

# 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 derived 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

$B = \frac{\mu_0 NI}{2R}$  it means it finds magnetic field of a small region of a wire while formula for ampere's Law is

$\oint \vec{B} \cdot d\vec{l} = \mu_0 I$  find magnetic field of whole conductor.



## Ampere's Law:-

Ampere's Law states 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:-

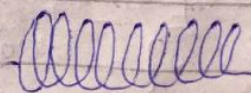
### • Magnetic field due to solenoid:-

To find magnetic field in solenoid ampere law is used

$$B = \mu_0 n I$$

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

$\mu_0$  is permeability of free space





- Magnetic field due to a Long wire of Length  $l$ :-

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

$B = \frac{\mu_0 (2l)}{4\pi r}$  is expression derived 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 derived from ampere's Law