Homework

P. 6 - 26 A ferromagnetic sphere of radius b is magnetized uniformly with a magnetization $\mathbf{M} = a_z M_0$.

a) Determine the equivalent magnetization current densities J_m and J_{ms}.

b) Determine the magnetic flux density at the center of the sphere.

P 6 - 28 Consider the magnetic circuit in Fig. 6 - 45. A current of 3 (A) flows through 200 turns of wire on the center leg. Assuming the core tohave a constant cross - sectional area of 10^{-3} (m^2) and a relative permeability of 5000.

a) Determine the magnetic flux in each leg.

b) Determine the magnetic field intensity in each legh of the core and in the air gap.

P 6 - 35 Determine the self - inductance of a toroidal coil of N turns of wire wound on an air frame with mean radius r_0 and a circular cross section of radius b. Obtain an approximate expresstion assuming $b << r_0$.

Homework

P 6 - 43 The cross section of a long thin metal strip and a parallel wire is shown in Fig. 6 - 51. Equal and opposite currents I flow in the conductors. Find the force per unit length on the conductors.

P 6 - 49 Assuming that the circular loop in Problem P 6 - 45 is rotated about its horizontal axis by an angle α, find the torque exerted on the circular loop.

P 6 - 51 A magnetized compass needle will line up with the earth's magnetic field. A small bar magnet (a magnetic dipole) with a magnetic moment 2 (Agm^2) is placed at a distance 0.15 (m) from the center of a compass meedle. Assuming the earth's magnetic flux density at the needle to be 0.1 (mT), find the maximum angle at which the bar magnet can cause the needle to deviate from the north - south direction. How should the bar magnet be oriented?