$\boxed{32.2}$ Once again I start with 32.2.5

$$P = \frac{2}{3}\frac{e^2}{c^3}(\vec{a})^2$$

$+2.5$
$\overline{3}$

This is a hooke's law potential, so $F=-kx$, and we are given $k=m\omega_0^2$.

$\Rightarrow F=ma=-m\omega_0^2 x \Rightarrow a=\omega_0^2 x$ ✓

$$\boxed{P=\frac{2e^2}{3c^3}(\omega_0^2\bar{x})^2}$$ ✓ where I have time averaged.

For a hooke's law potential, $\bar{V}=\frac{1}{2}k\bar{x}^2=\frac{1}{2}m\omega_0^2\bar{x}^2$,
and by the virial theorem, $\bar{V}=\frac{1}{2}E \Rightarrow E=m\omega_0^2\bar{x}^2$ ✓

Since $P=\gamma E$, $\boxed{\gamma=\omega_0^2\frac{2e^2}{3mc^3}}$ ✓

We are also given $P=\frac{-dE}{dt}$, so a solution to the ODE is
$E(t)=E(0)e^{-\gamma t}$.

Thus γ is, again, a characteristic lifetime
For $\omega_0=10^{15}\,s^{-1}$

I'll use a He atom (mass: $6.64\cdot10^{-27}$ kg)

Huh? $m=m_e$

To convert to SI units, set $e\longrightarrow(4\pi\varepsilon_0)^{-1/2}e$

$$\frac{1}{\gamma}=\frac{3mc^3}{2e^2\omega_0^2}\overset{SI}{\Longrightarrow}\frac{1}{\gamma}=\frac{\sqrt{4\pi\varepsilon_0}\,3mc^3}{2e^2\omega_0^2}$$

I plugged the numbers in using Mathematica! (see attached)

$$\boxed{\frac{1}{\gamma}\approx 3.7\cdot10^{-7}\,s}$$