

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 <sup>+</sup>	#n <sup>0</sup>	#e <sup>-</sup>	A	# Valence e <sup>-</sup>	Lewis Dot Diagram
${}_{14}^{28}\text{Si}$						
${}_{50}^{119}\text{Sn}$						
${}_{13}^{27}\text{Al}$						
${}_{34}^{79}\text{Se}$						

- 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.

- 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.
- Rutherford's bombardment experiments with metal foil suggest that alpha particles were being deflected by coming near a large, negatively charged atomic nucleus.
- The proton and electron have similar masses but opposite electrical charges.
- An element's atomic number represents the number of protons in its nucleus.
- Elements with atomic numbers greater than 83 are considered to be unstable and are susceptible to nuclear decay.
- Electrons and neutrons are always equal in a neutral atom.

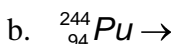
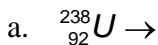
- 4) Explain how Rutherford's gold experiment disproved the Plum Pudding Model, and proved the existence of the Nucleus.

- 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?

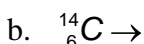
- 6) What is wrong with this symbol,  ${}_{7}^{12}\text{C}$ ?

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

- 8) Please write out the following alpha decay reactions:



- 9) Please write out the following beta decay reactions:



- 10) Explain the mole concept.

- 11) How many atoms are present in 305g of Niobium? $(1.98 \times 10^{24}$  atoms Nb)
- 12) How much does  $9.04 \times 10^{23}$  atoms of Osmium weigh? $(286$ g Os)
- 13) How many molecules are present in 56.9g of  $\text{SO}_2$ ? $(5.35 \times 10^{23}$  molecules  $\text{SO}_2$ )
- 14) Sodium bicarbonate,  $\text{NaHCO}_3$ , is one ingredient in baking powder. How many grams of sodium bicarbonate are in 0.673 moles? $(56.5$ g  $\text{NaHCO}_3$ )
- 15) Potassium permanganate,  $\text{KMnO}_4$ , 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  $\text{KMnO}_4$ )
- 16) Ammonium sulfate,  $(\text{NH}_4)_2\text{SO}_4$ , is a fertilizer used to supply both nitrogen and sulphur. How many grams are in 35.8 moles of  $(\text{NH}_4)_2\text{SO}_4$ ? $(4730$ g  $(\text{NH}_4)_2\text{SO}_4$ )
- 17) Sodium perborate,  $\text{NaBO}_3$ , 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  $\text{NaBO}_3$ ? $(380$ g  $\text{NaBO}_3$ )
- 18) Calculate the number of molecules present in 12.5g of  $\text{N}_2$ . $(2.69 \times 10^{23}$  molecules  $\text{N}_2$ )
- 19) Which compound has the highest %C,  $\text{C}_6\text{H}_6$  or  $\text{C}_6\text{H}_5\text{OH}$ ? $(\text{C}_6\text{H}_6, \%C=92.26)$
- 20) What is the percent composition of  $\text{Mg}_3(\text{PO}_4)_2$ ? $(\%Mg=27.74, \%P=23.57, \%O=48.69)$