Name: **Date:**

Unit #3 Review

Answer the following questions on a separate sheet of paper.

1) Please identify the number of subatomic particles for each of the following elements:

Nuclear Symbol	**#p^+**	**#n^0**	**#e^-**	**A**	**# Valence e^-**	**Lewis Dot Diagram**
$^{28}_{14}Si$						
$^{119}_{50}Sn$						
$^{27}_{13}Al$						
$^{79}_{34}Se$						

2) Explain what holds a neutral atom together. Provide an example using any element and its atomic structure to support your answer.

3) Indicate if the following statements are True or False. **If they are False, please correct them** to make them True.

a. In the Plum Pudding Model of the atom, the atom was envisioned as a sphere of negative charge in which positively charged electrons were randomly distributed.
b. Rutherford's bombardment experiments with metal foil suggest that alpha particles were being deflected by coming near a large, negatively charged atomic nucleus.
c. The proton and electron have similar masses but opposite electrical charges.
d. An element's atomic number represents the number of protons in its nucleus.
e. Elements with atomic numbers greater than 83 are considered to be unstable and are susceptible to nuclear decay.
f. Electrons and neutrons are always equal in a neutral atom.

4) Explain how Rutherford's gold experiment disproved the Plum Pudding Model, and proved the existence of the Nucleus.

5) When wood burns, the remaining ash weighs less than the original wood. Yet, the law of conservation of matter says that matter is neither created nor destroyed in a chemical reaction. How do you reconcile these results with this law?

6) What is wrong with this symbol, $^{12}_{7}C$?

7) In your own words, state the main ideas of Dalton's Atomic Theory.

8) Please write out the following alpha decay reactions:

a. $^{238}_{92}U \rightarrow$
b. $^{244}_{94}Pu \rightarrow$

9) Please write out the following beta decay reactions:

a. $^{247}_{96}Cm \rightarrow$
b. $^{14}_{6}C \rightarrow$

10) Explain the mole concept.

11) How many atoms are present in 305g of Niobium?(1.98x10^{24}atoms Nb)

12) How much does 9.04x10^{23}atoms of Osmium weigh?(286g Os)

13) How many molecules are present in 56.9g of SO_2?(5.35x10^{23}molecules SO_2)

14) Sodium bicarbonate, $NaHCO_3$, is one ingredient in baking powder. How many grams of sodium bicarbonate are in 0.673 moles?(56.5g $NaHCO_3$)

15) Potassium permanganate, $KMnO_4$, at one time was used as an anti-fungal agent. You could always tell someone who was just treated because their feet would turn purple. If the pharmacy gives you 250g of the anti-fungal agent, how many moles of it would you have?(1.6 moles $KMnO_4$)

16) Ammonium sulfate, $(NH_4)_2SO_4$, is a fertilizer used to supply both nitrogen and sulphur. How many grams are in 35.8 moles of $(NH_4)_2SO_4$?(4730g $(NH_4)_2SO_4$)

17) Sodium perborate, $NaBO_3$, is present in "oxygen bleach". It acts by releasing oxygen, which has bleaching ability. How many grams of the compound are in 4.65 moles of $NaBO_3$?(380g $NaBO_3$)

18) Calculate the number of molecules present in 12.5g of N_2.(2.69x10^{23}molecules N_2)

19) Which compound has the highest %C, C_6H_6 or C_6H_5OH?(C_6H_6, %C=92.26)

20) What is the percent composition of $Mg_3(PO_4)_2$?(%Mg=27.74, %P=23.57, %O=48.69)