P. 5-7 a) $e^{-(\sigma/\epsilon)t} = \frac{\rho}{\rho_0} = 0.01 \longrightarrow t = \frac{\ln 100}{(\sigma/\epsilon)} = 4.88\times10^{-12}(s) = 4.88(ps)$.

b) $W_i = \frac{\epsilon}{2}\int_{V'} E_i^2\, dv' = \frac{2\pi\rho_0 b^3}{45\epsilon} e^{-2(\sigma/\epsilon)t} = (W_i)_0 \left[e^{-(\sigma/\epsilon)t}\right]^2$.

$\therefore \frac{W_i}{(W_i)_0} = \left[e^{-(\sigma/\epsilon)t}\right]^2 = 0.01^2 = 10^{-4}$. Energy dissipated as heat loss.

c) Electrostatic energy stored outside the sphere $W_0 = \frac{\epsilon_0}{2}\int_b^\infty E_0^2 4\pi R^2 dR = \frac{Q_0^2}{8\pi\epsilon_0 b} = 45\ (kJ)$

—— constant.