1. Calculate the ratio of the wavelength of the 1.332 MeV photon to the diameter of the emitting $^{60}$Ni nucleus formed by the beta decay of $^{60}$Co.

2. The $^{134}$Cs nucleus decays 70% of the time by a $\beta^-$ decay ($4^+$, $T_{1/2}=2.06$ yr) to an excited state ($4^+$) in the daughter nucleus $^{134}$Ba at 1.4006 MeV. This state can decay to three lower lying states by gamma ray emission: (1) to a $2^+$ state at 1.168 MeV, (2) to a different $2^+$ state at 0.6047 MeV, or (3) to the 0+ ground state at 0.0 MeV.

(a) What is the lowest multipolarity and character of the photon that would be emitted in a transition from the $4^+$ excited state to each of the three possible lower energy states?

(b) Calculate the three rate constants for photon emission ($\lambda$ in s$^{-1}$) from the $4^+$ excited state to each of the three possible lower energy states using the Weisskopf estimates.