

## General Chemistry Unit 3 Study Guide: Compounds and Chemical Reactions

*The Unit 3 test will be on Monday, Nov. 11.  
You are allowed one 3 x 5" card (both  
sides) of notes.*

1. Define "ion":
2. Explain what an ionic bond is. What type(s) of elements form ionic bonds?
3. Explain what a covalent bond is. What type(s) of elements form covalent bonds? How many electrons are involved in a... Single bond? Double bond? Triple bond?
4. Know the properties of ionic compounds.
5. Know the properties of molecular compounds.
6. Use the periodic table to tell how many valence electrons an atom has.
7. Tell whether an atom will form a positive or negative ion, and what its oxidation # (ionic charge) is.
8. Determine the charge on a multivalent metal in an ionic compound by using the charge of the anion it is bonded with.
9. Octet rule: atoms will give, take, or share electrons achieve maximum stability with 8 valence electrons (or 2 valence e-s for  $\text{Li}^+$  or  $\text{Mg}^{2+}$ ).
10. Know the naming rules for ionic compounds and be able to write the balanced chemical formulas for ionic compounds when given their names.

11. Know the naming rules for molecular compounds and be able to write the chemical formulas when given names.
12. When given a word equation for a reaction, write the balanced chemical equation.
13. Classify reactions as synthesis, decomposition, single-replacement, double-replacement, combustion, or acid-base neutralization.
14. Compare the ability of one metal to replace another in a single-replacement reaction based on their relative positions on the metal activity series.
15. Compare the ability of one halogen to replace another in a single-replacement reaction based on their relative positions on the activity series.

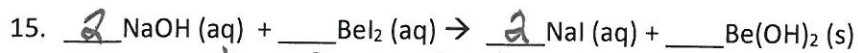
**Part II:** Determine whether each compound is ionic or molecular. Then write the chemical formula for each.

1. manganese (III) fluoride  $\text{MnF}_3$  IONIC
2. ammonium oxalate  $(\text{NH}_4)_2\text{C}_2\text{O}_4$  IONIC
3. Strontium chlorate  $\text{Sr}(\text{ClO}_3)_2$  IONIC
4. diphosphorus pentachloride  $\text{P}_2\text{Cl}_5$  COVALENT
5. tin (IV) dichromate  $\text{Sn}(\text{Cr}_2\text{O}_7)_2$  IONIC
6. tetracarbon decahydride  $\text{C}_4\text{H}_{10}$  COVALENT
7. silicon tetraiodide  $\text{SiI}_4$  COVALENT

**Part III:** Name each of the following compounds using the appropriate naming rules (ionic or molecular).

8.  $\text{TiO}_2$  TITANIUM (IV) OXIDE
9.  $\text{Mg}(\text{OH})_2$  MAGNESIUM HYDROXIDE
10.  $\text{CdCr}_2\text{O}_7$  CADMIUM (II) DICHROMATE
11.  $\text{CuNO}_3$  COPPER (I) NITRATE
12.  $\text{NaHCO}_3$  SODIUM BICARBONATE
13.  $\text{SF}_6$  SULFUR HEXAFLUORIDE
14.  $\text{Fe}_3(\text{PO}_4)_2$  IRON (II) PHOSPHATE

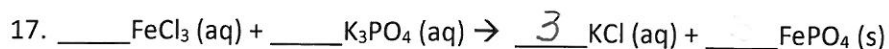
**Part IV:** Identify the type of reaction in each problem. Then balance the chemical equation.



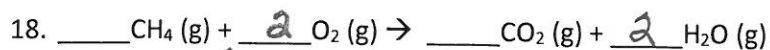
Reaction: DOUBLE REPL



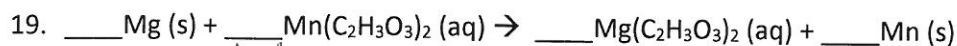
Reaction: DECOMP



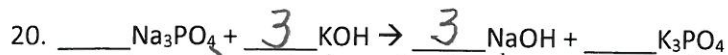
Reaction: \_\_\_\_\_



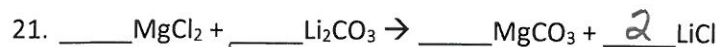
Reaction: COMBUSTION MOSTLY + DOUBLE REPL



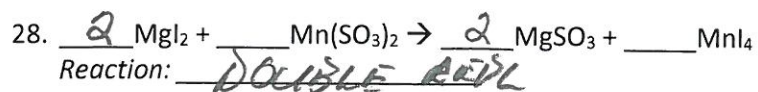
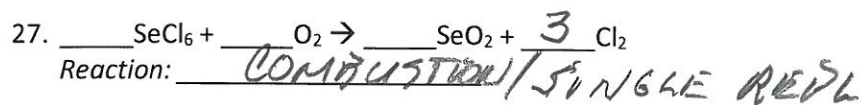
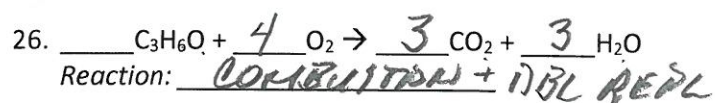
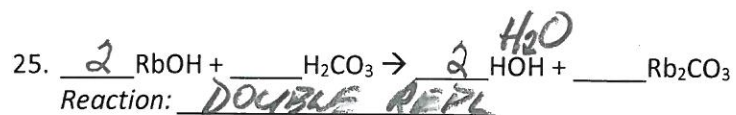
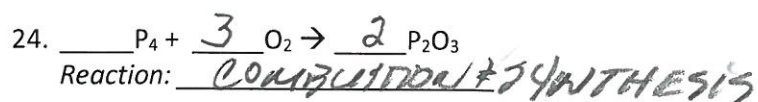
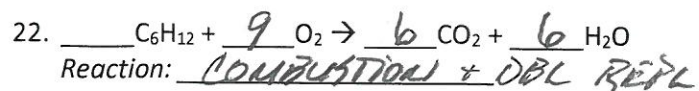
Reaction: SINGLE REPL



Reaction: DOUBLE REPL

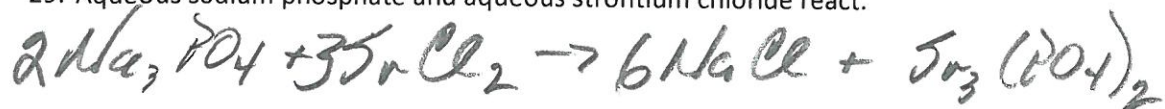


Reaction: DOUBLE REPL



Part VII: Convert the following word equations into chemical equations.

29. Aqueous sodium phosphate and aqueous strontium chloride react.



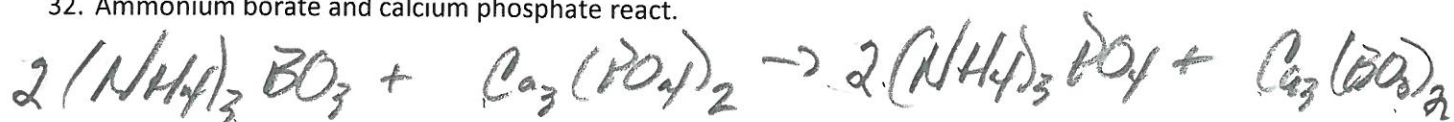
30. Solid potassium and chlorine gas combine to form solid potassium chloride.



31. Aluminum metal and aqueous silver nitrate are put together.



32. Ammonium borate and calcium phosphate react.



33. Silver is put in a solution of lithium chloride.



34. Ammonia decomposes.



35. Magnesium acetate and barium metal are put together.



36. Propane ( $\text{C}_3\text{H}_8$ ) burns.



37. Aluminum and oxygen react.

