**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: 2021**

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## 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)

1. You are provided with: retort stand, stopwatch, a thread of 100 cm, pendulum bob, cork pads and a metre rule.

(a) Set up the apparatus such that the pendulum bob is just above the top of the bench as shown in Figure 1.

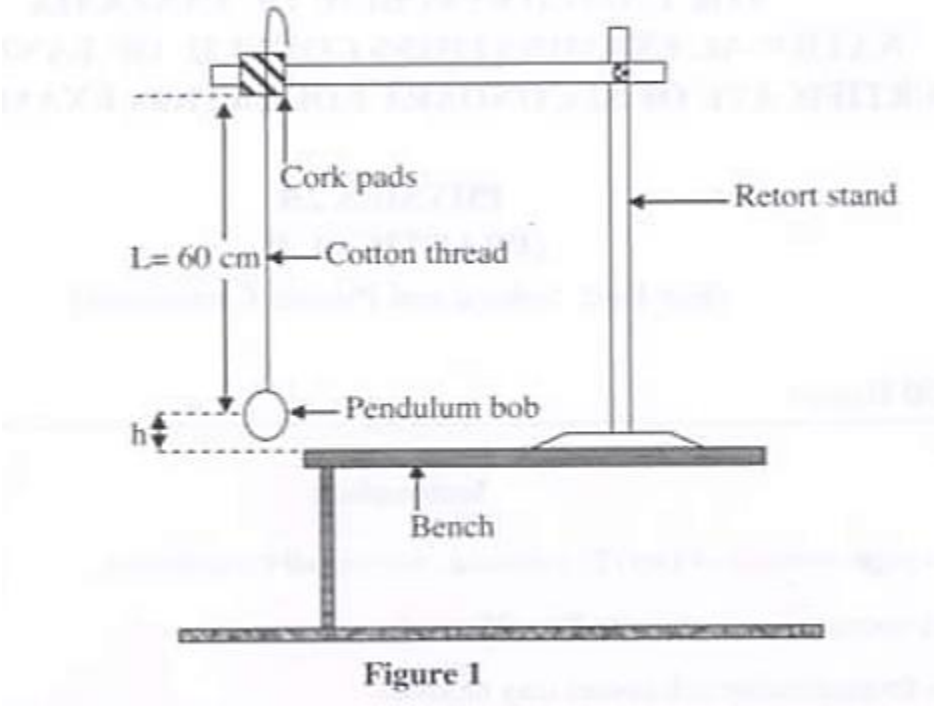


Figure 1

(b) Measure the height, h = 10 cm from the table top to the middle of the pendulum bob and displace the bob through a small distance. Release the bob then determine the time, t for 20 complete oscillations and its periodic time, T.

(c) Repeat the procedures in 1 (b) above for the values of h = 20 cm, 30 cm, 40 cm and 50 cm; and then;

(i) tabulate the results including the values of $T^2$

(ii) plot a graph of $T^2$ ($S^2$ ) against h (cm)

(iii) find the slope, S of the graph

(iv) record the value of $T^2$ for which h = 0

(v) determine the value of k from the equation: $T^2 = -(Sh + Sk)$

(vi) explain the physical meaning of the value obtained in 1 (v)

2. You are provided with: a dry cell of e.m.f, E; a switch, S; an ammeter, A; a voltmeter, V; connecting wires, a constantan wire, Q and a jockey J.

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

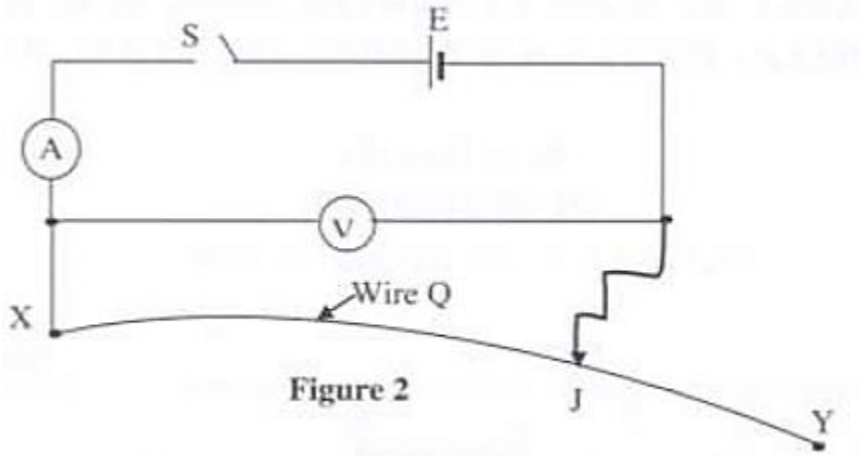


Figure 2

(b) Connect one end of the wire, Q to the ammeter, A at point X.

(c) Start at 15 cm length of a wire Q from end Y, move the jockey, J towards X until the ammeter registers 0.3 A. Record the voltmeter reading, V in volts.

(d) Move again the jockey, J towards X until the ammeter reads 0.4 A. Record the corresponding new voltmeter reading, V in volts.

(e) Repeat the procedures in 1 (d) when ammeter readings are 0.5 A, 0.6 A and 0.7 A; and then

(i) Tabulate the results

(ii) Plot a graph of current, I against voltage, V

(iii) Find the slope, S of the graph

(iv) Determine the internal resistance, r of a cell given that: $S = \frac{-1}{r}$

(v) Use the graph in 2(ii) to find the value of e.m.f, E of a dry cell.