UNIVERSIDAD MILITAR NUEVA GRANADA

TALLER CAMPOS ELECTROMAGNÉTICOS

Realizar el siguiente conjunto de ejercicios, sustentando y desarrollando analíticamente cada uno de ellos.

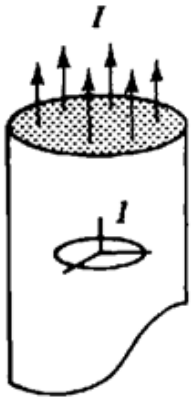
Nota: Deduzca las expresiones analíticas. No aplique formulas.

1-

A thin cylindrical conductor of radius a, infinite in length, carries a current I. Find **H** at all points using Ampère's law.

2

Determine **H** for a solid cylindrical conductor of radius a, where the current I is uniformly distributed over the cross section.



3-

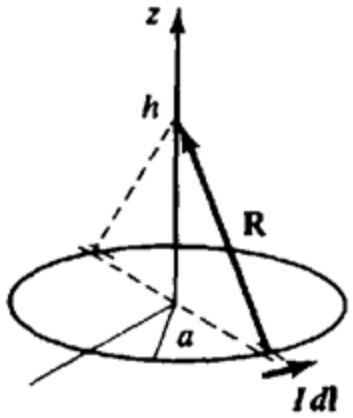
In the region $0 < r < 0.5\,\text{m}$, in cylindrical coordinates, the current density is

$$\mathbf{J} = 4.5e^{-2r}\mathbf{a}_z \quad (\text{A/m}^2)$$

and $\mathbf{J} = \mathbf{0}$ elsewhere. Use Ampère's law to find $\mathbf{H}$.

4-

Find $\mathbf{H}$ on the axis of a circular current loop of radius a. Specialize the result to the center of the loop.



5-

In cylindrical coordinates, $\mathbf{B} = (2.0/r)\mathbf{a}_\phi$ (T). Determine the magnetic flux Φ crossing the plane surface defined by $0.5 \le r \le 2.5\,\text{m}$ and $0 \le z \le 2.0\,\text{m}$. See Fig. 9-17.