Physics formula

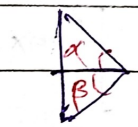
03/04/2020

① ~~Biot~~-savart's law.

$$dB = \frac{\mu_0 I\, dl \sin\theta}{4\pi \Sigma^2}$$

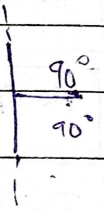
② formula of field for wire.

$$B = \frac{\mu_0 I}{4\pi \Sigma}(\sin\alpha + \sin\beta)$$



③ wire of infinite length

$$B = \frac{\mu_0 2I}{4\pi \Sigma}$$



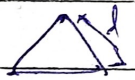
④ polygon.

$$B_{centre} = \frac{\mu_0 n I \sin(\pi/n) \cdot \tan(\pi/n)}{\pi l}$$

l → side length

a) for equilateral triangle.

$$B_{centre} = \frac{\mu_0 I (9)}{2\pi l}$$

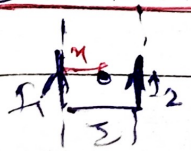


b) for square

$$B_c = \frac{\mu_0 I}{2\pi l}(4\sqrt{2})$$

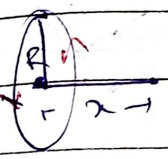
-parallel field (zero) होता है.

⑤ Neutral point (I/el wire)



$$x = \frac{I_1 \Sigma}{I_1 + I_2}$$

⑥ field at the axis of the Ring.

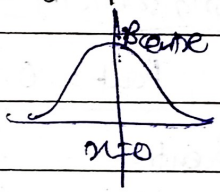


$$B_{axis} = \frac{\mu_0}{4\pi} \frac{2M}{(R^2+x^2)^{3/2}}$$

$M = I \times A$ (Dipole moment)

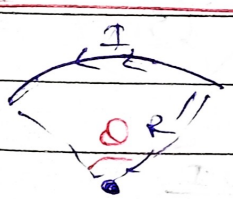
↓ closed body

$$B_c = \frac{\mu_0 I}{4\pi R} 2\pi$$



$$B_{axis} : \frac{B_{(centre)}}{(1+x^2/R^2)^{3/2}}$$

centre of Arc



$$B = \frac{\mu_0 I}{4\pi R}(\theta)$$

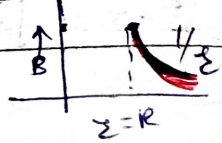
Ampere's law.

① Hollow pipe

$$B_{out} = \frac{\mu_0 2 I_{enclose}}{4\pi (\text{radius})}$$

$$B_{on} = \frac{\mu_0 2I}{4\pi R}$$

$B_{inside} = 0$

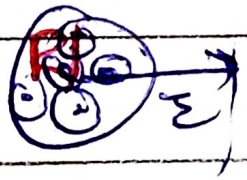


$M = NIA$ → closed body

$M = \frac{ql}{2m}$ → point charge

$M = m \times l_p$ → bar magnet

2) Solid pipe | Conducting wire

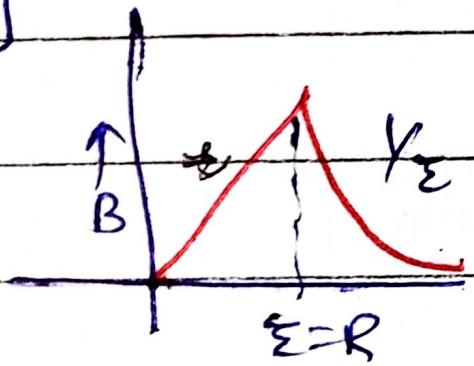


$$B_{outside} = \frac{\mu_0}{4\pi} \frac{2I}{\varepsilon}$$

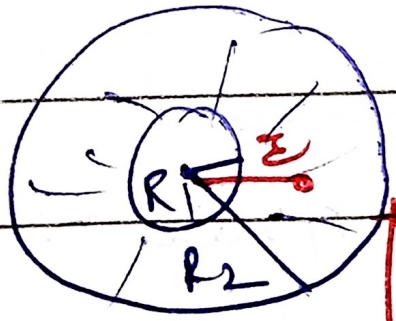
$$B_{out} = B_s \times R/\varepsilon$$

$$B_{surface} = \frac{\mu_0 2I}{4\pi R}$$

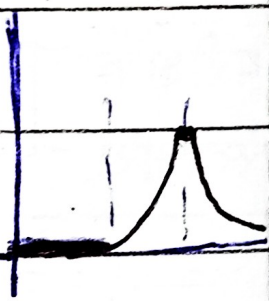
$$B_{inside} = B_s \, \varepsilon/R$$



3) Annular pipe



$$B_{out} = \frac{\mu_0 2I}{4\pi \varepsilon}$$



$$B_{inside} = \frac{\mu_0 2I}{4\pi \varepsilon} \left[\frac{\varepsilon^2 - R_1^2}{R_2^2 - R_1^2} \right]$$