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1. a) Find the momentum of (i) a 10.0-MeV gamma ray; (ii) a 25-keV X ray; (iii) a 1.0-μm infrared photon. Express the momentum in kg m/s .
   b)A metal surface has a photoelectric cutoff wavelength of 325.6 nm. It is illuminated with light of wavelength 259.8 nm. What is the stopping potential?

2. Compute the De Broglie wavelength of the following,
   a) A1000 kg automobile travelling at 80 km/hour.
   b)A smoke particle of mass 10^{-9}g moving at 1 cm/s.
   c) An electron with kinetic energy of 100 MeV.

3. In the double slit interference pattern for helium atoms, the beam of atoms had a kinetic energy of 0.02 eV. (a) What is the De-Broglie wavelength of helium atom with this kinetic energy? (b) Estimate the De-Broglie wavelength of the atoms for the fringe separation of 10 μm. Given that the separation between the two slits is 8μm and the distance from the double slit to the scanning slit is 64 cm.

4. In the Davisson-Germer experiment using Ni crystal (with d=0.215 nm), a second order scattering is observed at an angle of 55 degree. For what accelerating voltage does this occur?