**Define the following.**

1. Skeleton Equation -

2. Balanced Chemical Equation -

3. Complete or Total Ionic Equation –

4. Spectator Ion -

5. Net Ionic Equation –

6. Precipitate –

**Define the types of equations. Write the general format and an easy way to remember them.**

7.Synthesis -

8. Single Replacement –

What must you check for single replacement reactions?

9. Double Replacement –

10. Combustion –

11. Decomposition -

**Answer the following**

12. What do the following symbols represent?

(s) - (l) - (g) - (aq) -

13. What are the diatomic elements and what does diatomic mean?

14. What do we add to an unbalanced equation to make it balanced?

**Identify as combustion, decomposition, single replacement, synthesis or double replacement**

15. Octane is a main component of gasoline. When burned, water and carbon dioxide are produced.\_\_\_\_\_\_\_

16. Nickel reacts with sulfur to form nickel (II) sulfide. \_\_\_\_\_\_

17. When solutions of lead (II) nitrate and potassium iodide are mixed, a yellow solid forms.\_\_\_\_\_\_\_

18. When electricity is passed through molten sodium chloride, sodium and chlorine are formed. \_\_\_\_\_\_\_

19. When copper is placed in a solution of silver nitrate, the wire turns silvery and the solution turns blue. \_\_\_\_\_\_\_\_

20. Fluorine gas is bubble through a magnesium iodide solution. The solution turns yellow, the color of iodide.\_\_\_\_\_\_\_

**The following are proposed single replacement reactions, identify if the reaction will happen or not.**

21. 2NaI + Br2 🡪 NaBr + I2 22. CuCl2 + 2K 🡪 2KCl + Cu

23. NaOH + Li 🡪 LiOH + Na 23. Zn + CuSO4 🡪 Cu + ZnSO4

**For the following double replacement reactions, fill in the products and their phases and balance the equation.**

24. AgNO3(aq) + CuCl2(aq) 🡪

25. NaOH(aq) + FeSO4(aq) 🡪

**For the next six problems, write the balanced molecular equation (including phases) for each. Also write the total and net ionic equations.**

**If the purported reaction does NOT occur, write the formulas of the reactants and put “no reaction” after the arrow in the molecular equation. Leave the total and net ionic equations blank.**

16. Write the balanced molecular equation for silver metal reacting with oxygen to produce one product.

Molecular eq = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

17. Write the balanced equations for a solution of titanium (II) nitrate mixing with a solution of sodium sulfide. One of the products is a precipitate.

Molecular eq = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Total ionic eq = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Net ionic =\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

18. Write the balanced equations for platinum metal placed in a solution of copper (II) bromide.

Molecular eq = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Total ionic eq = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Net ionic =\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

19. Write the balanced molecular equation for butane gas (C3H8) burning in air.

Molecular eq = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

20. Balance the following molecular equation. Also write the total and net ionic equations.

Molecular eq = Cu (s) + HNO3(aq) 🡪 Cu(NO3)2(aq) + NO(g) + H2O(l)

Total ionic eq = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Net ionic =\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

21. Write the products and balance the following molecular equation.

Molecular eq = K2CO3(s) + heat 🡪\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Define the following.**

1. Skeleton Equation - an unbalanced chemical equation

2. Balanced Chemical Equation - even numbers of atoms on the products and reactants sides

3. Complete or Total Ionic Equation – all aqueous ions are broken up to show how they are in solution

4. Spectator Ion - a charged atom or group of atoms that doesn’t change from the reactants to the products

5. Net Ionic Equation – like the total ionic equation, but all spectators are omitted

6. Precipitate – a solid formed when two solutions are mixed, usually from a double replacement reaction

**Define the types of equations. Write the general format and an easy way to remember them.**

7.Synthesis - two or more elements become one compound – A+B 🡪 AB – a formed relationship

8. Single Replacement – one element replaces another in a compound A + BC 🡪 AC + B - senior boy, sophomore boy

What must you check for single replacement reactions? The replacing element must be more reactive

9. Double Replacement – two compounds switch positive ions. AB + CD 🡪 AD + CB – double date swap

10. Combustion – anything reacting with oxygen, produces CO2 and water if a hydrocarbon CxHyOz + O2 🡪 CO2 + H2O

11. Decomposition - one compound breaks down into two or more compounds AB 🡪 A + B – the break up

**Answer the following**

12. What do the following symbols represent?

(s) - solid (l) - liquid (g) - gas (aq) - aqueous (dissolved in water)

13. What are the diatomic elements and what does diatomic mean?

H, N, O, F, Cl, Br, I they don’t like to be alone, will bond with themselves in nature, ex. H2

14. What do we add to an unbalanced equation to make it balanced?

Add coefficients (numbers in front of compounds) until the atoms on the left = the atoms on the right

**Identify as combustion, decomposition, single replacement, synthesis or double replacement**

15. Octane is a main component of gasoline. When burned, water and carbon dioxide are produced.\_\_Comb\_\_\_\_\_

16. Nickel reacts with sulfur to form nickel (II) sulfide. \_\_synthesis\_\_\_\_

17. When solutions of lead (II) nitrate and potassium iodide are mixed, a yellow solid forms.\_\_\_double replacment\_\_\_\_

18. When electricity is passed through molten sodium chloride, sodium and chlorine are formed. \_\_\_decomp\_\_\_\_

19. When copper is placed in a solution of silver nitrate, the wire turns silvery and the solution turns blue. single replace

20. Fluorine gas is bubble through a magnesium iodide solution. The solution turns yellow, the color of iodide.\_\_SR\_\_\_

**The following are proposed single replacement reactions, identify if the reaction will happen or not.**

21. 2NaI + Br2 🡪 NaBr + I2 won’t 22. CuCl2 + 2K 🡪 2KCl + Cu will

23. NaOH + Li 🡪 LiOH + Na won’t 23. Zn + CuSO4 🡪 Cu + ZnSO4 will

**For the following double replacement reactions, fill in the products and their phases and balance the equation.**

24. 2 AgNO3(aq) + CuCl2(aq) 🡪 2 AgCl(s) + Cu(NO3)2(aq)

25. 2 NaOH(aq) + FeSO4(aq) 🡪 Fe(OH)2(s) + Na2SO4(aq)

**For the next six problems, write the balanced molecular equation (including phases) for each. Also write the total and net ionic equations.**

**If the purported reaction does NOT occur, write the formulas of the reactants and put “no reaction” after the arrow in the molecular equation. Leave the total and net ionic equations blank.**

16. Write the balanced molecular equation for silver metal reacting with oxygen to produce one product.

Molecular eq = \_\_\_\_\_\_\_\_\_\_4Ag(s) + O2(g) 🡪 2Ag2O(s)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

17. Write the balanced equations for a solution of titanium (II) nitrate mixing with a solution of sodium sulfide. One of the products is a precipitate.

Molecular eq = \_\_\_\_\_\_\_\_\_\_\_Ti(NO3)2(aq) + Na2S(aq) 🡪 TiS(s) + 2NaNO3(aq)\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Total ionic eq = \_\_\_\_\_Ti2+ + 2NO3- + 2Na+ +S2- 🡪TiS(s) + 2Na+ + 2NO3-\_\_\_\_\_\_\_\_\_\_\_\_

Net ionic =\_\_\_\_\_\_\_\_\_ Ti2+ +S2- 🡪TiS(s) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

18. Write the balanced equations for platinum metal placed in a solution of copper (II) bromide.

Molecular eq = \_\_\_\_\_\_Pt(s) + CuBr2(aq) 🡪 NO REACTION\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Total ionic eq = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Net ionic =\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

19. Write the balanced molecular equation for butane gas (C3H8) burning in air.

Molecular eq = \_\_\_\_\_\_\_\_\_\_C3H8(g) + 5O2(g) 🡪 3CO2(g) + 4H2O(g) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

20. Balance the following molecular equation. Also write the total and net ionic equations.

Molecular eq = 2Cu (s) + 6HNO3(aq) 🡪 2Cu(NO3)2(aq) + 3NO(g) + 3H2O(l)

Total ionic eq = \_\_\_\_\_\_\_2 Cu(s) + 6H+ + 6NO3- 🡪 2Cu2+ + 4NO3- + 3NO(g) + 3H2O(l)\_\_\_\_\_\_\_\_\_\_

Net ionic =\_\_\_\_\_\_\_\_2 Cu(s) + 6H+ + 2NO3- 🡪 2Cu2+ + 3NO(g) + 3H2O(l)\_\_\_\_\_\_\_\_\_\_

21. Write the products and balance the following molecular equation.

Molecular eq = K2CO3(s) + heat 🡪\_\_\_\_\_\_K2O(s) + CO2(g)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_