To Study Effect Of Intensity Of Light (By Varying Distance Of He Source) On An LDR

Aim

To study effect of intensity of light (by varying distance of the source) on an LDR.

Apparatus

Light source, light dependent resistors (L.D.R.s) of different variety, a Multimeter (or meter bridge), a source of intense light (a lamp bulb with battery eliminator) and a convex lens.

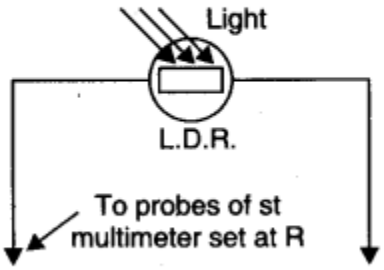
Light Dependent Resistor

The light dependent resistance are the devices for detecting and measuring electromagnetic waves (light etc.). Its working is based upon the principle of variation of the photoconductivity when radiation is incident upon it and absorbed by it.
A light dependent resistor is prepared from cadmium sulphide. Its resistance depends upon the intensity and duration of light incident on it.
A good quality LDR shows a resistance variation from 1 MΩ in complete darkness to about 10 Ω in full day light. The intensity of light decreases inversely with increase the square of distance.

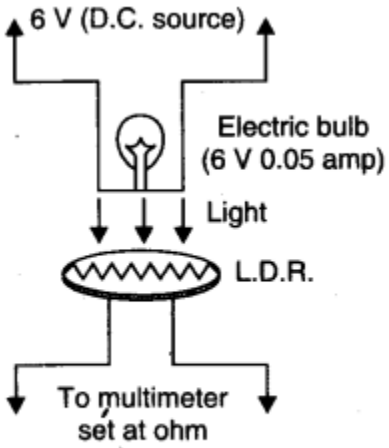
Procedure

1. Turn the selector switch and set it on R for the measurement of resistance, in Multimeter.
2. Plug the metallic ends of black probe in terminal marked common in Multimeter and that of red in terminal marked as P (or +). Short the other metallic ends and adjust the ‘R adjusting’ to get full scale deflection reading at zero ohm in the meter.
3. Touch the metallic probes to the two metal ends of the L.D.R. [Fig. (a)] and read the value of resistance when (a) the source is kept at a distance of 2 cm, fixing the source of light in a stand and keeping the L.D.R. vertically below it.
   (i) Moving the source to 4 cm distance from the L.D.R. and
   (ii) Moving the source to 6,8 and 10 cm from L.D.R. and repeating observation three more times.

Observation record



(*a*) Symbol of L.D.R.



(*b*) L.D.R. in series with a 6 V battery and exposed to light from bulb incident normally

Table for Light Exposure Time and Resistance

Serial No. of Obs. *(1)*	*Distance of source from L.D.R. (cm)* *(2)*	*Resistance of L.D.R. R (ohm)* *(3)*	*Decrease in Resistance R (ohm)* *(4)*
1	2	.....	.....
2	4	.....	.....
3	6	.....	.....
4	8	.....	.....
5	10	.....	.....

Conclusion

When the distance between light source and L.D.R. increases the resistance of L.D.R. decreases.

Note: Same activity can be done by varying the exposure time in steps for same source of light, same LDR and for same distance.

Precautions

1. No stray light should fall on the L.D.R. It is better to work in a dark room.
2. Connect L.D.R. carefully to the voltage source.

Viva Voce

Question. 1. Mention names of three basic logic gates.
Answer. (i) OR gate, (ii) AND gate, (iii) NOT gate.

Question. 2. What do you mean by logic gate in electronics?
Answer. The circuit which is used to perform the switching action is called a logic gate.

Question.3. What are n-p-n and p-n-p transistors?
Answer. An npn transistor consists of a thin p-type layer sandwiched between two thick n-type layers. A p-n-p transistor consists of a thin n-type layer sandwiched between two thick n-type layers.

Question. 4. In a transistor, base is made thin and is doped very lightly. Why?
Answer. Base is made very thin and is doped lightly so that most of the carriers are attracted straight into the collector and very few combine in the base. Therefore, to reduce the I_b and to increase I_c .

Question. 5. When does a diode work as an open switch?
Answer. In reverse bias, a diode works as an open switch.