

# Nuclear Physics Assignment

due Monday 21 November 2022

You may use the simulation to visualize any nuclear decays mentioned in this assignment. Google search *PHET Simulations* and choose the first option. Then lookup *Nucleus* and select *Build a Nucleus*.

1. Write the decay formulas for the following isotopes. Decay modes can be found on the isotope data sheet.
  - (a)  ${}^3_1\text{He}$
  - (b)  ${}^{14}_6\text{C}$
  - (c) both decays of  ${}^{236}_{92}\text{U}$

*The following questions ask for explanations, so only writing the nuclear decay equation doesn't show enough work to get full points.*

2. An oxygen-15 isotope decayed into a nitrogen isotope, answer the following questions and explain your reasoning:
  - (a) What type of decay occurred?
  - (b) What type of particle was emitted during the decay?
  - (c) Write the individual particle decay equation.
3. A chlorine-39 isotope decayed into a potassium isotope by doing two consecutive decays. Answer the following questions and explain your reasoning:
  - (a) What type of decay occurred?
  - (b) What type of particle was emitted during the decay?
  - (c) Write the individual particle decay equation.
4. A tungsten-184 isotope decayed into a hafnium isotope. Answer the following questions and explain your reasoning:
  - (a) What type of decay occurred?
  - (b) What type of particle was emitted during the decay?
  - (c) Explain how the nucleus changed during this decay.