MANGU HIGH SCHOOL

**232/3**

**PHYSICS NAME:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**PAPER 3**

**JULY 2014 ADM. NO. \_\_\_\_\_\_\_\_\_ CLASS: \_\_\_\_\_\_\_\_\_\_\_**

**TIME: 2½ HOURS**

**DATE: \_\_\_\_\_\_\_\_\_\_\_\_ SIGN: \_\_\_\_\_\_\_\_\_\_\_\_**

**Kenya Certificate of Secondary Education**

**Mock Examinations**

**Physics Paper 3**

**(Practicals)**

**2½ Hours.**

INSTRUCTIONS TO CANDIDATES

1. Write your name and index number in the spaces provided above
2. Sign and write the date of examination in the spaces provided above.
3. Answer **ALL** the questions in the spaces provided in the question paper.
4. You are supposed to spend the first **15 minutes** of the 2 ½ hours allowed for this paper reading the whole paper carefully before commencing your work.
5. Marks are given for a clear record of the observations actually made, their suitability, accuracy and the use made of them.
6. Candidates are advised to record their observations as soon as they are made.
7. Mathematical tables and electronic calculators may be used.

**For Examiner’s Use only**

*Question 1*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | d | e(i) | e(ii) | f | h | i  **Total** |
| Maximum Score | 5 | 4 | 4 | 1 | 4 | 2 |
| Candidate’s score |  |  |  |  |  |  |

*Question 2*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | e | f | g | i | l  **Total** |
| Maximum Score | 5 | 5 | 4 | 3 | 3  **Grand Total** |
| Candidate’s score |  |  |  |  |  |

This paper consists of **11 printed pages.** Candidates should check the question paper to ensure that all the pages are printed as indicated and no questions are missing.

*Turn Over*

*Question 1*

*This question consists of* ***two*** *parts* ***A*** *and* ***B*** *(i) attempt both parts.*

*Part A*

You are provided with the following

* a stop watch
* a milliameter
* a capacitor
* a switch Sa
* a bed switch Sb
* a set of seven resistors each of 100
* a dry cell and a cell holder

Proceed as follows

1. Connect the circuit as shown in figure 1

Figure 1

Make sure that the terminals of the capacitor and those of the battery are correctly connected. (positive to positive and negative to negative)

1. Close switch Sb. Then close switch Sa and record in table 1 the maximum reading of the milliameter.
2. Open switch Sb and at the same instant, start the stop clock. Record in table 1 the time taken for the value of the current to fall to half its original value.
3. Repeat the procedures in (b) and (c) for other values of resistance r shown in the table 1.

Complete the table (5mks)

*Table 1*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Resistance R | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 |
| Maximum Current I (MA) |  |  |  |  |  |  |
| Time t,(s) |  |  |  |  |  |  |
| Log10t |  |  |  |  |  |  |
| Log10R |  |  |  |  |  |  |

e (i) On the grid provided, plot a graph of log10R (y-axis) against log10t (4mks)

(ii) Given that Log r=n log t – log k. Use the graph to determine

1. the constant n (2mks)
2. the constant k (2mks)

*Part B*

You are provided with the following

* a balance (to be shared)
* a metre rule
* retort stand, one boss and one clamp
* two – 50g masses
* a spiral spring fitted with a pointer and a hook
* a stop watch
* two small pieces of wood

Proceed as follows

(f) Using the balance provided, determine the mass, Ms, of the spring

Ms = ----------------------------------(g) (1mk)

(g) Clamp one end of the spring between two wooden blocks so as to hang vertically downwards. Place the metre rule so that it stands vertically next to but touching the pointer of the spring as shown in figure 5.

Figure 5

(h) (i) Hang a 50g from the lower end of the spring and record the position, Lo, of the pointer on the metre rule.

Lo= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_cm (1mk)

(ii) Attach the second 50g mass to the lower end of the first mass and record the position, L1, of the pointer on the metre rule.

L1 =------------------------------------cm (1mk)

(iii) Determine the constant Po given that

(2mks)

Po=

i (i) Displace the masses slightly downward and release them so that the spring makes vertical oscillations. Time 20 oscillations and determine periodic time, T.

Time (t) for 20 oscillations = ---------------------------------(s) (1mk)

Periodic time T = ----------------------------(s) (1mk)

(ii) Determine the constant k, given that (1mk)

k=Po T

Question 2

*This question consists of* ***two*** *parts* ***A*** *and* ***B****, attempt both parts.*

Part A

You are provided with the following

* a triangular glass prism
* a piece of soft drawing board
* four (4) optical pins
* a sheet of plain paper

Proceed as follows

1. Place the plain sheet of paper on the soft board. Trace the triangular outline of the prism on the sheet of paper. Remove the prism and use a ruler to extend the three sides of the outline. See figure 4(a).
2. On the side AB mark a point N at a point half-way between A and B.
3. Draw a line at an angle Q=25o to BN. Stick two pins P1 and P2 vertically on this line, such that they are about 4cm apart. See figure 4(b)
4. Place the prism accurately on the outline. By viewing through the prism from side AC stick two other pins P3 and P4 vertically such that they are in line with the images, of pins P1 and P2. Remove the prism and the pins. Draw a line joining marks made by P3 and P4. Extend this measure and record in table 2 the value of angle .

Repeat the procedures n (c) and (d) above for other values of shown in table 2. Complete the table. (5mks)

NB: The sheet of paper with the drawing **must** be handed in with this question paper. Ensure you write your **name** and **index number** on the sheet of paper.

Table 2

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Angle of incidence  (deg) | 25 | 30 | 35 | 40 | 45 | 50 | 55 |
| Angle (deg) |  |  |  |  |  |  |  |
| Angle  R=(-) (deg) |  |  |  |  |  |  |  |

(f) (c) On the grid provided, plot a graph of the angle R(y axis) against the angle of incidence θ. (5mks)

(g) (i) From the graph, determine the value of R, when the gradient of the graph is zero. (1mk)

(ii) Determine θo, the value of θ, when r is minimum (1mk)

(iii) Determine the constant given that λ = 2 sin (90 – θo) (2mks)

PART B

You are provided with the following

* a rectangular glass block
* two drawing pins
* two white papers
* a soft drawing board
* a liquid labeled L1
* a liquid labeled L2
* a clean dry optical pin
* a sheet of tissue paper

Proceed as follows;

(h) (i) Place the white paper on the drawing board. Place the rectangular glass block on the paper and trace its outline suing a pencil.

(ii) Remove the glass block and mark its outline ABCD. Also mark a point P approximately 1.5cm from A as shown in figure 2(a).

Figure 2 (a)

(iii) Place the rectangular glass block on the outline. Push a drawing pin vertically through P into the drawing board. Ensure the pin is in contact with the glass block. Using the head of the optical pin provided, smear liquid L1 along the mounted drawing pin on the side against the glass block so that a thin film of the liquid forms between the pin and the vertical face of the glass block.

(iv) View the image of the pin from side CD through the glass block with your eye near to C and move the eye toward D until the image of the pin just disappears from view.

(v) Using a second drawing pin locate and mark two points x and y on the white paper along which the image just disappears (see figure 2(b)

Figure 2(b)

1. Remove the glass block. Join YX to meet CD at Z. Join ZP. Draw the normal UV at Z.

(j) (i) Measure angles = ------------------------------- (1mk)

= ------------------------------- (1mk)

1. Determine the refractive index g of the glass block. (1mk)

(k) Repeat procedure h(i), (ii), (iii), and (iv) using dry optical pin, the second white paper and liquid L2 (see figure 3)

l (i) Remove the glass block, join yx to meet CD AT z. Draw the normal UV and measure angle E.

E = -------------------------------------- (1mk)

(ii) Determine the constant k for liquid L2 given that (2mks)

k = 2 - sin 2 E

NB: The sheet of paper with the drawing **must** be handed in with this question paper. Ensure you write your **name** and **index number** on the sheet of paper.