

### Special Problem 5-4.4

A hollow conducting sphere of **radius 1 m** is centered at the origin. Every point on this sphere has an **electric scalar potential of 4.0 V**.

Another hollow conducting sphere of **radius 1/2 m** is also centered at the origin. Every point on this sphere has an **electric scalar potential of -4.0 V**.

The region between the spheres (i.e.,  $0.5 < r < 1.0$ ) is filled with a dielectric with **permittivity  $\epsilon = 2\epsilon_0$** .

Determine:

- 1) The **electric potential function  $V(r)$**  in the region between the spheres.
- 2) The **surface charge density  $\rho_s$**  on the surface of the smaller (radius 0.5m) sphere.

