Assignment-6 Experiment-6

To study V-I Characteristics of a Light Dependent Resistor (LDR)

Aim

To measure the photoconductive nature and the dark resistance of the given light dependent resistor (LDR) and to plot the characteristics of the LDR.

Apparatus Required

LDR, Resistor (1 kΩ), ammeter (0 – 10 mA), voltmeter (0 – 10 V), light source, regulated power supply.

Formula

By ohm's law, $V = IR$ (or) $R = \frac{V}{I}$ ohm

where R is the resistance of the LDR (i.e) the resistance when the LDR is closed. V and I represents the corresponding voltage and current respectively.

Principle

The photoconductive device is based on the decrease in the resistance of certain semiconductor materials when they are exposed to both infrared and visible radiation.

The photoconductivity is the result of carrier excitation due to light absorption and the figure of merit depends on the light absorption efficiency. The increase in conductivity is due to an increase in the number of mobile charge carriers in the material.

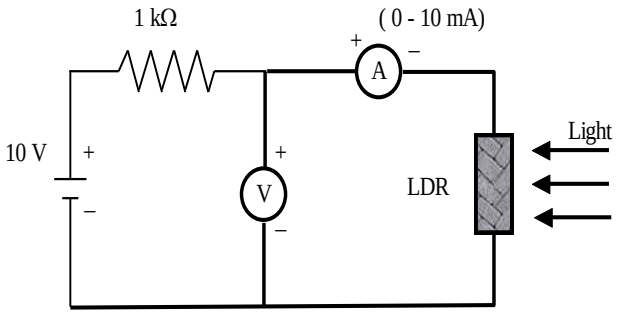

Fig. 6.1 Circuit diagram

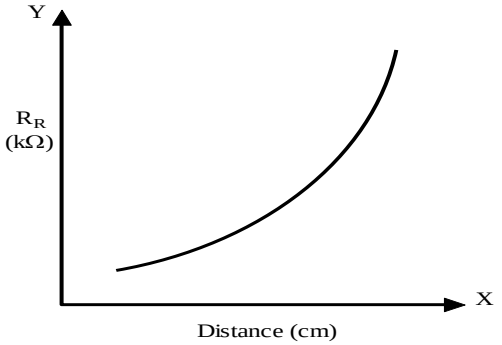

Fig.6.2 Model graph

To determine the resistances of LDR at different distances

S.No	Distance (cm)	Voltmeter reading (V) volt	Ammeter reading (I) mA	R_R kΩ
1	A = 15 cm	1	4	?
2		2	6	?
3		3	10	?
4		4	12	?
5		5	14	?
			Mean R_R	
1	B=10 cm	1	8	?
2		2	12	?
3		3	16	?
4		4	20	?
5		5	24	?
			Mean R_R	
1	C=5 cm	1	10	?
2		2	14	?
3		3	18	?
4		4	23	?
5		5	28	?
			Mean R_R	

Assignment Question:

1. By using the voltmeter and ammeter readings in the tabular coloum (V and I), calculate the resistance R_R and enter the values in three decimal points in the last coloum of the tabular coloum in your observation note book.

2. Calculate the mean value of resistance of all the five readings for each distance and enter the same in tabular coloum.

3. Draw the graph between Distance (cm) in X axis and mean value of Resistance R_R (KΩ) in Y axis.

4. Identify the maximum value of resistance when the intensity of light is minimum (15 cm). This is called Dark Resistance.

5. Write the result in the following order

   (i) The characteristics of LDR were studied and plotted.

   (ii) The dark resistance of the given LDR =…….K ohm

   Finally, submit the scanned copy of your observation note book in GCR on (or) before THREE working days from the date of experiment.