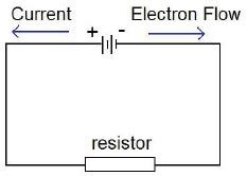
Ch-11 Electricity

1. **Current –** $I = \frac{Q}{t}$, Where, I = Current,
   Q = Net charge flowing, and
   t = time
2. Unit of current – The unit of current is Ampere.
   Q = Coulomb(C),
   I = Ampere(A), and
   t = Second(s) 1 A = $\frac{1\ C}{1\ s}$.
3. **Potential Difference –** The potential difference between two separate points is defined as the work done to move a unit positive charge from one point to another.
   $V = \frac{W}{Q}$.
4. Unit of potential difference – The unit of potential difference is Volt.
   1 Volt = $\frac{1\ \text{Joule}}{1\ \text{Coulomb}}$.
5. **Ohm's Law –**
   Potential Difference $\propto$ Current
   $V \propto I$
   V = I R, Where, R = Resistance.
6. Unit of Resistance – The unit of resistance is Ohm.
   R = Ω(Ohm),
   $1\Omega = \frac{1\ V}{1\ A}$.
7. **Factors on which resistance depends –**
   $R \propto l$, where, l = length,
   $R \propto \frac{1}{A}$, where, A = perpendicular cross-section,
   $R \propto \frac{l}{A}$,
   $R = \rho \frac{l}{A}$, where ρ = resistivity
8. **Resistivity –** Resistivity of a substance is equal to the resistance of a unit square of that substance. Its unit is Ω m.
9. **Resistance in a series connection –** $R_{total} = R_1 + R_2 + \ldots + R_n$.
10. **Resistance in parallel –** $\frac{1}{R_{total}} = \frac{1}{R_1} + \frac{1}{R_2} + \ldots + \frac{1}{R_n}$.
11. **Heating Effect of current –**
    Electric energy = V I t
    Heat, $H = V\ I\ t = I^2\ R\ t$
12. **Application –** Electric iron, toaster, fused wire, etc.
13. **Fused wire –** a low-melting point wire connected in series with electric devices for safety.
14. **Electric power –** $P = V\ I = I^2\ R = \frac{V^2}{R}$.
15. Unit of electric power – The unit of electric power is Watt.
    1 W = 1V × 1A,
    1 kWh = 3.6×10^6 J.

16. **Ohm's law –** Under constant physical conditions (i.e., constant temperature, pressure etc.), the current flowing through a conductor is directly proportional to the potential difference across the conductor.
17. Potential difference (which is measured in Voltage) is the cause of current (which is measured in Ampere).
18. In conductors, flow of electrons constitute current. In a circuit current flow from positive terminal of the battery to the negative terminal, but electrons travel from negative terminal to the positive terminal. The negative terminal of a battery is said to be at lower potential and the positive terminal is said to be at higher potential.



19. When a battery is not connected to any circuit, the potential difference across the terminals of the battery is equal to the EMF of the battery. (EMF = Electro Motive Force). Electromotive force, also called EMF, (denoted and measured in volts), refers to voltage generated by a battery or by the magnetic force according to Faraday's Law, which states that a time varying magnetic field will induce an electric current.