

TAP 111- 2: Applications of semiconductor devices

Circus of demonstrations: LDR, thermistor, semiconductor diode.

This is an opportunity to discuss applications. You could also introduce some ideas that will be useful later – alternating current, rectification, potential dividers, use of oscilloscopes, control circuits etc...

There are many possibilities, some of which are listed below:

- Half-wave rectification using a single diode
- Full-wave rectification using a bridge rectifier (4 diodes)
- A thermistor as a temperature sensing circuit (e.g. to switch on a fan/motor) when hot
- An LDR as a light sensor to sound an alarm when a light beam is broken (e.g. a burglar alarm)

Procedure:

You could treat this as a construction exercise, getting different groups to make different circuits and then explain them to the rest of the class.

Be aware of the power rating of the diodes and thermistors in each case, and ensure that they are not damaged by excessive currents, by suggesting suitable series resistors.

The diode 1N4001 (NB: max current 1 A) with a protective resistor $\sim 50 \Omega$ or greater, is suitable.

For a negative temperature coefficient thermistor care should be exercised to avoid thermal runaway, where its drop of resistance with temperature can lead to as a damaging growth of power dissipation with time. This is prevented by inclusion of a suitable series resistor, as before.

Some students may be familiar with uses of semiconductor devices from their experience in Technology; in which case, ask them to provide some demonstrations.