Atomic Structure & Nuclear Chemistry Review Name: KEY Period:

Complete the following chart.

Element/ion	Atomic Number	Atomic mass	Mass number	protons	neutrons	electrons
V	23	50.95	51	23	51-23=28	23
Na^+	11	22.99	23	11	12	10
$^{35}_{17}Cl^-$	17	35.45	35	17	18	18
$^{25}_{12}Mg^{2+}$	12	24.31	25	12	13	10
As^{3-}	33	74.92	75	33	42	36
^{107}Pd	46	106.42	107	46	61	46
S^{2-}	16	32.07	32	16	16	18
U	92	238.03	238	92	146	92

1. Explain the difference between atomic mass and mass number.
atomic mass: decimal, weighted average of all isotopes
mass number: whole number, protons + neutrons for a specific isotope

2. An anion has a negative charge. A cation has a positive charge.
3. What happens to the electrons when an atom becomes an anion? gain more electrons
4. What happens to the electrons when an atom becomes a cation? lose electrons

Calculate the atomic mass for the following elements using the weighted average method. Answer to two decimal places.

5. 93.3% Potassium 39, 6.7% Potassium 41.
$0.933 \times 39 = 36.387$
$0.067 \times 41 = 2.747$
$39.134 = 39.13$ amu

6. 78.7% Magnesium 24, 10.13% Magnesium 25, 11.17% Magnesium 26.
$0.787 \times 24 = 18.888$
$0.1013 \times 25 = 2.5325$
$0.1117 \times 26 = 2.9042$
$24.3247 = 24.32$ amu

Nuclear Chemistry

7. Write the symbols for each of the types of decay. $^4_2\alpha$ $^0_{-1}\beta$ $^0_0\gamma$
8. Transmutation happens when an atom changes from one element to another. Which types of decay result in transmutation? alpha & beta
9. Write the equation for the alpha decay of Mendelevium 249.
$^{249}_{101}Md \rightarrow {}^4_2\alpha + {}^{245}_{99}Es$
10. Write the equation for the beta decay of Thorium 236.
$^{236}_{90}Th \rightarrow {}^0_{-1}\beta + {}^{236}_{91}Pa$
11. What does "metastable" mean? unstable Which type of decay uses "metastable" to signify a change? gamma
12. Draw a picture (or two) explaining the difference between fission and fusion.
fission: ○ → ○ + ○ fusion: ○ + ○ → ○