Session 1

Introduction to Digital Electronics and Pulse Techniques Lab

OBJECTIVES: To get basic and preliminary ideas of Transistors, Diodes, Multimeter, Trainer Board etc.

Trainer Board:

The Analog/Digital Training System consists of DC power supply, breadboard, pulse generator and a digital probe.

Useful features include:

1. DC Power Supply
   - Fixed DC Inputs: +5V & -5V
   - Variable DC Inputs: +1.5V to +15V, -1.5V to -15V
2. Breadboard
   - Terminal strips arranged for easy connection of standard ICs.
3. Pulse Generator
4. Digital Probe

Multimeter:

A Multimeter is a combination of Voltmeter, Ammeter and Ohmmeter. They provide an easy way to measure different parameters of an electronic circuit like current, voltage etc.

Multimeters can measure values in both AC and DC. Earlier Multimeters are Analog and consists of a pointing needle. Modern Multimeters are Digital and are often called as Digital Multimeters or DMMs.

Useful features include:

1. To measure voltage levels, current and resistance.
2. To check the transistors and diodes proper functioning.

Diodes:

A Diode is a non-linear semiconductor device that allows flow of current in one direction. A Diode is a two–terminal device and the two terminals are Anode and Cathode respectively.

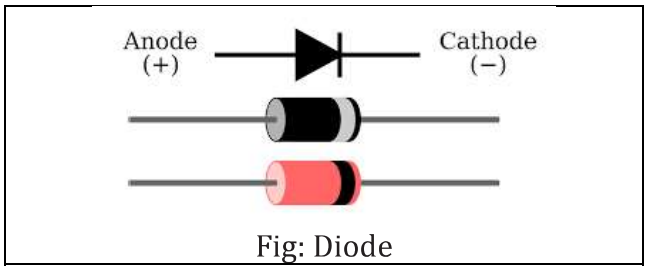

Fig: Diode

Transistors:

Transistor, the invention that changed the future of electronic circuits, is a semiconductor device that can be used to either switch electrical power or amplify electronic signals.

A Transistor is a 3 terminal device that can either a current controlled device or a voltage controlled device. Transistors are further classified in to Bipolar Junction Transistors (BJT) and Field Effect Transistors (FET).

A Bipolar Junction Transistor or BJT uses both the charge carriers i.e. electrons and holes and is often used as a current amplifier. Based on the construction, BJTs are further divided in to NPN and PNP Transistors.

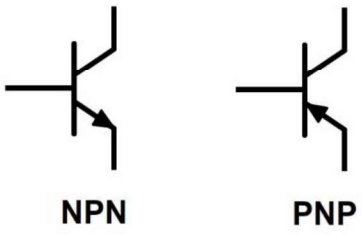

Fig: Two types of transistors

In the lab we will use NPN transistor (BD135). The transistor has three pins labeled as emitter, base and collector as shown in the following figure.

Fig: Pin Diagram of NPN transistor (BD135)