Radiation Biology, Protection and Applications

(PHYS-450)

Quizzz

Week 9

Problem 1:

Radiation energy spectra can be categorized into two main groups: those that consist of one or more discrete energies (line spectra) and those that consist of a broad distribution of energies (continuous spectra). For each of the radiation sources listed below, indicate whether « line » or « continuous » is a better description:

a) Alpha particles

b) Beta particles

c) Gamma rays

d) Characteristic X-rays

e) Conversion electrons

f) Auger electrons

g) Fission fragments

h) Bremsstrahlung

i) Annihilation radiation

Problem 2:

Which has the higher energy: a conversion electron from the L shell or from the M shell, if both arise from the same nuclear excitation energy?

Problem 3:

Determine ${}^{A}_{Z}X$ in the following nuclear reactions:

a) ${}^{2}_{1}H + {}^{A}_{Z}X \rightarrow {}^{4}_{2}He + {}^{4}_{2}He$

b) ${}^{14}_{7}N + {}^{A}_{Z}X \rightarrow {}^{17}_{8}O + {}^{1}_{1}H$

c) ${}^{A}_{Z}X \rightarrow {}^{60}_{27}Co + \gamma$

d) ${}^{A}_{Z}X + {}^{4}_{2}He \rightarrow {}^{12}_{6}C^{*} + {}^{1}_{0}n$