Name: _____

Group: _____

Date: _____

Practice Comp #1 - Key

1. Aluminum has becomes a liquid at 660° C and becomes a gas at 2,467° C. During a lab experiment, a piece of aluminum is heated from 25° C to 700°. What phase change has this metal experienced?
   A. ***The aluminum has melted.*** Solid → liquid = melting
   B. The aluminum has condensed.
   C. The aluminum has deposited.
   D. The aluminum has evaporated.

2. How many neutrons are in the following carbon atom, $^{14}_{6}C^{-4}$?
   A. Fourteen — 14 is the mass number (P^+ + N) and 6 is the atomic number (P^+).
   B. Eight — Subtract atomic # from mass # to get the neutron number (8).
   C. Six
   D. Twenty

3. Alkaline earth metals are most likely to have what charge?
   A. -1
   B. -2
   C. +1 — Alkaline earth metals are found in group 2A. All elements in 2A
   D. +2 — have a predicted charge of 2+. (They lose 2 e^- to become ions).

4. Which of the following elements is found in Period 3 and Group 4A?
   A. Scandium (Sc)
   B. Gallium (Ga)
   C. Carbon (C) — Periods run left/right and groups go up/down. Group 3A is below
   D. Silicon (Si) — boron and 4A is below carbon. Period 3 starts with sodium (Na).

5. Atoms of which of the following neutral elements has the electron configuration $1s^2 2s^2 2p^6 3s^2 3p^5$?
   A. Carbon — 2 + 2 + 6 + 2 + 5 = 17 e^-
   B. Fluorine — Neutral atoms have an equal number of e^- and P^+.
   C. Phosphorus
   D. ***Chlorine***

6. A particular substance is brittle and has a very high melting point. This substance is most likely to be a(n) _____ .

A. Ionic compound Ionic compounds tend to be brittle and have very high melting points. Think of NaCl.

B. Covalent compound
C. Metal
D. Gas

7. A substance has been identified as an ionic compound. As such it can be expected to _____.

A. Have a low melting point.
B. Increase the electrical conductivity of water. Ions added to H_2O attract and repel e^- making it easy for electricity to flow through the water.
C. Be malleable. In other words, it can be dented.
D. Share electrons between atoms.

8. What is the chemical name for $Ca_3(PO_4)_2$?

A. Calcium phosphate Ca has a predicted charge of 2+ and phosphate has a 3- charge. Drop and swap to produce formula.
B. Tricalcium diphosphate
C. Calcium (II) phosphate
D. Calcium phosphide

9. What is the chemical formula for chromium (III) chloride?

A. Cr_3Cl
B. $CrCl_3$ In an ionic compound the sum of negative and positive charge equals 0. There are three chlorides each with a 1- charge. Therefore the chromium must have a 3+ charge.
C. Cr_2Cl_3
D. Cr(III)Cl

10. A covalent compound is likely to _____.

A. Have a have a low boiling point. Covalent compounds tend to have low melting points. Think of H_2O for questions about Covalent compounds.
B. Be brittle.
C. Be hard.
D. Completely transfer electrons from one atom to another creating ions.

11. What is the chemical name for N_2O_3?

A. Nitrogen oxide
B. Nitrogen (III) oxide This compound is covalent so we use prefixes.
C. Dinitrogen trioxide Di- is the prefix for 2 and tri- is the prefix for 3.
D. Tetranitrogen trioxide

12. Timmy has gone to an alien world and brought back a piece of metal. It is likely to possess which of the following properties?

A. Low melting point
B. Good conductor of electricity There are no alien metals. Metals tend to be good conductors of electricity.
C. Brittle
D. Soft

13. An atom has one valence electron. It is most likely to be a(n) _____.

A. Nonmetal
B. Midichlorian
C. Metalloid
D. Metal

Neutral elements with a single electron are found in Group 1A. All group 1A elements are metals except hydrogen.

14. Which of the following is an example of a synthesis reaction?
    A. $PCl_3 + 3H_2O \rightarrow H_3PO_3 + 3HCl$
    B. $NH_4Cl \rightarrow HCl + NH_3$
    C. $2NO + O_2 \rightarrow 2NO_2$
    D. $Fe_2O_3 + 2Al \rightarrow 2Fe + Al_2O_3$

Multiple substances combine to form a single substance are in synthesis reactions.

15. Twenty two grams of propane are combusted with 80 grams of oxygen according to the following chemical equation. 36 grams of H_2O are produced. How many many grams of CO_2 will also be produced?

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

$$22\text{ g} + 80\text{ g} = x + 36\text{ g}$$

$$x = 66\text{ g}$$

A. 102 g CO_2
B. 132 g CO_2
C. 66 g CO_2
D. 1.8×10^{24} g CO_2

16. What are the coefficients in the following chemical formula when it is balanced?

$$\_\_\_\_KClO_3 \rightarrow \_\_\_\_KCl + \_\_\_O_2$$

A. 2, 3, 2
B. 2, 1, 3
C. 3, 1, 2
D. 2, 2, 3

17. What are the coefficients in the following chemical formula when it is balanced?

$$\_\_\_\_H_2SO_4 + \_\_\_\_ B(OH)_3 \rightarrow \_\_\_\_ B_2(SO_4)_3 + \_\_\_\_ H_2O$$

A. 1, 4, 3, 2
B. 3, 2, 1, 6
C. 5, 1, 2, 7
D. 1, 2, 1, 2

18. Which of the following is a necessary reactant in combustion reactants?
    A. O_2
    B. H_2O
    C. CO_2
    D. A hydrocarbon (CH_4, C_2H_6, etc)

Oxygen is necessary for all combustion reactions which is why explosions cannot happen in the vacuum of space.

19. How many molecules are contained in 3.7 moles of H_2O_2?

A. 6.14 x 10^{-24} molecules H_2O_2
B. 126 molecules H_2O_2
C. 6.02 x 10^{23} molecules H_2O_2
D. 2.2 x 10^{24} molecules H_2O_2

3.7 mol H_2O_2 x $\frac{6 \times 10^{23}\ H_2O_2\ \text{molecules}}{1\ \text{mol}\ H_2O_2}$

20. A sample of potassium (K) contains 4.3 x 10^{24} atoms. How many moles of potassium is this?

A. 5.6 mol K
B. 7.1 mol K
C. 9.0 mol K
D. 0.7 mol K

4.3 x 10^{24} K atoms x $\frac{1\ \text{mole K}}{6.02 \times 10^{23}\ \text{K atoms}}$ =

21. What is the mass in grams of 1.8 moles of calcium fluoride?

A. 106.2 g
B. 140.4 g
C. 55.8 g
D. 78.0 g

1.8 mol CaF_2 x $\frac{2\ \text{mol}\ F^{1-}}{1\ \text{mole}\ CaF_2}$ x $\frac{6.02 \times 10^{23}\ F^{1-}\ \text{ions}}{1\ \text{mol}\ F^{1-}}$ =

22. A sample of aluminum nitrate has a mass of 891 g. How many moles is this?

A. 4.18 moles
B. 15.6 moles
C. 5.9 moles
D. 4.6 moles

891 g $Al(NO_3)_3$ x $\frac{1\ \text{mol}\ Al(NO_3)_3}{213\ \text{g}\ Al(NO_3)_3}$ =

23. If 2.9 moles of potassium hydroxide are reacted with excess iron (III) sulfate, how many moles of iron (III) hydroxide will be produced?

$$Fe_2(SO_4)_3 + 6KOH \rightarrow 3K_2SO_4 + 2Fe(OH)_3$$

A. 8.7 moles $Fe(OH)_3$
B. 0.96 moles $Fe(OH)_3$
C. 1.45 moles $Fe(OH)_3$
D. 5.8 moles $Fe(OH)_3$

2.9 mol KOH x $\frac{2\ \text{mol}\ Fe(OH)_3}{6\ \text{mol KOH}}$ =

24. According to the following equation, how many moles of lithium sulfate are required to produce 6.1 moles of lithium phosphate?

$$\_3\_\_\ Li_2SO_4 + \_2\_\_\ K_3PO_4 \rightarrow \_2\_\_\ Li_3PO_4 + \_\_\_\_\ K_2SO_4$$

A. 4.1 moles Li_2SO_4
B. 9.2 moles Li_2SO_4
C. 12.2 moles Li_2SO_4
D. 18.3 moles Li_2SO_4

6.1 mol Li_3PO_4 x $\frac{3\ \text{mol}\ Li_2SO_4}{2\ \text{mol}\ Li_3PO_4}$