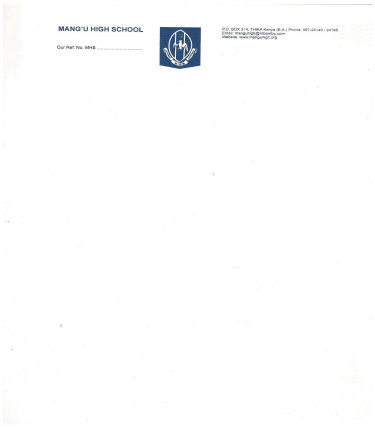
NAME: …… INDEX NO: ……

DATE : ……..

CANDIDATE'S SIGNATURE:……

MANGU HIGH SCHOOL TRIAL 2 MOCK 2021



Kenya Certificate of Secondary Education (KCSE)
PHYSICS
PAPER 3
TIME: 2 ½ HOURS
OCT/NOVEMBER

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 spaces provided above.*
(c) *Answer all questions in the spaces provided.*
(d) *You are supposed to spend the first 15 minutes of the 2½ hours allowed for this paper reading the whole paper carefully before commencing your work.*
(e) *Marks will be given for clear records of 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) *All working must be clearly shown where necessary.*

(h) *Mathematical tables and silent electronic calculators may be used.*

FOR EXAMINER'S USE ONLY

Question 1	b	c	d	e	f	g	h	TOTAL
Max. Score	3	2	6	5	1	1	2	20
Candidate's Score								

Question 2	e	f	g	h	i	j	k	l	m	TOTAL
Max. Score	8	5	1	1	1	1	1	2	1	20
Candidate's Score										

GRAND TOTAL

1. **Question one**

This question has two parts A and B. Answer both parts.

PART A

You are provided with the following:-

- A retort stand, clamp and boss.
- A spiral spring.
- A stop watch.
- Three 100g masses.

Proceed as follows:

(a) Suspend a 100g mass at the end of the spring as shown in figure 1.

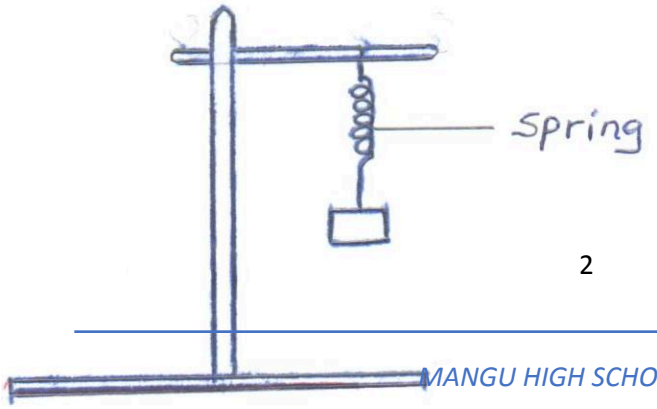


Fig. 1

Now give the mass a small vertical displacement and release so that it performs vertical oscillations. Time ten oscillations and determine the period T. Enter your results in table 1.

(b) Repeat the experiment for the other values of mass and complete the table.

Table 1

Mass m (g)	100	200	300
Time for 10 oscillations (s)			
Periodic time T(s)			

(3mks)

(c) Given that $T = \pi\sqrt{\frac{m}{K}}$, where k is the spring constant, find the average value k for the spring.
(2mks)

PART B

You are provided with the following:-

- A 250ml glass beaker
- A Bunsen burner
- A Thermometer
- A Stop watch
- A Tripod stand and a Wire gauze
- A measuring cylinder 100ml
- Water

Set the apparatus as shown in figure 2 below.

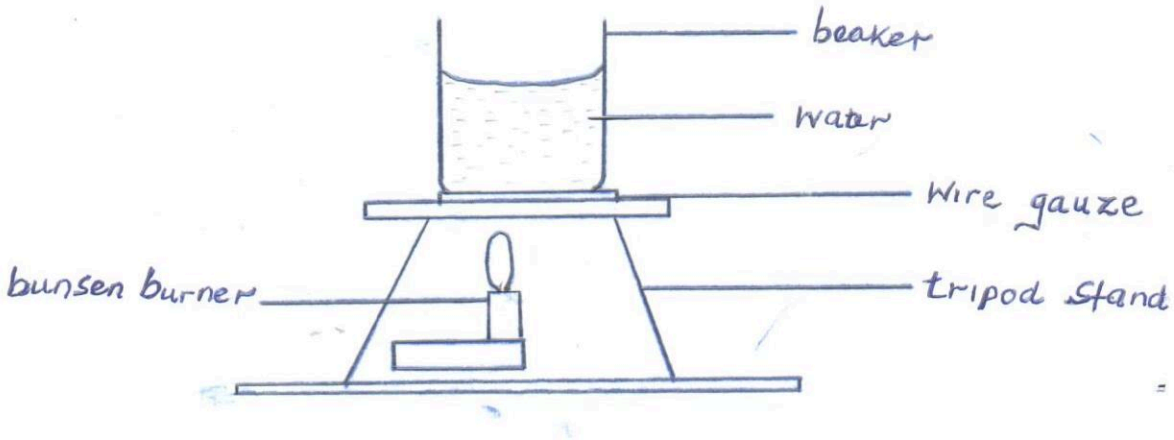


Fig. 2

(d) Measure 100cm^3 of water and pour it into the beaker. Take the initial temperature of the water.

T_0 = ……^{0}C (1mk)

Now heat the water to a temperature of 80^{0}C. switch off the gas tap and place a thermometer into the beaker and start the stop watch when the temperature is 65^{0}C. Take the temperature T^{0}C of water ever two minutes. Record your results in the table 2 below.

Table 2

Time, t(min)	2	4	6	8	10	12	14
Temperature (T) ^{0}C							
(T - T_0)							
Log (T - T_0)							

(5mks)

(e) Plot a graph of Log (T - T_0) against Time (t). (5mks)

(f) Find the value of P of log $(T - T_0)$ when t = 0. (1mk)

(g) Determine N, where N is the antilog of P. (1mk)

(h) Calculate the temperature of the surrounding T_R using the expression $N = 65 - T_R$ (2mks)

2. **Question 2**

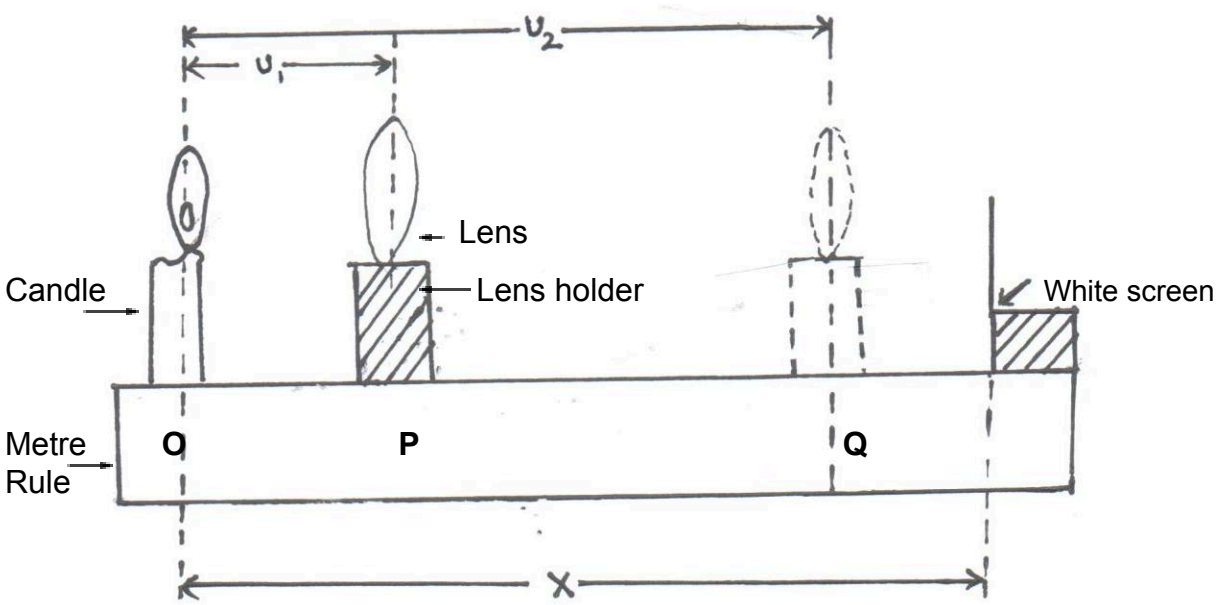
Part A

You are provided with the following:-

- A lens and a lens holder.
- A candle.
- A white screen.

Proceed as follows:

(a) Set the apparatus as shown below.



(b) Place the white screen at a distance X = 100cm from the candle. Let the lens be at position P, adjacent to the lit candle.

(c) Move the lens towards the screen until an enlarged image of the candle is formed on the screen. Measure and record the distance u_1.

(d) Move the lens to a second position Q where the image of the candle is sharp but diminished on the screen.

Measure and record the distance u_2.

Hence determine the value of $d = u_2 - u_1$.

(e) Repeat the procedure in (c) and (d) for either values of x = 95, 90, 85, 80cm. Complete table 2 shown below.

Table 2

x (cm)	100	95	90	85	80
u_1(cm)					
U_2(cm)					
$d = u_2 - u_1$(cm)					
$y = {}^{d^2}/_{x}$(cm) (2d.p)					

(8mks)

(f) On the grid provided, plot a graph of y against x. (5mks)

(g) Determine the value of $x = x_0$, when $y = 0$. (1mk)

x_0 = …… cm

(h) Given that $k = \frac{x_o}{4}$, determine the value of k. (1mk)

PART B

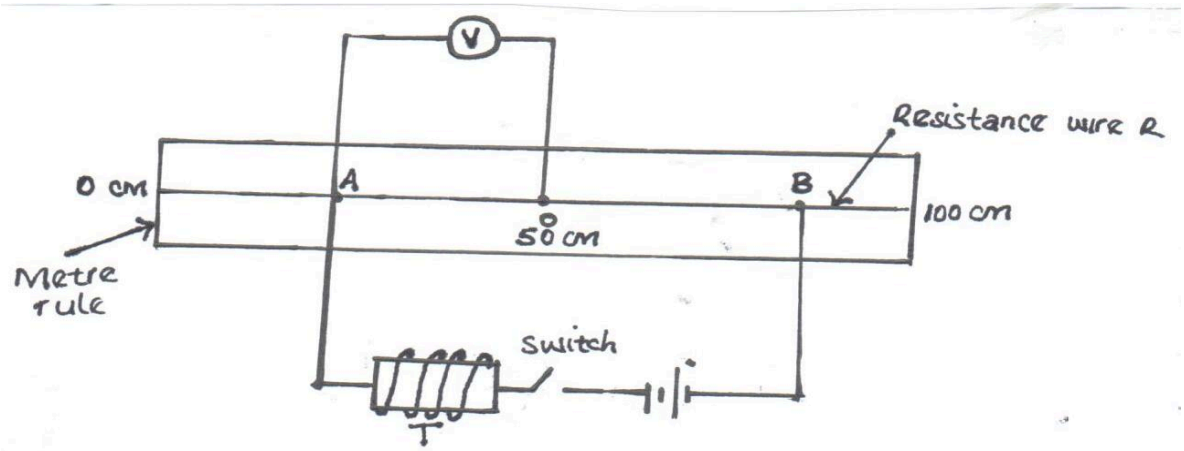
You are provided with the following:-

- A voltmeter
- A resistance wire labelled R mounted on a metre rule.
- A metre rule.
- A resistance wire labelled T mounted on a small piece of carton.
- Two dry cells and a cell holder.
- Six connecting wires, each with a crocodile clip at one end.
- A switch.

Proceed as follows;

(i) Measure and record the e.m.f. E_0 of the cells connected in series, E_0 = ____ v. (1mk)

(j) Connect the circuit as shown below. Point O on resistance wire P is at 50cm mark of the metre rule. A and B are points on resistance wire P such that AO = OB = X = 30cm.



(k) Close the switch. Read and record the potential difference V across AO

V = …… Volts. (1mk)

(l) The relationship between V and x is given by:

$$\frac{l}{V} = \frac{35}{x} + \frac{1}{y}$$

Determine the value of y. (2mks)

(m) Use the e.m.f. E_0 to determine the constant k, given that:

$$k = \frac{8}{35E_0}$$ (1mk)