

# Free Particle Problem

A free electron has wave function  $\Psi(x, t) = \sin(kx - \omega t)$ . Determine the electron's de Broglie wavelength (in  $\text{\AA}$ ), momentum (in MKS), kinetic energy (in eV) and speed (in m/s) when  $k = 50 \text{ nm}^{-1}$  and the particle's mass is  $m = 9.1 \times 10^{-31} \text{ kg}$ .