

Answer the following in your notes, or on this review paper if there is room to do so.

1. Differentiate between physical & chemical properties. State two examples of each.

A physical property of matter is an aspect of matter that can be observed without changing its chemical composition (colour, volume, temperature). A chemical property may only be observed by changing the chemical identity of a substance (i.e. by reacting it with something). Examples of chemical properties include, acidity, reactivity, flammability.

2. What does WHMIS stand for? What does HHPS stand for?

Workplace Hazardous Material Information System  
Household Hazardous Product System

3. Name two household products that have an HHPS on them. Name the symbol. Give one precaution for each.

Bleach – corrosive, paint thinner - flammable

4. Periodic Table: know what group each element is in and how that relates to its valence electrons?

Group number (i.e. column number) tells you how many valence electrons are in the atom.

5. Identify the general location of the metal groups, nonmetal groups and metalloids?

Metals to the left, nonmetals to the right, metalloids are in the middle.

6. Differentiate between an element and a compound. Give an example of each.

An element is a single atom whereas a compound has 2 or more atoms that combine (either ionically or covalently)

7. Differentiate between a binary ionic compound and a polyatomic compound. Give an example of each.

A binary ionic compound has two different elements in it. A polyatomic compound has three or more elements in it.

8. Differentiate between an ionic compound and a molecular compound. Give an example of each.

An ionic compound is formed from a metal and a nonmetal. A molecular compound is formed from 2 nonmetals.

9. Differentiate between physical and chemical changes. Give an example of each.

Physical Changes – the substance does not change what it is (i.e. the underlying chemical formula for the substance did not change (example – ice melting into water). Chemical change – a new substance is formed (example - iron rusting and forming iron oxide)

10. State the four clues that a chemical change has taken place.

Change in temperature  
Change in colour  
Emission of gas  
Smell or odor

- There could also be a change in pH (increase or decrease in acidity or basicness)

11. Describe how an atom become an ion.

An atom becomes an ion by adding or losing one or more electrons resulting in a net negative or positive charge.

12. How do metals become ions and what is the resulting charge? How do non-metals become ion and what is the resulting charge?

Metals become ions by losing one or more electrons becoming positive.

13. State the charge of the ions of the following atoms:

a) Beryllium  
+2

b) Phosphorus  
-3

c) aluminum  
+3

d) argon  
0 (argon does not form an ion)

14. Name the noble gas which has the same number of electrons as an ion of the following elements.

- |           |                |            |            |
|-----------|----------------|------------|------------|
| a) sodium | b) phosphorous | c) bromine | d) calcium |
| Neon      | Argon          | Krypton    | Argon      |

15. Fill in the following chart to show how an ionic compound is formed. Give the formula of each.

	Lewis Dot or Bohr Diagram of ATOM	Lewis Dot or Bohr Diagram of ION	Lewis Dot or Bohr Diagram of the COMPOUND, showing electron transfer
Magnesium		$Mg^{2+}$	<p>Formula:</p>
Chlorine		$Cl^{-}$	
Aluminum		$Al^{3+}$	<p>Formula:</p>
Oxygen		$O^{2-}$	

16. Write the chemical formula for the following compounds.

- |                                    |                                     |                                     |
|------------------------------------|-------------------------------------|-------------------------------------|
| a) potassium oxide<br>$K_2O$       | d) hydrobromic acid<br>$HBr$        | g) iron (III) chloride<br>$FeCl_3$  |
| b) calcium nitrate<br>$Ca(NO_3)_2$ | e) aluminum nitride<br>$AlN$        | h) copper (I) chlorate<br>$CuClO_3$ |
| c) calcium sulfate<br>$CaSO_4$     | f) disulphur heptaoxide<br>$S_2O_7$ | i) ammonium fluoride<br>$NH_4F$     |

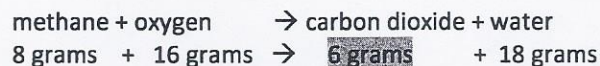
17. Write the names of the following compounds

- |  |                                     |                                    |
|--|-------------------------------------|------------------------------------|
| a) $H_2SO_4$<br>hydrogen sulfate         | d) $Na_3N$<br>sodium nitride        | g) $NiO$<br>nickel (II) oxide      |
| b) $FeP$<br>iron (III) phosphide         | e) $Br_3O_8$<br>tribromine octoxide | h) $Ca(NO_3)_2$<br>calcium nitrate |
| c) $Pb_3(PO_4)_2$<br>lead (II) phosphate | f) $CCl_4$<br>carbon tetrachloride  | i) $FeSO_4$<br>iron (II) sulfate   |

18. State the Law of Conservation of Mass.

The total mass of the reactants always equals the total mass of the products.

19. When 8.0 grams of methane is reacted with 16.0 grams of oxygen gas, 18.0 of water is produced how much carbon dioxide is produced?



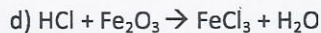
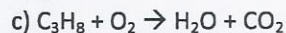
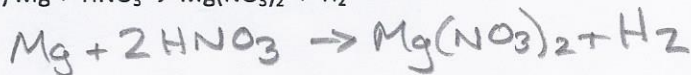
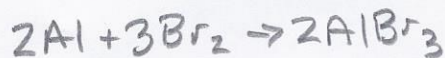
20. Count the number of atoms in each of the following (make a chart for yourself to keep track):

a)  $AlSO_4$   
Al - 1  
S - 1  
O - 4

b)  $Ba_3(PO_4)_2$   
Ba - 3  
P - 2  
O - 8

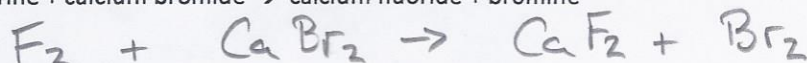
c)  $3Cr_3(SO_4)_2$   
Cr - 9  
S - 6  
O - 24

21. Balance the following equations.

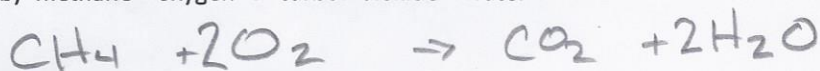


22. Convert the following word equations to a skeleton equation and then balance them: (remember to look for EVERYTHING!!!)

a) fluorine + calcium bromide  $\rightarrow$  calcium fluoride + bromine



b) methane + oxygen  $\rightarrow$  carbon dioxide + water



23. For each of the following reactions, 1. predict the product(s), 2. identify the TYPE of chemical reaction, 3. write the chemical skeleton for the equation, and then 4. balance it!

a. aluminum combines with chlorine

S



S

b. magnesium combines with aluminum chloride

SD



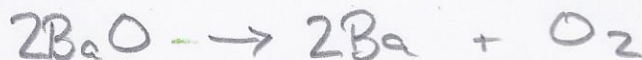
c. calcium chloride combines with sodium sulfide

DD



d. barium oxide is heated

D



e. methane fuel burns

C



f.  $Sn + AgNO_3 \rightarrow$

SD



g.  $NiCO_3 \rightarrow$

D



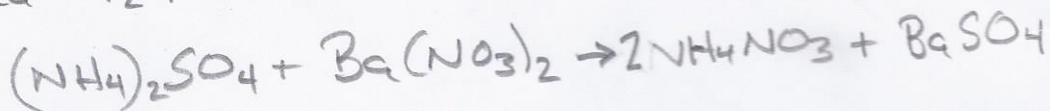
h.  $CaCl_2 + F_2 \rightarrow$

SD



i.  $(NH_4)_2SO_4 + Ba(NO_3)_2 \rightarrow$

DD



S-synthesis, D-decomposition, SD-single displacement  
DD-double displacement, C-combustion

24. How would you know if a substance is an acid or a base by looking at its chemical formula?

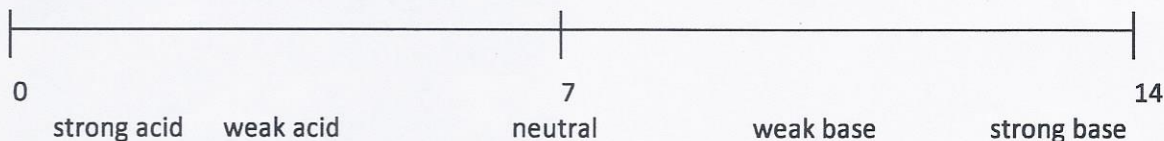
An acid will have hydrogen in the formula without an adjacent oxygen. Bases will have a hydroxide ion ( $\text{OH}^{-1}$ ) in the formula.

State 3 other ways that you could tell if a substance was an acid or a base (using their properties).

Acids are sour, reacts with metals and turns blue litmus paper red.

Bases are bitter, feels slippery and turns red litmus paper blue.

25. Complete the diagram of the pH scale below by adding the appropriate numbers



Label the location of each of the following on the pH scale

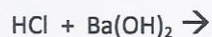
- Weak acid
- Strong acid
- Weak base
- Strong base
- Neutral

26. Write the general equation for a neutralization reaction.

*(Also, be sure you are able to recognize a neutralization reaction if you see one!)*



27. Complete the following neutralization reaction.



28. Explain how the pH value of a solution changes as the concentration of an acid is increased.

As the concentration of an acid increases the pH of the solution will steadily decline below 7.

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**NOTES:**