

SCPY152 General Physics II

Problem Set#6 - Nuclear Phenomenology and Models

Date: April 20, 2022. Due date: April 25, 2022 (Submit to Google Classroom)

1. Calculate binding energy and binding energy per nucleon (in MeV) of the following elements

$$a) {}^{12}\text{C}, b) {}^{16}\text{O}, c) {}^{28}\text{Si}$$

2. Calculate radioactivity from $0.01\mu\text{g}$ of pure ${}^{98m}\text{Tc}$ ($T_{1/2} = 6.015\text{Hr}$) (m means meta-stable state.) This isotope always used in bone scan in nuclear medicine.

3. Write the nuclear orbitals configurations of proton and neutron of the following elements

$$a) {}^{12}\text{C}, b) {}^{16}\text{O}, c) {}^{28}\text{Si}$$

4. Evaluate the energy Q and K_{α} from the decay ${}_{94}^{239}\text{Pu} \rightarrow {}_{92}^{235}\text{U} + \alpha$.

Nuclear mass data: <https://www.ndc.jaea.go.jp/NuC/index.html>