

c) Replace lens A with lens B. Fix the plane mirror at the back of lens B. Repeat the procedure in (b) above. Measure the distance  $\ell_2$  between the screen and lens B.

$\ell_2 = \underline{\hspace{2cm}} \text{ cm}$

d) Remove the mirror from the lens holder.

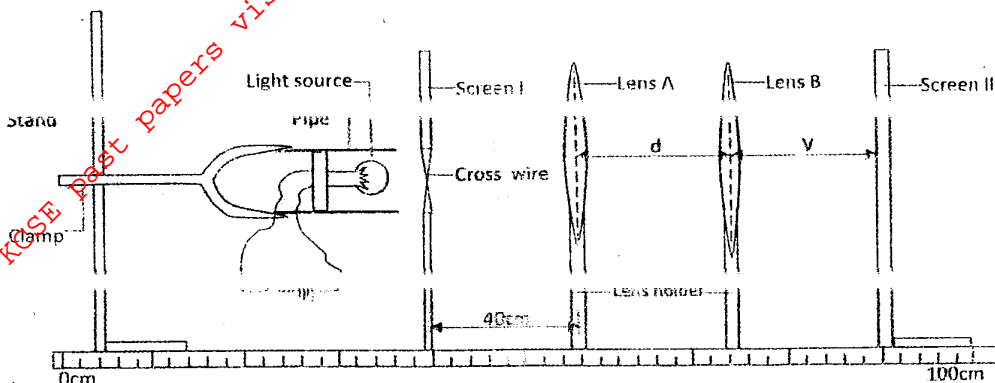


Figure 2

Set the distance  $d$  between lens A and lens B to be 65cm. Adjust the position of screen II to obtain a sharp image of the cross wires on it. Measure the distance  $V$  between lens B and screen II.

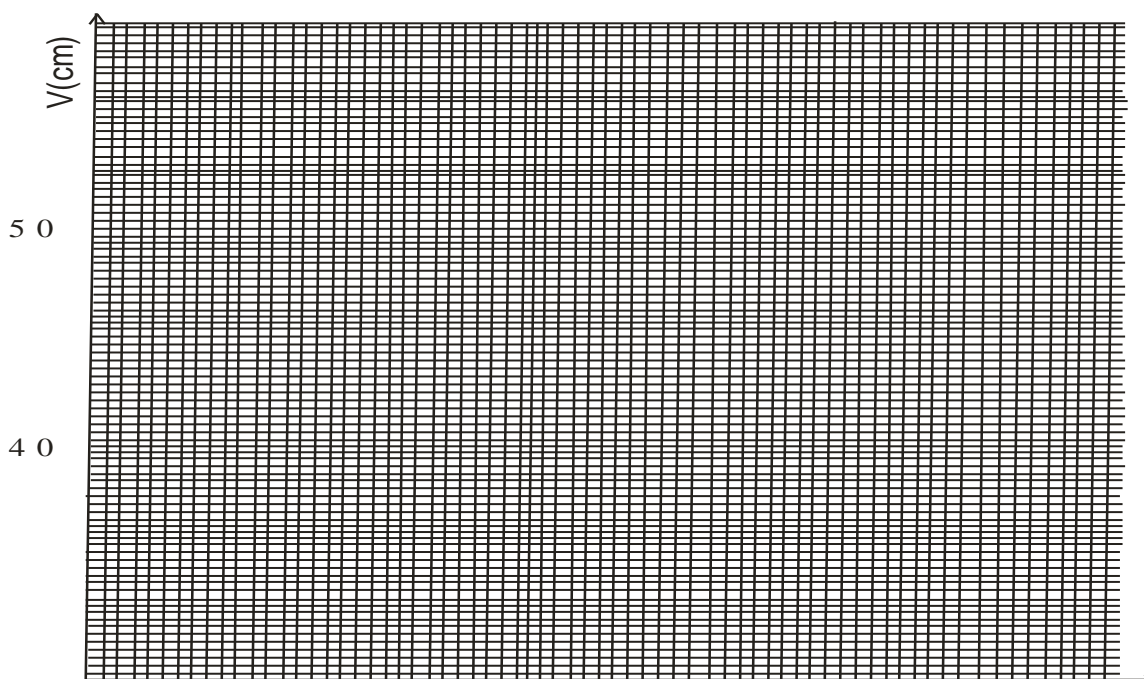
Repeat the experiment

D(cm)	65	67	69	71	73	77	80
V(cm)							

(7marks)

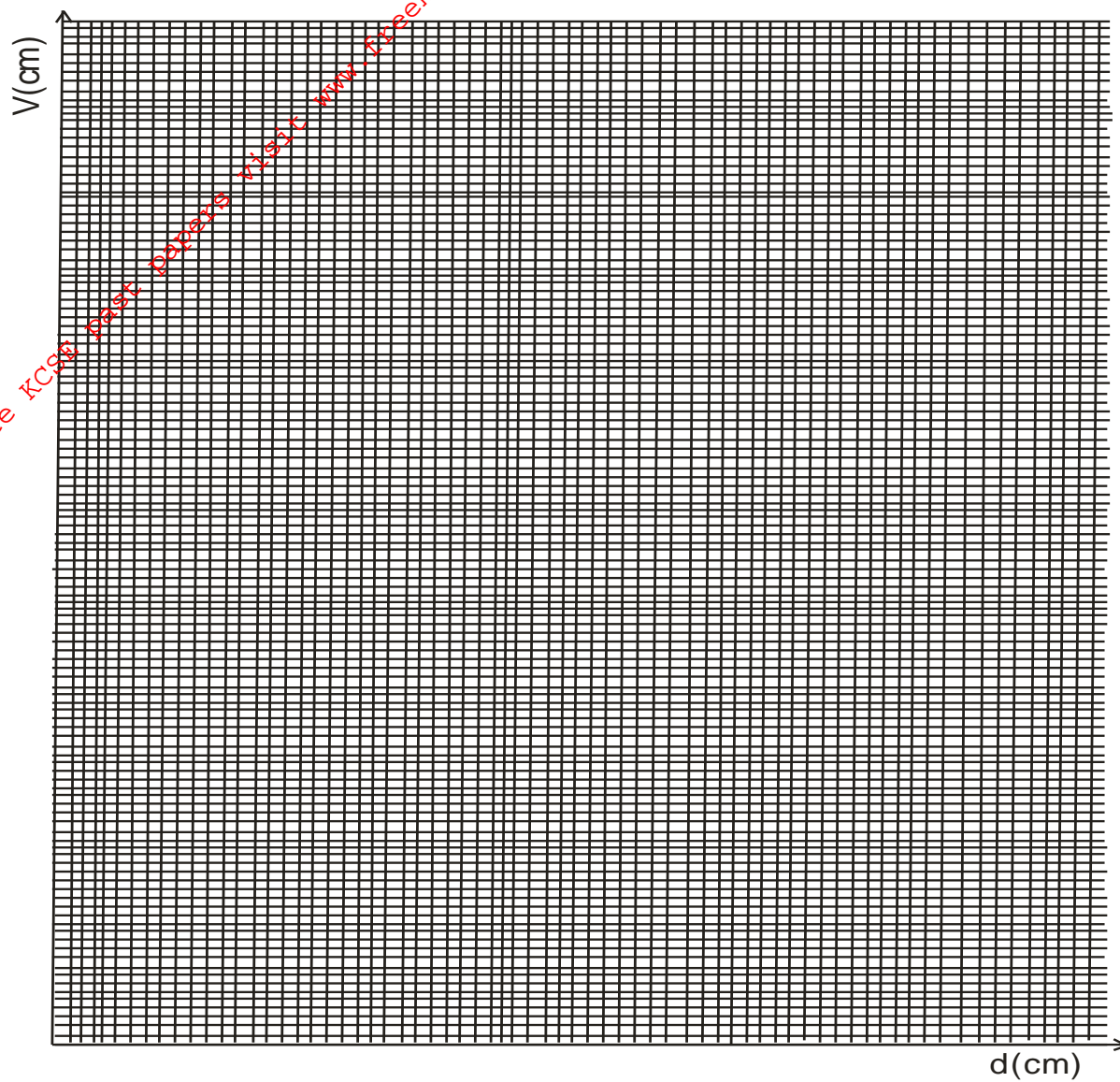
f) On the axes provided below, plot the graph of  $v$ (y-axis) against  $d$ .

(3marks)



f) On the axis provided below, plot the graph of  $v$  (y – axis) against  $d$ .

(3marks)



g) I) From the graph, at  $d = 70\text{cm}$ . determine;

I. the value of  $v$ .

(1mark)

II. the slope  $S$  of the graph.

(3marks)

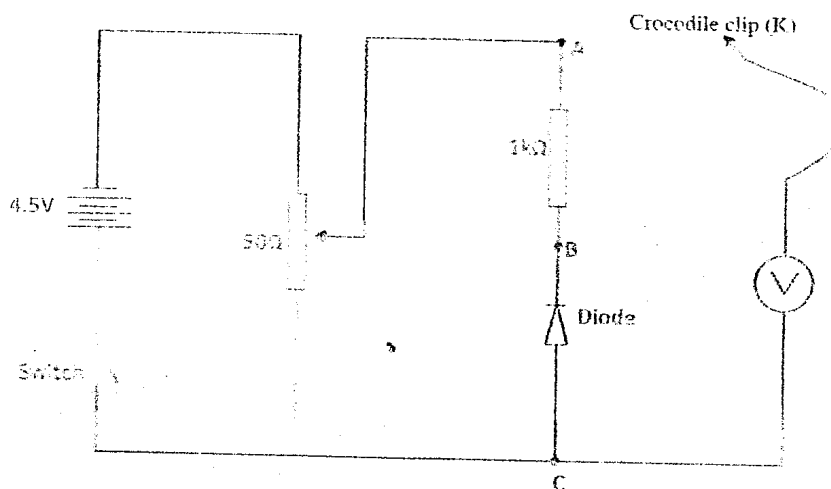
- ii) Given that  $K = \frac{-225}{(d-55)^2}$   
determine the value of K (2marks)
- iii) determine the value of m given that  $m = \frac{S}{K}$  (2marks)

### Question 2

You are provided with the following;

- A voltmeter
- A diode with ends labelled B and C
- A 1k  $\Omega$  resistor
- A 50 $\Omega$  potentiometer
- 3 dry cells and a cell holder
- A switch
- 8 connecting wires (at least 4 with crocodile clips)
- Proceed as follows;

- a) Set up the circuit as shown in figure 3.



**Figure 3**

- b) i) Connect the crocodile clip K to point A. Adjust the potentiometer by turning the knob until the voltmeter reading is maximum.

Maximum voltmeter reading = \_\_\_\_\_ volts. (1mark)

- ii) Without adjusting the potentiometer, disconnect the crocodile clip K from point A and connect it to point B. record the voltmeter reading.

Voltmeter reading = \_\_\_\_\_ volts. (1mark)

- iii) Explain why the voltmeter reading in b(i) is different from that in b(ii). (2marks)

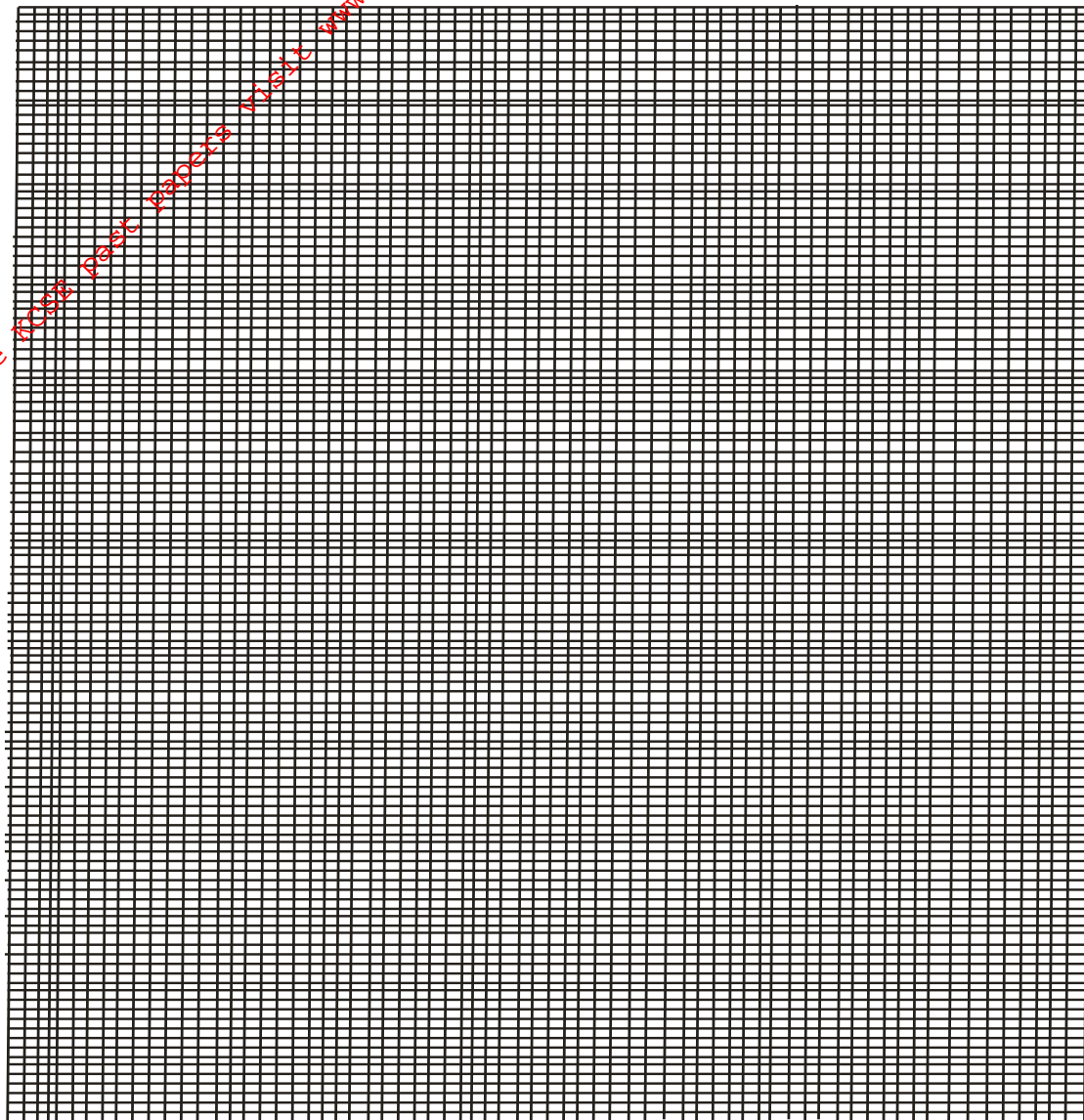
- c) Disconnect the crocodile clip K from point B and connect it to point A. Adjust the potentiometer so that the voltmeter reading  $V_A$  is 1.0V. Disconnect the crocodile clip K from A and connect it to point B. Record the voltmeter reading  $V_B$ .

$V_B$  = \_\_\_\_\_ volts. (1mark)

- d) By adjusting the potentiometer to obtain other values of  $V_A$  (when K is at A) shown in table 2, repeat the procedure in (c) to obtain the corresponding values of  $V_B$  (when K is at B) and complete the table.

$V_A(V)$	$V_B(V)$	$I = \left( \frac{V_A - V_B}{1000} \right) (A)$
1.5		
2.0		
2.5		
3.0		
3.5		
4.0		

- c) On the grid provided, plot a graph of  $I$  (y – axis) against  $V_B$ .



- f) Use the graph to determine the resistance of the diode when the current is 0.45A.  
(3marks)