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

**Candidates Sign: …………....…..…**

**Date: ……………………………….**

232/3

**PHYSICS**

Paper 3

(Practical)

Time: *2 ¼ Hours*

**OPENER EXAMINATIONS 2021/2022**

**PAVEMENT NATIONAL EXAMINATION**

***Kenya Certificate of Secondary Education (K.C.S.E)***

232/3

**PHYSICS**

Paper 3

(Practical)

Time: *2 ¼ Hours*

**Instructions To The Candidates**

* *Answer all the questions in the spaces provided in the question paper.*
* *You are supposed to spend the first 15 minutes reading the whole paper carefully before commencing your work.*
* *Marks are given for clear record of the observations accurately made, their suitability and accuracy and the use made of them.*
* *Mathematical tables and electronic calculators may be used*

**FOR EXAMINERS USE ONLY**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Question 1 | c | F | g(i) | g(ii) | g(iii) | h |
| Max Score | 2 | 7 | 5 | 2 | 2 | 2 |
| Candidate’s Score |  |  |  |  |  | TOTAL |

TOTAL

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Part 1 | | | | Part 2 | |
| Question 2 | b | D | e | f | b | c |
| Max Score | 1 | 8 | 5 | 2 | 3 | 1  TOTAL |
| Candidate’s Score |  |  |  |  |  |  |

**GRAND TOTAL**

TOTAL

*This paper consists of 6 printed pages.*

*Candidates should check the question paper to ensure that all the*

*Pages are printed as indicated and no questions are missing.*

**Question 1**

You are provided with the following;

* A piece of candle
* Plane mirror
* Metre rule
* A thin lens mounted on a lens holder
* A cardboard with cross-wire at its centre
* A piece of plasticine
* A white screen

Proceed as follows;

1. Set up the apparatus as shown in figure 1.

Cardboard with cross-wires at centre

Lens

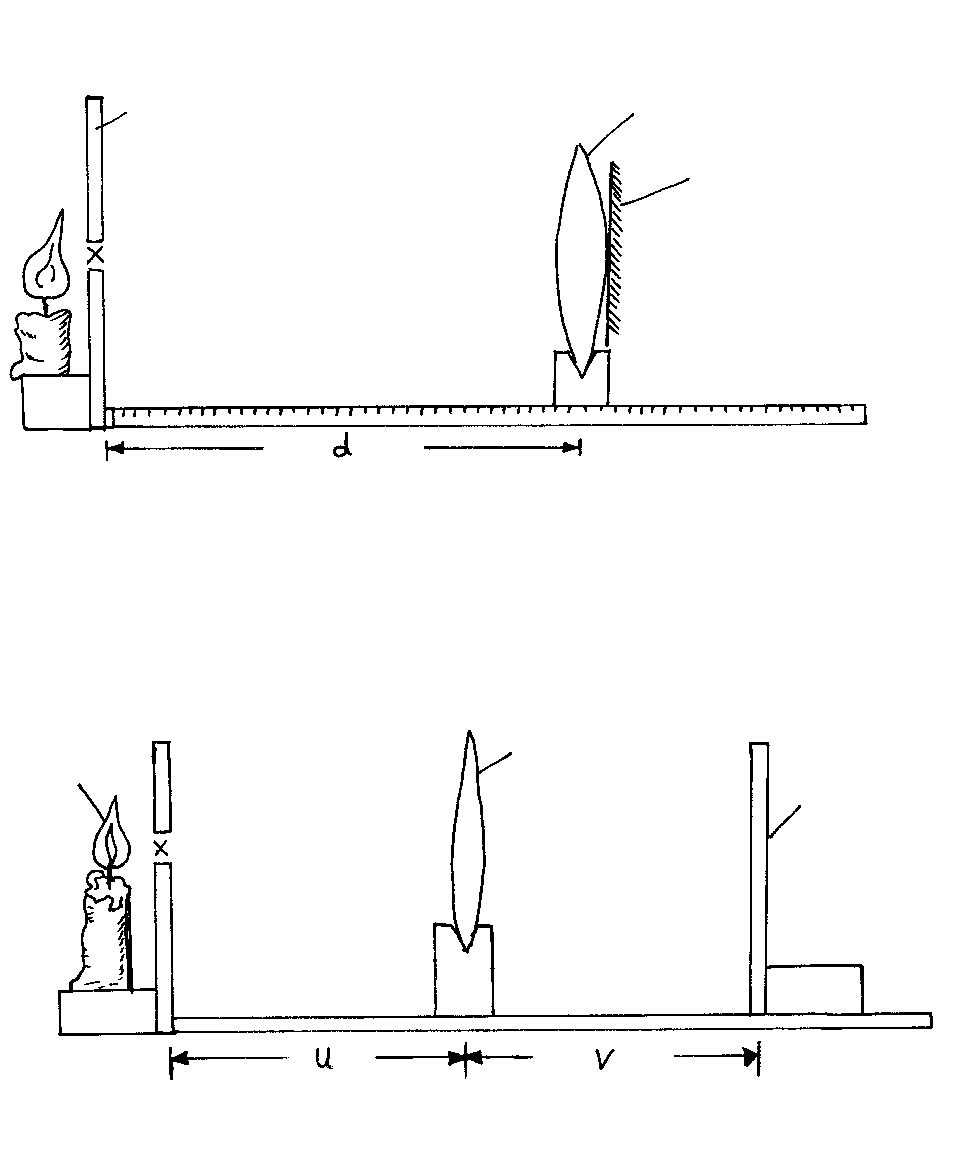


Figure 1

Candle

Plane mirror

Ensure that the candle frame is at the same height as the cross-wires. The plane mirror should also be attached to the lens as shown using a piece of cello tape. Plasticine can be used to fix the metre rule to the table.

1. Place the cardboard with cross-wire at the centre at the O mark of the metre rule.
2. Move the object along the metre rule until a sharp image of the cross-wire is formed alongside the object cross-wire.

Measure the length *d* using the metre rule.

*d*: ………………………………………………………………m *(2 marks)*

1. Now arrange the candle flame, the lens the object and the screen as shown below.

Lens

Candle

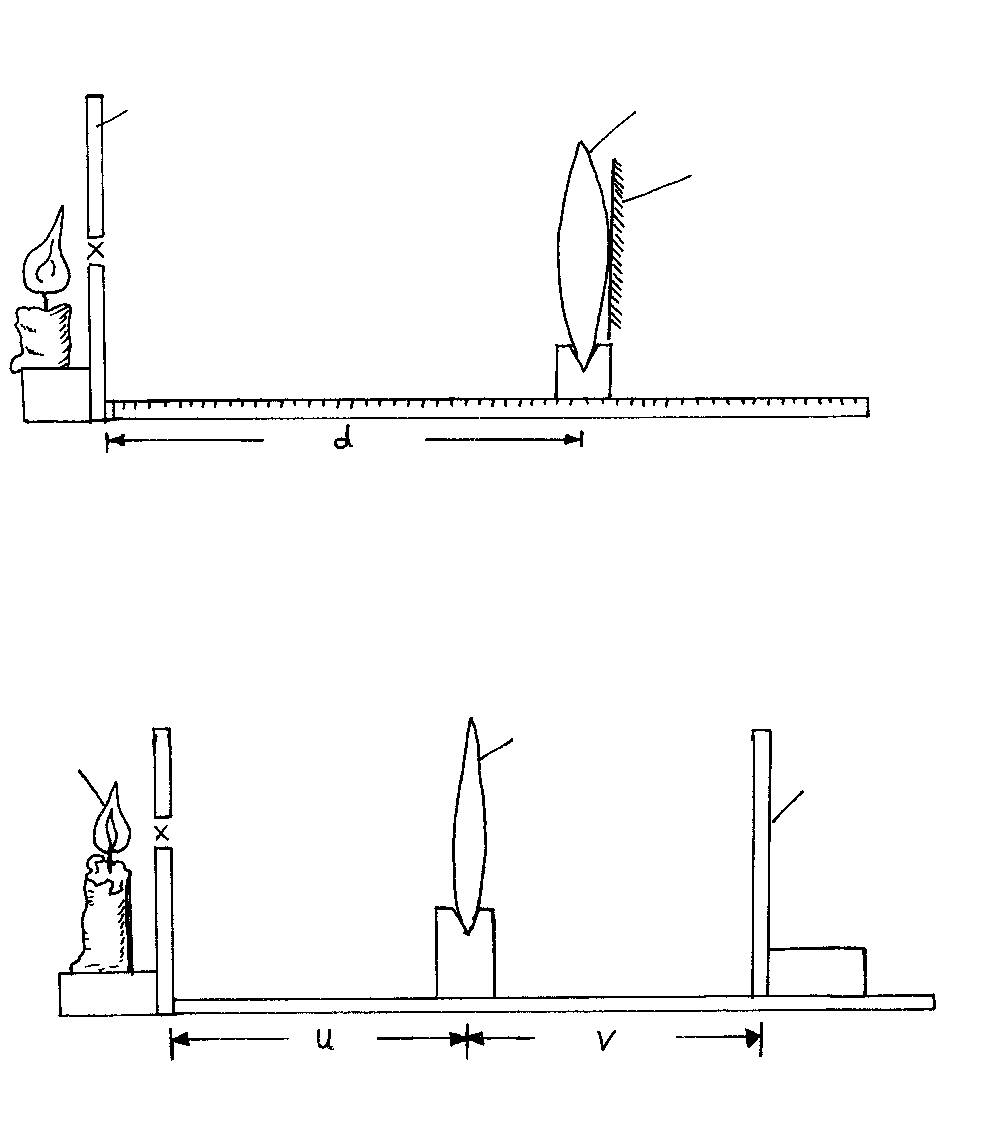


Figure 2

Screen

1. Adjust the distance between the lens and the object O to each of the distances given in the table. For every value of u, adjust the position of the screen until a sharp image of the cross-wires appears on the screen. Measure the value of v and record in the table.
2. Repeat the procedure *(e)* above for each of the other values of u and complete the table below.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| u (cm) | 35 | 40 | 45 | 50 | 55 | 60 | 70 |
| v (cm) |  |  |  |  |  |  |  |
| uv (cm3) |  |  |  |  |  |  |  |
| u + v (cm) |  |  |  |  |  |  |  |

*(7 marks)*

1. (i) Plot the graph of uv against u + v. *(5 marks)*

(ii) From your graph, calculate the slope, S *(2 marks)*

*………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………*

(iii) Use the graph to determine the focal length. *(2 marks)*

*………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………….………*

1. How is the focal length obtained in (i) above related to d obtained in c).

Explain your answer. *(2 marks)*

*…………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………*

**Question 2**

PART I

You are provided with the following:

* A spiral spring
* One stand, one boss and one clamp
* A metre rule
* A stop watch
* A set of masses

Proceed as follows:

1. Arrange the set-up as shown below

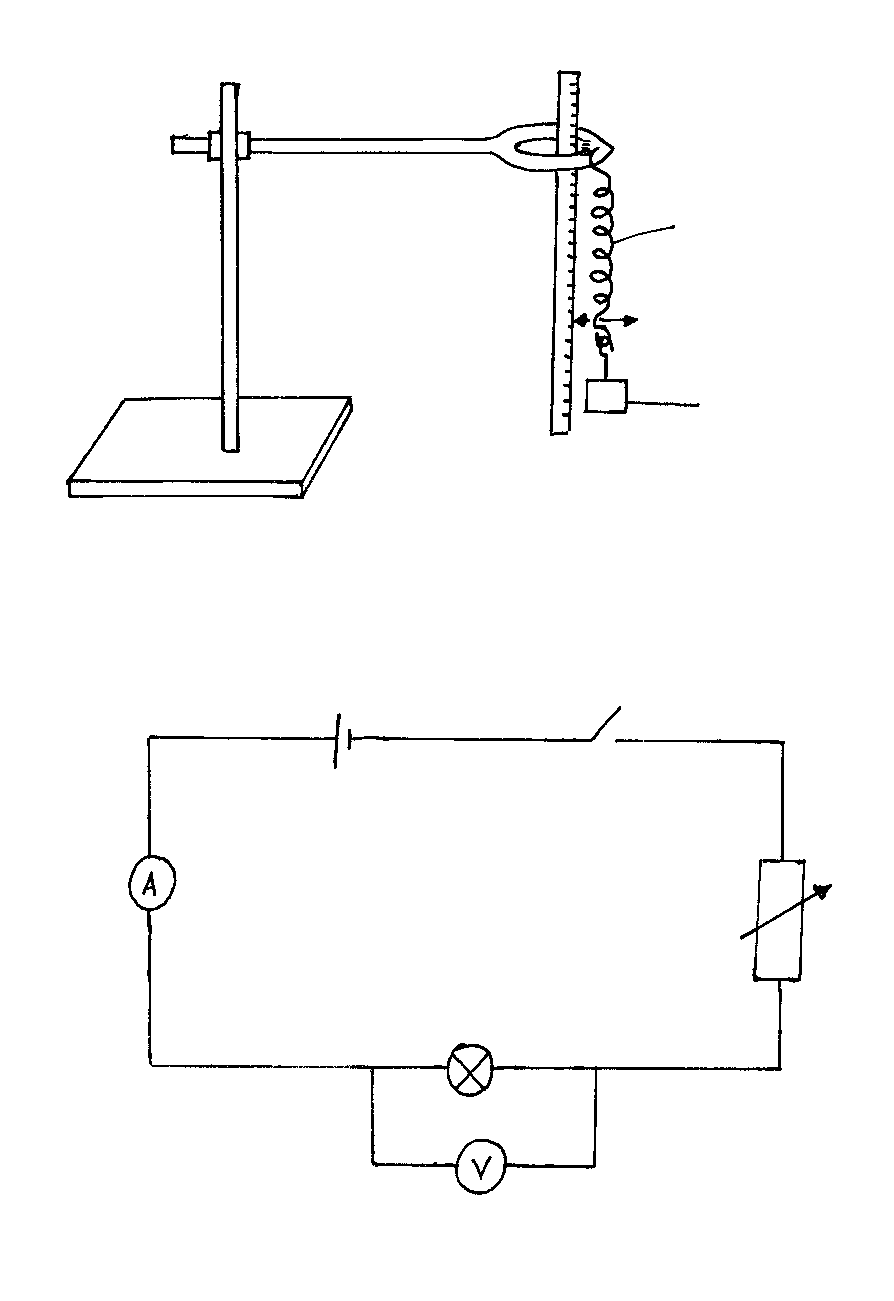


Figure 3

Mass

Pointer

Metre rule

Spiral spring

1. Note the reading of the pointer of the spring when no mass is suspended from its hook.

Lo = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cm *(1 mark)*

1. Attach a 50g mass on the spiral spring and measure the length L of the spring with the mass 50g on the spring, slightly displace the spring downwards and note the time for 20 oscillations. Record your results in table 2 below
2. Repeat procedure in c) above for 100g, 120g, 150g, 200g and 250g. Complete the table.

Table 2

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Mass M(g) | 50 | 100 | 120 | 150 | 200 | 250 |
| L (cm) |  |  |  |  |  |  |
| e = L – Lo (cm) |  |  |  |  |  |  |
| time, t for 20 oscillations (s) |  |  |  |  |  |  |
| Log t |  |  |  |  |  |  |
| Log e |  |  |  |  |  |  |

*(8 marks)*

1. Plot the graph of *log t* against *log e*. *(5 marks)*
2. Given that

Log t intercept = ½ log  Determine the value of A *(2 marks)*

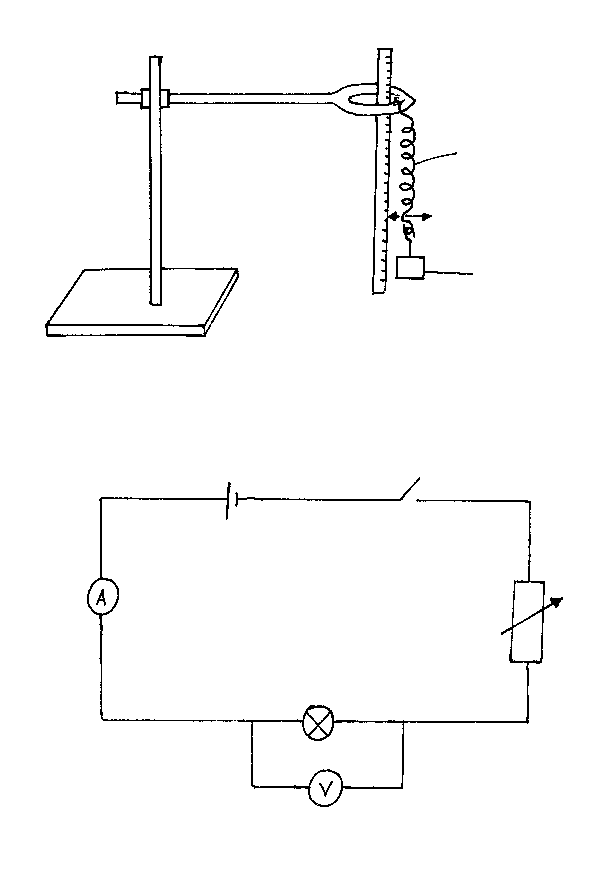
*………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………….……………….………*

PART II

You are provided with the following apparatus

* One new dry cell
* One cell holder
* Switch, K
* An ammeter
* A voltmeter
* A variable resistor, rheostat or potentiometer
* Seven connecting wires, at least 4 of which with crocodile clips
* A bulb holder
* A torch bulb 2.5V (for 2 dry cells)

1. Set up the apparatus as shown below



1. Set the ammeter reading to 0.04A, 0.06A and 0.08A using the rheostat. Get the corresponding readings and fill the table below. *(3 marks)*

|  |  |  |
| --- | --- | --- |
| Current (A) | Voltage (V) | Resistance (Ω) |
| 0.04 |  |  |
| 0.06 |  |  |
| 0.08 |  |  |

1. From the table, calculate the average resistance of the bulb filament. *(1 mark)*

*………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………*