ACTIVITY

AIM

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

MATERIAL REQUIRED

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

THEORY

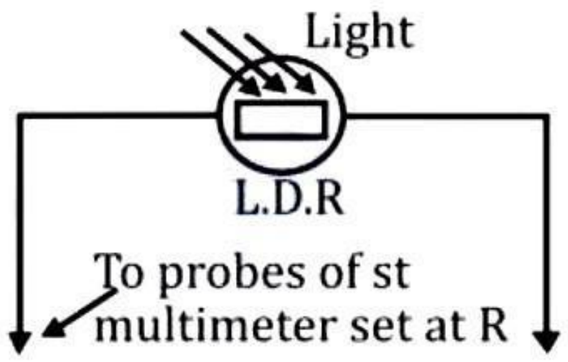
Light Dependent Resistor

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

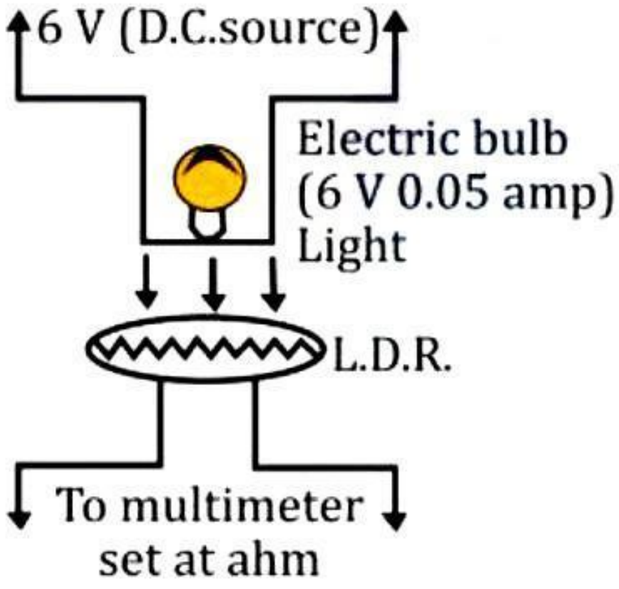
PROCEDURE

1. Turn the selector switch and set it on *R* for the measurement of resistance, in a multimeter.
2. Plug the metallic ends of the black probe in the terminal marked common in a multimeter and that of red in the terminal marked as P(or +). Short the other metallic ends and adjust the 'R adjusting' to get a full-scale deflection reading at zero ohms in the meter.

Touch the metallic probes to the two metal ends of the L.D.R. (Fig.) and read the value of resistance when,



(a) Symbol of L.D.R.



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

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.

(a) Moving the source to (a) 4cm distance from the L.D.R. and

(b) Moving the source to 6,8 and 10 cm from L.D.R. and repeating the observation three more times.

OBSERVATION

TABLE FOR LIGHT EXPOSURE TIME AND RESISTANCE

S. No.	Distance of source from *L, D, R.* (cm)	Resistance of L.D.R. R (ohm)	Decrease in Resistance R(ohm)
1.			
2.			
3.			
4.			
5.			

CALCULATION

Create a graph depicting d against R, with d on the X-axis and R on the Y-axis. The graph's characteristic will be a straight line that passes through the origin.

RESULT

When the distance between the 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 the same source of light, the same LDR, and the 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.

SOURCE OF ERROR

The presence of background illumination introduces an error in this activity.

VIVA- VOCE

Q 1. Mention the names of three basic logic gates.

Ans. The names of three basic logic gates are:

(i) OR gate

(ii) AND gate

(iii) NOT gate

Q 2. What do you mean by the logic gate in electronics?

Ans. The circuit which is used to perform the switching action is called a logic gate.

Q 3. What are *n-p-n* and *p-n-p* transistors?

Ans. 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.

Q 4. In a transistor, the base is made thin and is doped very lightly. Why?

Ans. The 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.

Q 5. When does a diode work as an open switch?

Ans. In reverse bias, a diode works as an open switch.