Answers to homework problems not found in text.

Chapter 3

10. The atomic nucleus is found at the center of each atom, containing protons and neutrons. Most of the mass of an atom is concentrated in the atomic nucleus.

11. Protons have a positive charge. Neutrons are neutral and have about the same mass as a proton. Electrons have a negative charge and are located around the atom's nucleus.

12. The proton and electron should attract because they are oppositely charged. The proton and neutron should neither attract or repel because the neutron is not a charged particle.

16. Californium, Cf → 251 amu

18. Atomic mass is the sum of all the masses of protons, neutrons, and electrons.

20. \( _1^1H, _2^2H, _3^3H \)
Unit 4

answers to homework problems not found in text (continued)

30. a. He $\rightarrow$ 2 electrons  b. Na $\rightarrow$ 11 electrons
c. Cl $\rightarrow$ 17 electrons  d. O $\rightarrow$ 8 electrons
e. Mg $\rightarrow$ 12 electrons  f. S $\rightarrow$ 16 electrons

32. $^{83}_{35}$ Br

34. a. $^{69}_{31}$ Ga  b. $^{98}_{42}$ Mo  c. $^{99}_{42}$ Mo  d. $^{98}_{43}$ Tc

36. pair of isotopes: b

Chapter 4

4. nucleon number = mass number = 
   \# of protons + \# of neutrons

6. $^{8}_{5}$ B (remember, the atomic \# determines the element)

8. $^{125}_{53}$ I

10. a. $^{62}_{30}$ Zn: 30 protons, 32 neutrons
    b. $^{24}_{94}$ Pu: 94 protons, 147 neutrons
    c. $^{99}_{43}$ Tc: 43 protons, 56 neutrons
    d. $^{81}_{36}$ Kr: 36 protons, 45 neutrons

12. b. $^1$ H

14. $^{47}_{43}$ Tc
answers to homework problems
not found in text (continued)

16. 10.8 atomic mass units or u (amu)

Chapter 6: typo!! should be 39-42

38. a. SO$_3$  
   formula mass: 80.1 u  
   molecular mass: 80.1 g/mole

b. KBrO$_3$  
   formula mass: 167 u  
   molecular mass: 167 g/mole

c. K$_2$Cr$_2$O$_7$  
   formula mass: 294.1 u  
   molecular mass: 294.1 g/mole

d. Fe(NO$_3$)$_3$  
   formula mass: 241.8 u  
   molecular mass: 241.8 g/mole

40. a. 4.61 mol AlCl$_3$  (MW of AlCl$_3$ = 133.5 g/mol)  
   \[
   \text{4.61 mol} \times \frac{133.5 \text{ g}}{\text{mol}} = 615 \text{ g AlCl}_3
   \]

b. 0.615 mol Cr$_2$O$_3$  
   \[
   \text{0.615 mol} \times \frac{152.0 \text{ g}}{\text{mol}} = 93.5 \text{ grams Cr}_2\text{O}_3
   \]

C. 0.158 mol IF$_5$  
   \[
   \text{0.158 mol} \times \frac{221.9 \text{ g}}{\text{mol}} = 35.1 \text{ grams IF}_5
   \]
Unit 4

Answers to homework problems not found in text (continued)

Chapter 6:

42. a. 16.3 g \( \text{SF}_6 \) (MW of \( \text{SF}_6 = 146.9 \text{ g/mol} \))

\[
16.3 \text{ g} \times \frac{1 \text{ mol}}{146.9 \text{ g}} = 0.112 \text{ mol} \text{ SF}_6
\]

b. 25.4 g \( \text{Pb(C}_2\text{H}_3\text{O}_2)_2 \) (MW = \( \frac{352.2+320.2}{2} = 325.2 \text{ g/mol} \))

\[
25.4 \text{ g} \times \frac{1 \text{ mol}}{325.2 \text{ g}} = 0.781 \times 10^{-2} \text{ mol} \text{ Pb(C}_2\text{H}_3\text{O}_2)_2
\]

c. 35.6 g \( \text{FeCl}_3 \) (MW = 162.3 \text{ g/mol} )

\[
35.6 \text{ g} \times \frac{1 \text{ mol}}{162.3 \text{ g}} = 0.219 \text{ mol} \text{ FeCl}_3
\]

d. 76.3 g \( \text{CO(ClO}_3)_2 \) (MW = 225.9 \text{ g/mol} )

\[
76.3 \text{ g} \times \frac{1 \text{ mol}}{225.9 \text{ g}} = 0.333 \text{ mol} \text{ CO(ClO}_3)_2
\]