Department of Physics, Bennett University

Tutorial Set-5

1. Consider an infinitely long cylinder of circular cross-section of radius a which is uniformly magnetised parallel to its axis.
   (a) Obtain the bound surface and volume currents.
   (b) Obtain the magnetic field produced by the magnetised cylinder.

2. An infinitely long straight wire made of copper and of radius R carries a current I which is uniformly distributed across its cross-section. Using Ampere's law obtain the values of the fields $\vec{H}$ and $\vec{B}$ within and outside the wire. What are the bound surface and volume currents?

3. A coaxial cable consists of two very long cylindrical tubes separated by a linear insulating material with magnetic susceptibility χ_m. If a current I flows along the inner tube and returns along the outer tube, find the magnetic field in the region between the two tubes.