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: 2021**

Instructions

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



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1. You are required to perform the following experiment:

(a) Tie a thread to a given pendulum bob. Fix a wooden rod as shown in Figure 1 and mark its reach point N. Then remove the rod.

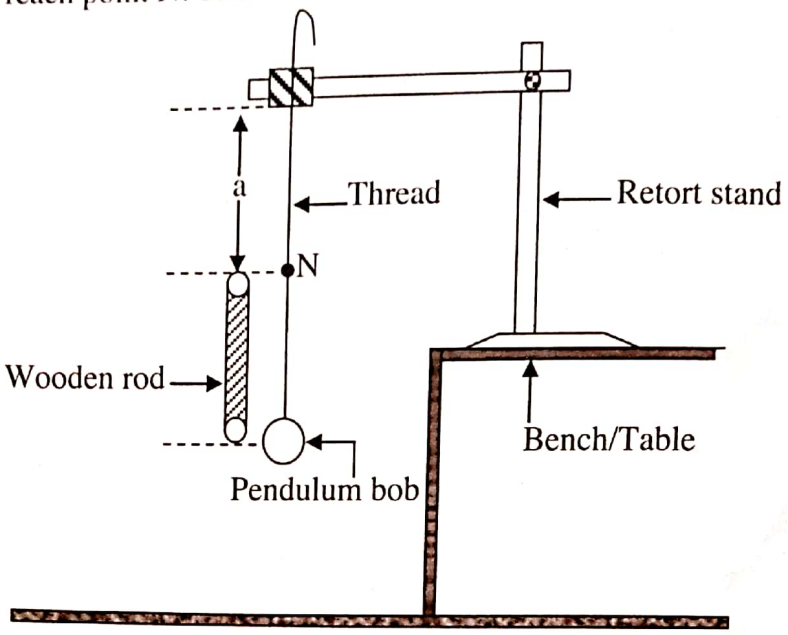


Figure 1

(b) Measure a distance a = 20 cm from point N to the point of suspension of the pendulum. Displace the bob to a small distance and release it so that it performs to and fro motion. Determine the time, t for twenty complete oscillations and hence the periodic time T.

(c) Repeat the procedures in 1 (b) for values of a = 40 cm, 60 cm, 80 cm and 100 cm.

Questions

(i) Tabulate the values of a, t, T and T^2.

(ii) Plot a graph of T^2 (sec^2) against a (cm).

(iii) Find the slope, S of the graph.

(iv) Determine the value of 'b' from the equation $T^2 = S(a + b)$.

(v) What does the value of 'b' represent?

2. You are provided with two dry cells of e.m.f. E, a key, K, an ammeter, A, voltmeter, V, Rheostat, Rh, unknown resistor, R and a 4 Ω resistor.

Proceed as follows:

(a) Set up the circuit as shown in Figure 2.

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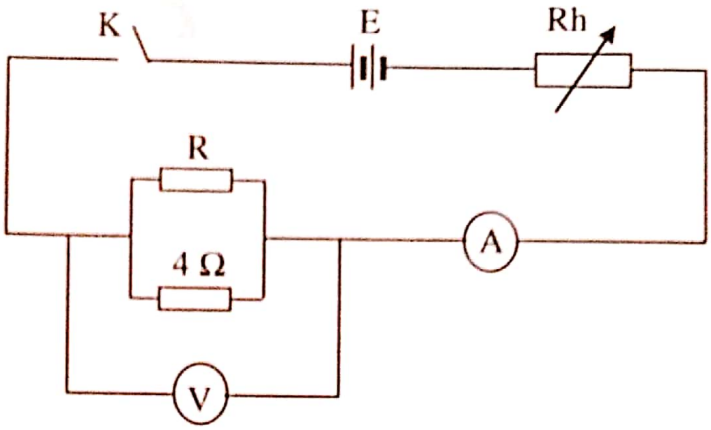


Figure 2

(b) Close the key and adjust the rheostat so that the ammeter reading is 0.1 A. Record the voltmeter reading V in volts.

(c) Repeat the procedures in 2 (b) for the values of ammeter readings of 0.3 A, 0.5 A, 0.7 A and 0.9 A.

Questions

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

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

(iii) Find the slope of the graph.

(iv) Determine the value of the unknown resistance R.

(v) What is the effect of connecting resistor, R as shown in Figure 2?

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