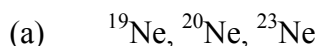
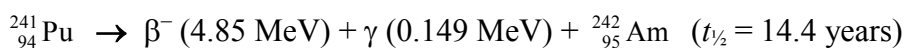
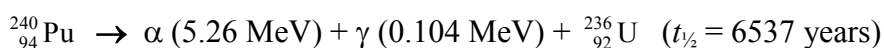
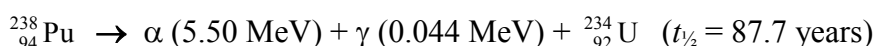


CHEM1612 Problem Sheet 10 (Week 13)

1. For each of the following groups of isotopes, which is likely to be the most stable? What decay modes are the unstable ones most likely to undergo, and what product(s) would be formed?



2. Using the decay data of plutonium isotopes below, rank the isotopes in order of their likely harm to living organisms.



Ranking

3. Positron-emission tomography (PET) may be used to image soft tissue and relies on emission of a positron from a radioactive isotope. ^{15}O labelled water may be used. What isotope is formed by positron emission from ^{15}O ?
4. The function of the thyroid gland may be monitored using ^{131}I , which decays by β emission with a rate constant of 0.086 day^{-1} . How long does it take for the concentration of ^{131}I to fall to 10% of its original value?
5. Complete the following table by indicating the state (*solid*, *liquid* or *gas*) of the dispersed phase and the dispersing medium and the name of the colloid system of the following examples.

Example	Dispersed phase	Dispersing system	Name of colloid system
Shaving cream			
Fog			
Toothpaste			
Styrofoam			

6. Explain the main structural feature(s) of a cell membrane.
7. Explain why Mg^{2+} gives rise to 'hard' water, while Na^+ does not.