

CENTRAL WEST EDUCATION DIVISION
2025 MALAWI SCHOOL CERTIFICATE OF EDUCATION
MOCK EXAMINATION
PHYSICS

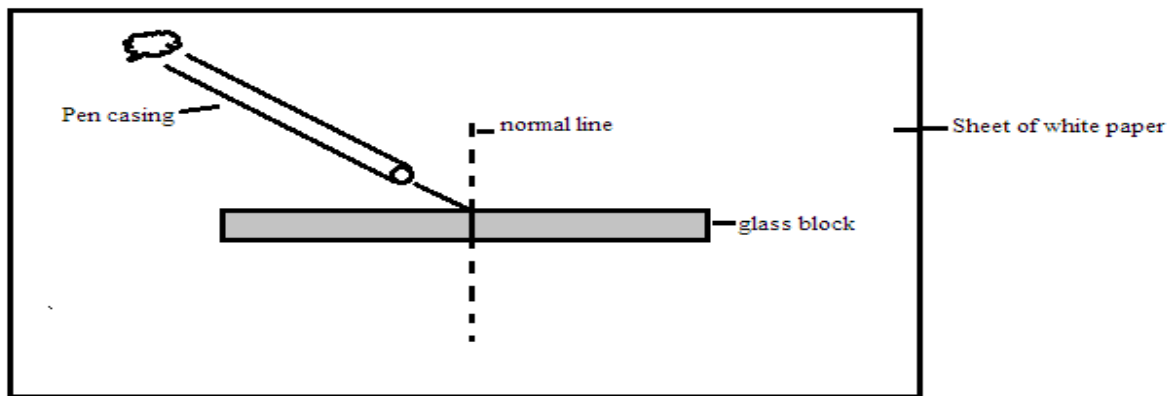
Subject Number: M164/II

PAPER II
PRACTICAL
MARKING KEY

Suggested answer to question One

1. a. Arrange the apparatus as shown:





(2 marks) for relevant diagram

(showing a light source, glass block and a normal line on a sheet of white paper)

b. place the glass block on the paper and draw around the block./1 [drawing around a block]

c. Direct a single ray of light into the block using a pen casing /1 [producing incident ray]

d. Mark with a cross the position of refracted ray on the screen from the block /1

[tracing refracted ray]

e. Remove the glass block and draw the normal line at the entry point of incident ray/1

[drawing normal line]

f. Draw the line for incident ray and another line from normal line to position of image on the screen as refracted ray /1 [drawing incident and refracted rays]

g. Measure angles of incidence and refracted ray /1 [measuring angles]

h. Calculate refractive index /1 using formula refractive index = $\frac{\sin i}{\sin r}$ /1

[calculating the index and its formula]

Suggested answer to question Two

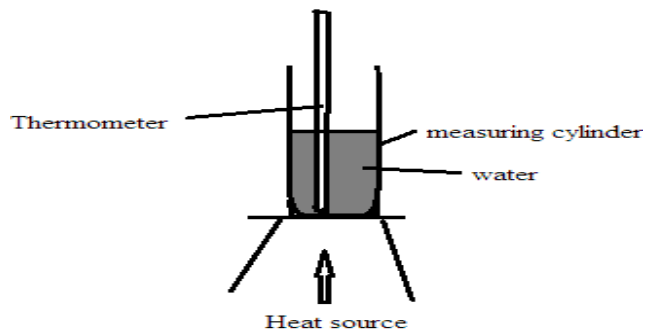
Title: An experiment to investigate/ (or An investigation into/ Experiment to find out) whether

density of water is affected by its temperature. /1

Aim: To investigate whether density of water is affected by its temperature./1

Apparatus:

- The apparatus was set up as shown below



(1 mark)

Procedure:

Water of known mass was poured in a measuring cylinder where its initial temperature and volume values were determined and recorded. /1 Heat was then supplied to a temperature of 80° and its corresponding volume was recorded./1

Data analysis

Density was then calculated using the formula $\text{Density} = \frac{\text{mass}}{\text{volume}}$ /1 and the results were tabulated as shown below.

Temperature ($^{\circ}\text{C}$)	Mass of water (g)	Volume (cm^3)	Density (/ 1 mark for completing this column)
20	90	40	2.25
80	90	45	2.0

Results indicated that as temperature of water increased, its density decreased./1

Conclusion

It was therefore concluded that density of water is affected by its temperature./1

Marks allocation: Title = 1 mark
Aim = 1 mark
Apparatus = 1 mark
Procedure = 2 marks
Data analysis = 3 marks
Conclusion = 1 mark
Past tense = 1 mark

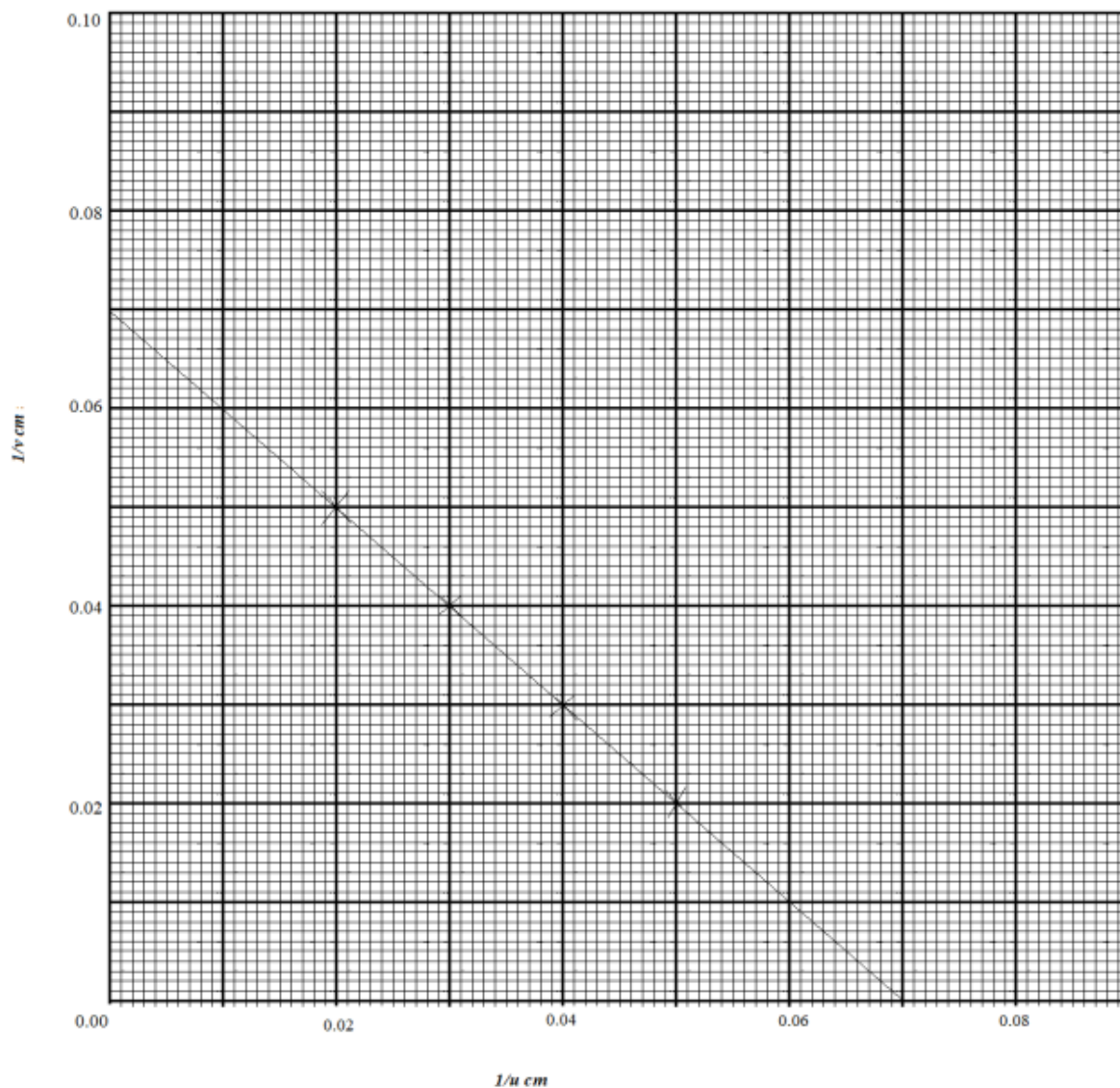
Answer to Question Three

Object distance (u)(cm)	Image distance (v)(cm)	$\frac{1}{u}$	$\frac{1}{v}$
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20	60	0.02	0.05
25	38	0.03	0.04
40	24	0.04	0.03
50	21	0.05	0.02

(1 mark for three or any two correct values in each row)

(1 mark for decreasing trend on image distance)



(- 1 mark for correct scale)

(- 1 mark for labels)

(- 1 mark for plotted points)

(- 1 mark for line of best fit)

i. Use your graph to determine the focal length of the lens.

- The point where the line of the graph intersects either axis is $1/f$.
- So, the line intersects either $1/v$ or $1/u$ at 0.07.

- $0.07 = 1/f$ (1)
 - $\therefore f = 1/0.07 = 14.29$ (1)
- The actual value is 15cm**

Total for the question : 10 marks

Answer to Question Four

Spring arrangement	Initial pointer reading (cm)	Final pointer reading (cm)	Extension (cm)
Two springs	0	2 /1	2 $\pm$ 1 /1
Single spring	0	4 /1	4 $\pm$ 1 /1

1 mark for both initials

Note: Final pointer reading values will depend on the initial values!

g. $K_p = f/e = 2N/2cm$ /1 $= 1N/cm$ /1

h. $K_s = f/e = 2N/4cm$ /1 $= 0.5N/cm$ /1

(Note that the values of extension will depend on the acceptable range)

i. $\frac{K_p}{K_s} = \frac{1}{0.5} = 2$

$K_p = 2 K_s$ /1 Or $K_s = \frac{1}{2} K_p$

Note: Tolerance for part i : $K_p = 1.5 - 2.5 K_s$