

PROVISIONAL MARKING KEY
PHYSICS PAPER II



SOUTH EAST EDUCATION DIVISION

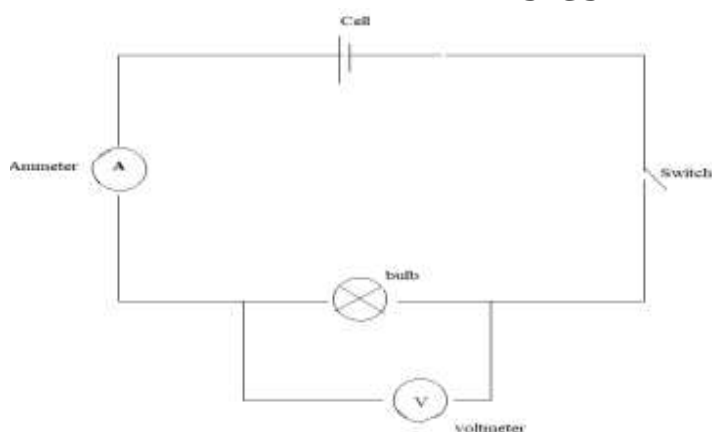
2024 MALAWI SCHOOL CERTIFICATE OF EDUCATION MOCK EXAMINATION
PHYSICS
PAPER II
(PROVISIONAL MARKING KEY)

SECTION A (20 Marks)

1. **Describe an experiment that could be conducted to investigate the effect of amplitude on frequency of an oscillating pendulum.**
 - a. *Hang the pendulum from a fixed point on the support structure, ensuring it swings freely without any interference. (1)*
 - b. *Pull the mass side wards by 15cm and release it to oscillate (1) and start the stopwatch at once (1)*
 - c. *Record the time it takes for specific number of oscillations (e.g. 10 oscillations) (1)*
 - d. *Calculate the Period (T) (1) and frequency (f) (1) of the oscillations.*
 - e. *Maintain the length of the string and the mass at the end of the string (1), repeat steps (b) to (d) with the following amplitudes 20cm, 25cm, 30cm, 35cm. (1).*
 - f. *Plot a graph of frequency against amplitude (1)*
 - g. *Draw a conclusion (1)*
2. **With the aid of a well labelled diagram, describe an experiment that could be done in order to determine the relationship between voltage and current across a bulb given 4 cells.**
 - a. *Arrange a set up as shown below;*



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(1 – correct diagram)

(2 - any **two** correct labels 1 mark each)

- b. Close the switch (1)
- c. Read (1) and record (1) the ammeter and voltmeter readings.
- d. Repeat procedures a, b and c with 2 cells, 3 cells, 4 cells (1)
- e. Tabulate the results (1)
- f. Plot a graph of voltage against current (1)
- g. Deduce the relationship from the graph (1)

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SECTION B (20 Marks)

3. You are provided with 250ml beakers filled with water, a plank labelled $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$, a 100ml beaker and a beam balance.
- a. Weigh the mass of the empty 100ml beaker on a beam balance and record the mass as m_1
 - b. Slowly immerse the $\frac{1}{4}$ full of the plank into the 250ml beaker as shown in Figure 1 below;

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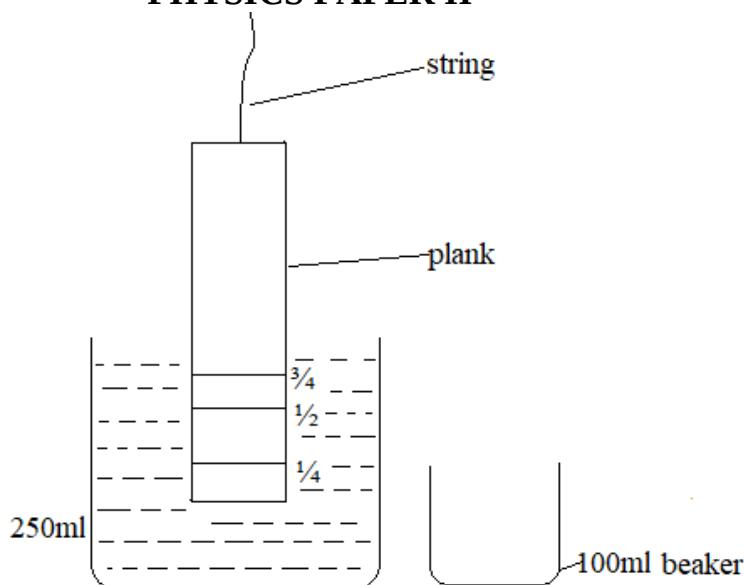


Figure 1

- c. Collect the overflow in the 100ml beaker and re-weigh it on the beam balance as m_2
- d. Find the mass of the overflow water by subtracting m_1 from m_2 i.e. $(m_2 - m_1)$ and record it in the table of results provided.
- e. Repeat procedures b, c and d with $\frac{1}{2}$ and $\frac{3}{4}$ full of the plank.

f. Table of results

Mass of empty beaker, $m_1 = \underline{22} \text{ g}$

(1) –any mass

Table of results

Portion of plank immersed	Mass of overflow water ($m_2 - m_1$)	Weight of the overflow water ($100\text{g} = 1\text{N}$)
$\frac{1}{4}$	2g	0.02
$\frac{1}{2}$	4g	0.04
$\frac{3}{4}$	5g	0.05

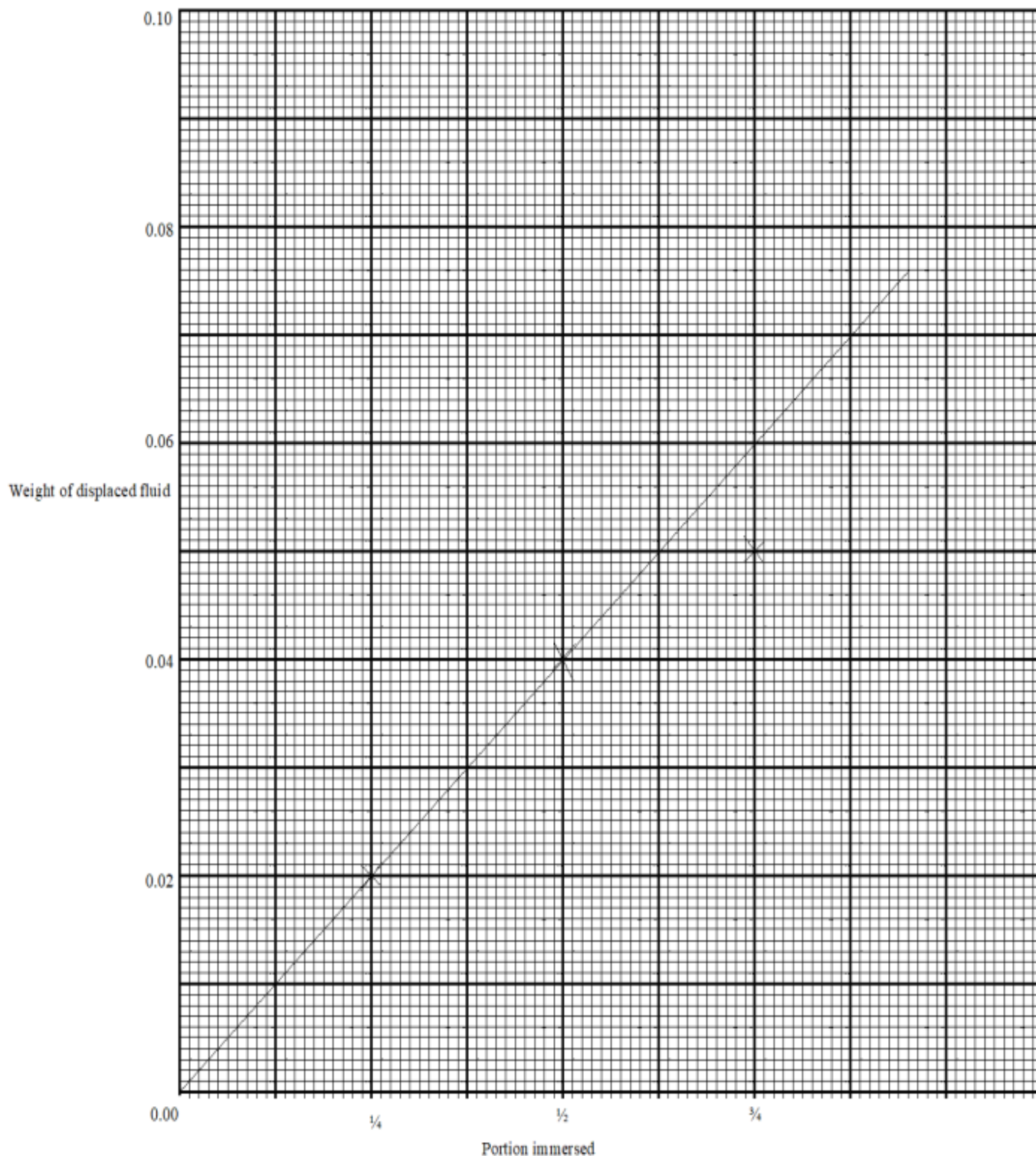
(1 mark for filling the table in each row)

(3 marks in total)

- g. Plot a graph of weight of displaced water against the portion of the plank immersed.

Continued/...

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GRAPH OF WEIGHT OF DISPLACED WATER AGAINST THE PORTION OF THE
PLANK IMMERSED **(5 marks)**



(1 – axes; 1 – labelling; 1 – scale; 1 – any correct two points; 1 – graph line)

h. From the graph, deduce the relationship between the weight of displaced fluid and the portion of plank immersed. (1 mark)

As the portion of immersed plank increases, the height of displaced fluid increases. (1)



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4. You are provided with a candle, matches, convex lens, lens holder, meter rule and white screen.
- a. Arrange the apparatus as shown in Figure 2 below;

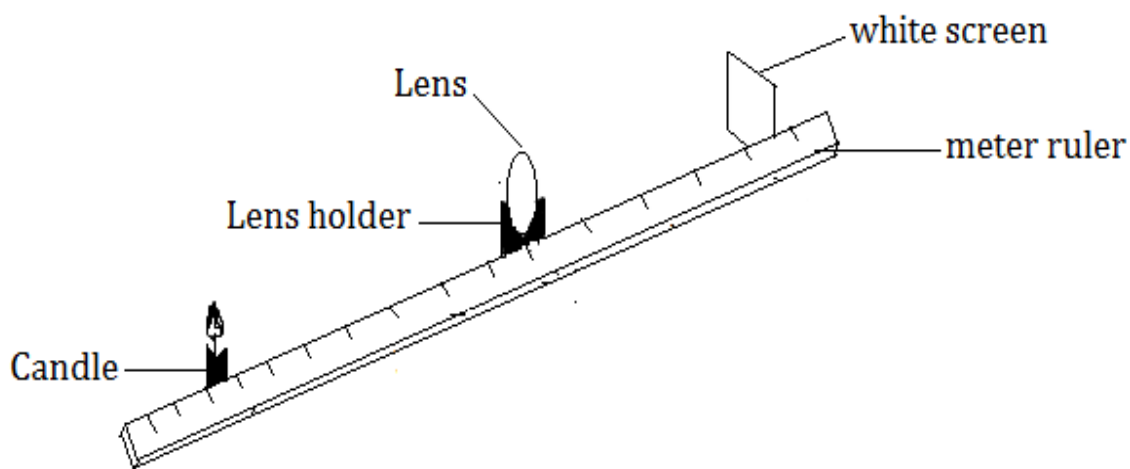


Figure 2

- b. Light the candle.
- c. Move the object (candle) until it is 20cm away from the lens.
- d. Move the screen until a clear image of the object (candle) is formed on the screen.
- e. Measure the image distance, v and record it in the table of results.
- f. Repeat steps c to e for object distances, u shown in the table of results.
- g. Complete the $1/v$ and $1/u$ columns of the table of results

Table of Results

Object distance, u (cm)	Image distance, v (cm)	$1/v$	$1/u$
20	60	0.02	0.05
25	38	0.03	0.04
40	24	0.04	0.03
50	21	0.05	0.02

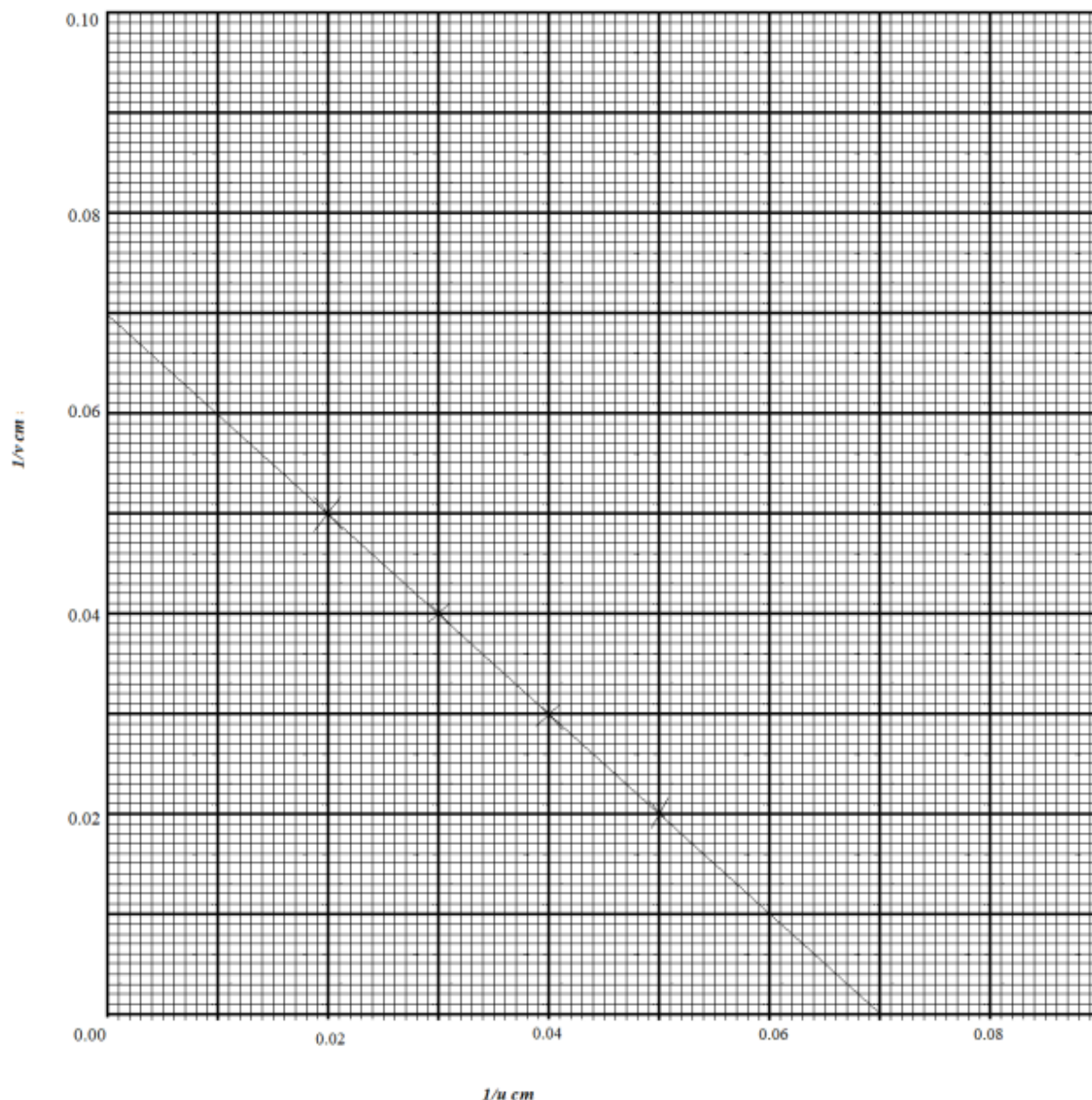
(1 mark for three or any two correct values in each row)

(4 marks in total)

- h. Plot a graph of $1/v$ cm against $1/u$ cm.

GRAPH OF $1/V$ AGAINST $1/U$.

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- (- 1 mark for vertical axis with the correct scale)
- (- 1 mark for horizontal axis with the correct scale)
- (- 1 mark for plotted points)
- (- 1 mark for the line)

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

END OF PROVISIONAL MARKING KEY

NB: This paper contains 6 printed pages.

