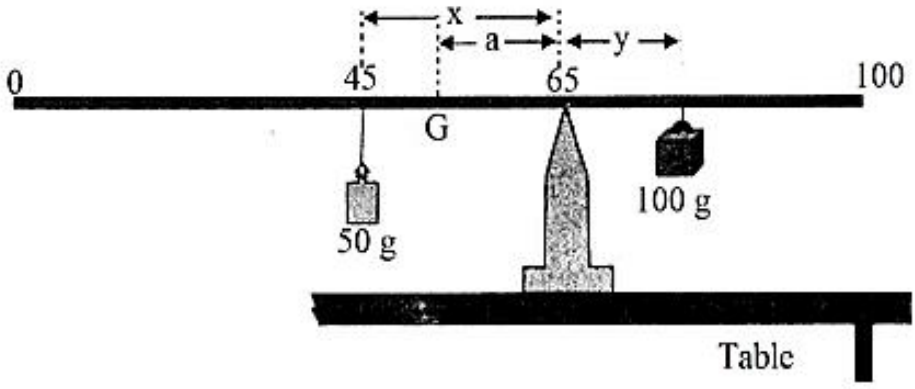
1. You are provided with a knife edge, metre rule, two strings of 20 cm, each 50 g and 100 g masses. Perform experiment following procedures (a) to (e).

(a) Balance a metre rule on a knife edge, mark the balancing point, write letter G at the balancing point using a pencil.

(b) Use a Vernier calliper to determine the thickness, t and the width, w of the metre rule.

(c) Place the metre rule on a knife edge so that the knife edge is at 65 cm mark. Suspend the given 100 g mass at a point which balances the metre rule. Record the distance between the knife edge and G as a cm, and between the knife edge and the position of 100 g mass as y.

(d) Suspend the mass of 50 g on the left hand side of the knife edge at the position 45 cm and the adjust the position of 100 g mass to balance the metre rule as shown in Figure 21. Record the new value of y and then record the distance between the 50 g mass and the knife edge as x.



(e) Repeat the procedures in 1 (d) by changing the position of 50 g to 40 cm, 35 cm, 30 cm and 25 cm. Answer the following questions:

(i) Tabulate the results of x (in cm) and y (in cm).

(ii) Plot a graph of y against x.

(iii) Determine the slope of the graph.

(iv) Calculate the value of z from your experimental results given that,

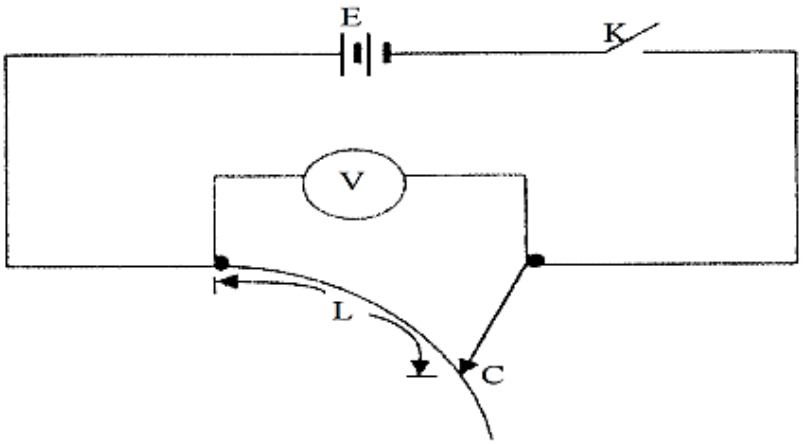
$$y = Sx + \frac{z + a}{100}.$$

(v) State the physical significance of z.

(vi) State the aim of doing this experiment.

2. Determine the resistivity of the material of the wire provided from the following procedures:

(a) Use the micrometre screw gauge to determine the diameter of the given wire and hence find its cross section area in m^2 . Connect the circuit as shown in Figure 26 where C is a crocodile clip. Measure the length of wire L = 100 cm and clip it so that the current flows across the wire. Record the voltmeter reading V.



(b) Repeat the procedures in 2 (a) with crocodile clip at L =80 cm, 60 cm, 40 cm and 20 cm . Record the corresponding voltmeter reading in each case.

(i) Tabulate the values of L, V, $\frac{1}{L}$ and $\frac{1}{V}$. (The length L should be in metres).

(ii) Plot a graph of $\frac{1}{V}\left(V^{-1}\right)$ against $\frac{1}{L}\left(L^{-1}\right)$

(iii) Determine the slope S.

(iv) Find the value of V for which $\frac{1}{L} = 0$ and state its physical meaning.

(v) Determine the value of resistivity of the wire given that, $\frac{1}{V} = \frac{A}{\rho E}\frac{1}{L} + \frac{1}{E}$.