**Special Problem 6-4.3**

Consider a conducting sphere, radius 1 m. Also consider a conducting cube, with edge lengths (e.g., height, width, depth) of 1 m.

The electric potential difference between these two conductors is 10 V.

The surface charge density on the sphere is:

\[
\rho_{s+}(\vec{r}) = \frac{1}{2\pi} \left[ \frac{C}{m^2} \right]
\]

While the surface charge density on the cube is:

\[
\rho_{s-}(\vec{r}) = -\frac{1}{3} \left[ \frac{C}{m^2} \right]
\]

Determine:

1) the capacitance of these two conductors

2) the amount of work done by the voltage source in creating these charge distributions.