Chemistry 101 – Unit 5
Answers to Practice Problems

1. Fill in the Table below with the correct name or formula for each compound. For each indicate if the compound is IONIC, MOLECULAR, or an ACID.

#	Name	Formula	Type
1	calcium fluoride	**CaF_2**	**ionic**
2	**sodium acetate**	$NaC_2H_3O_2$	**ionic**
3	iron(III) sulfate	**$Fe_2(SO_4)_3$**	**ionic**
4	sodium oxide	**Na_2O**	**ionic**
5	**lithium phosphate**	Li_3PO_4	**ionic**
6	ammonium chloride	**NH_4Cl**	**ionic**
7	**magnesium iodide**	MgI_2	**ionic**
8	nickel phosphate	**$Ni_3(PO_4)_2$**	**ionic**
9	potassium chlorate	**$KClO_3$**	**ionic**
10	carbon disulfide	**CS_2**	**molecular**
11	**sulfuric acid**	H_2SO_4	**acid**
12	sulfur hexafluoride	**SF_6**	**molecular**
13	lithium bromide	**LiBr**	**ionic**
14	**dinitrogen pentoxide**	N_2O_5	**molecular**
15	copper(II) nitrate	**$Cu(NO_3)_2$**	**ionic**
16	ammonia	**NH_3**	**molecular**
17	**aluminum phosphate**	$AlPO_4$	**ionic**
18	mercury(II) sulfide	**HgS**	**ionic**
19	ammonium sulfate	**$(NH_4)_2$ SO_4**	**ionic**
20	**iron (II) chloride**	$FeCl_2$	**ionic**
21	barium carbonate	**$BaCO_3$**	**ionic**
22	sulfur trioxide	**SO_3**	**molecular**
23	phosphoric acid	**H_3PO_4**	**acid**
24	**nitrogen dioxide**	NO_2	**molecular**
25	silver nitrate	**$AgNO_3$**	**ionic**
26	**aluminum carbonate**	$Al_2(CO_3)_3$	**ionic**
27	phosphorus pentabromide	**PBr_5**	**molecular**
28	nitric acid	**HNO_3**	**acid**
29	carbon tetraiodide	**CI_4**	**molecular**
30	lithium phosphide	**Li_3P**	**ionic**

Fill in the Table below with the correct name or formula for each compound. For each indicate if the compound is IONIC, MOLECULAR, or an ACID.

#	Name	Formula	Type
31	potassium hydroxide	**KOH**	**ionic**
32	**cobalt (III) chloride**	$CoCl_3$	**ionic**
33	sodium sulfate	**Na_2SO_4**	**ionic**
34	nitrous acid	**HNO_2**	**acid**
35	potassium chlorite	**$KClO_2$**	**ionic**
36	lead(IV) oxide	**PbO_2**	**ionic**
37	**calcium carbonate**	$CaCO_3$	**ionic**
38	sodium hydrogen sulfate	**$NaHSO_4$**	**ionic**
39	barium nitrate	**$Ba(NO_3)_2$**	**ionic**
40	**hydrobromic acid**	HBr	**acid**
41	sodium nitride	**Na_3N**	**ionic**
42	**calcium oxide**	CaO	**ionic**
43	nickel acetate	**$Ni(C_2H_3O_2)_2$**	**ionic**
44	aluminum sulfate	**$Al_2(SO_4)_3$**	**ionic**
45	**silver iodide**	AgI	**ionic**
46	tetrasulfur tetranitride	**S_4N_4**	**molecular**
47	**ammonium hydroxide**	NH_4OH	**ionic**
48	copper(II) sulfate	**$CuSO_4$**	**ionic**
49	lead(II) acetate	**$Pb(C_2H_3O_2)_2$**	**ionic**
50	**potassium sulfate**	K_2SO_4	**ionic**
51	magnesium chloride	**$MgCl_2$**	**ionic**
52	copper(I) sulfide	**Cu_2S**	**ionic**
53	**phosphorus trichloride**	PCl_3	**molecular**
54	sodium hydrogen carbonate	**$NaHCO_3$**	**ionic**
55	hydrofluoric acid	**HF**	**acid**
56	**mercury (II) oxide**	HgO	**ionic**
57	silver chloride	**AgCl**	**ionic**
58	sulfurous acid	**H_2SO_3**	**acid**
59	cobalt(III) nitrate	**$Co(NO_3)_3$**	**ionic**
60	magnesium hydroxide	**$Mg(OH)_2$**	**ionic**

2. Indicate the number of atoms in each of the following:

3 $Mg(OH)_2$	**3**	Mg	**6**	O	**6**	H	
4 $(NH_4)_2SO_4$	**8**	N	**32**	H	**4**	S	**16** O
2 $Ca_3(PO_4)_2$	**6**	Ca	**4**	P	**16**	O	
6 $Co(NO_3)_3$	**6**	Co	**18**	N	**54**	O	

3. Fill in the Table below for ionic compounds.
How do you recognize an ionic compound?
Ionics contain ions; often a metal + nonmetal or polyatomic ion(s)

Compound	Cation	Anion	Formula
magnesium fluoride	**Mg^{2+}**	**F^-**	**MgF_2**
sodium carbonate	**Na^+**	**CO_3^{2-}**	**Na_2CO_3**
iron(III) bromide	**Fe^{3+}**	**Br^-**	**$FeBr_3$**
silver nitrate	**Ag^+**	**NO_3^-**	**$AgNO_3$**
barium sulfate	**Ba^{2+}**	**SO_4^{2-}**	**$BaSO_4$**
aluminum oxide	**Al^{3+}**	**O^{2-}**	**Al_2O_3**
lead(II) acetate	**Pb^{2+}**	**$C_2H_3O_2^-$**	**$Pb(C_2H_3O_2)_2$**
potassium sulfide	**K^+**	**S^{2-}**	**K_2S**
zinc phosphate	**Zn^{2+}**	**PO_4^{3-}**	**$Zn_3(PO_4)_2$**
calcium phosphate	Ca^{2+}	PO_4^{3-}	**$Ca_3(PO_4)_2$**
copper (II) chloride	Cu^{2+}	Cl^-	**$CuCl_2$**
ammonium sulfate	NH_4^+	SO_4^{2-}	**$(NH_4)_2SO_4$**

4. Fill in the following Table for acids. How do you recognize an acid?
(Chemical formula begins with "H". Organic Acids end in "COOH")

cation formula	anion formula	anion name	acid name	acid formula
H^+	**NO_3^-**	**nitrate**	nitric acid	**HNO_3**
H^+	**F^-**	**fluoride**	hydrofluoric acid	**HF**
H^+	**$C_2H_3O_2^-$**	**acetate**	acetic acid	**$HC_2H_3O_2$ or CH_3COOH**
H^+	**ClO_2^-**	**chlorite**	chlorous acid	**$HClO_2$**
H^+	**I^-**	**iodide**	**hydroiodic acid**	HI
H^+	**SO_4^{2-}**	**sulfate**	**sulfuric acid**	H_2SO_4
H^+	**S^{2-}**	**sulfide**	**hydrosulfuric acid**	H_2S
H^+	PO_4^{3-}	**phosphate**	**phosphoric acid**	**H_3PO_4**

5. Write the name or the formula for the following molecular compounds.
How do you recognize molecular compounds?
Molecular compounds contain nonmetals only

NAME	FORMULA
phosphorus tribromide	**PBr_3**
dichlorine heptoxide	**Cl_2O_7**
carbon tetrachloride	**CCl_4**
sulfur dioxide	**SO_2**
sulfur hexafluoride	SF_6
nitrogen monoxide	NO
diphosphorus pentoxide	P_2O_5
iodine trifluoride	IF_3

6. Write the chemical formulas for the following compounds:

1. $NaNO_2$
2. $CaCO_3$
3. CF_4
4. HCl
5. $Ba(OH)_2$
6. KI
7. $Ca(ClO_3)_2$
8. N_2O_5
9. CuI_2
10. $Cu(NO_3)_2$
11. $AgBr$
12. $(NH_4)_2SO_4$
13. HBr
14. $KClO_3$
15. SF_6
16. H_2SO_3
17. SnO_2
18. $MgCO_3$
19. $CsOH$
20. SrF_2
21. SO_3
22. Rb_2SO_4
23. $Fe_3(PO_4)_2$
24. Cu_2SO_3
25. $PbCl_4$
26. HNO_2
27. $LiHSO_4$
28. NH_3
29. CoI_3
30. NH_4OH
31. $KHCO_3$
32. $SrCl_2$
33. $HC_2H_3O_2$
34. $Al(OH)_3$
35. $Fe(NO_3)_3$
36. $Ni_3(PO_4)_2$
37. PbI_2
38. $SnSO_4$
39. HNO_3
40. H_2O
41. BCl_3
42. $FeBr_2$
43. Li_3PO_4
44. $PbSO_4$
45. $ZnCO_3$
46. H_2SO_4
47. $Co(C_2H_3O_2)_2$
48. $ZnCl_2$
49. CsI
50 H_3PO_4