**Name: ………………………………………………..**  **Index No.: ………….................**

**Candidate’s Sign: …………………………………… Date: …..………........................**

**Nakuru Sub-County Trial Examination 2016**

***Kenya Certificate of Secondary Education***

**232/3**

**PHYSICS**

**PAPER 3**

**JULY/AUGUST - 2016**

**TIME: 2 ½ HOURS**

**INSTRUCTIONS TO CANDIDATES**

(a) Write your name and index number in the spaces provided above.

(b) Sign and write the date of examination in the space provided above.

(c) Answer all the questions in the spaces provided in the question paper.

(d) You are supposed to spend the first 15 minute of the 2 ½ hours allowed for this paper reading the whole paper carefully before commencing your work.

(e) Marks are given for clear observations actually made, their suitability, accuracy and the use made of them.

(f) Candidates are advised to record their observations as soon as they are made.

(g) Non-programmable silent electronic calculators may be used.

(h) This paper consists of 8 printed pages

(i) Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

**FOR EXAMINERS USE ONLY**

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

 Grand total

 Max score 40

1. You are provided with the following apparatus
* Two metre rules
* Two stands/ 2 clamps, boss
* A pendulum bob(heavy bob0
* Stop watch
* A piece of string about 1.5m long.
* Geometric set (students to carry)

**Proceed as follows:**

1. Tie the pendulum bob to the centre of the string. On one side of the string, mark a point 60cm from the pendulum bob.
2. Repeat procedure (a) for the other side of the string.
3. Using some cellotape, suspend the pendulum bob at 40cm mark using one side of the string such that the pendulum bob is suspended a distance L1=60cm below the point of suspension. **Ensure** **that the loop can slide along the scale of the meter rule**.
4. Using some cellotape, fix the other side of the string at the 60cm mark on the metre rule with the pendulum bob suspended a distance L2=60cm below the point of suspension. Ensure that the loop can slide along the scale of the meter rule, the string forms a V shape and the distance between A and B is 20cm.
5. Measure the angle 1θ and record the value in the table below
6. Displace the pendulum bob slightly along the horizontal and allow it to oscillate freely below the metre rule.
7. Record the time taken for 10 oscillations in the table below.
8. Slide each loop of the string by 5cm from its position so that points A and B are 30cm apart.

A

B

1θ

L1

L2

1. Repeat procedure (v), (vi) and (vii) above.
2. Repeat procedure (v), (vi) and (vii) above for other values of AB and complete the table appropriately.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Length from A to B (cm) | 20 | 30 | 35 | 40 | 45 | 50 | 55 |
| θ |  |  |  |  |  |  |  |
| Time for 10 oscillation(s) |  |  |  |  |  |  |  |
| Period time T (s) |  |  |  |  |  |  |  |
| T2(s2) |  |  |  |  |  |  |  |
| $$^{θ}/\_{2}$$ |  |  |  |  |  |  |  |
| Cos$\left(\frac{θ}{2}\right)$ |  |  |  |  |  |  |  |

 (9marks)

1. Plot a graph of T2 against Cos$\left(\frac{θ}{2}\right)$ (5 marks)
2. Find the slope “s” of the graph. (3 marks)
3. Given that k=1.6$π^{2}$ $\frac{Cos\left(\frac{θ}{2}\right)}{T^{2}}$ find k. (3 marks)
4. (a)You are provided with the following apparatus
* Thumb tack (4 pieces)
* A white plain paper
* Soft board
* Mirror (about 6 x 6cm)
* Glass block.
* Cello-tape
* Geometrical set
* 4 optical pins

**Proceed as follows:**

* 1. With the use of the thumb tacks, secure firmly a white plain paper on the soft board.
	2. Place the glass block on the white plain paper as shown in fig 2 and draw the outline of the glass block on the paper; label the outline obtained ABCD as indicated in the figure.

E

 200

G

P­4

P­3

P­2

P­1

H

O

O1

D

C

B

A

Set Square

S

* 1. Remove the block and locate the point G 1cm from A along the line AD.
	2. Draw a ray EG incident at G. The incident ray should make angles 200 with the normal.
	3. Using some cello-tape, attach the mirror on the side of the glass block labeled BC.
	4. Replace the glass block together with the attached mirror so as to exactly fit the outline in (ii).
	5. Place two pins P1 and P2 along the line labeled EG as shown.
	6. Using pins P3 and P4 Locate the images of pins P2 and P1 along a straight line when viewed through the glass block from the position S as shown
	7. Place the pins P3and P4 such that the images of pins P1 and P2 are in a straight line with P3 and P4
	8. Remove the glass block together with the attached mirror from the outline. Remove also the pins and produce the lines joining P1 to P2 and P3 to P4 so that they intersect at O1.
	9. Locate the point O along BC for which OO1 lie on the perpendicular line to BC. (The perpendicular line can be located by sliding the set square of the geometrical set along BC)
	10. Measure the distances HO and HO1 and record your values in the table below.
	11. For different angles of incident that are shown in the table below, Repeat procedure iv to xii and fill the table appropriately.

**NB:** It may be necessary to draw another outline so as to avoid congestion of construction line

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Angle (0) | 20 | 30 | 40 | 50 | 60 |
| H O(cm) |  |  |  |  |  |
|  HO1 (cm) |  |  |  |  |  |

 (5mk)

* 1. Plot a graph of OH against OH1  (5mk)

i

* 1. Determine the gradient of the graph (3mk)
	2. State the refractive index of n of glass. (1mk)
	3. State one cause of error in the experiment above. (1mk)
1. You are provided with the following apparatus:
* A cell and cell holder size D
* A resistor 10Ω
* An ammeter
* A voltmeter
* Connecting wires
* switch
	1. Record the emf of the cell E; E = …………. (1mk)
	2. Set up the circuit shown in figure 3

R

* 1. Record the value of I and V; V = …………….. (1mk)

I = ………………. (1mk)

* 1. Determine the lost voltage ……………………….. (1mk)
	2. Given that E=V+Ir; find the value of r (2mk)