10. For a sphere of radius a and uniform magnetization $\vec{M}_0$ with the z axis chosen along the magnetization direction, find the bound volume and surface current densities

$$\vec{J}_B(\vec{r}) = \vec{\nabla} \times \vec{M}(\vec{r}) \qquad\qquad \vec{K}_B(\vec{r}) = \vec{M}(\vec{r}) \times \hat{n}$$

Compare this problem to (9) on the previous assignment.

11. A solenoid, whose length is large compared to its radius, is wound with n turns of wire per unit length each carrying current I. The interior of the solenoid is filled with iron which has a magnetic susceptibility $X_m = 5000$.
    (a) Find the permeability μ of the iron.
    (b) Find $\vec{H}(\vec{r})$ and $\vec{B}(\vec{r})$ inside the solenoid.

12. A current, whose instantaneous value is I, is charging a parallel-plate capacitor with circular plates of radius R and separation d. What is the magnetic field between the plates a distance $r < R$ from the center of the circular plate?