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

Adm. No……….Class: …………

Signature:…………………………

**232/3**

**PHYSICS**  Date: ………………………………..

**PRACTICAL**

**JULY, 2018**

**TIME: 2 ½ HRS**

**M O K A S A II J O I N T E X A M I N A T I O N - 2018**

**Kenya Certificate to Secondary Education**

**PHYSICS PAPER 3**

**PRACTICAL**

**Instructions**

* *Write your name, admission number, class, signature and date of examination in the spaces provided at the top of the page.*
* *Answer* ***all*** *the questions in the spaces provided in this paper.*
* *You are supposed to spend the first 15 minutes of the 2 ½ hours allowed for this paper reading the whole paper carefully before your start.*
* *Marks will be given for clear record of observations actually made, for their suitability and accuracy, and the use made of them.*
* *Candidates are advised to record their observations as soon as they are made.*
* *Electronic calculators and mathematical tables may be used.*

**FOR EXAMINER’S USE ONLY**

**Question 1**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | (a)(i) | (ii) | (iii) | (b) | (c)(i) | (ii) | (iii) | (d)(i) | (ii) | **TOTAL** |
| Maximum Score | **1** | **½** | **1** | **6** | **5** | **2** | **1** | **2** | **2** | **20** |
| Candidate’s  Score |  |  |  |  |  |  |  |  |  |  |

**Question 2**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **2(A)** | (a)(i) | (ii) | (b) | (c)(iii) | d | e | **2(B)** | (a) | (b) | (c) | (d) | **TOTAL** |
| Maximum Score | **2** | **1** | **1** | **2** | **5** | **2** | **-** | **1** | **4** | **1** | **1** | **20** |
| Candidate’s Score |  |  |  |  |  |  |  |  |  |  |  |  |

*This paper consists of* ***9*** *printed pages. Candidates are advised to check and to make sure all pages are printed.*

Q1. (a) You are provided with the following apparatus.

* A metre rule
* A mass marked M
* Six 20g masses
* A stop watch
* A complete stand
* A balance for sharing

Arrange the apparatus as shown in the figure 1.1 (a) below.

1. Record the Pointer reading R0 of unloaded spring, R0 = ……………………………….

**(½ mark)**

Attach the mass marked M to the free end of the spring to exert a downward force Mg in newton’s as shown in figure 1.1 (b) above. If the mass causes an extension e called static extension, then Mg = ke where k is the spring constant and g is acceleration due to gravity. (g = 10N/kg)

1. Pointer reading R for the mass M, R = …………………..…cm.  **(½ mark)**
2. State the static extension e caused by M in cm.

e = …………………………………………………………………………….. cm.  **(½ mark)**

1. Using the balance, weight the mass of M in grams ………………g.

**(½ mark)**

1. Determine the spring constant k in Newton’s per meter. **(½ mark)**
2. Pull the mass M down a further distance x below the equilibrium position as shown in figure time for 10 oscillations and record your values in the table shown below.

Repeat the experiment for other pointer reading R and complete the table.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Mass  M(g) | Pointer Reading,  R(cm) | Extension  e (cm) | Time for 10 oscillations(s) | Period  T (s) | T2 (s2) |
| O |  |  |  |  |  |
| M |  |  |  |  |  |
| M + 20 |  |  |  |  |  |
| M + 40 |  |  |  |  |  |
| M + 60 |  |  |  |  |  |
| M + 80 |  |  |  |  |  |
| M + 100 |  |  |  |  |  |

1. Plot the graph of e (y – axis in metres) against T2 on the graph paper provided.  **(6 marks)**

***Hint: Draw your axes to include point (0, 0) a third way up the page i.e., T2 axis to run across a third of the page from the bottom.* (5 marks)**

G R A P H

From the graph determine;

1. The slope of the graph, S. **(2 marks)**
2. The intercept of the e-axis, C.  **(1 mark)**
3. If Ms is effective mass of the spring, the period T of the oscillating system is given by;

Using this formula, calculate:

1. Acceleration due to gravity g. **(2 marks)**
2. The effective mass Ms of the spring. **(2 marks)**

**Q2.**

**PART A**

You are provided with the following;

* A voltmeter
* A milliammetre
* A micrometer screw gauge ( to be shared)
* A centre zero galvanometer
* A switch
* Ten connecting wires (at least five with a crocodile clip on one end)
* A resistance wire mounted on a millimeter scale labelled AB
* A resistance wire labelled P
* A resistance wire labelled Q
* A metre rule or half metre rule
* Two dry cells and a cell holder.

Proceed as follows:

1. Using the micrometer screw gauge provided, measure the diameter.
2. D of wire P.

D = …………………………..  **(1 mark)**

1. Determine cross-sectional area Ap of wire P (in metres2) AP= ………….

**(1 mark)**

1. d of wire Q **(1 mark)**

d = …………………………….

1. Determine C1 the value of the ratio . **(1 mark)**

C1 = …………………………………………………….

1. Set up the circuit as shown in the figure below. *(Ensure that each of the*

*wires P and Q is 50cm long)*

1. Close the switch. Using the clip at the free end of the wire from the galvanometer, tap wire **AB** near end **A** and observe the deflection in the galvanometer.
2. Then tap the wire near end **B** and again observe the deflection in the galvanometer.
3. Now tap the wire **AB** at various points between **A** and **B** to obtain a point **K** where there is no deflection in the galvanometer.
4. Determine the length L1, the distance from **A** to **K**. **(1 mark)**

L1 = ………………………………………..

1. Determine the length L2, the distance from **B** to **K**. **(1 mark)**

L2 = ………………………………………

1. (i) Given that the resistance RQ of Q is 9.0 ohms, determining the

resistance Rp of P using the expression: **(2 marks)**

(ii) Determine the value of C2 given that; **(2 marks)**

1. Compare the value of C1 (in part (b) with that of C2. **(1 mark)**
2. Determine the resistivity of wire P given that the resistance

**(2 marks)**

**PART B**

You are provided with the following:-

* Convex lens on a lens holder, L
* A candle, O
* Screen, S
* Metre rule

(a) Use a distant object to determine the focal length, f1.

f1 = …………………………………cm **(1 mark)**

(b)

* Set the apparatus as shown.
* Set the distance X to, X = 70cm and lens position at L1 and closer to the object O. Move the lens towards the screen S until an enlarged image is focused on S.

Record the distance U1.

* Move the lens to position L2 and closer to the screen, where a sharp diminished image is focused on the screen.

Record the new distance U2.

* Repeat for the other given value of distance X and complete the table.

**Note:** The focal length f is given by the equation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| X (cm) | U1 (cm) | U2 (cm) |  |  |
| 70 |  |  |  |  |
| 50 |  |  |  |  |

**(4 marks)**

(c) From the above measurements determine the average focal length of the lens.

**(1 mark)**

=

(d) Calculate the ratio R of the focal length obtained in (a) to the focal length obtained in (c) above. **(1 mark)**

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