CHEM 130 **Key begins on page 5.**
PROBLEM SET Ch.2

1. Rubidium has two naturally occuring isotopes of mass 85.0 and 87.0 amu. What percent of Rubidium-85 is normally present given that its reported atomic mass is 85.47 amu?

_____

2. Balance the following equations.

a) ____UO_2 + ____HF -----> ____UF_4 + ____H_2O

b) ____H_3BO_3 ----------> ____B_2O_3 + ____ H_2O

c) ____B_2O_3 + ____HF -------> ____BF_3 + ____H_2O

d) ____C_2H_3Cl + ____O_2 ------> ____CO_2 + ____H_2O + ____HCl

e) ____PH_3 + ____O_2 -------> ____P_4O_{10} + ____H_2O

3. Indicate whether the following compounds are **ionic** or **covalent**.

a) CCl_4 _____ c) NaF _____

b) CO_2 _____ d) PF_3 _____

4. Give names for the following **ionic** compounds.

a) Na_2CO_3 _____ c) $Ba(ClO_3)_2$ _____

b) AlP _____ d) Cu_2CrO_4 _____

5. Give formulas for each of the following **ionic** compounds.

a) zinc sulfate _____ c) aluminum phosphate _____

b) silver nitrate _____ d) magnesium nitride _____

6. Give names for the following **covalent** compounds.

a) PCl_3 _____ c) CS_2 _____

b) SO_2 _____ d) N_2O_5 _____

7. Give formulas for the following **covalent** compounds.

a) nitrogen triiodide _____ c) phosphorus trifluoride _____

b) oxygen difluoride _____ d) diphosphorus tetroxide _____

8. Indicate the "pet" name associated with each of the following.

a) Mg _____ c) K _____

b) Ar _____ d) Cl _____

9. Briefly distinguish between **homogeneous** and **heterogeneous** mixtures.

10. Briefly distinguish between **periods** and **groups** on the periodic table.

11. Briefly describe the difference betwween **anions** and **cations.**

Naming Ionic and Covalent Compounds

Give the names of the following ionic compounds	Write the formulas for the following ionic compounds
$Al(NO_3)_3$	calcium hydroxide
HgI_2	magnesium nitride
$Fe_2(CrO_4)_3$	copper(I) cyanide
NH_4NO_2	silver nitrate
Li_2CO_3	potassium bromide
SrO	lead(IV) bromide
$Ba(OH)_2$	tin(II) sulfide
Mg_3P_2	potassium phosphate
CoF_3	mercury(I) iodide
$Ca(C_2H_3O_2)_2$	ammonium hydroxide
$PbCl_4$	potassium dichromate
Cu_2S	lead(II) carbonate
$KMnO_4$	barium sulfite
Na_2HPO_4	lithium phosphide

Give the name the following covalent compounds	Write the formula for the following covalent compounds
$SeBr_4$	carbon monoxide
F_2O_2	nitrogen triiodide
IBr_2	tetraphosphorus decasulfide
OF_2	disulfur dichloride
N_2S_5	dichlorine heptoxide
Br_3O_8	diphosphorus tetraoxide
CS_2	dinitrogen monoxide
S_4N_4	selenium hexafluoride

Valences of Some Common Ions

Cations (positive charge)				**Anions** (negative charge)			
+1				–1			
H^+	hydrogen	H_3O^+	hydronium	H^-	hydride	MnO_4^-	permanganate
Li^+	lithium	Hg^+	mercury(I)	F^-	fluoride	ClO^-	hypochlorite
Na^+	sodium			Cl^-	chloride	ClO_2^-	chlorite
K^+	potassium			Br^-	bromide	ClO_3^-	chlorate
Ag^+	silver			I^-	iodide	ClO_4^-	perchlorate
Cu^+	copper(I)			OH^-	hydroxide	HCO_3^-	hydrogen carbonate
NH_4^+	ammonium			NO_2^-	nitrite	$C_2H_3O_2^-$	acetate
				NO_3^-	nitrate	HSO_3^-	hydrogen sulfite
				CN^-	cyanide	HSO_4^-	hydrogen sulfate
						$H_2PO_4^-$	dihydrogen phosphate
+2				–2			
Mg^{2+}	magnesium	Cr^{2+}	chromium(II)	O^{2-}	oxide	$C_2O_4^{2-}$	oxalate
Ca^{2+}	calcium	Co^{2+}	cobalt(II)	S^{2-}	sulfide	$S_2O_3^{2-}$	thiosulfate
Sr^{2+}	strontium	Mn^{2+}	magnanese(II)	CO_3^{2-}	carbonate	HPO_4^{2-}	monohydrogen phosphate
Ba^{2+}	barium	Cd^{2+}	cadmium	SO_3^{2-}	sulfite	O_2^{2-}	peroxide
Zn^{2+}	zinc	Sn^{2+}	tin(II)	SO_4^{2-}	sulfate		
Cu^{2+}	copper(II)	Pb^{2+}	lead(II)	CrO_4^{2-}	chromate		
Fe^{2+}	iron(II)	Ni^{2+}	nickel(II)	$Cr_2O_7^{2-}$	dichromate		
Hg^{2+}	mercury(II)						
+3				–3			
Al^{3+}	aluminum	Cr^{3+}	chromium(III)	N^{3-}	nitride	PO_4^{3-}	phosphate
Fe^{3+}	iron(III)	Co^{3+}	cobalt(III)	P^{3-}	phosphide		
+4							
Sn^{4+}	tin(IV)						
Pb^{4+}	lead(IV)						

CHEM 130
PROBLEM SET Ch.2

1. Rubidium has two naturally occuring isotopes of mass 85.0 and 87.0 amu. What percent of Rubidium-85 is normally present given that its reported atomic mass is 85.47 amu?

x = FRACT ABUND. Rb-85 $(x)(85.0) + (1-x)(87.0) = 85.47$
$1-x$ = " " Rb-87 $85x - 87x + 87 = 85.47$
$-2x = -1.53 \Rightarrow x = 0.765$ 76.5%

2. Balance the following equations.

a) ___UO_2 + 4 HF -----> ___UF_4 + 2 H_2O

b) 2 H_3BO_3 ---------> ___B_2O_3 + 3 H_2O

c) ___B_2O_3 + 6 HF -------> 2 BF_3 + 3 H_2O

d) 2 C_2H_3Cl + 5 O_2 ------> 4 CO_2 + 2 H_2O + 2 HCl

e) 4 PH_3 + 8 O_2 -------> ___P_4O_{10} + 6 H_2O

3. Indicate whether the following compounds are **ionic** or **covalent**.

a) CCl_4 COVALENT c) NaF IONIC

b) CO_2 COVALENT d) PF_3 COVALENT

4. Give names for the following **ionic** compounds.

a) Na_2CO_3 SODIUM CARBONATE c) $Ba(ClO_3)_2$ BARIUM CHLORATE

b) AlP ALUMINUM PHOSPHIDE d) Cu_2CrO_4 COPPER (I) CHROMATE

5. Give formulas for each of the following **ionic** compounds.

a) zinc sulfate $ZnSO_4$ c) aluminum phosphate $AlPO_4$

b) silver nitrate $AgNO_3$ d) magnesium nitride Mg_3N_2

6. Give names for the following **covalent** compounds.

a) PCl_3 PHOSPHORUS TRICHLORIDE c) CS_2 CARBON DISULFIDE

b) SO_2 SULFUR DIOXIDE d) N_2O_5 DINITROGEN PENTOXIDE

7. Give formulas for the following **covalent** compounds.

a) nitrogen triiodide NI_3 c) phosphorus trifluoride PF_3

b) oxygen difluoride OF_2 d) diphosphorus tetroxide P_2O_4

8. Indicate the "pet" name associated with each of the following.

a) Mg ALKALINE EARTH METAL c) K ALKALI METAL

b) Ar NOBLE GAS d) Cl HALOGEN

9. Briefly distinguish between **homogeneous** and **heterogeneous** mixtures.

IN TEXT.

10. Briefly distinguish between **periods** and **groups** on the periodic table.

IN TEXT.

11. Briefly describe the difference betwween **anions** and **cations.**

IN TEXT

Naming Ionic and Covalent Compounds

Give the names of the following ionic compounds		Write the formulas for the following ionic compounds	
$Al(NO_3)_3$	Aluminum Nitrate	calcium hydroxide	$Ca(OH)_2$
HgI_2	Mercury (II) Iodide	magnesium nitride	Mg_3N_2
$Fe_2(CrO_4)_3$	Iron (III) Chromate	copper(I) cyanide	$CuCN$
NH_4NO_2	Ammonium Nitrite	silver nitrate	$AgNO_3$
Li_2CO_3	Lithium Carbonate	potassium bromide	KBr
SrO	Strontium Oxide	lead(IV) bromide	$PbBr_4$
$Ba(OH)_2$	Barium Hydroxide	tin(II) sulfide	SnS
Mg_3P_2	Magnesium Phosphide	potassium phosphate	K_3PO_4
CoF_3	Cobalt (III) Fluoride	mercury(I) iodide	HgI
$Ca(C_2H_3O_2)_2$	Calcium Acetate	ammonium hydroxide	NH_4OH
$PbCl_4$	Lead (IV) Chloride	potassium dichromate	$K_2Cr_2O_7$
Cu_2S	Copper (I) Sulfide	lead(II) carbonate	$PbCO_3$
$KMnO_4$	Potassium Permanganate	barium sulfite	$BaSO_3$
Na_2HPO_4	Sodium Hydrogen Phosphate	lithium phosphide	Li_3P

Give the name the following covalent compounds		Write the formula for the following covalent compounds	
$SeBr_4$	Selenium Tetrabromide	carbon monoxide	CO
F_2O_2	Difluorine Dioxide	nitrogen triiodide	NI_3
IBr_2	Iodine Dibromide	tetraphosphorus decasulfide	P_4S_{10}
OF_2	Oxygen Difluoride	disulfur dichloride	S_2Cl_2
N_2S_5	Dinitrogen Pentasulfide	dichlorine heptoxide	Cl_2O_7
Br_3O_8	Tribromine Octoxide	diphosphorus tetraoxide	P_2O_4
CS_2	Carbon Disulfide	dinitrogen monoxide	N_2O
S_4N_4	Tetrasulfur Tetranitride	selenium hexafluoride	SeF_6