

## (DC1-4) Light Dependent Resistance, LDR

## Aim of experiment

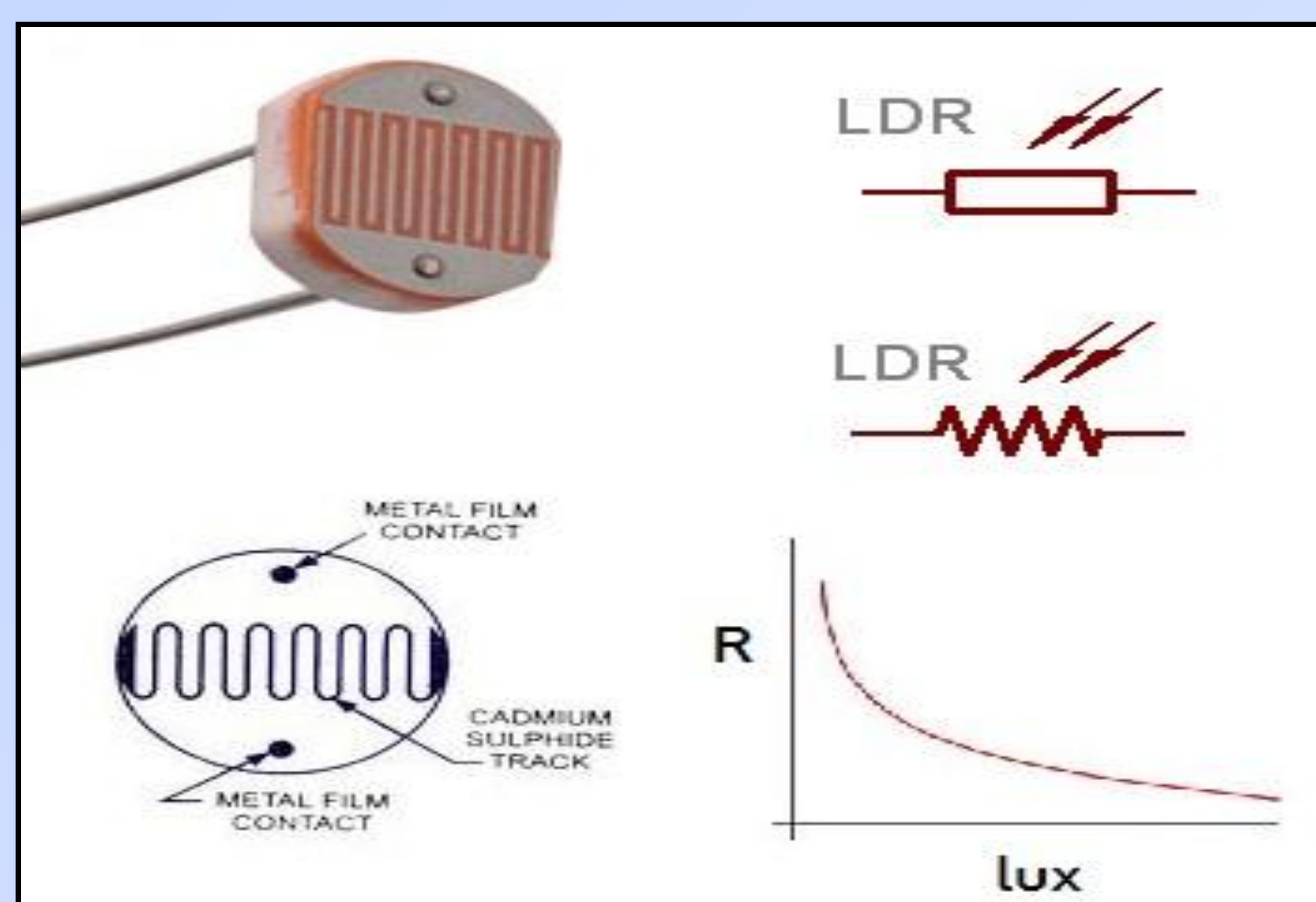
## Study of the LDR characteristics.

## Tools

LDR – Resistor =470 ohm –Lamp –  
Ammeter- Voltmeter - DC Power  
Supply.

## Theory of experiment

An LDR is an input transducer (sensor) which converts light intensity to resistance. It is made from cadmium sulphide (CdS) and the resistance decreases as light intensity falling on the LDR increases, *figure 1*.



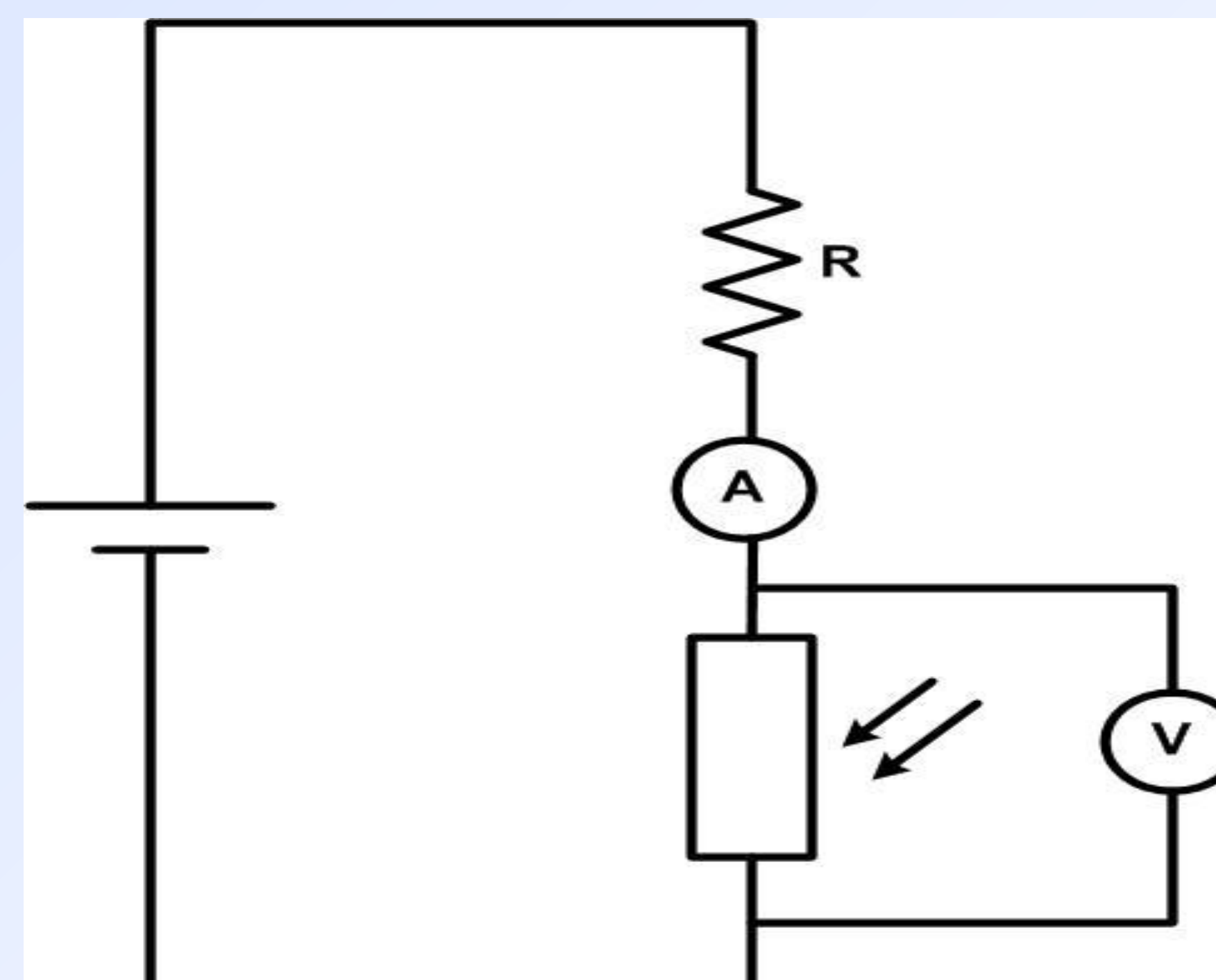
**Figure 1** LDR symbols and Resistance –lux (light intensity) characteristics

A light-dependent resistor alternatively called an LDR, photoresistor, photoconductor, or photocell, is a variable resistor whose value decreases with increasing incident light intensity.

An LDR is made of a high-resistance semiconductor. If light falling on the device is of high enough frequency, photons absorbed by the semiconductor give bound electrons enough energy to jump into the conduction band. The resulting free electron (and its hole partner) conduct electricity, thereby lowering resistance.

In this experiment, one measures the relation between light intensity of a monochromatic source and the LDR resistance,  $R_{\text{LDR}}$ . Light intensity of a light source follows the inverse square law with distance. So, increasing the distance from the light source, the intensity decreases nonlinearly. Consequently, the resistance increases, until it reaches an equilibrium state.

Alternatively, if one plots the relation between  $R_{\text{LDR}}$  and  $1/d^2$  one obtains the same behaviour curve depicted in *figure 1*.



*Figure 2* The circuit diagram used

## Procedures

1. Connect the circuit as shown in *figure 2*.
2. Turn on the DC power supply at 10 Volt.
3. Change the light intensity by changing the distance between the lamp and LDR each 0.2 cm and record the corresponding value of current and voltage drop across LDR in each case up to reach equilibrium value.
4. Calculate the resistance of LDR,  $R_{\text{LDR}}$ .
5. Draw a graph between the distance  $d$  on X- axis and  $R_{\text{LDR}}$  on Y –axis.
6. Comment on the graph

## Results

[illegible]