**TERM 2 - 2023**

**PHYSICS – PRACTICAL (232/3)**

**FORM THREE (3)**

**Time – 2**$\frac{1}{2}$ **Hours**

**Name …………………………………………….……… Admission Number …………….**

**Candidate’s Signature ………………….…...……….. Class ……………………………**

**INSTRUCTIONS:**

* Answer all the questions in this paper
* You are supposed to spend the first 15 minutes of the $2\frac{1}{2}$ hours allowed for this paper reading the whole paper carefully before starting your work.
* Marks are given for clear record of the observations made, their suitability and accuracy and the use made of them.
* Candidates are advised to record observations as soon as they are made
* Mathematical table and electronic calculators may be used.
* **The earth’s gravitational pull,** $g=10Nkg^{-1}$

 **For Examiner’s use only:**

|  |  |  |
| --- | --- | --- |
| **QUESTION** | **TOTAL MARKS**  | **CANDIDATE’S SCORE** |
| 1 | **20** |  |
| 2 | **20** |  |
| GRAND TOTAL | **40** |  |

***This paper consists of 6 printed pages. Candidates should check the question paper to ensure that all the pages are printed as indicated and no questions are missing.***

**QUESTION 1**

**You are provided with the following apparatus:**

* One dry cell
* A cell holder
* A volt-meter (0-3V)
* An ammeter (0-1A)
* A switch
* Amounted resistance wire labelled AB
* Micrometer screw-gauge

**PROCEED AS FOLOWS:**

1. Set up the apparatus as shown in the circuit below, figure 1

**Figure 1**

1. Using the micrometer screw-gauge provided, measure the diameter, D of the mounted wire.

D = .................................mm D = ......................m ($1\frac{1}{2} marks$)

1. Determine the cross-sectional area, A of the mounted wire given that:

$A=πR^{2}$ where, R is the radius of the wire (2 marks)

1. While the switch is open, record the voltmeter reading, V0

$V\_{0}=$ ........................... ($\frac{1}{2}$ mark)

1. Put on the switch. While the crocodile clip is at A (i.e. L = 100 cm) take the volt-meter reading (V) and the ammeter reading (I). Record V and I in the table, 1 below:

**Table 1**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Length,** $L$ **(cm)** | **100** | **80** | **60**  | **40** | **20** | **0** |
| Voltage (V) |  |  |  |  |  |  |
| Current, I (A) |  |  |  |  |  |  |
| R = $\frac{v}{I}$ (Ω) |  |  |  |  |  |  |

 (10 marks)

1. Repeat the procedure in (c) above for the lengths shown and complete the table 1 above.
2. Determine, $R\_{av}$, the average value of resistance, R (2 marks)
3. The relationship between resistance, R and length, $l$ is given by the equation:

$R\_{av}=\frac{ρl}{A}$ , determine the value of the constant, $ρ$ when $l=100cm$ (3 marks)

1. State the significance of the constant, $ρ$ (1 mark)

**QUESTION TWO**

You are provided with the following:

* a metre rule
* 3 optical pins
* 2 small wooden blocks
* a stop watch
* a stand, a boss and clamp
* a piece of sello-tape

**Proceed as follows**:

1. Using the two wooden blocks, clamp two optical pins about 4 cm apart in the stand so that they project out of the blocks in a horizontal plane.
2. Using a piece of sellotape, attach the third optical pin across the metre rule at a distance x = 10 cm from the 50 cm mark. Now suspend the metre rule on the two clamped pins so that it can swing freely in a vertical plan with the third pin as the axis. (See **figure 2**)



**Figure 2**

1. Displace the lower end of the metre rule slightly and let it oscillate as shown in the **figure 2**. Measure and record in table 2 the time t (s) for 20 oscillations.
2. Repeat the procedure in (b) and (c) for the values of x shown in table 2.
3. For each value of x shown in the table, determine the period T(s), and complete the table. (The period T is the time for one complete oscillation).



(9 marks)

1. On the grid provided, plot a graph of T2. X (y-axis) against X2 (5 marks)



1. From the graph, determine:
2. the slope S of the graph. (3 marks)
3. The value of constant r given that: $rS=39.5$ (3 marks)

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