WS 6.6 Quiz Review!

1. Fill in the missing name or formula for the following compounds

Rb_2S rubidium sulfide
Cl_2O dichlorine monoxide
SF_2 sulfur difluoride
$MgCl_2$ magnesium chloride
ferric chromate $Fe_2(CrO_4)_3$
potassium phosphate K_3PO_4
iron (II) carbonate $FeCO_3$
lithium carbonate Li_2CO_3
zinc hydroxide $Zn(OH)_2$
Magnesium phosphate $Mg_3(PO_4)_2$
Lead (II) sulfite $PbSO_3$
Copper (I) sulfite Cu_2SO_3

$Sn(CO_3)_2$ tin (IV) carbonate (stannic carbonate)
Sn_3P_2 tin (II) phosphide (stannous phosphide)
SnS tin(II) sulfide (stannous sulfide)
CO carbon monoxide
dinitrogen tetroxide N_2O_4
nitrogen dioxide NO_2
arsenic trifluoride AsF_3
chromium (III) phosphide CrP
NCl_3 nitrogen trichloride
AlF_3 aluminum fluoride
Ag_2CrO_4 silver chromate
IF_5 Iodine pentafluoride

2a. For each element in the six compounds below, indicate whether the element must gain, lose, or share electrons in order to form the compound.

ionic — Rb_2S — loses electrons / gains electrons
ionic — Li_2O — loses e- / gains e-
covalent — Cl_2O — Both Cl and O share e- (with each other)
covalent — SF_2 — S and F share e- with each other
ionic — $MgCl_2$ — Mg loses e- / Cl gains e-

b. What do metals typically do with their electrons when they form compounds?

They lose electrons, and therefore they become cations.
(they can also do "metallic bonding" when they form alloys... we'll cover that later)

c. What do nonmetals typically do with their electrons when they form compounds?

They can either gain electrons (if bonding to/with a metal) (ionic bonding)
or share electrons (if bonding with a nonmetal) (covalent bonding)

3. Thallium (Tl; element number 81) can form ions with a +1 charge and a +3 charge.

a. What is the charge on a Thallium atom? Ø (atoms are neutral)

b. How many protons and electrons does it (the atom) have? 81 p 81 e

c. How many protons and electrons are in a Thallium (III) ion? (Tl^{+3}) 81 p 78 e

and Tl^{+1} has 81p, 80 e.

d. Which of the Thallium ions (if any) have the same number of electrons as a noble gas? neither!

neither ion has 2, 10, 18, 36, 54, or 86 electrons

e. Actinium is element # 89. Actinium ion is not on your ion sheet.
How many protons and how many electrons would you predict to be in actinium ion? 89 p 86 e

Ac could form a +3 ion, and have 86 e- like Rn

f. Fill in the ion charges below without looking at your ion sheet ! (A periodic table might be helpful!)

Ion Name:	Ion Formula (fill in the charge!)	Ion Name:	Ion Formula (fill in the charge!)
Sodium ion	Na^{+1}	oxide ion	O^{-2}
Sulfide ion	S^{-2}	potassium ion	K^{+1}
Aluminum ion	Al^{+3}	calcium ion	Ca^{+2}
phosphide ion	P^{-3}	lead (II) ion	Pb^{+2}
barium ion	Ba^{+2}	manganese (IV) ion	Mn^{+4}
iodide ion	I^{-1}	Gold (III) ion	Au^{+3}

g. What is the charge on.... a sodium atom? Ø a chlorine atom? Ø an aluminum atom? Ø

Atoms are neutral! (ions have charge)

4. Rewrite each number in scientific notation, so that it keeps the same number of significant figures as it started with.

(4) 0.00003460 3.460×10^{-5}

(1) 50 5×10^{1}

(4) 2460. 2.460×10^{3}

(1) 0.0009 9×10^{-4}

(3) 750. 7.50×10^{2}

(4) 93.00 9.300×10^{1}

(2) 75000 7.5×10^{4}

(2) 0.14 1.4×10^{-1}

5580 5.58×10^{3} (3)

700 7×10^{2} (1)

88888000 8.8888×10^{7} (5)

46.500 4.6500×10^{1} (5)

17 1.7×10^{1} (2)

.00040 4.0×10^{-4} (2)

610 6.1×10^{2} (2)

60000 6×10^{4} (1)

5. Significant Figures!
Do each calculation, and report the answer to the correct number of significant figures.
Use scientific notation ONLY WHEN NECESSARY.

3.417 – 3.217 = 0.2 → 0.200

106.232 – 105.48 = 0.752 → 0.75

106.232 / 105.48 = 1.0071293 → 1.0071

22.34 + 86.92 = 109.26 → 109.26

9999 / 3333 = 3 → 3.000

9999 – 3333 = 6666 → 6666

12222 / 3055.5 = 4 → 4.0000

5.40 x 8.925 = 48.195 → 48.2

7.98 x 6.3 = 50.274 → 50.

490 + 131 = 621 → 620

88.49 – 86.29 = 2.2 → 2.20

3.147 – 3.125 = 0.022 → 0.022

6.8 + 13.2 = 20 → 20.0

72.186 – 70.110 = 2.076 → 2.076

8800 / 44.0 = 200 → 2.0×10^2

0.0004 x 197 = 0.0788 → 0.08

40. x 200. = 8000 → 8.0×10^3

0.13 x 130 = 16.9 → 17

24.38 – 24.17 = 0.21 → 0.21

24.38 – 24.18 = 0.2 → 0.20

24.18 / 24.38 = 0.9917965 → 0.9918

93.0 x 968.495 = 90070.035 → 90100

93 x 968.495 = 90070.035 → 9.0×10^4

6. Conversions! (you will probably need some of the conversion factors given on WS 4.0 to do these.)

a. The top of a table has an area of 16200 square centimeters. Convert this into square feet.

$$(16200\ cm^2)\left(\frac{1\ inch}{2.54\ cm}\right)^2\left(\frac{1\ ft}{12\ in}\right)^2 = 17.438 \rightarrow \boxed{17.4\ ft^2}\ (a)$$

b. Convert a speed of 444 meters per hour into centimeters per second.

$$\left(\frac{444\ m}{hr}\right)\left(\frac{100\ cm}{m}\right)\left(\frac{1\ hr}{60\ min}\right)\left(\frac{1\ min}{60\ s}\right) = \boxed{12.3\ cm/second}\ b$$

c. Convert 343 deciseconds (ds) into microseconds (μs).

$$(343\ ds)\left(\frac{10^5\ \mu s}{1\ ds}\right) = \boxed{34300000\ \mu s}\ \text{or}\ \boxed{3.43\times10^7\ \mu s}\ c$$

d. Convert from 4.38×10^{11} cm^3 into km^3.

$$(4.38\times10^{11}\ cm^3)\left(\frac{1\ km}{10^5\ cm}\right)^3 = \boxed{0.000438\ km^3}\ d\ \text{or}\ \boxed{4.38\times10^{-4}\ km^3}$$

e. Iron has a density of 7.86 g/cm^3. Convert this into pounds per cubic inch.

$$\left(\frac{7.86\ g}{cm^3}\right)\left(\frac{1\ lb}{453.8\ g}\right)\left(\frac{2.54\ cm}{1\ inch}\right)^3 = 0.28383 \rightarrow \boxed{0.284\ \frac{lb}{in^3}}\ e$$

f. Convert 30. milliliters (mL) into liters.

$$(30.\ mL)\left(\frac{1\ L}{1000\ mL}\right) = \boxed{0.030\ L}\ f$$

g. Convert 0.00198 kilograms into milligrams.

$$(0.00198\ kg)\left(\frac{10^6\ mg}{1\ kg}\right) = \boxed{1980\ mg}\ g$$

h. Convert 1.67 nanograms (ng) into micrograms (μg).

$$(1.67\ ng)\left(\frac{1\ \mu g}{10^3\ ng}\right) = \boxed{0.00167\ \mu g}\ h$$

i. A glacier is moving at a speed of 91 centimeters per day. Convert this speed into nanometers per second.

$$\left(\frac{91\ cm}{day}\right)\left(\frac{10^7\ nm}{1\ cm}\right)\left(\frac{1\ day}{24\ hr}\right)\left(\frac{1\ hr}{60\ min}\right)\left(\frac{1\ min}{60\ s}\right) = 10532 \rightarrow \boxed{11000\ \frac{nm}{s}}\ i$$

7. Write the symbol (for example, $^{24}Na^{+1}$) for:

a. An ion with 78 electrons, a mass of 202 amu, and 122 neutrons. $^{202}Hg^{+2}$

$202 - 122 = 80\ p$

b. An ion with 36 electrons, a charge of -3, and 42 neutrons. $^{75}As^{-3}$

$42 + 33 = 75$

c. An atom with 27 electrons and 33 neutrons. ^{60}Co

so p = e (no charge)

↖ you could say zero for charge but not necessary