To study the static characteristic of a transistor (Common Emitter Configuration)

Product Categories: (Class -12), Physics Experiment
Product Tags: Analytical Laboratory Equipment, Educational Equipment, physics Equipments, Scientific Equipment
Product Page: https://www.labappara.com/product/study-static-characteristic-transistor-common-emitter-configuration/

Product Description

Transistor characteristics:

Our Objective:

To study the static characteristic of a transistor (Common Emitter Configuration)

The Theory:

A transistor is a semiconductor device used to amplify or switch electronic signals and electrical power. It is composed of semiconductor material with at least three terminals for connection to an external circuit. A voltage or current applied to one pair of the transistor's terminals changes the current through another pair of terminals. Because the controlled (output) power can be higher than the controlling (input) power, a transistor can amplify a signal.

Bipolar Junction Transistors

Bipolar Junction Transistors are transistors which are made up of 3 regions, the base, the collector, and the emitter. A small current entering in the base region of the transistor causes a much larger current flow from the emitter to the collector region. Bipolar junction transistors come in two main types, npn and pnp. A npn transistor is one in which the majority current carrier are electrons. Electron flowing from the emitter to the collector forms the base of the majority of current flow through the transistor. The other type of charge,holes, are a minority. pnp transistors are the opposite. In pnp transistors, the majority current carriers are holes.

The circuit diagram for npn transistor is shown below.

Transistor characteristics:

1) Input characteristics

Keeping the collector- emitter (VCE) voltage constant, the base- emitter (VBE) voltage is increased from 0 and the corresponding base current (IB) values are noted. This is repeated for increasing values of VCE. The family of curve obtained by plotting IB against VBE for each VCE value is called input characteristics.

2) Output Characteristics

By keeping the base current (IB) constant, collector- emitter (VCE) voltage is varied and the corresponding IC values are obtained. This is repeated for increasing values of IB. The family of curves obtained by plotting IC against VCE for each value of IB is called output characteristics.

Learning Outcomes:

Students understand the following terms:

Transistor

pnp and npn transistors

Transistor characteristics

Students will be able to do the experiment, once they understand the procedure.