

64. (a) The energy per unit volume is

$$u = \frac{1}{2}\varepsilon_0 E^2 = \frac{1}{2}\varepsilon_0 \left(\frac{e}{4\pi\varepsilon_0 r^2} \right)^2 = \frac{e^2}{32\pi^2\varepsilon_0 r^4} .$$

(b) From the expression above $u \propto r^{-4}$. So for $r \rightarrow 0$ $u \rightarrow \infty$.