Name: Answers! Date: _____

Chemistry ~ Ms. Hart **Class:** Anions or Cations

charge shaggy

THE URBAN ASSEMBLY SCHOOL FOR CRIMINAL JUSTICE

Unit 6 Review Sheet

1. All chemical reactions have a conservation of
   (1) mass, only
   (2) mass and charge, only
   (3) charge and energy, only
   (4) mass, charge, and energy

2. Which equation represents a double replacement reaction?
   (1) $2\ Na + 2\ H_2O \rightarrow 2\ NaOH + H_2$
   (2) $CaCO_3 \rightarrow CaO + CO_2$
   (3) $LiOH + HCl \rightarrow LiCl + H_2O$ → 2 compounds!
   (4) $CH_4 + 2\ O_2 \rightarrow CO_2 + 2\ H_2O$

3. Which equation represents a double replacement reaction?
   (5) $2\ Na + 2\ H_2O \rightarrow 2\ NaOH + H_2$ oops!
   (6) $CaCO_3 \rightarrow CaO + CO_2$
   (7) $LiOH + HCl \rightarrow LiCl + H_2O$
   (8) $CH_4 + 2\ O_2 \rightarrow CO_2 + 2\ H_2O$

4. Which equation shows a conservation of mass?
   (1) $Na + Cl_2 \rightarrow NaCl$
   (2) $Al + Br_2 \rightarrow AlBr_3$
   (3) $H_2O \rightarrow H_2 + O_2$
   (4) $PCl_5 \rightarrow PCl_3 + Cl_2$ balanced! same # of atoms

5. What is the percent composition by mass of hydrogen in NH_4HCO_3 (gram-formula mass=79 grams/mole)?
   (1) 5.1%
   (2) 10.%
   (3) 6.3%
   (4) 50.%

   $\frac{5}{79} \times 100$

6. A substance has an empirical formula of CH_2 and a molar mass of 56 grams per mole. The molecular formula for this compound is
   (1) CH_2
   (2) C_4H_8
   (3) C_4H_6
   (4) C_8H_4

   mass = 14

   #2 $\frac{56}{14} = 4$ → multiply by subscript → #1

   most active

7. The percentage by mass of Br in the compound $AlBr_3$ is closest to
   (1) 10%
   (2) 75%
   (3) 25%
   (4) 90%

   $\frac{207}{240}$

8. In which compound is the percent composition by mass of chlorine equal to 42%?
   (1) HClO (gram-formula mass = 52 g/mol)
   (2) $HClO_2$ (gram-formula mass = 68 g/mol)
   (3) $HClO_3$ (gram-formula mass = 84 g/mol)
   (4) $HClO_4$ (gram-formula mass = 100g/mol)

9. Write the empirical formula for the compound C8H18.

   C_4H_9

10. Given the unbalanced equation:
    ___ Fe_2O_3 + 3 CO → 2 Fe + 3 CO_2
    When the equation is correctly balanced using the *smallest* whole number coefficients, what is the coefficient of CO? (2 points, 1 for correct answer and 1 for showing work)
    (1) 1
    (2) 2
    (3) 3
    (4) 4

11. The gram formula mass of $(NH_4)_2CO_3$ is
    (1) 46.0 g
    (2) 64.0 g
    (3) 78.0 g
    (4) 96.0 g

12. Given the balanced equation:

    $AgNO_3$ (sq) + NaCl (aq) → $NaNO_3$ (aq) + AgCl (s)

    This reaction is classified as
    (1) synthesis
    (2) decomposition
    (3) single replacement
    (4) double replacement

13. What is the percent by mass of oxygen in Fe_2O_3 (formula mass = 160)
    (1) 16%
    (2) 30%
    (3) 56%
    (4) 70%

    $3 \times 16 = \frac{48}{160}$

14. According to Reference Table J, which of these metals will react most readily with 1.0 M HCl to produce H_2(g)?
    (1) Ca
    (2) K
    (3) Mg
    (4) Zn

    Which metal is more active than H_2

15. Which metal can replace Cr in Cr_2O_3?
    (1) nickel
    (2) lead
    (3) copper
    (4) aluminum

    which metal is higher than Cr?

16. Which substance has the same molecular and empirical formulas?
    (1) C_6H_4
    (2) C_2H_4
    (3) CH_4 !!
    (4) $C_6H_{12}O_6$

    H_2O = empirical + molecular

17. Given the incomplete equation:

$$4\ Fe + 3O_2 \rightarrow 2X$$

Which compound is represented by X?

(1) FeO
(2) Fe_2O_3
(3) Fe_3O_2
(4) Fe_3O_4

18. a) Show a correct **numerical setup** for calculating the formula mass of glucose, $C_6H_{12}O_6$. DO NOT SOLVE. JUST SET UP THE EQUATION

mass

$6(12) + 12(1) + 6(16)$

# of atoms

b) Write the empirical formula for the compound $C_6H_{12}O_6$.

CH_2O

19. During a laboratory activity, a student reacted a piece of zinc with 0.1 M HCl (aq).

a) Complete the equation below by writing the formula of the missing product.

$$Zn\ (s) + 2\ HCl\ (aq) \rightarrow \underline{ZnCl_2}\ (aq) + H_2\ (g)$$

Zn^{2+} Cl^{-1}

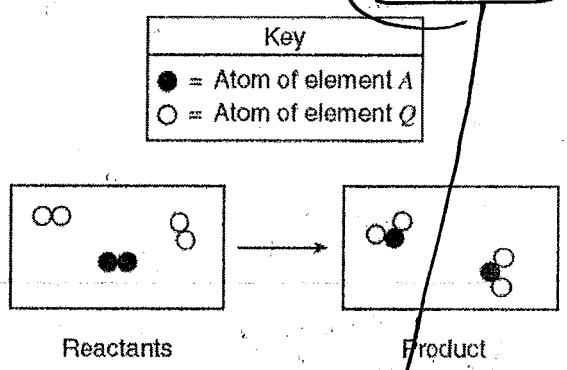
b) What type of reaction is this?

element SR 1 compound

$ZnCl_2$

c) Based on Reference Table J, identify one metal that *not* spontaneously react with HCl.

20. The particle diagrams below represent the reaction between two nonmetals, A_2 and Q_2.



a) Using the symbols A and Q, write the chemical formula of the product.

$2AQ_2$

b) Identify the type of chemical bond between an atom of element A and an atom of element Q.

covalent

c) Compare the total mass of the reactants to the total mass of the product.

Same! It is conserved!

21. Base your answer to 21a and 21b on the balanced equation below.

$$Fe(s) + 2HNO_3(aq) \rightarrow Fe(NO_3)_2(aq) + H_2(g)$$

a) What is the total number of oxygen atoms represented in the formula of the iron compound produced?

6!

b) Explain, using information from Reference Table J, why this reaction is spontaneous (will occur)