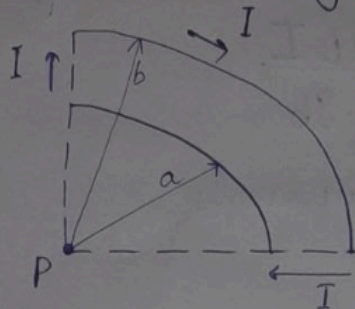


Name - Thanvi Kath
Roll no - 20221128

Q) Find the magnetic field at point P the steady current configuration.



Ans) The field due to a circle of radius R and carrying current I at the center is

$$B = \frac{\mu_0 I}{2R} \quad \text{--- (1)}$$

The field due to infinite straight wire carrying current I at a distance R from it is.

$$B = \frac{\mu_0 I}{2\pi R} \quad \text{--- (2)}$$

From (1), the field from the inner ring is $B = \frac{1}{4} \times \frac{\mu_0 I}{2a} = \frac{\mu_0 I}{8a}$

The field is pointed outwards.
due to right hand rule

from ① the field from the outer ring

$$\text{is } B = \frac{1}{4} \times \frac{\mu_0 I}{2b} = \frac{\mu_0 I}{8b}$$

This field is pointed inwards
due to right hand rule

Net field B is

$$B = \frac{\mu_0 I}{8} \left(\frac{1}{a} - \frac{1}{b} \right)$$

The field is pointed outwards.