Exam Review: Chemistry

- 1. Name two household products that have an HHPS on them and state the symbol.
- 2. What does WHMIS stand for? What does HHPS stand for?

Workplace Hazardous Materials Information System

Hazardous Household Product Symbols

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

An element contains one type of atom, Cu, Ag, Au etc., a compound contains two or more types of atoms combined in a fixed ratio CO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>

4. Differentiate between physical and chemical properties.

Physical properties describe the substance chemical properties describe how a substance will react with substances

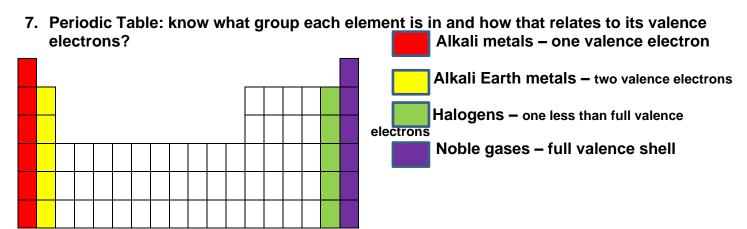
- 5. State two physical and two chemical properties of matter.
  - colour
  - luster
  - ductility

- malleability
- odour
- brittlenes

- reaction with an acid
- reaction with water
- reaction with oxygen
- 6. State four clues that a chemical change has taken place.
  - change in colour
- bubbles of gas are formed

- a new odour

- a precipitate is formed



8. What are metal groups non-mental groups and transition metals

## 9. Differentiation between an ionic compound and a molecular compound. Give an example of each

An ionic compound is made by a metal and a non-metal- calcium chloride, sodium sulfate aluminum phosphide, a molecular compound is made by two or more non-metals - carbon dioxide, sugar, nitrogen dioxide

- 10. How does an atom become an ion? Gaining or losing electrons.
- 11. Why do elements form ions? To get a full valence shell and become stable
- 12. Metals tend to lose electrons. Non-metals tend to gain electrons.
- 13. What is the charge of the ions of the following atoms?
  - a) Beryllium +2
- b) Phosphorus -3

## 14. Which noble gases are the following ions isoelectronic with?

- a) **sodium** neon
- b) **phosphorous** argon
- c) **bromine** krypton

d) calcium – argon

## 15. Write the chemical formula for the following compounds

- a) potassium oxide K<sub>2</sub>O
- b) barium phosphide Ba<sub>3</sub>P<sub>2</sub>
- c) iron (III) chloride FeCl<sub>3</sub>

- d) calcium nitrate Ca(NO<sub>3</sub>)<sub>2</sub>
- e) aluminum nitride AIN
- f) copper (I) chlorate CuClO<sub>3</sub>

- g) calcium sulfate CaSO<sub>4</sub>
- h) disulfur heptaoxide S<sub>2</sub>O<sub>7</sub>
- i) ammonium fluoride NH<sub>4</sub>F

## 16. Write the names of the following compounds

- a) KBr potassium bromide
- b) Na<sub>3</sub>N sodium nitride
- c) NiO nickel (II) oxide

- d) FeP Iron (III) phosphide
- e) Br<sub>3</sub>O<sub>8</sub> tribromine octoxide
- f) Ca(NO<sub>3</sub>)<sub>2</sub> calcium nitrate
- g)  $Pb_3(PO_4)_2 lead(II)$  phosphate
- h) CCl<sub>4</sub> carbon tetrachloride
- i) FeSO<sub>4</sub> iron (II) sulfate

17. Fill in the following chart, to show how an ionic compound is formed

	Lewis Dot or	Lewis Dot or Bohr	Lewis Dot or Bohr Diagram of the		
	Bohr Diagram of	Diagram of ION	formation of the COMPOUND, showing		
	ATOM		electron transfer		
Magnesium	• Mg•	[Mg] <sup>2+</sup>	:Cl: '/ [NA = 12+ ] - [-; ] ] -		
Chlorine	•CI	[:ä:] <sup>-</sup>	$\cdot \operatorname{Mg} \cdot \overset{\cdot}{\overset{\cdot}{\overset{\cdot}{\cdot}}} \rightarrow [\operatorname{Mg}]^{2+} + 2 \begin{bmatrix} \ddot{\Box} \vdots \end{bmatrix}^{-}$		
Carbon	• Č •	NA	000C		
Oxygen	•0	NA	→ O=C=O		

18. State the Law of Conservation of Mass.

Matter cannot be created or destroyed. The total mass of the reactants is equal to 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?

methane + oxygen → carbon dioxide + water
mass of reactants = mass of products
mass of methane + mass of oxygen = mass of carbon dioxide + mass of water
8.0og + 16.0g = mass of carbon dioxide + 18.0g
mass of carbon dioxide = 6.0g

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

track):

a) (SO <sub>4</sub> ) <sub>2</sub>		
sulfur	2	
oxygen	8	
total	10	

b) Ba <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub>	
barium	3
phosphorus	2
oxygen	8
total	13

c) 3Cr <sub>3</sub> (SO <sub>4</sub> ) <sub>2</sub>	
Chromium	9
sulfur	6
oxygen	24
total	39

21. Balance the following equations.

```
a) 2AI + 3Br_2 \rightarrow 2AIBr_3
```

b) 
$$Mg + 2HNO_3 \rightarrow Mg(NO_3)_2 + H_2$$

c)  $C_3H_8 + 5O_2 \rightarrow 4H_2O + 3CO_2$ 

d) 6HCl + Fe<sub>2</sub>O<sub>3</sub>  $\rightarrow$  2FeCl<sub>3</sub> + 3H<sub>2</sub>O

22. Convert the following word equations to a skeleton equation and then balance them

a) fluorine + calcium bromide → calcium fluoride + bromine

$$F_2 + CaBr_2 \rightarrow CaF_2 + Br_2$$

b) methane + oxygen → carbon dioxide + water CH<sub>4</sub> + 2O<sub>2</sub> → CO<sub>2</sub> + 2H<sub>2</sub>O

23. For each of the following reactions, predict the product(s), identify the <u>TYPE</u> of chemical reaction, write the chemical skeleton for the equation, and then balance it!

a. aluminum combines with chlorine

$$AI + 3CI2 \rightarrow 2AICI3$$

b. magnesium combines with aluminum chloride.

single displacement  $3Mg + 2AlCl_3 \rightarrow 2Al + 3MgCl_2$ 

c. calcium chloride combines with sodium sulfide.

Double displacement CaCl<sub>2</sub> + Na<sub>2</sub>S → CaS + 2NaCl

d. barium oxide is heated.

decomposition 2BaO → 2Ba + O<sub>2</sub>

e. methane fuel burns.

combustion  $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$ 

f. Sn + AgNO<sub>3</sub>  $\rightarrow$ 

Single displacement  $Sn + AgNO_3 \rightarrow Ag + Sn(NO_3)_2$ 

g. NiCO<sub>3</sub> →

decomposition  $NiCO_3 \rightarrow Ni + CO_3$ 

h. CaCl<sub>2</sub> + F<sub>2</sub>  $\rightarrow$ 

single displacement  $CaCl_2 + F_2 \rightarrow CaF_2 + Cl_2$ 

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

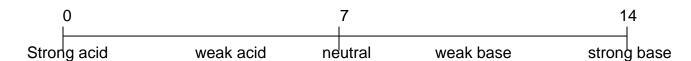
double displacement  $(NH_4)_2SO_4 + Ba(NO_3)_2 \rightarrow 2NH_4NO_3 + BaSO_4$ 

24. How would you know if a substance is an acid or a base looking at its chemical formula? State 3 other ways that you could tell if a substance was an acid or a base.

Acids will produce hydrogen ions when dissolved in water. They have a low pH and are also corrosive, and have a sour taste.

Bases contain hydroxide ions. They have a high pH and also have a bitter taste and slippery feel.

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



26. Write the general equation for a neutralization reaction.

27. Complete the following neutralization reaction

$$2HCl + Ba(OH)_2 \rightarrow BaCl_2 + 2H_2O$$

**28.** Explain what how the pH of a solution changes as the concentration of an acid is increased The pH decreases as the concentration of an acid increases