Name: M/s ..... Index No.....

232/3
PHYSICS
PRACTICAL
PAPER 3
JAN/FEB 2021
TIME: $2\frac{1}{2}$ HRS

Candidate's Signature:.....

Date:.....

KASSU JET EXAMINATION.

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

232/3
PHYSICS
Paper 3

INSTRUCTIONS TO CANDIDATES

- **Write your name and index number in the spaces provided.**
- **Mathematical tables and non-programmable calculators may be used.**
- **This paper consists of three questions.**
- **Attempt all the questions in the spaces provided.**
- **ALLOW working MUST be clearly shown.**

For Examiners Use

QUESTIONS	MAXIMUM SCORE	CANDIDATE'S SCORE
1	20	
2	20	
TOTAL	40	

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

QUESTION ONE

Apparatus

-stopwatch

-250ml beaker

-Rubber bung

-Thermometer

- Bunsen burner

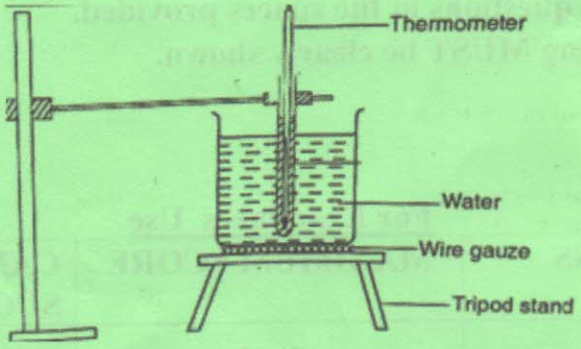
-Tripod

- Gauze

- Retort stand and clamp

- Hot water

Figure 2.



Procedure

(a) (i) Measure and record the ambient temperature, T_A =.....24.....^{0}C (1 mark)

(ii) Fill an empty beaker with exactly 150ml of hot water (check the side scale of the beaker)

(iii)Set up the apparatus as shown in **figure 2**. Ensure the thermometer is about 2cm above the bottom of the beaker.

(i) Light the Bunsen burner and put on a blue flame and heat up the water.

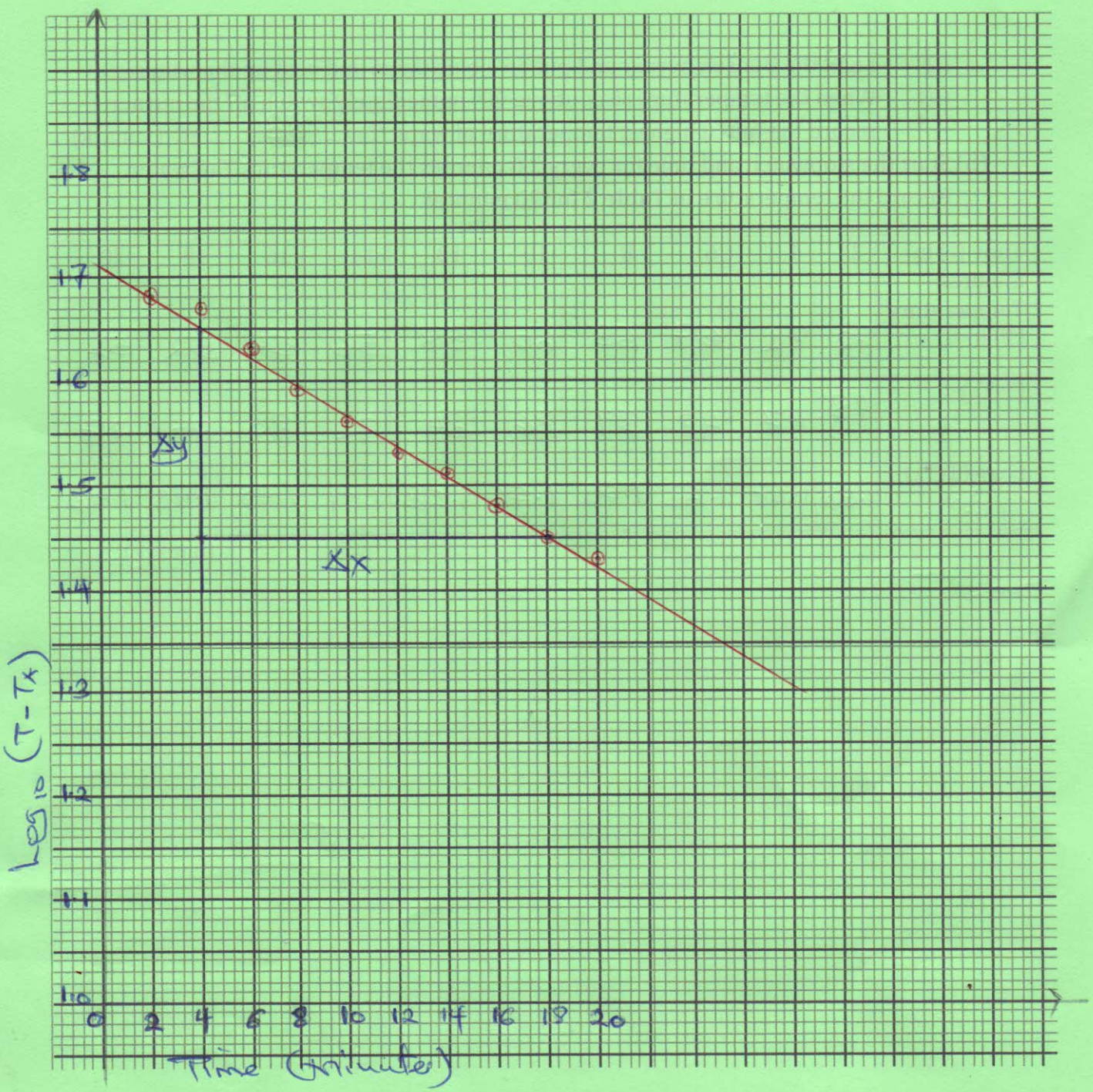
(ii) When the temperature rises above 90^0 immediately switch off the burner, record the initial highest temperature of water T_H=.....83..... ^0C (1 mark)

(b) Start the stopwatch and time for every 2.0 minutes the temperature T of water. Record the temperature in **Table 2** for 20 minutes

Time (t) in minutes	2	4	6	8	10	12	14	16	18	20
Temperature (T) in ^0C	72	71	67	63	60	58	56	54	52	51
$(T-T_A)^0C$	48	47	43	39	36	34	32	30	28	27
$Log_{10}(T-T_A)$ (2 dp)	1.68	1.67	1.63	1.59	1.56	1.53	1.51	1.48	1.45	1.43

(6 mark)

(c) Plot a graph of $Log_{10}(T-T_A)$ against time (5 mark)



(d) From the graph determine:

(i) The Slope S (3marks)

$S = \frac{\Delta y}{\Delta x} = \frac{1.65 - 1.45}{4 - 18}$

$= -0.01429 / min$

(ii) The cooling constant , K of water given S=-0.4343K (2 mark)

$-0.01429 = -0.4343K$

$K = 0.03289 / min$

(e) Given that the specific heat capacity of water is 4.2J/g/^{0}C determine the heat lost when the water cools to the temperature of the surrounding (2 mark)

$H = mc\Delta\theta$

$m = 150 cm^3 \times 1 g/cm^3$

$= 150 g$

$H = 0.15 \times 4200 \times 59$

$= 37,170 J.$

2. PART A

You are provided with the following apparatus :

- one resistor labelled R = 40Ω
- a wire labelled W mounted on milliameter scale
- a wire labelled S mounted on a milliameter scale
- one dry cell and a cell holder
- one jockey
- one centre zero galvanometer
- eight connecting wires, four with crocodile clips at both ends
- a micrometer screw gauge
- a switch

Proceed as follows

a) Determine the average diameter D, of the wire labelled W using the micrometer screws gauge provided.

D_1 = 0.30 mm (½ mark)

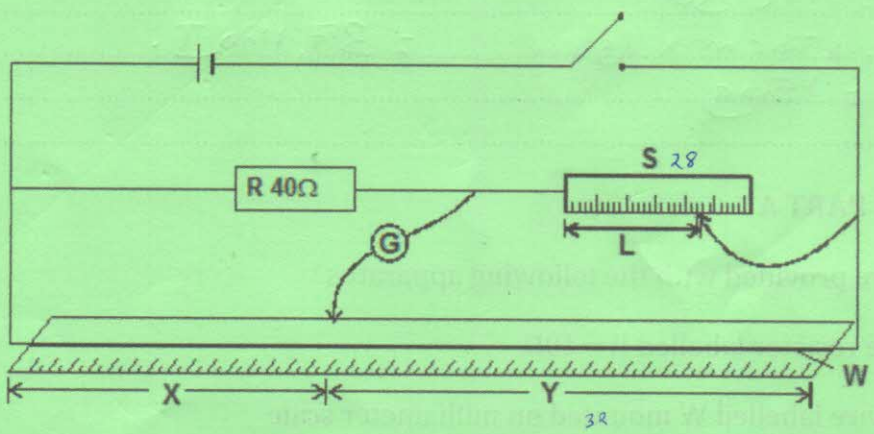
D_2 = 0.30 mm (½ mark)

$D = \frac{D_1 + D_2}{2} = \frac{0.30 + 0.30}{2}$ (1 mark)

= 0.30 mm

b) Set up the apparatus as shown in the circuit diagram in **figure 3** below.

Use the crocodile clips to fix length L, of wire labelled S at 50cm from the end connected to the galvanometer G.



c) Close the switch and use the jockey to touch one end of the wire W, and then the other end. The deflections on the galvanometer should be in opposite directions, if not check the circuit. Adjust the positions of the jockey along the wire W until there is no deflection in the galvanometer. Record the value of x and y.

x = 88.3 cm (½ mark)

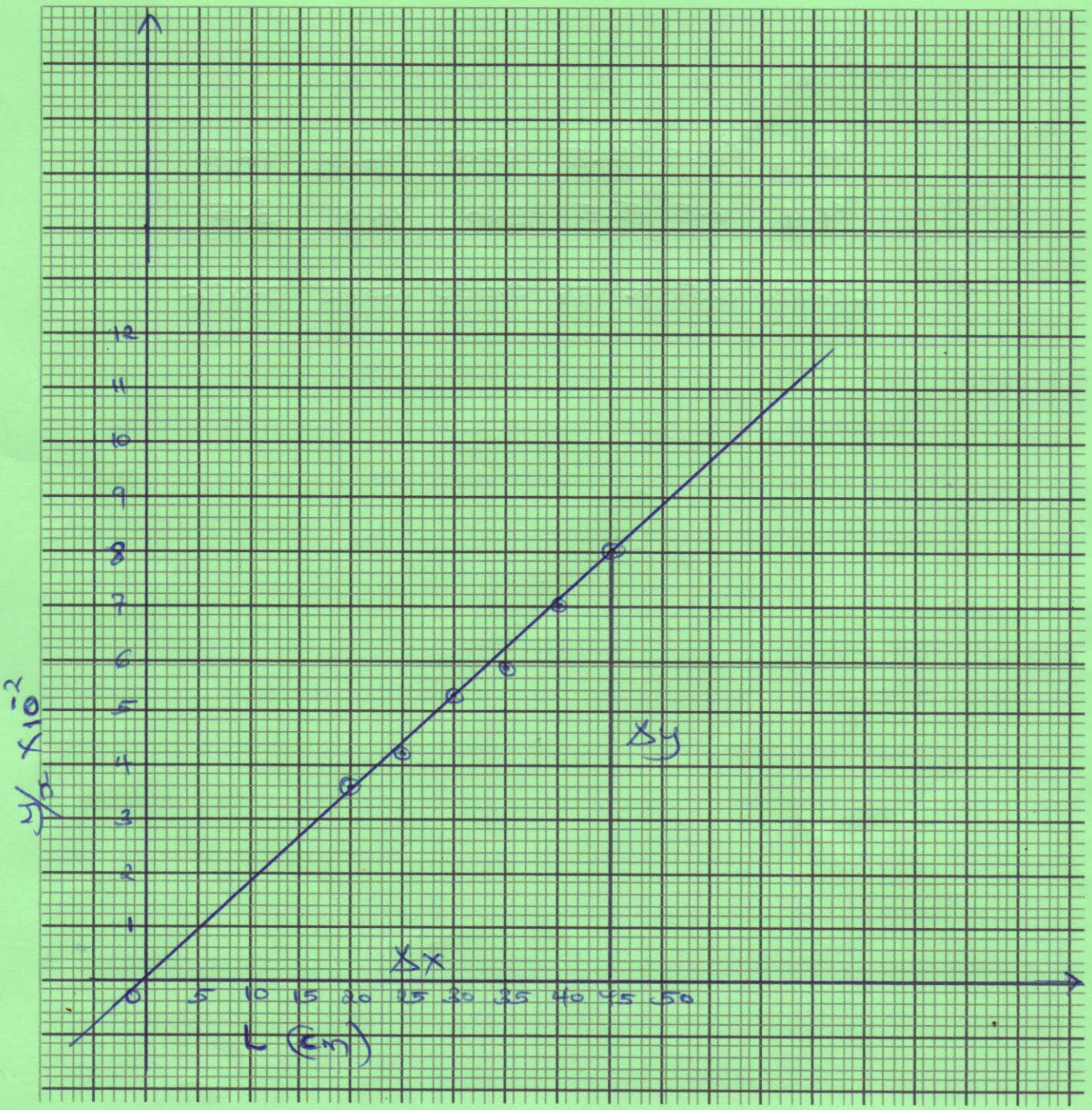
y = 11.7 cm (½ mark)

d) Record for other values of L in **table 3** below

L (cm)	45	40	35	30	25	20
X (cm)	92.6	93.5	94.5	95.0	96.0	96.5
Y (cm)	7.4	6.5	5.5	5.0	4.0	3.5
$\frac{y}{x}$ (3dp)	0.080	0.070	0.058	0.053	0.042	0.036

(4 marks)

e) i) Plot a graph of $^{y}/_{x}$ (y-axis) against L. (5 marks)



ii) Determine the slope, m of the graph. (2 marks)

$G = \frac{\Delta y}{\delta x} = \frac{(8-0)\times 10^{-2}}{45-0} = \frac{0.08}{45}$

1.778×10^{-3} cm.

iii) Given that K = 100D, determine the value of K. (2 marks)

$K = 100 \times \frac{0.30}{10}$

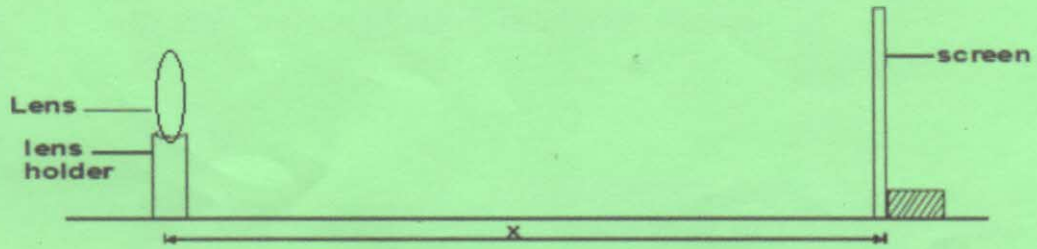
= 30mm.

PART B

b) You are provided with a lens P a lens holder a white screen and half metre rule.

Procedure

i)Set the apparatus as shown in **figure 4** below. Focus a sharp image of a distant object on the screen. The obje



a) Measure the distance x in cm between the lens and the screen at which a sharp image is obtained repeat this two times, using different objects and record your readings in **table 4** below.

Object	Distance X, (cm)
1	10.0
2	10.0

(2 marks)

ii) Calculate the average value of x (1 mark)

$\frac{10+10}{2} = 10$ cm.

iii)What is the physical significance of the result obtained in (iii) above? (1 mark)

Focal length.