Classical electrodynamics predicts that atoms are unstable. Consider a classical planetary model of a hydrogen atom: at time $t=0$ the electron is a distance $R$ apart from the proton and revolving around a circular orbit. How long will it take for the electron to fall on the proton?

What is the "lifetime" of atom if the initial radius is $R = 1 \, \text{Å}$? [10 points]

Hint: make use of Eq. (11.60), page 457.