

## 25

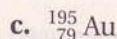
## NUCLEAR CHEMISTRY

## Practice Problems

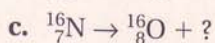
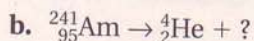
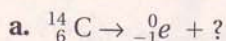
In your notebook, solve the following problems.

## SECTION 25.1 NUCLEAR RADIATION

- What happens to the mass number and atomic number of an atom that undergoes beta decay?
- A radioisotope of an element undergoes alpha particle decay. How do the atomic number and mass number of the particle change?
- Give the composition of the nucleus of the following isotopes.



- Complete each of the following equations.



## SECTION 25.2 NUCLEAR TRANSFORMATIONS

- Write a nuclear equation for the following radioactive processes.
  - alpha decay of francium-208
  - electron capture by beryllium-7
  - beta emission by argon-37
  - positron emission by fluorine-17
- Complete the equations for these transmutation reactions.
  - ${}^6_3\text{Li} + {}^1_0n \rightarrow {}^4_2\text{He} + ?$
  - ${}^{235}_{92}\text{U} + {}^1_0n \rightarrow ? + {}^{141}_{56}\text{Ba} + 3{}^1_0n$
  - ${}^{27}_{13}\text{Al} + {}^4_2\text{He} \rightarrow ? + {}^1_0n$
  - ${}^{235}_{92}\text{U} \rightarrow {}^{90}_{38}\text{Sr} + ? + {}^1_0n + 4{}^{-1}_1e$
  - ${}^1_0n + ? \rightarrow {}^{144}_{58}\text{Ce} + {}^{90}_{38}\text{Sr} + 6{}^1_0n + 2{}^{-1}_1e$
- Polonium-214 has a relatively short half-life of 164 s. How many seconds would it take for 8.0 g of this isotope to decay to 0.25 g?
- How many days does it take for 16 g of palladium-103 to decay to 1.0 g? The half-life of palladium-103 is 17 days.
- By approximately what factor would the mass of a sample of copper-66 decrease in 51 minutes? The half-life of copper-66 is 5.10 min.
- In 5.49 seconds, 1.20 g of argon-35 decay to leave only 0.15 g. What is the half-life of argon-35?