

- A. A uniform external electric field  $E_0 \hat{z}$  is applied to a conducting sphere of radius  $R$ . What is the resulting electric dipole moment of the sphere?
- B. A second, identical sphere is now introduced at a distance  $d \gg R$ . Show that the field due to the first sphere evaluated at the second sphere is much less than  $E_0$ . Thus, the polarization of the two spheres is practically independent.
- C. A dielectric solid is approximated by a lattice of conducting spheres, radius  $R$ , with number density  $n$  ( $\text{m}^{-3}$ ). Assuming  $nR^3 \ll 1$ , what is the electric susceptibility  $\chi_e$  of the material?