REVIEW QUESTIONS

Q_1 : Compare the de Broglie wavelength (nm) of an electron moving at a velocity of $5.0 \times 10^6 ms^{-1}$ with that of a tennis ball travelling at $50.5 ms^{-1}$. (Masses : electron = $9.11 \times 10^{-31} kg$; tennis ball = $0.156 kg$.)

Q_2 : Calculate the de Broglie wavelength of a neutron moving at 12% the velocity of light.
(Given : mass of neutron = $1.67 \times 10^{-24} g$)

Q_3. Calculate the de Broglie wavelength of a 50,000kg sport-utility vehicle moving at 255 km per hour.

Q_4. Calculate the de Broglie wavelength of an electron moving at 4% the speed of light.

Q_5. To generate a well-defined patterns, the wavelength of the particle-wave must be about the same as the distance between atomic nuclei in the crystal. In a typical crystal this distance is 0.28nm. Determine the energy of

a) a photon particle-wave beam with this wavelength

b) an electron particle-wave with this wavelength.

Q6. Compare the wavelengths of an electron traveling at $1.50 \times 10^{6}\ ms^{-1}$ and a ping-pong ball of mass 10.8 g traveling at $3.8\ ms^{-1}$.

Q7. Calculate the wavelength associated with a photon whose energy is 1.20×10^{-18} J and the wavelength associated with an electron having a kinetic energy of 1.20×10^{-18} J.

Q8. Determine the wavelengths of electrons with the following kinetic energies (a) 1.18×10^{-19} J (b) $3.85\ kJmol^{-1}$ (c) $7.55 \times 10^{-2}\ Jmol^{-1}$

Q9. Determine the kinetic energies of electrons with the following wavelengths: (a) 4.35 nm (b) 4.26 m (c) 7.52 mm

Q10. Determine the kinetic energies of electron with the following wavelengths: (a) 4.10 nm (b) 3.66 μm (c) 3.15 mm.

Prepared by
V. Manoharan
vmano@usm.my
manovv1955@yahoo.com
04-6533888 ext 3566