3) A photon of energy $E$ undergoes Compton scattering with a free electron mass $m_0$ initially at rest. Find an expression for the maximum recoil energy of the electron. Evaluate for $E = 1 \text{MeV}$.

- $\vec{p}_0$: photon momentum (initial)
- $\vec{p}_e$: photon momentum (final)
- $\vec{p}_e'$: recoil momentum of electron

$T_{\text{max}} = E = 1 \text{MeV}$

$T_2 = c (\vec{p}_0 - \vec{p}_e) = c \vec{p}_0$ \quad $\vec{p}_0 = \dfrac{E}{c}$