Kirchhoff's current law

This law is also called Kirchhoff's first law, Kirchhoff's point rule, Kirchhoff's junction rule, and Kirchhoff's nodal law.

The principle of conservation of electric charge implies that:

> At any point in an electrical circuit where charge density is not changing in time, the sum of currents flowing towards that point is equal to the sum of currents flowing away from that point.

The law may be written as

The algebraic sum of the current at a point on the circuit must be zero. The current towards the junction are taken positive and away from the junction are taken as negative.

Or $\Sigma I = 0$

Kirchhoff's voltage law

This law is also called Kirchhoff's second law, Kirchhoff's loop rule, and Kirchhoff's second rule.

The principle of conservation of energy implies that:

> The directed sum of the electrical potential difference around a circuit must be zero.

1. As we know that if we move in a close loop and come back to the same point the potential will not change

2. There is increase in electric potential across an electric cell equal to its emf (decrease if connected in opposite way).

3. The electric potential is dropped across a resistor R in the direction of current by I*R where I is current across it (will increase in the direction opposite to the current).

Hence the rule may be written as in a close mesh in a particular direction the algebraic sum of the emfs and the product of IR is zero

or $\Sigma E - \Sigma IR = 0$