INTRODUCTION TO NATURAL SCIENCE

CHEMISTRY H.W - WEEK 2 - FALL 2006

Chapter 2

(p + n)

(9) (a) Mg $12 + 15 = \underline{27}$

(b) Ti $22 + 26 = \underline{48}$

(c) Zn $30 + 32 = \underline{62}$

(n + p)

(11) (a) K $A = 20 + 19 = 39$ $^{39}_{19}K$

(b) Kr $A = 48 + 36 = 84$ $^{84}_{36}Kr$

(c) Co $A = 33 + 27 = 60$ $^{60}_{27}Co$

(14)

		p	$\bar{e}$	n
(a)	$^{13}_{6}C$	6	6	7
(b)	$^{63}_{29}Cu$	29	29	34
(c)	$^{205}_{83}Bi$	83	83	122

(17)

n	p	A	
30	27	57	$^{57}_{27}Co$
31	27	58	$^{58}_{27}Co$
33	27	60	$^{60}_{27}Co$

(19) Since atomic weight (204.4) is closer to 205 than to 203, the ^{205}Tl isotope must be more abundant.

(21) atomic ~~weight~~ mass of Li } $= \dfrac{(7.50 \times 6.015121 + 92.50 \times 7.016003)\text{ amu}}{100}$

$= \underline{\underline{6.94}}$ ~~g~~amu

(25) ^{60}Ga 68.9257 amu

atomic mass of Ga = 69.723 amu

^{71}Ga 70.9249 amu

If the abundance of $^{60}Ga = x\%$, then the abundance of $^{71}Ga = (100-x)\%$.

$$69.723\text{ amu} = \frac{\{x[68.9257] + (100-x)(70.9249)\}\text{ amu}}{100}$$

$$6972.3 = 68.9257x + 7092.49 - 70.9249x$$

$$1.9992x = 120.19$$

$$x = 60.119$$

Natural abundance of $^{60}Ga = \underline{\underline{60.119\%}}$

$^{71}Ga = 100 - x = \underline{\underline{39.881\%}}$

27) (a) $2.5 \text{ mol Al} \times \frac{26.9815 \text{ g}}{1 \text{ mol Al}} = 67.45 \text{ g} = \underline{\underline{68 \text{ g}}}$

(b) $1.25 \times 10^{-3} \text{ mol Fe} \times \frac{55.845 \text{ g}}{1 \text{ mol Fe}} = \underline{\underline{6.98 \times 10^{-2} \text{ g}}}$

(c) $0.015 \text{ mol Ca} \times \frac{40.078 \text{ g}}{1 \text{ mol Ca}} = \underline{\underline{6.0 \times 10^{-1} \text{ g}}}$

(d) $653 \text{ mol Ne} \times \frac{20.1797 \text{ g}}{1 \text{ mol Ne}} = \underline{\underline{1.32 \times 10^{4} \text{ g}}}$

29) (a) $127.08 \text{ g Cu} \times \frac{1 \text{ mol}}{63.546 \text{ g}} = \underline{\underline{1.9998 \text{ mol}}}$

(b) $0.012 \text{ g Li} \times \frac{1 \text{ mol}}{6.941 \text{ g}} = \underline{\underline{1.7 \times 10^{-3} \text{ mol}}}$

(c) $5.0 \text{ mg Am} \times \frac{1 \text{ mol}}{243.061 \text{ g}} \times \frac{1 \text{ g}}{1000 \text{ mg}} = \underline{\underline{2.1 \times 10^{-5} \text{ mol}}}$

(d) $6.75 \text{ g Al} \times \frac{1 \text{ mol}}{26.9815 \text{ g}} = \underline{\underline{0.250 \text{ mol}}}$

31) (a) $1.0 \text{ g He} \times \frac{1 \text{ mol}}{4.0026 \text{ g}} \times \frac{6.02 \times 10^{23} \text{ atoms}}{1 \text{ mol}} = 1.5 \times 10^{23} \text{ atoms}$

(b) $1.0 \text{ g Fe} \times \frac{1 \text{ mol}}{55.845 \text{ g}} \times \frac{6.02 \times 10^{23} \text{ atoms}}{1 \text{ mol}} = 1.1 \times 10^{22} \text{ atoms}$

(c) $1.0 \text{ g Li} \times \frac{1 \text{ mol}}{6.941 \text{ g}} \times \frac{6.02 \times 10^{23} \text{ atoms}}{1 \text{ mol}} = 8.7 \times 10^{22} \text{ atoms}$

(d) $1.0\ g\ Si \times \frac{1\ mol}{28.0855\ g} \times \frac{6.02 \times 10^{23}}{1\ mol} = 2.1 \times 10^{22}$ atoms

(e) $1.0\ g\ C \times \frac{1\ mol}{12.011\ g} \times \frac{6.02 \times 10^{23}}{1\ mol} = 5.0 \times 10^{22}$ atoms

He sample contains the largest number of atoms. Fe sample contains the smallest.

(33) 63.546 amu can convert this to g also

$63.546\ amu \times \frac{1.6605 \times 10^{-24}\ g}{1\ amu} = 1.0552 \times 10^{-22}\ g$