A 50 μCi source emitting 5 MeV α particles is suspended between the plates of a large gas ionization chamber. If the emitted α particles lose all their energy in the chamber gas, calculate the current measured at the output. Assume that the average energy to create an ion pair in the gas is 34 eV and that all the charges produced in the chamber are collected.

Explain how a Geiger‑Muller counter works. What are its advantages and disadvantages for radiation measurement?

The 4.4 MeV *γ* rays from the decay of the first excited state of ***12C*** to the ground state are observed using a **Nal(T1)** scintillation detector. (a) Explain how many peaks are observed instead of just one full-energy peak. What can you say regarding the relative heights of these peaks in relation to the size of the scintillation crystal? **(b)**The pulse-height spectrum of a radioactive source, known to emit only monoenergetic *γ* rays, shows three peaks at channel numbers 1650, 1252 and 854. What is the γray energy?

Two detectors, placed symmetrically on either side of a fission source, record two

fission fragments fl and f2 from a fission event. If the flight time for fl is 20% greater than that for f2, calculate the ratio of the masses of f1 and f2 . Which has the most energy?