1. [10 pts] An electron in a finite potential well has a 1.0 nm penetration distance into the classically forbidden region. How far below U_0 is the electron's total energy?

   [We need to use the formula for penetration depth]

$$\eta = \frac{h/2\pi}{\sqrt{2m(U_0 - E)}}$$

$$\Rightarrow (U_0 - E) = \frac{(h/2\pi)^2}{2m\eta^2}$$

$$= \frac{(1.05*10^{-34})^2}{2*9.11*10^{-31}*(10^{-9})^2}$$

$$= 6.05*10^{-21} J$$

$$= .038eV$$