Name: …… Adm. No……

Index No…… Class……Signature……

232/3
PHYSICS
PRACTICAL
JUNE 2023
TIME: $2^1/_2$ HRS

KASSU-JET EXAMINATION
Kenya Certificate of Secondary Education
PHYSICS PAPER 3
PRACTICAL

Instruction to Candidates

- Write your name, admission number, class and signature in the spaces provided at the top of this page.
- Answer all the questions in the spaces provided
- You are supposed to spend the first 25 minutes of the $2^1/_2$ hours allowed for this paper reading the whole paper carefully before you start.
- Marks shall be awarded for clear record of observations actually made, for their suitability and accuracy and the use made of them.
- Candidates ae advised to record their observations as soon as they are made.
- Electronic calculators and mathematical tables may be used
- This paper consists of **8 printed pages.**

FOR EXAMINER'S USE ONLY

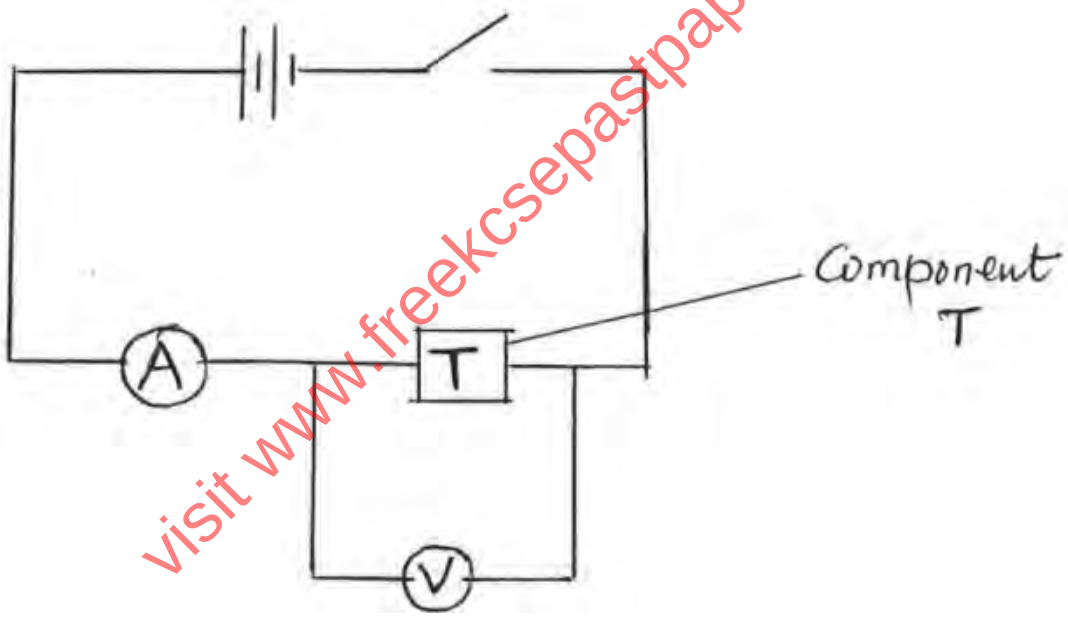
Question	Maximum Score	Candidate's Score
1	20	
2 Part A	10	
2 Part B	10	
TOTAL	40	

Question 1.

You are provided with the following:

- A stirrer
- A stand, a boss and a clump
- A thermometer
- An ammeter
- A voltmeter
- A beaker
- A source of boiling water
- Two dry cells in a cell holder
- A switch
- Seven connecting wires
- A component labelled T

Proceed as follows:



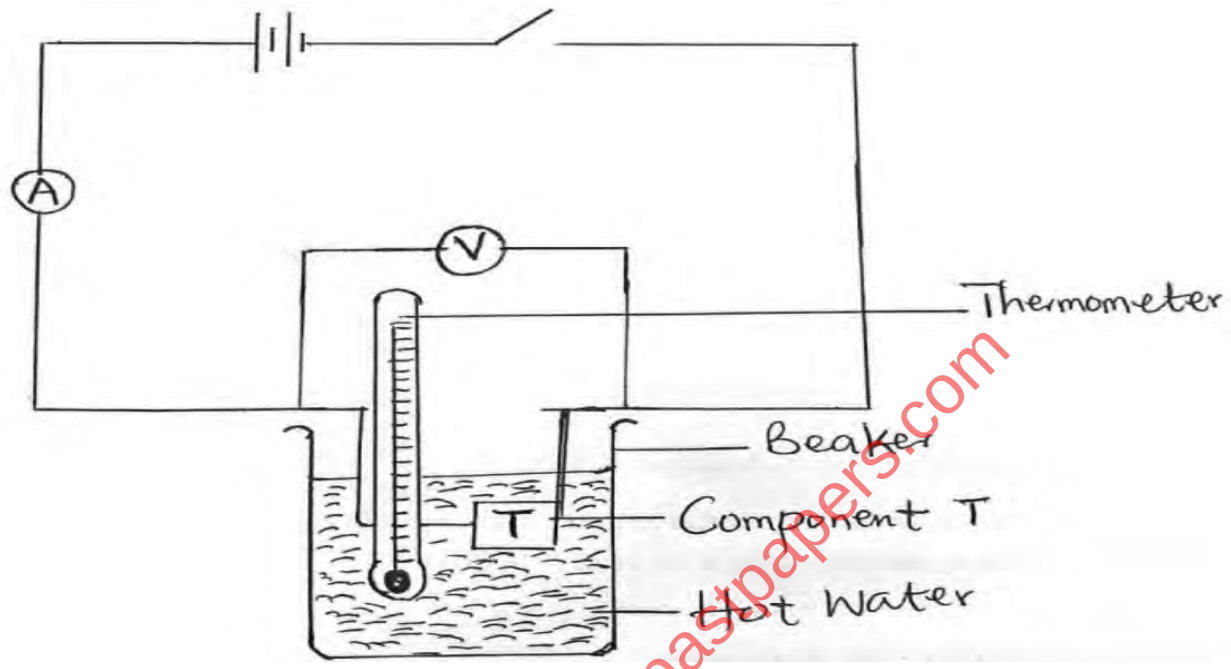
(a) Set up the circuit as shown in figure above.
Close the switch, read and record the current I through component T and the potential difference V across it. (2mks)

I =..... V =.....

Open the switch.

Determine the resistance R of component X given that: $R = \frac{V}{I}$ (1mk)

(b) Pour hot water into the beaker and set up the apparatus as in figure 2, so that component T and the thermometer bulb are fully immersed in the water.

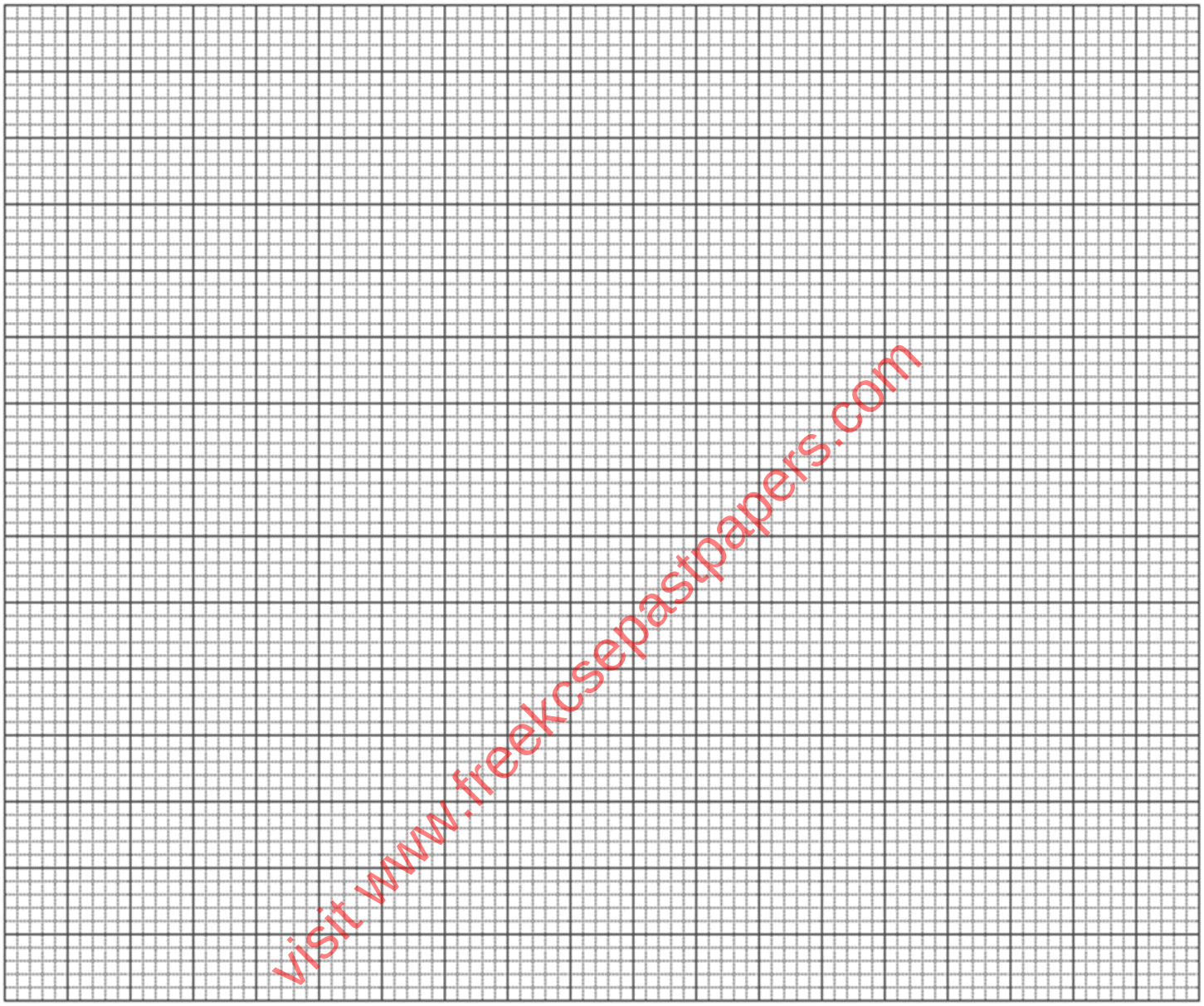


(c) Stir the water from time to time, when the temperature falls to 80°, switch on the circuit, read and record the current I and the potential difference V in table 1. Then open the switch.

(d) Repeat (c) for every 5^0C drop in temperature and fill the table below. Complete the table. (9mks)

Temperature ^{0}C	80	75	70	65	60
Temperature in Kelvin (K)					
Current, I (A)					
Potential Difference, V (V)					
Resistance, R= V/I (Ω					
Log T					
Log R					

(e)On the axis provided, plot a graph of Log R against log T. (4mks)



(f) Given that R and T are related by the equation Log R = Log Q + p Log T.
determine the value of p and Q. (4mks)

Question 2

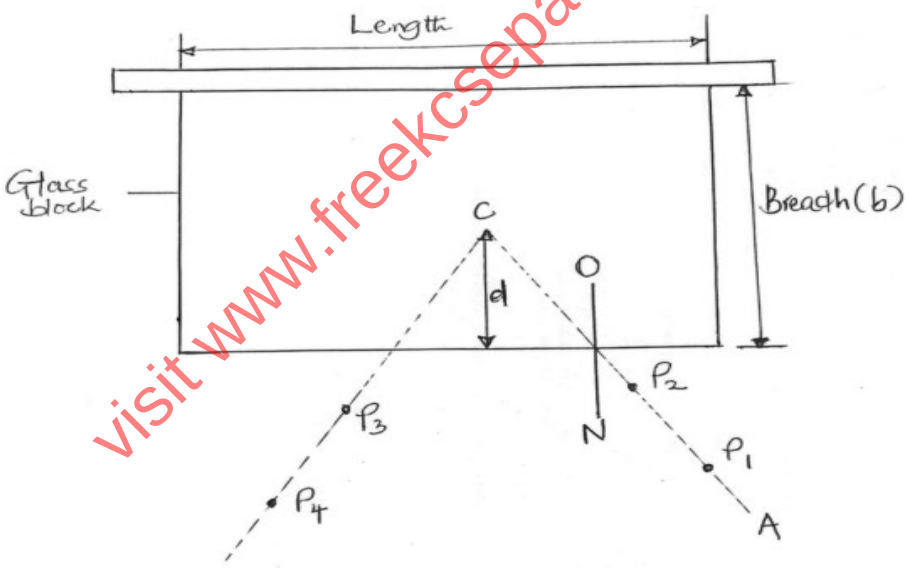
PART A

You are provided with the following apparatus

- A glass block (10 cm x 6 cm)
- A Plane mirror (7cm x 6 cm)
- 4 optical pins
- A soft board
- Cello-tape (about 15 cm long)
- 2 white – plain sheets of paper
- a vernier calipers
- A protractor
- 4 office pins
- Complete Mathematical set

Proceed as follows: -

i) Using the cello tape provided fix the plane mirror to the glass block alongside as shown in the figure below. The reflecting surface to face the glass block.



ii) With the use of the office pins, secure firmly a white plain paper on the board and place the block together with attached mirror.

iii) Draw the outline of the glass block together with the mirror

iv) Remove the block and the mirror and draw a normal at B somewhere a quarter- way the length of the outline you drew in (iii) above.

v) Draw four (4) different rays AB incident at B and extended to C. The incident rays should make incident angles of 10°, 20°, 30° and 40°.

vi) Replace the glass block together with the attached mirror so as exactly fit the outline in(iii)

vii) Place two optical pins P_1 and P_2 along the 10° line. Locate the images of pins P_1 and P_2 as they appear by no-parallax **method (the images of the pins appear to be in a straight line when viewed through the glass block).** Place pins P_3 and P_4 so that the images of pins P_1 and P_2 are not seen.

viii) Remove the glass block together with the attached mirror from the outline and produce the lines joining P_1 to P_2 and P_3 to P_4 so that the they intersect at C. Measure and record the distance **d** in the table below. (5mks)

NB. It may be necessary for you to draw another outline so as to avoid congestion of (construction) lines.

Angle i °	**10**	**20**	**30**	**40**
Distance d (cm)				
Distance d (m)				

ix) Using a vernier calipers, measure the breadth **b** of the glass block.

b=_____cm (1mk)

b= _____ m (1mk)

x) Calculate the average A_d of the values of **d** in the table above

A_d _____ m (2mks)

xi) Determine the refractive index of the glass block using the formula.

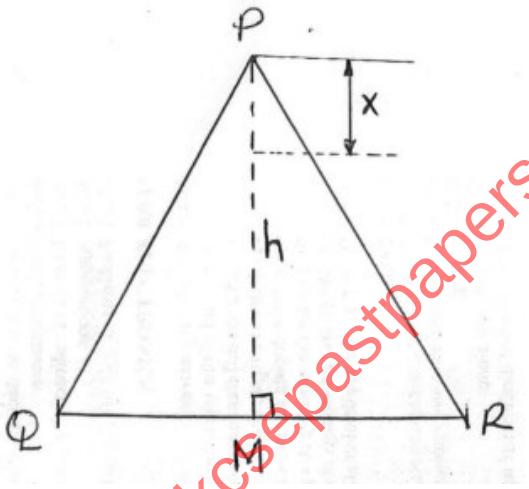
Refractive index n of glass $n = \frac{b}{A_d}$ (2mks)

PART B

You are provided with the following apparatus

- A triangular Card marked PQR
- A stand, a boss and a clamp
- 2 optical pins
- Stop watch
- Millimeter Scale
- Complete Mathematical set

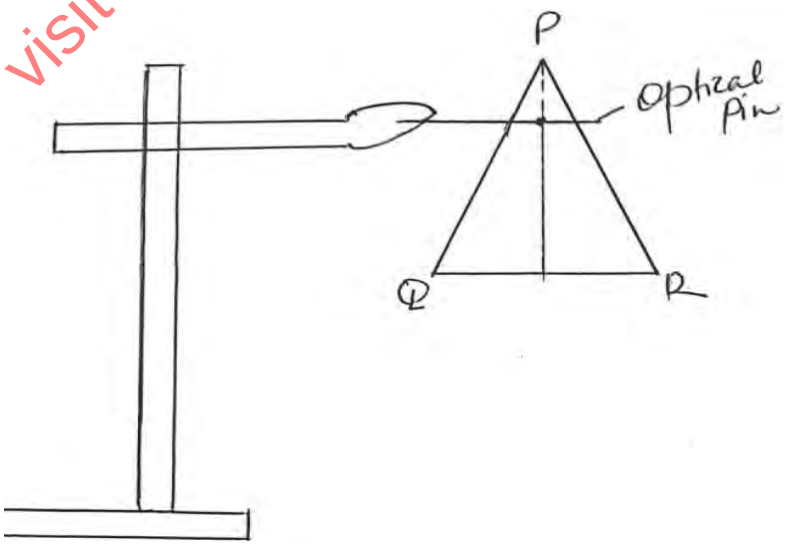
i) Draw the perpendicular line to the base QR and using a metre rule, measure and record, the height PM of the triangle.



PM (h) = ... cm (1mk)

ii) Using the optical pin provide make holes along the perpendicular line drawn such that the distance **x** = 1.0cm, 2.0cm and 3.0cm from P.

iii) By the other optical pin, hang freely the triangular card with the pin passing through the hole **x=1.0cm.** Displace the card so that it oscillates about the optical pin on its axis as shown below.



iv) Determine the time for 5 complete oscillations and record the values in the table below.

v) Increase the distance **x to 2.0** and repeat the experiment with **x=3.0cm**.

vi) Complete the table. (5mks)

X (cm)	**1.0**	**2.0**	**3.0**
Time for 5 Oscillations			
Periodic time, T (s)			
$Z = \frac{T\sqrt{3(y-5)}}{h}$			

vii) Determine the average value of Z. (2mks)