

19. Assume the charge on Earth is distributed with spherical symmetry. If the electric potential is zero at infinity then at the surface of Earth it is  $V = q/4\pi\epsilon_0 R$ , where  $q$  is the charge on Earth and  $R = 6.37 \times 10^6$  m is the radius of Earth. The magnitude of the electric field at the surface is  $E = q/4\pi\epsilon_0 R^2$ , so  $V = ER = (100 \text{ V/m})(6.37 \times 10^6 \text{ m}) = 6.4 \times 10^8 \text{ V}$ .