A spherical shell of an insulating material, with radius a, is uniformly charged with a total charge of Q. The spaces both inside and outside the shell are vacua. Solve the problems below, specifying the system of units that you will be using.

(a) Find the force per unit area on the shell due to the shell's electric field.

Let the center of the shell be at the origin of a Cartesian coordinate system, and let the shell rotate about the z-axis at a constant angular velocity $\omega\hat{z}$.

(b) Find the magnetic field (including the direction) at the origin.

(c) Calculate the magnetic dipole moment of the rotating sphere.