# Quiz # 8

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## Difference between Ampere's Law and biot Savart Law:-

- Biot Savart Law is a basic general Law to find magnetic field while ampere is drived after biot Savart Law.
- Biot Savart Law gives the magnetic field produced by a loop of any shape while ampere's Law is a simplified and convenient version for symmetrical wire and magnetic field configuration.
- The formula for biot Savart Law is

  $B = \frac{U.NI}{2R}$ it mean it find magnetic field of a small region of a wire while formula for ampere's Law is

  $\oint \vec{B}.\vec{dl} = U.I$ find magnetic field of whole conductor.

## Ampere's Law:-

Ampere's Law state that the closed line integral of magnetic field around a current carrying conductor is equal to the absolute permeability times the total current enclosed in conductor.

**Formula:-**

$$\oint \vec{B} \cdot d\vec{l} = \mu \cdot I$$

## Applications of ampere law in electronic Lab:-

- **Magnetic field due to Solenoid:-**

To find Magnetic field in solenoid ampere Law is used

$$B = \mu_0 nI$$

where n is number of turns per lenght and I is current passing through solenoid.

$\mu_0$ is permiability of free space

- **Magnetic field due to a Long wire of Lenght l :-**

To find magnetic field of Long wire in which current is passing through ampere law is used

$B = \frac{\mu_0}{4\pi}\left(\frac{2l}{r}\right)$ is expression drived from ampere's law to find magnetic field

- **Magnetic field due to a point of a Toroid with respect to axis :-**

To find magnetic field of a Toroid ampere's Law is used

$B = \frac{\mu_0 NI}{2\pi r}$ $\quad n = \frac{N}{2\pi r}$

$B = \mu_0 nI$ is expression for magnetic field of toroid is drived from ampere's Law