During a diagnostic X-ray, a broken leg with a mass of 5 kg receives an equivalent dose of 0.5 mSv. If the X-ray energy is 50 keV, how many X-ray photons were absorbed?

The entire body of a living subject weighing 5 kg has just received 1 rad of radiation. Express this dose in SI unit. Estimate the total energy deposited in it. Estimate the total number of ion pairs produced.

If a radionuclide, with a physical half-life t1/2, is ingested and has a biological half-life tb1/2, What is the effective half-life te1/2, for the removal of the radioactive nuclide from the system?

What is the gamma-ray absorbed dose rate (Gy/h) in an infinite air medium at a distance of 10 cm from a 1 mCi point source of (a) 13N and (b) 43K? Decay data and energies can be found at this site: http://www.nndc.bnl.gov/mird/

Describe in your own words the rationale for the NCRP [1987] limit of 50 mSv a year whole-body exposure for occupational workers. Give arguments why you do or do not believe this limit to be reasonable.