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**MBOONI EAST SUB-COUNTY**  
**FORM 4 JOINT EXAMINATION 2014**  
**PHYSICS 232/3**  
**CONFIDENTIAL**

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Each candidate requires the following items

**Question 1**

- ✓ A metre rule
- ✓ 250ml plastic beaker
- ✓ A pieces of cotton thread each 30cm long
- ✓ A piece of cellotape
- ✓ 100ml measuring cylinder
- ✓ Complete stand
- ✓ A50g mass
- ✓ Some water in a 500mls beaker

**Question 2**

- ✓ Plane mirror
- ✓ Metre rule
- ✓ Lense  $f = 15\text{cm}$
- ✓ Lense holder
- ✓ Card board with cross wire at its centre
- ✓ Screen

CONFIDENTIAL

NAME ..... DATE .....

INDEX NO. .... SIGNATURE .....

**232/3**  
**PHYSICS**  
**PAPER 3**  
**PRACTICAL**  
**JULY / AUGUST, 2014**  
**TIME: 2 1/4 HOURS**

## **MBOONI EAST SUB - COUNTY FORM FOUR JOINT EXAMINATION 2014**

*Kenya Certificate of Secondary Education*

**232/3**  
**PHYSICS**  
**PAPER 3**  
**PRACTICAL**  
**TIME: 2 1/2 HOURS**

### **INSTRUCTIONS TO CANDIDATES**

- Write **your name** and **index number** in the spaces provided
- Answer **ALL** the questions in the spaces provided in the question paper.
- You are supposed to spend the first 15 minutes of the 2 1/4 hours allowed for this paper reading the whole paper carefully before commencing your work.
- Marks are given for clear record of observations made, their suitability, accuracy and the use made of them.
- Candidates are advised to record their observations as soon as they are made.
- **Non-programmable** silent electronic calculators and KNEC mathematical table may be used.
- This paper consists of 6 printed pages. Candidates should check to ensure that all pages are printed as indicated and no questions are missing

### **FOR EXAMINER'S USE ONLY**

<b>QUESTION</b>	<b>MAXIMUM SCORE</b>	<b>CANDIDATES SCORE</b>
<b>1</b>	<b>20</b>	
<b>2</b>	<b>20</b>	
<b>TOTAL</b>	<b>40</b>	

2014 Mbooni East sub - county Form Four Joint Examination  
 232/3  
 Physics  
 Paper 3

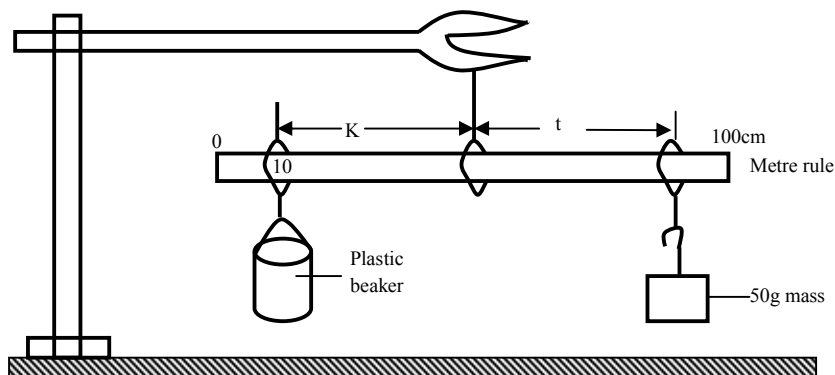
1. You are provided with the following apparatus:

- ✓ A metre rule
- ✓ A 250 ml plastic beaker
- ✓ 4 pieces of cotton thread each 30cm long
- ✓ A piece of cellotape
- ✓ 100ml measuring cylinder
- ✓ Complete stand
- ✓ A 50g mass
- ✓ Water in a beaker

**Proceed**

- (a) Suspend the metre rule using the thread and ensure it balances horizontally (the point of balance should remain unchanged throughout the experiment).
- (b) Suspend the empty plastic beaker at the 10cm mark and hang the 50g mass on the other side of the metre rule.
- Move the 50g mass along the metre rule until the set-up balances horizontally as shown in the figure below.

**Figure 1**



- (c) - Record the distances K and t (1 mark)

K \_\_\_\_\_ cm

t \_\_\_\_\_ cm

(Use the cellotape to fix the position of 50g mass)

- The 50g mass should remain at this position throughout the experiment.

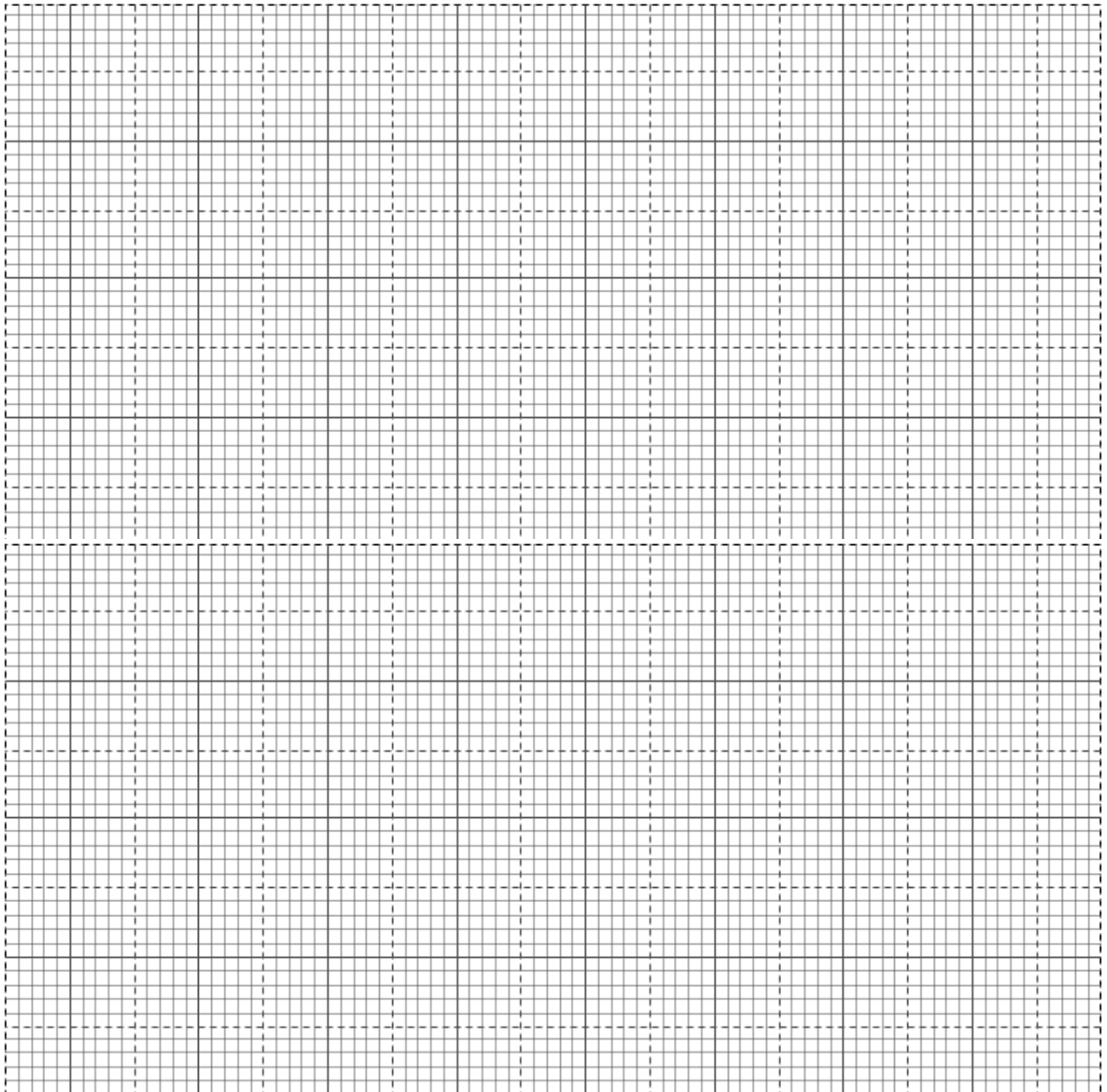
- (d) Using the measuring cylinder, measure 20cm<sup>3</sup> of water and pour it into the plastic beaker. Adjust the position of the beaker until the metre rule balances horizontally again. Record the distance K in table 1 below.

- (e) Repeat the procedure (d) above for the other value of V shown. (6 Marks)

Table 1

Volume, V (cm <sup>3</sup> )	0	20	40	60	80	100	120
Distance, K, (cm)							
$\frac{1}{k}$ (cm <sup>-1</sup> )							

(f) Plot a graph of volume,  $V$  (y – axis) against  $\frac{1}{k}$  (5 Marks)



(g) Determine the slope,  $S$ , of the graph. (2 Marks)

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(h) Given that  $V = 1000 \left( \frac{50t}{dk} \right) - \frac{1000m}{d}$   
 Use your graph to determine the values of  
 (i)  $d =$  (3 marks)

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(ii)  $m =$

(3 marks)

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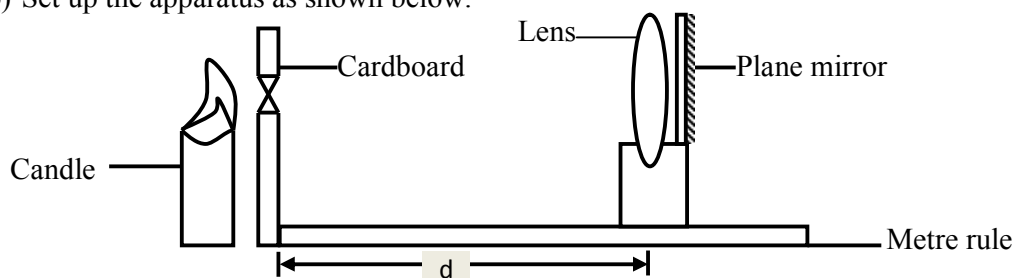
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2. You are provided with the following:-

- ✓ Candle
- ✓ Plane mirror
- ✓ Metre rule
- ✓ Lens
- ✓ Lense holder
- ✓ A cardboard with cross-wire at its centre
- ✓ Screen

Proceed as follows:

- (a) Attach the plane mirror to the lens using cellotape.  
 (b) Set up the apparatus as shown below.

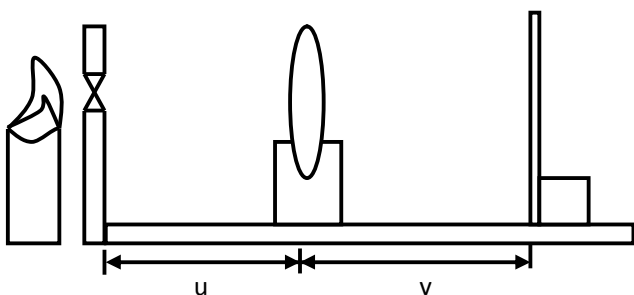


Ensure that the candle flame is at the same level as the cross wires.

- (c) Place the cardboard with cross wires at the 0cm mark.  
 (d) Move the lens along the metre rule until a sharp image of the cross-wire is formed alongside the object cross wire. Measure the length d.

$d =$  \_\_\_\_\_ cm

Now set up the apparatus as shown below.



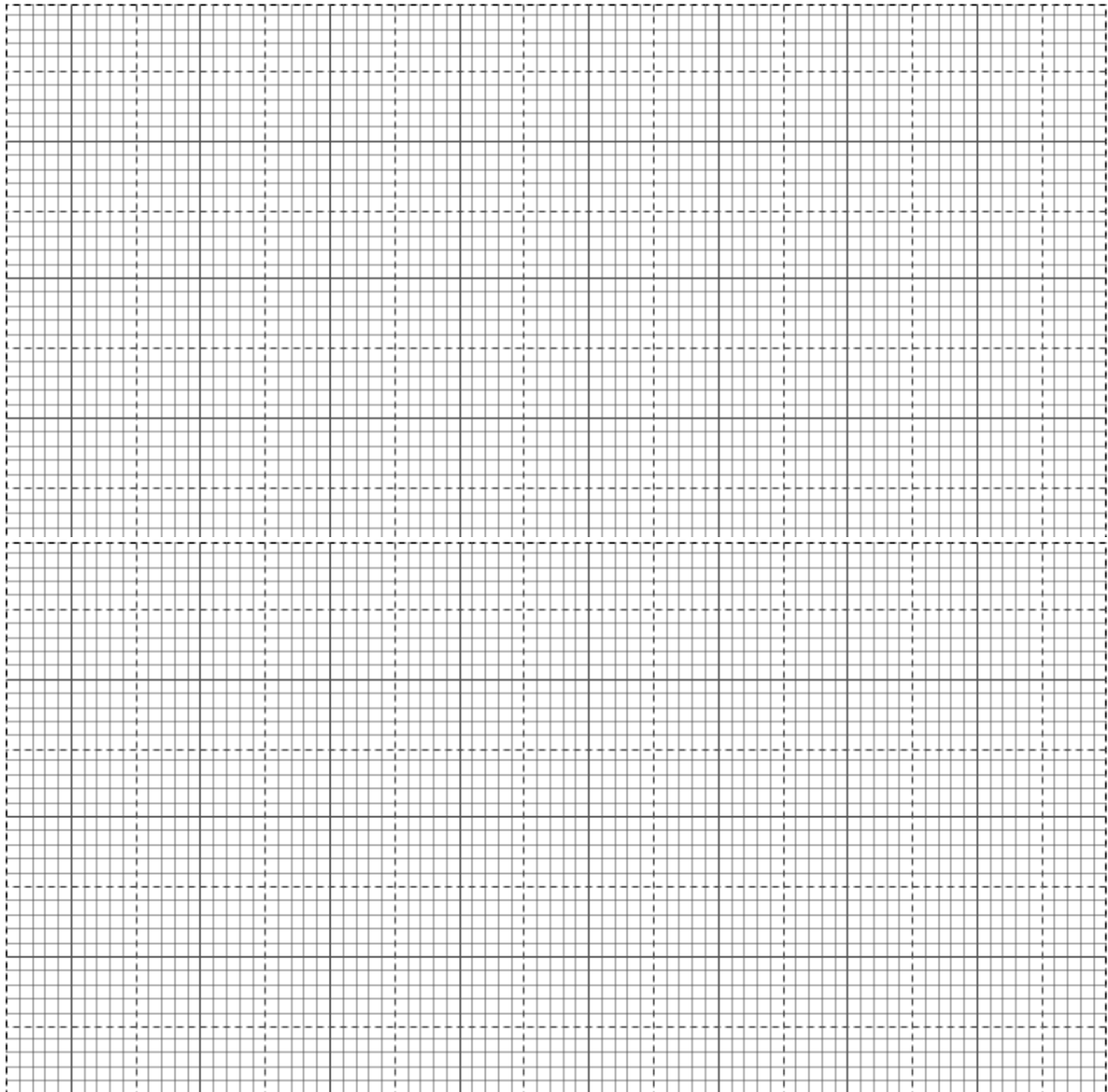
- (e) Set  $u = 25\text{cm}$  and adjust the screen until a clear image of the cross wire appears on the screen. Measure the value of  $v$  and record in the table.  
 (f) Repeat the procedure (e) above for other values of  $u$  and complete the table below.

u (cm)	25	30	35	40	50
v (cm)					
$m = \frac{v}{u}$					

(7 Marks)

(g) Plot a graph of m against v

( 5 Marks)



(h) Determine the slopes of the graph

(3 Marks)

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(i) Given that the equation of the graph is given by  $m = \frac{v}{n} - 1$  where n is a constant, determine the value of n.

(2 Marks)

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(j) Find the value of  $v$  when  $m = 0$

(1 Mark)

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(k) What physical quality does  $n$  represent?

( 1 Mark)

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**MBOONI EAST SUB – COUNTY FORM FOUR JOINT EXAMINATION 2014**

232/3

Physics

PAPER 3

MARKING SCHEMES

1. c)  $K = 40.0 \pm 0.4\text{cm}$  ✓ ½  
 $t = 30.2 \pm 0.4\text{cm}$  ✓ ½

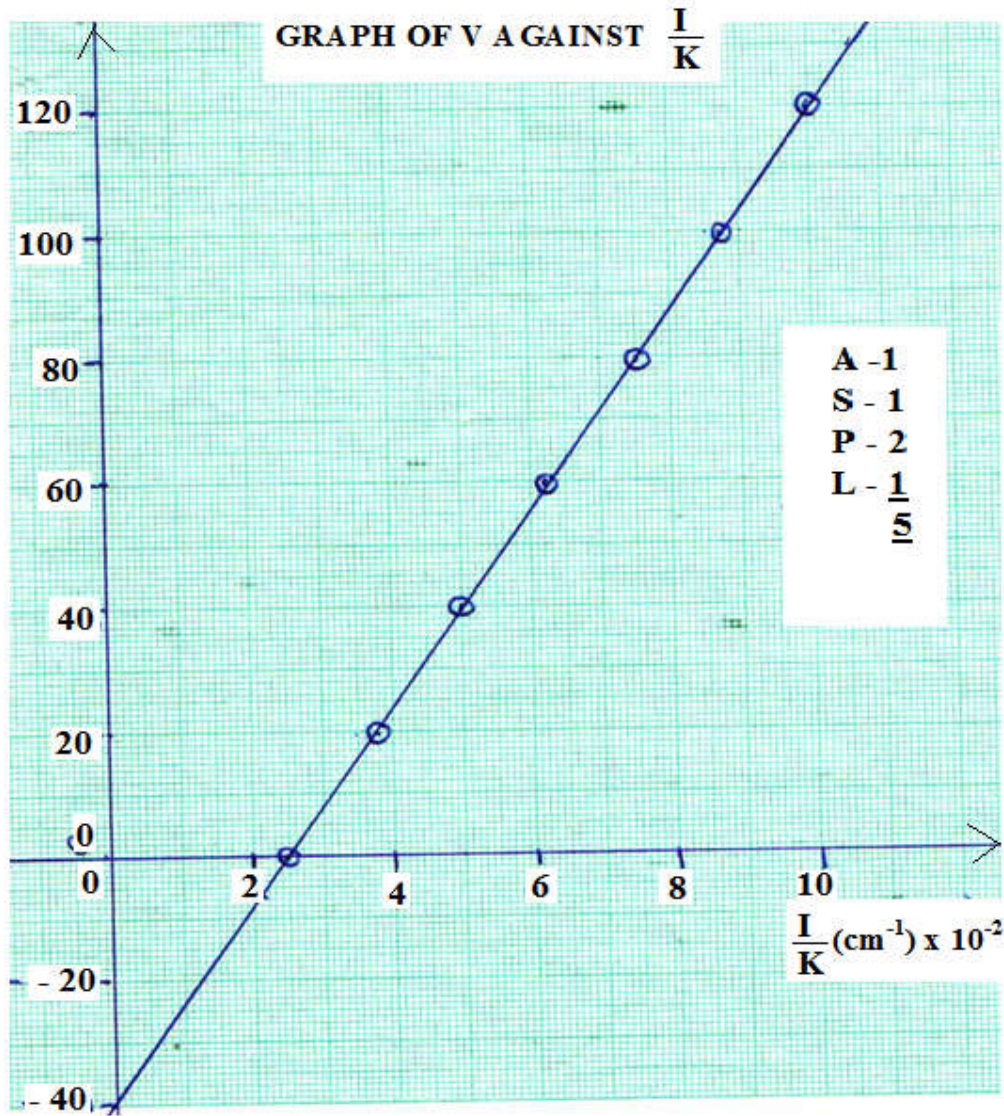
e)

Vol, $V(\text{cm}^3)$	0	20	40	60	80	100	120
Distance; $K$ (cm)	40.0	26.6	20.0	16.1	13.4	11.5	10.0
$\frac{1}{K}$ ( $\text{cm}^{-1}$ ) $\times 10^{-2}$	2.5	3.76	5.00	6.21	7.46	8.70	10.0

$K$  – row, 4 mks, All values  $\pm 0.4\text{cm}$

$\frac{1}{K}$  – row, 2 mks, All values

f)





A – 1, well labelled with units

S- 1, Linear and appropriate

P – 2, All values

L – 1

$$\text{g) Slope, } S = \frac{\Delta V}{\Delta k} = \frac{120-40(\text{cm}^3)}{(10-5) \times 10^{-2}(\text{cm}^{-1})} \checkmark$$

$$= 1600\text{cm}^4 \text{ with units } \checkmark$$

$$\text{h) (i) } S = \frac{50000t}{d} \checkmark \text{ For realising}$$

$$\Rightarrow 1600\text{cm}^4 = \frac{5000 \times 30.2\text{cm}}{d} \checkmark$$

$$d = \frac{50000 \times 30.2\text{cm}}{1600} \checkmark$$

$$= 943.75\text{cm}^{-3} \checkmark$$

$$\text{(ii) V – axis intercept} = \frac{1000m}{d} \checkmark \text{ for reading}$$

$$-40 = \frac{-1000m}{943.75\text{cm}^{-3}} \checkmark$$

$$m = \frac{943.75\text{cm}^{-3} \times 40}{1000} \checkmark$$

$$= 37.75 \checkmark$$

2. (d)  $d = 18 \pm 1\text{cm}$ 

(f) Table

u (cm)	25	30	35	40	45	50
v (cm)	49.0	36.5	32.0	28.0	26.0	25.0
$m = \frac{v}{u}$	1.96	1.22	0.91	0.7	0.58	0.50

v – 1m each for maximum – 5mks

m – 5-6 values – 2mks

3 -4 values – 1mks

(g) Graph

Axes labelled with units – 1mk

Scale – 1mk

Plotting – 2mks

Straight line with positive gradient – 1mk

$$\text{(h) Slope } S = \frac{\Delta m}{\Delta v} = \frac{(20-8.5)10^{-1}}{50-29} = 0.0595$$

$$\text{Accuracy } 0.052 - 0.058$$

$$\text{(i) } n = \frac{1}{\text{slope}} = \frac{1}{0.0595} = 16.81$$

$$\text{(j) } n_1 = 16.5$$

(k) n is the focal length of the lens