Assignment 8

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

O Scorable Items

1. What is the bound charges $\rho_b$ and $\rho_e$? 4 points
   - $\rho_b = 4\pi R^2$, $\rho_e = 34R$
   - $\rho_b = 2R/3$, $\rho_e = -34R$
   - $\rho_b = 3R/4$, $\rho_e = 34R$
   No, the answer is incorrect.
   Accepted Answers:
   - $\rho_b = 4\pi R^2$, $\rho_e = 34R$

2. Find the field inside and outside the sphere. 5 points
   - $r < R$, $\vec{E} = \frac{\rho_b}{4\pi R^3}$
   - $r > R$, $\vec{E} = 0$
   No, the answer is incorrect.
   Accepted Answers:
   - $r < R$, $\vec{E} = \frac{\rho_b}{4\pi r^3}$
   - $r > R$, $\vec{E} = 0$

3. Dielectrics 6 points
   - A sphere of linear dielectric material has embedded in it a uniform free charge density $\rho$. Find the potential at the center of the sphere (relative to infinity). If its radius is $R$, and its dielectric constant is $\varepsilon_r$.
   - $V = \frac{\rho R^2}{8\pi \varepsilon_r}$
   - $V = \frac{\rho R^2}{8\pi \varepsilon}$
   - $V = \frac{\rho R^2}{8\pi \varepsilon_w}$
   - $V = \frac{\rho R^2}{8\pi \varepsilon_o}$
   No, the answer is incorrect.
   Accepted Answers:
   - $V = \frac{\rho R^2}{8\pi \varepsilon_r}$

4. coaxial cable 6 points
   - A certain coaxial cable consists of a copper wire, radius $a$, surrounded by a concentric copper tube. The inner and outer radii of the tube is $A$ and $b$. The space between is partially filled with material with dielectric constant $\epsilon_r$. Find the capacitance per unit length of this cable.
   - $\varepsilon = \frac{\varepsilon_{00}}{2\varepsilon_{00}}$
   - $\varepsilon = \frac{\varepsilon_{00}}{\varepsilon_{00}} + \frac{\varepsilon_{00}}{\varepsilon_{00}}$
   - $\varepsilon = \frac{\varepsilon_{00}}{2\varepsilon_{00}}$
   - $\varepsilon = \frac{\varepsilon_{00}}{\varepsilon_{00}} + \frac{\varepsilon_{00}}{\varepsilon_{00}}$
   No, the answer is incorrect.
   Accepted Answers:
   - $\varepsilon = \frac{\varepsilon_{00}}{2\varepsilon_{00}}$