TYPES OF CHEMICAL BONDS

Name _____

Classify the following compounds as ionic (metal and nonmetal), covalent (nonmetal and nonmetal) or both (compound containing a polyatomic ion).

1. $CaCl_2$ _____
2. CO_2 _____
3. H_2O _____
4. $BaSO_4$ _____
5. K_2O _____
6. NaF _____
7. Na_2CO_3 _____
8. CH_4 _____
9. SO_3 _____
10. LiBr _____

11. MgO _____
12. NH_4Cl _____
13. HCl _____
14. KI _____
15. NaOH _____
16. NO_2 _____
17. $AlPO_4$ _____
18. $FeCl_3$ _____
19. P_2O_5 _____
20. N_2O_3 _____

NUMBER OF ATOMS IN A FORMULA

Name _____

Determine the number of atoms in the following chemical formulas.

1. $NaCl$ _____
2. H_2SO_4 _____
3. KNO_3 _____
4. $CaCl_2$ _____
5. C_2H_6 _____
6. $Ba(OH)_2$ _____
7. NH_4Br _____
8. $Ca_3(PO_4)_2$ _____
9. $Al_2(SO_4)_3$ _____
10. $Mg(NO_3)_2$ _____
11. $Cu(NO_3)_2$ _____
12. $KMnO_4$ _____
13. H_2O_2 _____
14. H_3PO_4 _____
15. $(NH_4)_3PO_4$ _____
16. Fe_2O_3 _____
17. $NaC_2H_3O_2$ _____
18. $Mg(C_2H_3O_2)_2$ _____
19. Hg_2Cl_2 _____
20. K_2SO_3 _____

WRITING BINARY FORMULAS

Name _____

Write the formulas for the compounds formed from the following ions.

1. Na^{+}, Cl^{-} _____
2. Ba^{+2}, F^{-} _____
3. K^{+}, S^{-2} _____
4. Li^{+}, Br^{-} _____
5. Al^{+3}, I^{-} _____
6. Zn^{+2}, S^{-2} _____
7. Ag^{+}, O^{-2} _____
8. Mg^{+2}, P^{-3} _____
9. Ni^{+2}, O^{-2} _____
10. Ni^{+3}, O^{-2} _____
11. Fe^{+2}, O^{-2} _____
12. Fe^{+3}, O^{-2} _____
13. Cr^{+2}, S^{-2} _____
14. Cr^{+3}, S^{-2} _____
15. Cu^{+}, Cl^{-} _____
16. Cu^{+2}, Cl^{-} _____
17. Pb^{+2}, O^{-2} _____
18. Pb^{+4}, O^{-2} _____
19. Mn^{+2}, Br^{-} _____
20. Mn^{+4}, Br^{-} _____

BALANCING EQUATIONS

Name _____

Balance the following chemical equations.

1. $CH_4 + O_2 \rightarrow CO_2 + H_2O$

2. $Na + I_2 \rightarrow NaI$

3. $N_2 + O_2 \rightarrow N_2O$

4. $N_2 + H_2 \rightarrow NH_3$

5. $KI + Cl_2 \rightarrow KCl + I_2$

6. $HCl + Ca(OH)_2 \rightarrow CaCl_2 + H_2O$

7. $KClO_3 \rightarrow KCl + O_2$

8. $K_3PO_4 + HCl \rightarrow KCl + H_3PO_4$

9. $S + O_2 \rightarrow SO_3$

10. $KI + Pb(NO_3)_2 \rightarrow KNO_3 + PbI_2$

11. $CaSO_4 + AlBr_3 \rightarrow CaBr_2 + Al_2(SO_4)_3$

12. $H_2O_2 \rightarrow H_2O + O_2$

13. $Na + H_2O \rightarrow NaOH + H_2$

14. $C_2H_6 + O_2 \rightarrow CO_2 + H_2O$

15. $Mg(NO_3)_2 + K_3PO_4 \rightarrow Mg_3(PO_4)_2 + KNO_3$

CLASSIFYING CHEMICAL REACTIONS

Name _____

Classify the following reactions as synthesis, decomposition, single replacement or double replacement.

1. $2KClO_3 \rightarrow 2KCl + 3O_2$

2. $HCl + NaOH \rightarrow NaCl + H_2O$

3. $Mg + 2HCl \rightarrow MgCl_2 + H_2$

4. $2H_2 + O_2 \rightarrow 2H_2O$

5. $2Al + 3NiBr_2 \rightarrow 2AlBr_3 + 3Ni$

6. $4Al + 3O_2 \rightarrow 2Al_2O_3$

7. $2NaCl \rightarrow 2Na + Cl_2$

8. $CaCl_2 + F_2 \rightarrow CaF_2 + Cl_2$

9. $AgNO_3 + KCl \rightarrow AgCl + KNO_3$

10. $N_2 + 3H_2 \rightarrow 2NH_3$

11. $2H_2O_2 \rightarrow 2H_2O + O_2$

12. $(NH_4)_2SO_4 + Ba(NO_3)_2 \rightarrow BaSO_4 + 2NH_4NO_3$

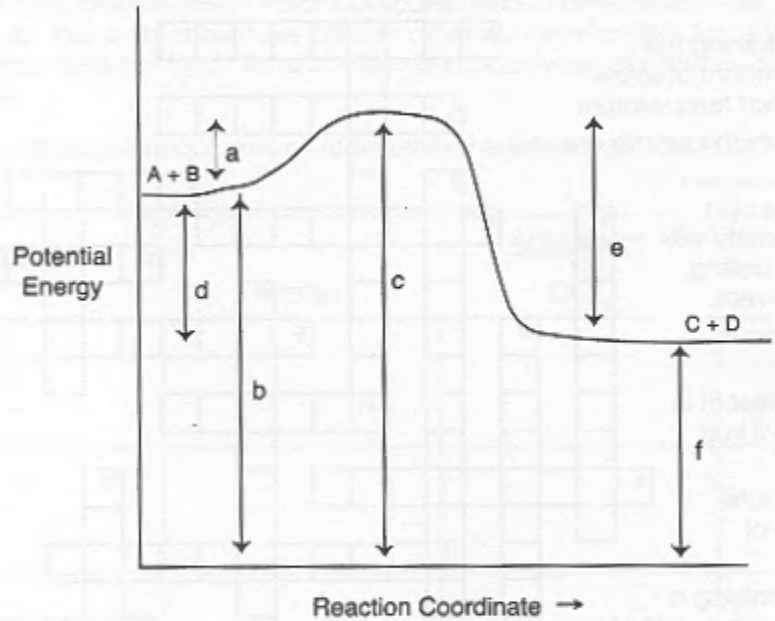
13. $MgI_2 + Br_2 \rightarrow MgBr_2 + I_2$

14. $SO_3 + H_2O \rightarrow H_2SO_4$

15. $6KCl + Zn_3(PO_4)_2 \rightarrow 3ZnCl_2 + 2K_3PO_4$

POTENTIAL ENERGY DIAGRAM

Name _____



A + B ↔ C + D + energy

Answer the questions using the graph above.

1. Is the above reaction endothermic or exothermic? _____
2. What letter represents the potential energy of the reactants? _____
3. What letter represents the potential energy of the products? _____
4. What letter represents the heat of reaction (ΔH)? _____
5. What letter represents the activation energy of the forward reaction? _____
6. What letter represents the activation energy of the reverse reaction? _____
7. What letter represents the potential energy of the activated complex? _____
8. Is the reverse reaction endothermic or exothermic? _____
9. If a catalyst were added, what letter(s) would change? _____

ACID, BASE OR SALT

Name _____

Classify each of the following compounds as an acid, base or salt. Then, indicate whether each acid and base is strong or weak.

1. HNO_3 _____ _____
2. $NaOH$ _____ _____
3. $NaNO_3$ _____ _____
4. HCl _____ _____
5. KCl _____ _____
6. $Ba(OH)_2$ _____ _____
7. KOH _____ _____
8. H_2S _____ _____
9. $Al(NO_3)_3$ _____ _____
10. H_2SO_4 _____ _____
11. $CaCl_2$ _____ _____
12. H_3PO_4 _____ _____
13. Na_2SO_4 _____ _____
14. $Mg(OH)_2$ _____ _____
15. H_2CO_3 _____ _____
16. NH_4OH _____ _____
17. NH_4Cl _____ _____
18. HBr _____ _____
19. $FeBr_3$ _____ _____
20. HF _____ _____

pH

Name _____

pH is a scale that measures the hydronium ion concentration of a solution. Therefore, the pH scale can be used to determine the acidity of a solution. A pH of less than 7 indicates an acidic solution, a pH of 7 is neutral, and a pH of greater than 7 up to 14 is basic. The lower the pH, the higher the acidity. The higher the pH, the lower the acidity.

Indicators are substances that change color at a different pH levels. Phenolphthalein is colorless in an acid and a neutral solution, pink in a base. Blue litmus changes to red in an acid, and remains blue in neutral and basic solutions. Red litmus remains red in acidic and neutral substances, but turns blue in bases.

Complete the following chart.

pH	Acid, Base, Neutral	Phenolphthalein	Blue Litmus	Red Litmus
2				
8				
4				
7				
13				
11				
5				
1				