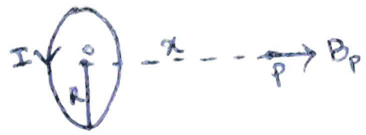
Sol : We are asked to calculate the Magnetic Field at center of current carrying loop.



So, Formula for that is,

$$\boxed{B_{Centre} = \frac{\mu_0 N I}{2R}} \quad (1)$$

N = no. of loop

∵ There is only a single loop

N = 1

I = current in the loop

R = radius of the loop.

We Donot Know the value of I

So, we Find I value using the following :-

Given,

Magnetic field at the point 'p', 7cm away from centre(B_p) = 48 MT = 48×10^{6} T

Using the formula,

Magnetic field at a point 'p' on axis of the loop,

$$B_p = \frac{\mu_0 N I R^2}{2(R^2+x^2)^{3/2}}$$

Given

$B_p = 48 \times 10^{6}$ T

x = 7cm = 0.07 m

R = 4cm = 0.04 m

Given,

No of loop N = 1

R = ~~4~~ 4 cm = 4×10^{-2} m

x = 7cm = 7×10^{-2} m

B_p = 48×10^{6} T

$$48 \times 10^{6} = \frac{\mu_0 I R^2}{2(x^2+R^2)^{3/2}}$$

As we need 'I' value, we will rearrange the above formula,

$$I = \frac{48 \times 10^{6} \times 2(x^2+R^2)^{3/2}}{\mu_0 R^2}$$

$$\boxed{I = \frac{96 \times 10^{6}(x^2+R^2)^{3/2}}{\mu_0 R^2}} \quad (2)$$

Substitute eq. (2) in eq. (1)

$$B_{centre} = \frac{\cancel{\mu_0}}{\cancel{2}R} \times \frac{\left[\overset{48}{\cancel{96}} \times 10^{6}(x^2+R^2)^{3/2}\right]}{\cancel{\mu_0}R^2}$$

$$= \frac{48 \times 10^{6}(x^2+R^2)^{3/2}}{R^3}$$

$$= 48 \times 10^{6} \frac{\left((7 \times 10^{-2})^2 + (4 \times 10^{-2})^2\right)^{3/2}}{(4 \times 10^{-2})^3}$$

$$= 48 \times 10^{6} \frac{\left[(49 \times 10^{-4}) + (16 \times 10^{-4})\right]^{3/2}}{64 \times 10^{-6}}$$

$$= \frac{\overset{3}{\cancel{\overset{6}{\cancel{48}}}} \times 10^{6}}{\underset{4}{\cancel{\underset{8}{\cancel{64}}}}} \times 10^{6} \times \left[10^{-4}(49 + 16)\right]^{3/2}$$

$$= \frac{3}{4} \times 10^{12} \left[10^{-4} \times 65\right]^{3/2}$$

$$= \frac{3}{4} \times 10^{12} \left[(10^{-4} \times 65)^3\right]^{1/2} \qquad \boxed{\because a^{m/n} = (a^m)^{1/n}}$$

$$= \frac{3}{4} \times 10^{12} \left[10^{-12} \times 274625\right]^{1/2}$$

$$= \frac{3}{4} \times 10^{12} \left[10^{-6} \times 524.04\right]$$

$$= 393.03 \times 10^{6} \ T$$

$$\boxed{B_{centre} = 393.03 \ MT}$$