

KERICHO SUB-COUNTY JOINT EVALUATION 2015

Kenya certificate of secondary education

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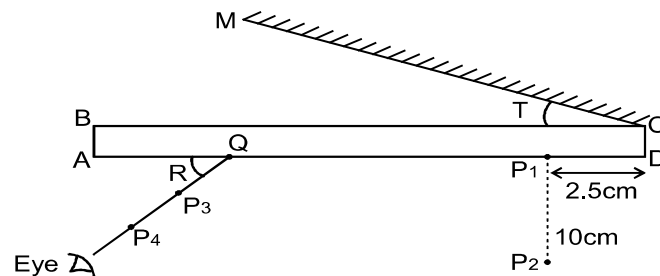
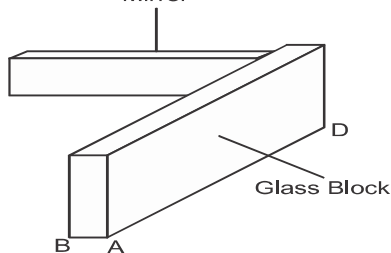
PHYSICS**PAPER 3 (PRACTICAL)**

TIME: 2½ HRS

QUESTION 1

a) You are provided with the following apparatus:

- Plane mirror
- Rectangular glass block
- Soft board
- Plain paper
- Four optical pins



- i) With the glass block standing on one of its longer edges as shown in fig 1(a), trace its outline to obtain ABCD as shown in fig 1(b).
- ii) Draw the line MC at an angle $T = 10^\circ$.
- iii) Fix pins P_1 , 2.5cm from point D and another pin P_2 , 10cm from pin P_1 as shown in fig 1(b). The pins must be left at these positions throughout the experiment
- iv) Replace the glass block and using a small piece of plasticine, hold the plane mirror vertically along CM, behind the glass block.
- v) Insert pins P_3 and P_4 such that they are in straight line with the images of P_1 and P_2 as seen through the glass block after reflection from the plane mirror.
- vi) Draw a line joining P_3P_4 to meet the block at Q.
- vii) Measure and record the value of angle R.
- viii) Repeat steps (ii- vii) to obtain other values of R when T is at angles 15° , 20° , 25° , 30° and 35° and record the results in the table below.

T	10°	15°	20°	25°	30°	35°
R($^\circ$)						

- ix) Plot a graph of R against T.
- x) Determine the value of T_0 of T when $R = 0$.
- xi) Determine the value of n in the given equation.

(6 marks)

(5 marks)

(1 mark)

(2 marks)

$$n = \frac{1}{\sin(90^\circ - T_0)}$$

Question 1(b)

You are provided with the following apparatus:

- Candle
- Screen
- A meter rule
- Convex lens and lens holder

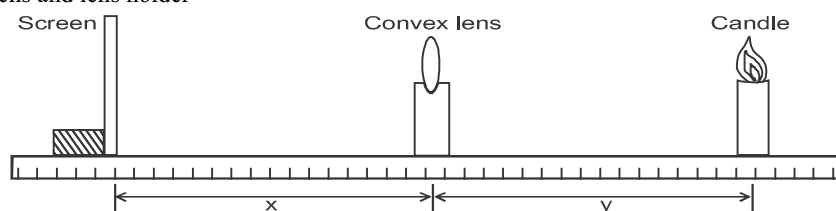


Fig 2

- i) Set up the apparatus as shown in fig 2.
- ii) Set the object distance $y = 25\text{cm}$. By adjusting the position of the screen, obtain a sharp image of the candle. Record the value of image distance X . Repeat the procedure for $y = 35\text{cm}$.
- iii) Complete the table below. (3 marks)

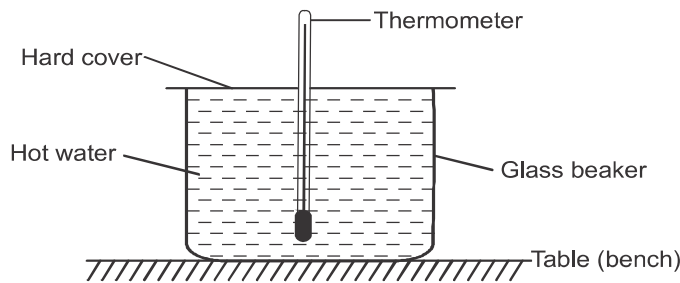
y cm	25	35	
x cm			
(x + y) cm			
(xy)cm ²			

- iv) Calculate the average value of f using the equation $f = \frac{xy}{x + y}$ (2 marks)

Q2. You are provided with the following apparatus.

- Hot water source
- Glass beaker (200cm³), diameter about 5.0cm
- Thermometer (0- 100°C)
- Stop watch
- Plastic measuring cylinder (100ml)
- Hard cover plate with hole to fit thermometer
- i) Measure and record the room temperature.

$\theta_R = \dots\dots\dots$ (1 mark)



- ii) Measure exactly 150ml of the hot water using the measuring cylinder. Quickly transfer the water into the glass beaker and cover it with the hard board plate. Place the beaker on a wooden table and insert the thermometer through the hole on the cover.
- iii) Measure and record the temperature θ of the cooling water after every two minutes for at least 20 minutes. Stir gently using the thermometer before every temperature reading. Record the values of temperature θ in the table below. (4 marks)

Time, t (min)								
Temperature $\theta(^{\circ}\text{C})$								

- iv) Plot a graph of θ against time t(min). (5 marks)
- v) On the drawn curve, construct as accurately as possible, five tangents at temperatures of 80°C, 75°C, 70°C, 65°C, and 60°C. Find the slope of each and record the value in the table below.

Time $\theta(^{\circ}\text{C})$	80	75	70	65	60
$(\theta - \theta_R)^{\circ}\text{C}$					
Slope of tangent (θ/t)					

- (5 marks)
- vi) For every tangent find the difference between temperature θ and room temperature θ_R (see the table above)
- vii) Plot a graph of slope θ/t of tangents against temperature difference. $(\theta - \theta_R)$ (3 marks)
- viii) Find the slope of the graph. (2 marks)