**NAME…………………………..…………………ADM NO……………..…..CLASS…………**

**232/3**

**PHYSICS**

**PAPER 3**

**END OF TERM 1 EXAM 2023**

**TIME: 2** $\frac{1}{2}$**HOURS.**

**Instructions to candidates**

1. Write your name and admission number in the space provided above
2. Answer all questions on the question paper
3. You are supposed to spend the first 15 minutes allowed for this paper reading the whole paper carefully before commencing your work and confirming your apparatus.
4. Marks are given for a clear record of the observations actually made, (or their suitability and accuracy and or the use made of them)
5. Candidates are advised to record observations as soon as they are made.
6. Mathematical tables or electrical calculators may be used
7. Candidates should answer all the questions in English

For examiner use only.

|  |  |  |
| --- | --- | --- |
| Question  | Maximum  | Candidates score  |
| 1 | 20 |  |
| 2 | 20 |  |
| Total | 40 |  |
|  |

**QUESTION 1**

You are provided with following apparatus

* A pendulum bob
* A cotton thread about1m long
* A retort stand and clamp
* A metre rule
* A stopwatch
* Two pieces of wood
* Vernier calipers(to be shared)

Proceed as follows

1. Using the vernier calipers measure the diameter of the pendulum bob. (1mk)

…………………………cm

1. Clamp the pendulum as shown starting with L=80cm



**Figure 1**

1. Give the bob a small displacement and record the time t for 20 complete oscillations. Record also periodic time T for one complete oscillation.
2. Repeat the procedure above for values of L as shown in the table. Record and complete the table.(8marks)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Length L (cm)** | **L (m)** | **Time for 20 oscillations** | **Period T** | **(T2)****(s2)** |
| 80 |  | 34.75 |  |  |
| 70 |  | 32.81 |  |  |
| 60 |  | 29.66 |  |  |
| 50 |  | 27.50 |  |  |
| 40 |  | 24.47 |  |  |
| 30 |  | 21.50 |  |  |
| 20 |  | 17.68 |  |  |

1. Plot the graph of T2 against L(m)(5marks)



1. Determine the slope of the graph(3marks)
2. The equation for the graph is given by T2  = $\frac{4π^{2}L}{g}$ where g is a constant. From the graph find the value of g.(2marks)
3. What is the significance of g.(1mark)

**QUESTION 2**

**APPARATUS**

* concave mirror
* lens holder
* screen
* candle
* proceed as follows;



**Figure 2**

**Procedure**

1. Set the apparatus as shown in figure 2
2. Place the candle at a distance **x**=**5.0 cm** from the screen
3. Move the mirror to and fro to focus a clear; sharp image of the candle on the screen
4. Measure and record the distance u between the mirror and the candle and the distance v between the screen and the mirror.
5. Repeat the experiment for other values of x and complete the table below (8MKS)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **x (cm)** | **5.0** | **10.0** | **15.0** | **20.0** | **25.0** | **30.0** |
| **u (cm)** | 18.0 | 16.0 | 15.0 | 14.5 | 14.0 | 13.0 |
| **v (cm)** | 23 | 26 | 30 | 34.5 | 39.0 | 43.0 |
| **( u + v)** **(cm)** |  |  |  |  |  |  |
| **uv (cm)** |  |  |  |  |  |  |

Vi) Draw a graph of **( u + v)** cm against **u v** (cm) (5MKS)



Vii) Determine the slope  **S** of the graph 3mks

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

viii) Using the value of **S** obtained above in (viii); determine the value of **f,** the focal length of the mirror, 2mks

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………….

Given that **R = 4f/s2** 2mks

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………