3 a) $p = \hbar k = \hbar \frac{2\pi}{\lambda} \Rightarrow \lambda = \frac{2\pi\hbar}{p}$

For electron moving at 10^7 cm/s, $p = m_e v = (9.11 \cdot 10^{-30}\,kg)(10^5\,m/s) = 9.11 \cdot 10^{-25}\,kg\frac{m}{s}$

So $\lambda = \frac{2\pi(1.05 \cdot 10^{-34}\,J\,s)}{9.11 \cdot 10^{-25}\,kg\,m/s} = \boxed{7.2 \cdot 10^{-10}\,m}$

b) $p = mv = (10^{-1}\,kg)(30\,m/s) = 3\,kg\,m/s$

So $\lambda = \frac{2\pi(1.05 \cdot 10^{-34}\,J\cdot s)}{3\,kg\,m/s} = \boxed{2.2 \cdot 10^{-34}\,m}$

c) $K.E. = \frac{1}{2}mv^2 = \frac{p^2}{2m} \Rightarrow p = \sqrt{2mK} = \sqrt{2(9.11 \cdot 10^{-30}\,kg)(3 \cdot 1.60 \cdot 10^{-19}\,J)}$

$p = 2.96 \cdot 10^{-24}\,kg\,m/s$

So $\lambda = \frac{2\pi(1.05 \cdot 10^{-34}\,J\cdot s)}{2.96 \cdot 10^{-24}\,kg\,m/s} = \boxed{2.2 \cdot 10^{-10}\,m}$