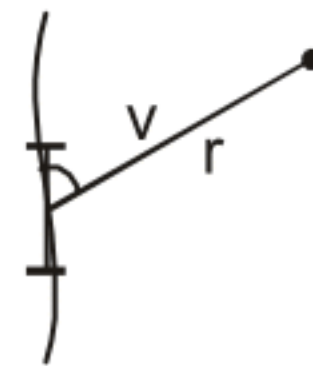


1. **Magnetic field due to a moving point charge**

$$\vec{B} = \frac{\mu_0}{4\pi} \cdot \frac{q(\vec{v} \times \vec{r})}{r^3}$$

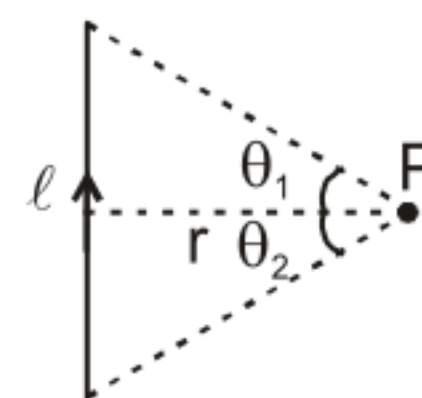


2. **Biot-savart's Law**

$$d\vec{B} = \frac{\mu_0 I}{4\pi} \cdot \left(\frac{d\vec{\ell} \times \vec{r}}{r^3} \right)$$

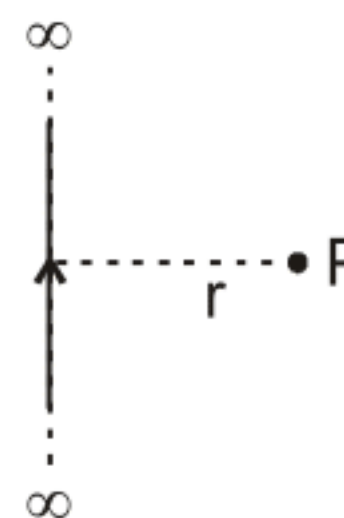
3. **Magnetic field due to a straight wire**

$$B = \frac{\mu_0}{4\pi} \frac{I}{r} (\sin \theta_1 + \sin \theta_2)$$



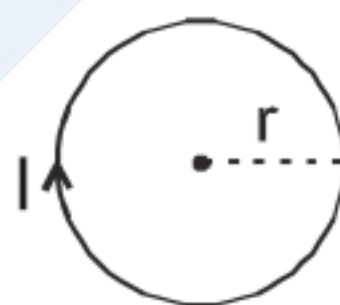
4. **Magnetic field due to infinite straight wire**

$$B = \frac{\mu_0}{2\pi} \frac{I}{r}$$



5. **Magnetic field due to circular loop**

(i) At centre

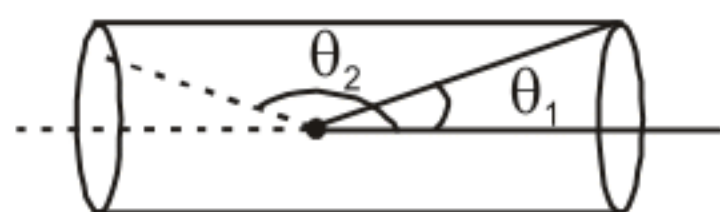


$$B = \frac{\mu_0 NI}{2r}$$

(ii) At Axis

$$B = \frac{\mu_0}{2} \left(\frac{NIR^2}{(R^2 + x^2)^{3/2}} \right)$$

6. **Magnetic field on the axis of the solenoid**



$$B = \frac{\mu_0 nI}{2} (\cos \theta_1 - \cos \theta_2)$$

7. **Ampere's Law**



$$\oint \vec{B} \cdot d\vec{\ell} = \mu_0 I$$

8. **Magnetic field due to long cylindrical shell**

$$B = 0, r < R$$

$$= \frac{\mu_0 I}{2\pi r}, r \geq R$$



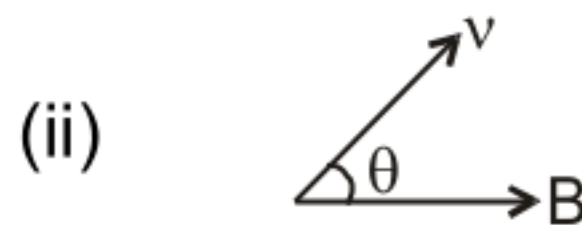
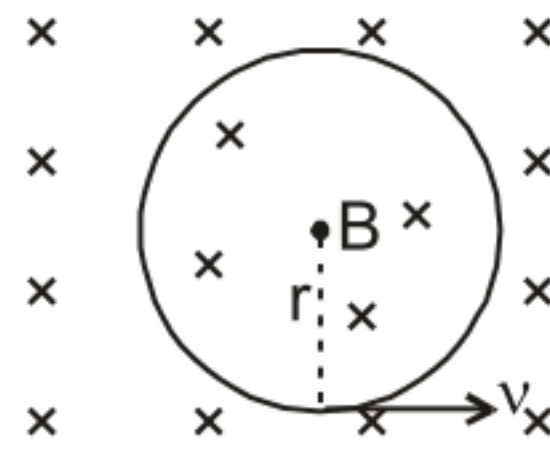
9. **magnetic force acting on a moving point charge**

a. $\vec{F} = q(\vec{v} \times \vec{B})$

(i) $\vec{v} \perp \vec{B}$

$$r = \frac{mv}{qB}$$

$$T = \frac{2\pi m}{qB}$$



$$r = \frac{mv \sin \theta}{qB}$$

$$T = \frac{2\pi m}{qB}$$

$$\text{Pitch} = \frac{2\pi m v \cos \theta}{qB}$$

b. $\vec{F} = q[(\vec{v} \times \vec{B}) + \vec{E}]$

10. **Magnetic force acting on a current carrying wire**

$$\vec{F} = I(\vec{l} \times \vec{B})$$

11. **Magnetic Moment of a current carrying loop**

$$M = N \cdot I \cdot A$$

12. **Torque acting on a loop**

$$\vec{\tau} = \vec{M} \times \vec{B}$$

13. **Magnetic field due to a single pole**

$$B = \frac{\mu_0 \cdot m}{4\pi r^2}$$

14. **Magnetic field on the axis of magnet**

$$B = \frac{\mu_0}{4\pi} \cdot \frac{2M}{r^3}$$

15. **Magnetic field on the equatorial axis of the magnet**

$$B = \frac{\mu_0}{4\pi} \cdot \frac{M}{r^3}$$

16. **Magnetic field at point P due to magnet**

$$B = \frac{\mu_0}{4\pi} \frac{M}{r^3} \sqrt{1 + 3\cos^2 \theta}$$

