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

031/2B

# PHYSICS 2B
# ACTUAL PRACTICAL B

(For Both School and Private Candidates)

Time: 2:30 Hours

Year: 2024

**Instructions**

1. This paper consists of **two** (2) questions. Answer **all** the questions.
2. Each question carries **twenty five** (25) marks.
3. All writings should be in **blue** or **black** ink, except for diagrams which must be in pencil.
4. Mathematical tables and non-programmable calculators may be used.
5. Communication devices 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. You are required to determine the mass **m** of a given solid body. Proceed as follows:

(a) Pivot a metre rule on a knife edge at its midpoint. If the metre rule does not balance, add plasticine on the lighter side to make it balance.

(b) Suspend the 50 g mass on the position **a** = 20 cm mark and place the solid body **m** given on the other side of the metre rule, at the position of the metre rule to balance it as shown in Figure 1. Record the value of **b**.

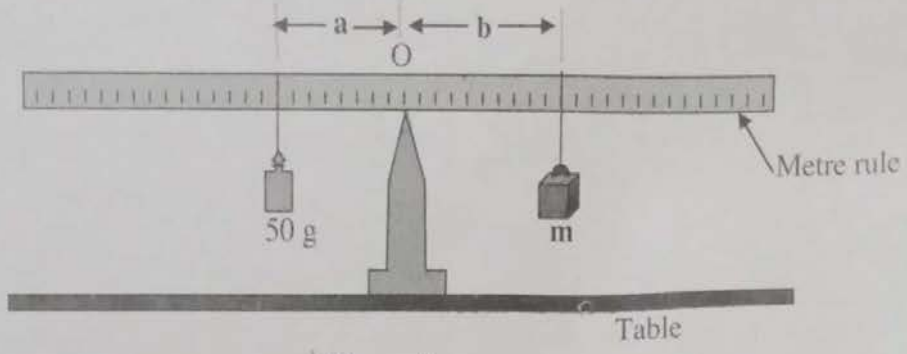



**Figure 1**

(c) Repeat the procedure in 1 (b) for values of **a** = 25 cm, 30 cm, 35 cm and 40 cm, in each experiment, read and record the corresponding values of **b**.

**Questions**

(i) Tabulate the results.

(ii) Plot a graph of **a** (cm) against **b** (cm).

(iii) What is the nature of the graph?

(iv) Determine the slope of the graph in 1 (ii).

(v) Deduce the relative density of metre rule used in the experiment.

(vi) Use the information obtained from the graph to determine the mass of the given body (in grams), stating clearly how you have arrived to the answer.

**(25 marks)**

2. You have been provided with the following apparatuses: an ammeter **A**, voltmeter **V**, a dry cell **E**, a key **K**, variable resistor **Rh**, unknown resistance **R** and connecting wires. Proceed as follows:

(a) Use the electrical components provided to design and construct an electric circuit in which the current flowing through the circuit is directly proportional to the potential difference across the cell terminals. Make sure that the voltmeter is connected parallel with the unknown resistance.



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(b) Close the key **K**, adjust the variable resistor **Rh** so that the current I passing in the circuit is 0.1 A. Meanwhile read and record the value of voltage V from the voltmeter.

(c) Repeat the procedures in 2 (b) for the current I equal to 0.2 A, 0.3 A 0.4 A and 0.5 A. Read and record the value of voltage in each case.

**Questions**

(i) Draw the circuit diagram of the constructed circuit in 2 (a).

(ii) Tabulate the results.

(iii) Plot a graph of V against I.

(iv) What is the nature of the graph in 2 (iii)?

(v) Determine the slope of the graph plotted in 2 (iii).

(vi) Calculate the unknown resistance **R**.

(vii) Why high currents in this experiment are unsuitable?

(viii) How will you minimize the error when calculating the value of **R** from $\frac{V}{I}$ ?

**(25 marks)**



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