Contents

UNIT- ELECTRONICS

LEARNING OBJECTIVES….

After Completing this Unit Students will able to Understand Concept of Electronics and its use-

- Able to understand about Charge and Current.
- Able to differentiate between conductor and insulator & their generation methods.
- Able to understand about types of connections used in electronics.

Electronics

"Electronics is a branch of science in which we learn about the flow of charge. We primarily work with direct current (DC) voltage."

Electronics learning used to make devices such as Remote-Controlled Car, Calculator, Radio, Digital Watch, TVs, Satellite, Missiles and Autonomous Air Vehicles. etc

Charge

Electric charge is the physical property of matter. There are two types of electric charge: *positive* and *negative* (commonly carried by protons and electrons).

Charges are of two types

1. Negative or Electron (-)
2. Positive or Proton (+)

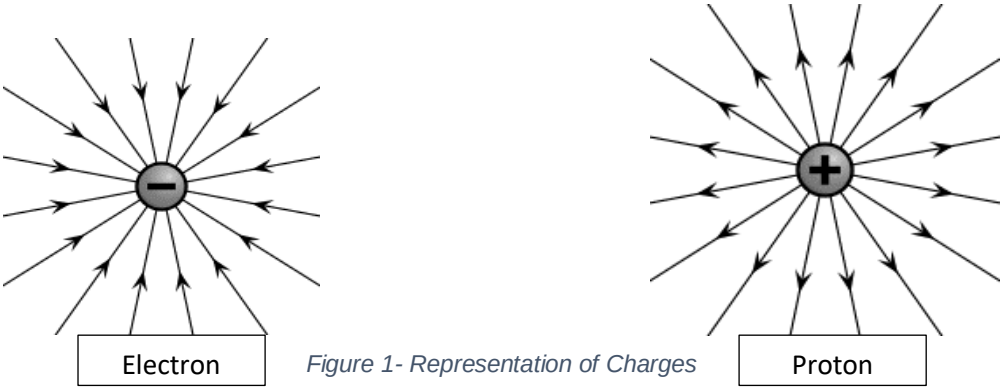
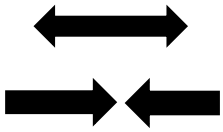


Figure 1- Representation of Charges

Properties of Charge

1. Same Charges Repel Each Other
2. Different Charges Attract Each Other



Current

"Current is flow of Charge." Current measured in Ampere

(OR)

Current is the movement of electric charge along a pathway, much like water flowing in a river. In a circuit, electrons flow from the negative terminal of a battery, through wires, and back to the positive terminal.

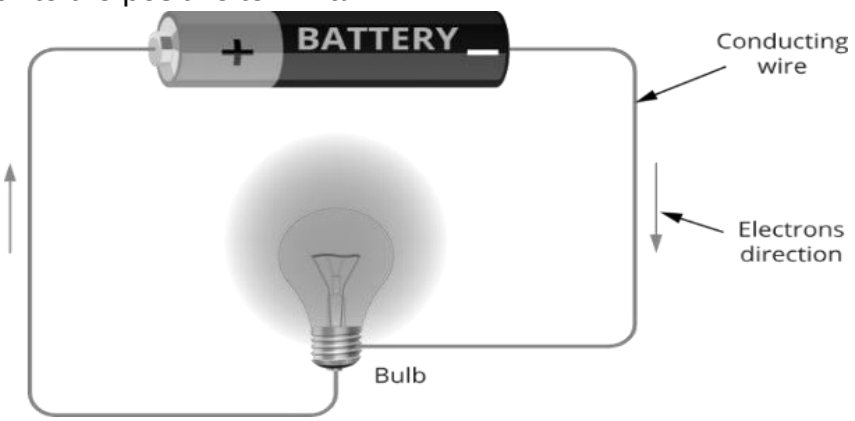


Figure 2- Representation of flow of charges

Voltage

"Voltage is the pressure that pushes charges." Voltage measures in Volt

(OR)

For example, consider a water tank on a hill. The higher the tank is placed, the greater the pressure of the water flowing out of the tap at the bottom of the tank. Similarly, in an electrical circuit, a higher voltage provides more "push" for electric charges to move through the circuit. This push is what drives current flow, just as higher pressure drives water flow in a pipe.

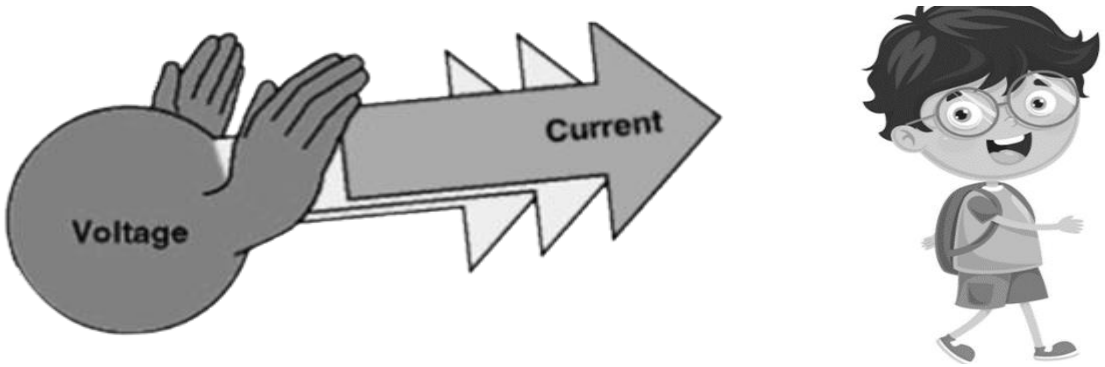


Figure 3- Representation of Voltage

Battery-

A battery is like a little power pack. They provide electricity to devices like toys, remotes, or phones. Each battery has a positive (+) and negative (-) end.

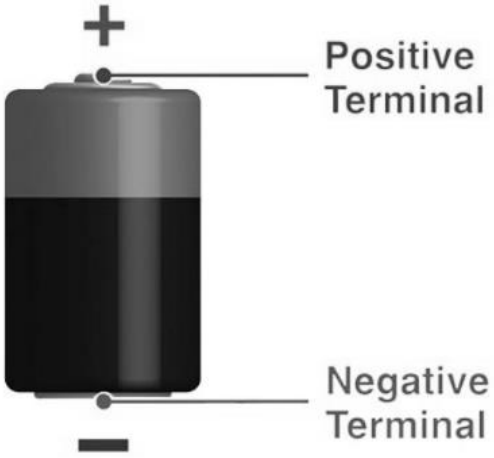


Figure 1 Representation of Battery

Conductor

Conductors are materials through which electricity can flow. Like Water flow through the pipe then pipe will be conductor for the water.

Examples of conductors include metals like **gold**, **silver**, **wires, iron, water,** etc.

Figure 4- Representation of Conductors

Insulator

An insulator is like a barrier that stops electricity from flowing through it. Think of it as a roadblock for electric current.

Examples of insulator are wood, glass, bottle etc.

Figure 5- Representation of Insulator

Wire-

A wire is a pathway for electricity, like a road for cars, allowing electricity to flow from one place to another.

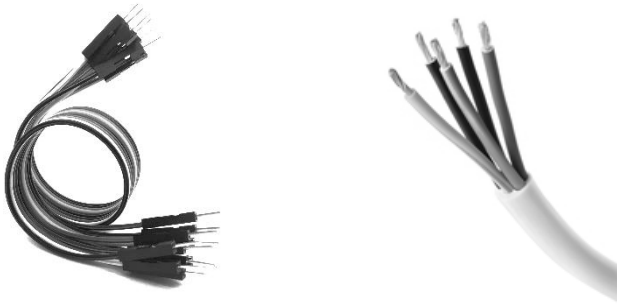


Figure 6- Representation of Wire

LED-

LED stands for "Light Emitting Diode.

When an electric current travels through a light-emitting diode (LED), it emits light.

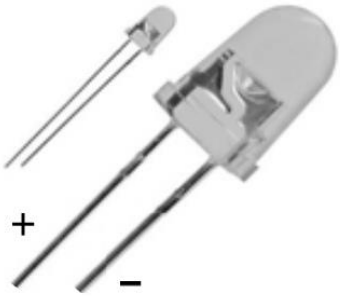


Figure 2 Representation of LED

Buzzer-

A buzzer is a simple device that makes a loud buzzing sound when electricity passes through it.

Figure 3 Representation of Buzzer

Breadboard-

A breadboard is a tool used in electronics to build and test circuits without soldering.

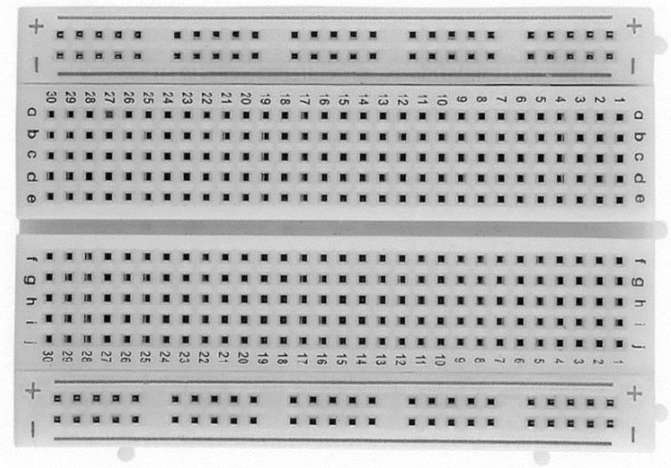


Figure 4 Representation on Breadboard

Activities

(LED Glow & Diming LED)

Electrical Connections:

“Electrical Connections are of two types given below.”

1. Series (Cascade) Connection.
2. Parallel (Shunt) Connection.

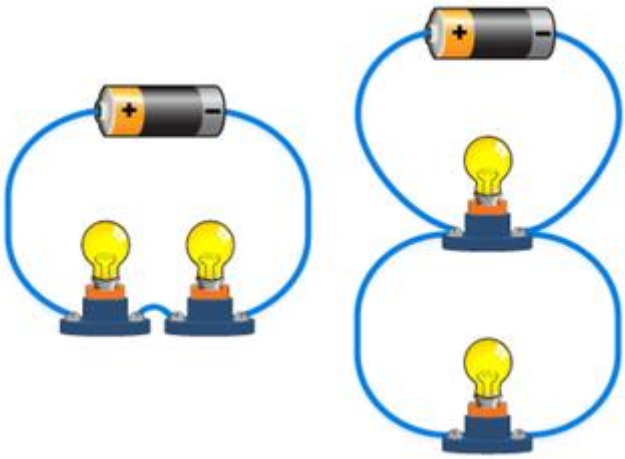


Figure – Representation of Series and Parallel

Resistor:

Resistor is an electronic Component that opposes the flow of charge (Current). It’s just like a traffic light or Breakers on road.

For your Knowledge Resistance is the measure of Breakers height on road (Conductor).

Figure- Representation of Resistor

Project 1- Series & Parallel Connection with Different projects

LDR (Light Dependent Resistor):

An LDR, or **Light Dependent Resistor**, is a component which sense light.

Project 2- Alarm

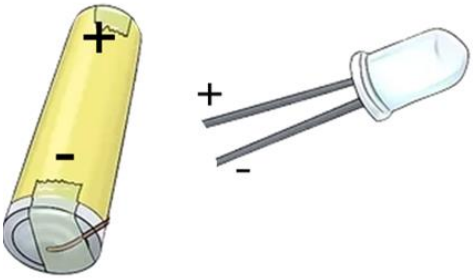
NOTES AT A GLANCE-

- Electronics: Branch of science involving charge flow and DC voltage.
- Charge: Positive and negative types, repel or attract.
- Current: Flow of charge, measured in Amperes.
- Voltage: Pressure pushing charges, measured in Volts.
- Battery: Provides electricity, positive and negative ends.
- Conductor: Allows electricity flow (e.g., metals).
- Insulator: Blocks electricity flow (e.g., wood).
- LED: Emits light with current flow.
- Buzzer: Produces sound with electric current.
- Breadboard: Tool for circuit building without soldering.
- Electrical Connections: Series and parallel types.
- Resistor: Opposes current flow.
- LDR (Light Dependent Resistor): Senses light.

Assessment

Q1. Write the terminal names of LED. (Use Pencil Only)

Q2. Complete the following circuit. (Use Pencil Only)



Multiple-choice questions (MCQs)

1. What is a conductor in electronics?
   a. A person who conducts experiments.
   b. A material that allows electricity to flow through easily
   c. An electronic device with buttons.
2. Which of the following is an example of a conductor?
   a. Plastic.
   b. Copper.
   c. Wood.
3. What do we use to connect electrical devices and create a pathway for electricity?
   a. Toys.
   b. Wires.
   c. Books.
4. What does a switch do in an electronic circuit?
   a. Turns on and off the lights.
   b. Makes noise.
   c. Changes colours.
5. Which material is commonly used to make electrical wires?
   a. Rubber.
   b. Glass.
   c. Copper.

Answer in Short-

Q1. Define Current?

Q2. Define Voltage?

Q3. What is “Flow of Charge”?

Answer in long

Q1. Write down the material that opposes the flow of electricity? With few examples.

Q2. Explain the below topics in short

1. Charge and its types
2. Insulator

(Completed. Well done. Now you are an Electronics Engineer)