

ECE1008 (SENSORS & CONTROL SYSTEMS) EXPERIMENT – 6

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AIM –

Design LDR sensor circuit and demonstrate its functioning

MATERIALS REQUIRED –

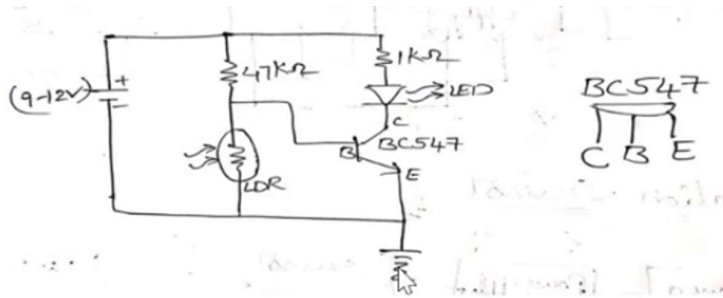
Bread board, connecting wires, LDR sensor, transformer, LED, BC547 transistor, resistor 1k ohm and 47k ohm.

WHAT IS LIGHT DEPENDENT RESISTOR ?

Light Dependent Resistor (also known as a photoresistor or LDR) is a device whose resistivity is a function of the incident electromagnetic radiation. Hence, they are light-sensitive devices. They are also called as photoconductors, photoconductive cells or simply photocells.

They are made up of semiconductor materials that have high resistance. There are many different symbols used to indicate a photoresistor or LDR.

CIRCUIT DIGRAM –

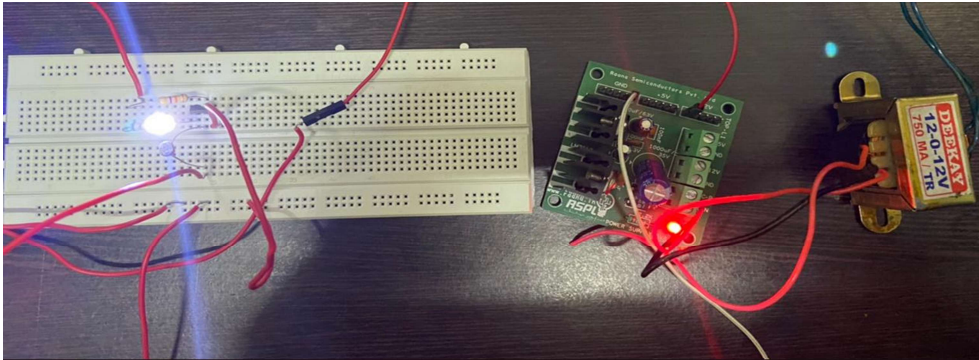


PROCEDURE –

1. Place BC547 transistor in 3 different holes of bread board.
2. Place the 47k ohm and 1k ohm parallel to each other.
3. Connect positive of LED to 1k ohm resistor and negative of LED to collector of transistor.
4. Place LDR positive to 47k ohm resistor and negative to ground.
5. Connect base emitter of transistor in between 47k ohm resistor and LDR.
6. Give the 12V power supply. Connect the positive power supply to resistors and negative to ground.
7. Connect emitter of transistor to ground.
8. Switch on the power supply.
9. LED glows as we on the power supply. If we provide external light on LDR, LED stops glowing.
10. This shows that LDR detects light and in return stops the LED from glowing.

WORKING OF L.D.R –

Photoresistors work based on the principle of photoconductivity. Photoconductivity is an optical phenomenon in which the material's conductivity is increased when light is absorbed by the material. When light falls i.e., when the photons fall on the device, the electrons in the valence band of the semiconductor material are excited to the conduction band. These photons in the incident light should have energy greater than the bandgap of the semiconductor material to make the electrons jump from the valence band to the conduction band. Hence when light having enough energy strikes on the device, more and more electrons are excited to the conduction band which results in a large number of charge carriers. The result of this process is more and more current starts flowing through the device when the circuit is closed and hence it is said that the resistance of the device has been decreased. This is the most common working principle of LDR.



APPLICATIONS –

They are used in burglar alarms, alarm clocks, light intensity meters, detects absence or presence of light like in the camera light meter.

CONCLUSION –

Whenever the external light is emitted on LDR, it stops LED from glowing. This sensor is useful for making automatic bed lights.