

Quiz 3

Name:

Solution 1

PID:

Lab section: (circle one)

W 10:30 am

W 4:30 pm

Th 7:30 am

Th 10:30 am

Th 1:30 pm

M 1:30 pm

F 10:30 am

F 1:30 pm

Problem 1: Given a wire with a uniform current density, radius a and the total current I . Calculate the magnitude of the magnetic field for

a) $r > a$

$$\mu_0 I = B \cdot 2\pi r$$

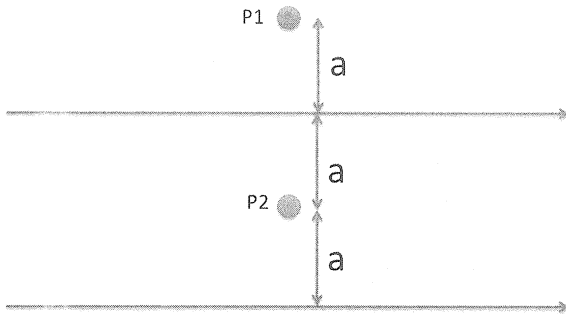
$$B = \frac{\mu_0 I}{2\pi r}$$

b) $r < a$

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

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

Problem 2: Two parallel wires are carrying equal current I



(a) what is the magnetic field [indicate direction and magnitude] at P1?

P1: FIELD $B = \frac{\mu_0 I}{2\pi r}$

$$B_{\text{TOTAL}} = \frac{\mu_0 I}{2\pi a} + \frac{\mu_0 I}{2\pi 3a}$$

$$= \frac{4}{3a} \frac{\mu_0 I}{2\pi} = \boxed{\frac{2\mu_0 I}{3\pi a}}$$

OUT OF BOARD

OR SHEET

(b) what is the magnetic field [indicate direction and magnitude] at P2?

P2 :

$$\vec{\text{FIELD}} = 0$$