

KING FAHD UNIVERSITY OF PETROLEUM AND MINERALS

Department of Electrical Engineering

EE 340 Electromagnetic

Homework 5 (Due Sat. April 21)

1- the magnetic field strength \bar{H} due to a current of length l shown in Fig. 1-a is given at a point p in the x-y plane.

$$\bar{H} = \frac{1}{4\pi r} [\cos \alpha_2 - \cos \alpha_1] \hat{a}_n$$

where \hat{a}_n is a unit vector normal to the x-y plane. Use the above result to obtain the magnetic field intensity at the center of the closed loop shown in Fig. 1-b

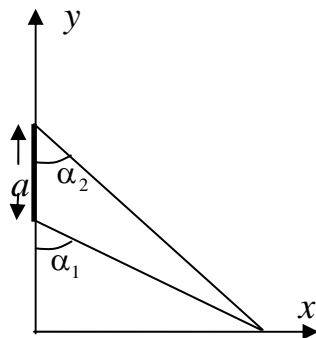


Fig. 1-a

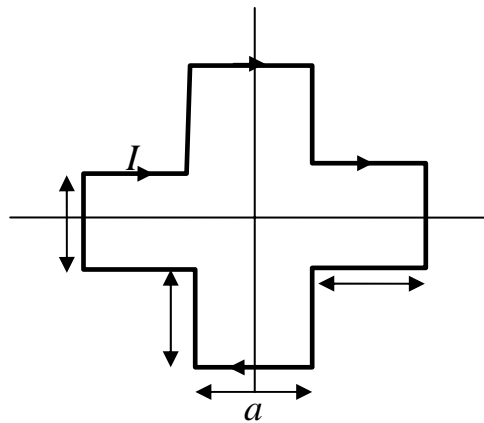


Fig. 1-b

4- A circular loop of radius a carried a direct current I , as shown in Fig. 2. Calculate the magnetic field intensity on the z-axis.

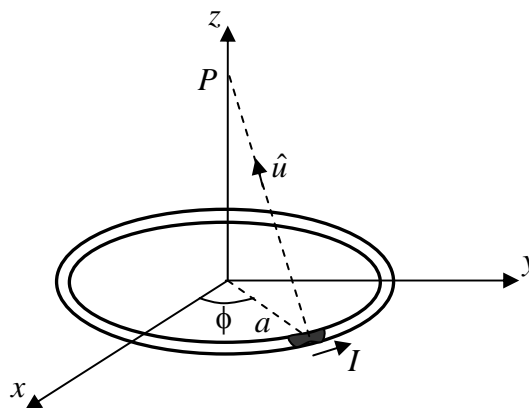
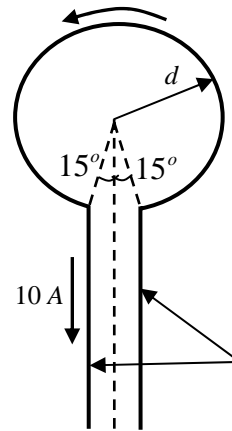


Fig. 2

3- An incomplete circular loop with very long leads carries a current of 10 A, as shown in the figure. Calculate the magnetic field intensity at the center of the loop.



4- A hollow conducting cylinder has inner radius a and outer radius b and carries current I along the positive z -direction. Find \vec{H} everywhere.