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

**INDEX NUMBER …………………………………………CANDIDATE’S SIGN………………**

**PHYSICS**

**PAPER 3**

**TIME: 2 ½ HOURS**

 ***JOINT  PRE -MOCK EXAMINATION 2021***

**INSTRUCTIONS TO CANDIDATES**

* This paper consist of two questions and Answer ALL questions in the spaces provided
* All workings MUST be clearly shown *Write your name and index number in the spaces provided above.*
* *Sign and write the date of the examination paper.*
* *Answer* ***ALL*** *the questions in the spaces provided in the question paper.*
* *ALL working* ***MUST*** *be clearly shown where necessary.*
* *Mathematical tables and silent electronic calculators may be used.*
* *Candidates should check the paper to ascertain that all the pages are printed as indicated and that no questions are missing.*
* .

**FOR EXAMINERS USE ONLY**

|  |  |  |  |
| --- | --- | --- | --- |
| **PART** | **QUESTION** | **MAX SCORE** | **CAND SCORE** |
| I | 1a | 3 |  |
|  | 1b | 14 |  |
|  | 1c | 4 |  |
| 2 | 2a | **3** |  |
|  | 2b | **16** |  |
|  | total | **40** |  |

**QUESTION 1**

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

* Rectangular glass block

two plain papers

* Four optical pins
* Four paper pins or thumb pins
* Protractor
* A meter rule
* 25 cm3 Measuring cylinder
* 50g mass
* Three threads 15cm
* 1.6 cm diameter  Marble

**PART A**

**PROCEDURE**

(i) Trace the outline of the glass block again on the plain paper and label it ABCD as shown in figure 1

(ii) Construct a normal on the side AB approximately 3cm from A and measure angle of incidence i=300 (secure the plain paper using paper pins).

(iii) Replace the glass block on the outline and fix pins P1 and P2 along the line of 300.

(iv) Viewing from the sides CD through the block, fix pins P3 and P4 such that they appear in line with the images of P1 and P2.

(v) Join P3 and P4  and join x and y.

 (vi) Extend the line P1 and P2 to obtain lateral displacement as shown in the figure below

Measure the following; (1mks)

 Angle r ……...

 Length d…………..cm

Give d= b(sin(i-r)/sin (90-r).  calculates the value of b.             (2mk)

**PART B**

viii) Repeat the procedure in (i) to (v) **BUT NOT** (vi) as shown in the figure 2 below for angles of incidence 400, 500,600 and 700

(vii)Tabulate your results. (5mks)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **i0** | 30 | 40 | 50 | 60 | 70 |
| **L (cm)** |  |  |  |  |  |
| **S (cm)** |  |  |  |  |  |
| **S/L** |  |  |  |  |  |
| **SIN i** |  |  |  |  |  |

(ix)Plot a graph of **sin i** against **s/l**                                                                       (4mks)



Determine the slope of the graph   (3mks)

Given that sine i =(S/L)k . Determine the value of k.         (2mks)

**PART C**

**Procedure:**

1. Using a thread, suspend the meter rule from the stand and note down the centre of gravity G.   G = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_cm **(1 mark)**
2. Hang the mass labelled W from the 65cm mark.  Suspend the 50g mass from the other side and adjust its position till the system is in equilibrium as shown in the figure below.  Record the values of:

X = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_m Y = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_m **(1 mark)**



Calculate the mass of m

 Use the measuring cylinder and some water to measure the volume of the ball/calculate its density in SI units.  Volume =………………. Density =…………………. (2mks)

**QUESTION 2**

* You are provided with the following;
* A voltmeter
* Ammeter
* Switch
* 10 Ωresistor
* A dry cell in a cell holder
* A nichrome wire on a mm scale
* A jockey
* Seven connecting wires

**PROCEDURE**

a) Set the apparatus us shown in the diagram above. Take voltmeter readings when the switch is open. E=………… (1/2 mk)

b)  Close the switch and measure the current I            (1/2mk)

I=……….

Given that E=IR+Ir where R is 10Ω

 Determine the value of r r=………………. (2mks)

**B**

a)  Reset your apparatus as shown in the figure 4 below. use micrometer screw gauge to measure the diameter R of the nichrome wire. R=………mm     R=……… cm (1mk)

b) Adjust the position of the jockey so that L= 20 cm. close the switch and record the reading of voltmeter.

c) Repeat the procedure (b) for other values of L and complete the table below.  (5mks)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Length l (cm) | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
| p.d (V) |  |  |  |  |  |  |  |
| 1/L |  |  |  |  |  |  |  |
| 1/v |  |  |  |  |  |  |  |

Draw a graph of 1/V (y axis) against 1/L. (5 marks).



Determine the slope S of the graph. (3mks)

Given that **S=Ar/EP**

Where A is the cross-section area of the wire, r is internal resistance of the cell and E is the emf of the cell. Determine the value of P. (2mks )