

Name: _____

Problem Set #2

$$\text{Given: } ^\circ\text{C} = \frac{5}{9} (^{\circ}\text{F} - 32) \quad K = ^\circ\text{C} + 273.15 \quad ^\circ\text{F} = \left(\frac{9}{5} ^\circ\text{C}\right) + 32$$

- 1.) You have a patient with a fever of 39.9 °C, what is that temperature in °F and K?

- 2.) Liquid nitrogen boils at 77 K, what temperature is that in °C and °F?

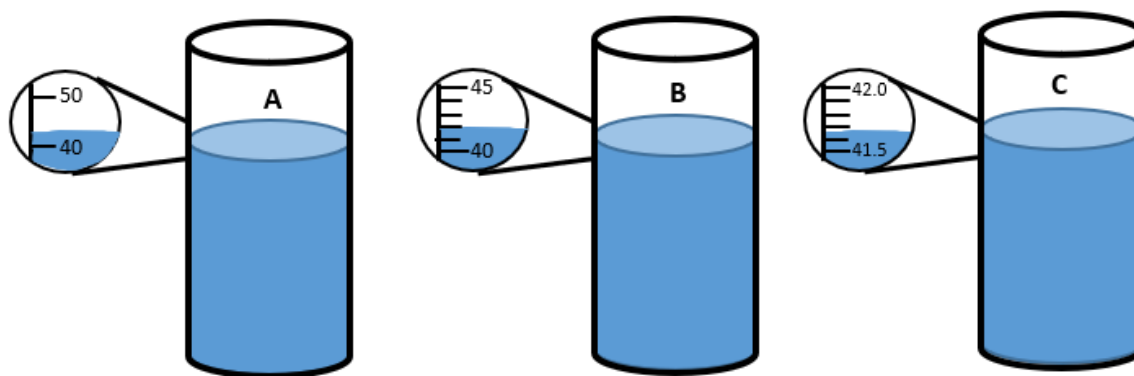
- 3.) Indicate whether the following numbers are exact or inexact
 - a. There are 5280 feet in a mile _____
 - b. Syracuse campus is 2450 meters across _____
 - c. There are 1094 pages in our textbook _____
 - d. Life Science Building is 68 ft high _____
 - e. There are 453.5 grams in 1 pound _____

- 4.) Express the following values in scientific notation with correct number of significant figures:
 - a. 15000 meters
 - b. 132602 grams (report 3 significant figures)
 - c. 0.00000193 milligrams
 - d. $(235.4 \times 16.172) =$

- 5.) How many significant figures are indicated in the following examples:
 - a. 0.0000124
 - b. 2.73×10^3
 - c. 45,010.20

6.) Please **box** in both answers: The Atocha is a famous Spanish shipwreck in the Florida Keys from 1622. It was carrying silver bars that were 35.5 cm long, 13.0 cm wide, and 10.0 cm high. If the density of silver is 10.5 grams/cm^3 , what is the mass (in grams) of one bar? If there are 453.5 grams in one pound, how much does one bar weigh in pounds?

7.) The three different beakers are used to measure a volume of water. Please report, with appropriate significant figures, the amount of water in beaker A, B, and C. In what beaker is the volume of water most accurate? Least accurate?



8.) 14 grams of nitrogen reacts with 16 grams of oxygen to form nitrogen monoxide (NO), a second compound, nitrogen dioxide (NO_2), is formed when 14 grams of nitrogen reacts with 32 grams of oxygen. What law does this demonstrate?

9.) Determine whether each of the following statements is true or false. If false, correct the statement to make it true.

- The nucleus has most of the mass and comprises most of the volume of the atom
- The number of electrons in an atom equals the number of neutrons in the atom
- The heavy subatomic particles are found in the nucleus

Name: _____

Problem Set #3 (M/T)

Given the copy of the Periodic Table of Elements below, please answer questions (1-3):

Main Group Representative Elements										Main Group Representative Elements														
1A ^a		2A		Transition metals										3A		4A		5A		6A		7A		8A
1	1																					2	18	
	H																						He	
	1.00794																						4.002602	
2	3	4																					10	
	Li	Be																					Ne	
	6.941	9.012182																					20.1797	
3	11	12																					18	
	Na	Mg																					Ar	
	22.989770	24.3050																					39.948	
4	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36					36	
	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr					Kr	
	39.0983	40.078	44.955910	47.867	50.9415	51.9961	54.938049	55.845	58.933200	58.6934	63.546	65.39	69.723	72.64	74.92160	78.96	79.904	83.80					83.80	
5	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54					54	
	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe					Xe	
	85.4678	87.62	88.90585	91.224	92.90638	95.94	[98]	101.07	102.90550	106.42	107.8682	112.411	114.818	118.710	121.760	127.60	126.90447	131.293					131.293	
6	55	56	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86					86	
	Cs	Ba	Lu	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn					Rn	
	132.90545	137.327	174.967	178.49	180.9479	183.84	186.207	190.23	192.217	195.078	196.96655	200.59	204.3833	207.2	208.98038	[208.98]	[209.99]	[222.02]					222.02	
7	87	88	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118					118	
	Fr	Ra	Lr	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn					**						Cn	
	[223.02]	[226.03]	[262.11]	[261.11]	[262.11]	[266.12]	[264.12]	[269.13]	[268.14]	[281.15]	[272.15]	[285]	[284]	[289]	[288]	[292]	[294]	[294]					[294]	

- 1.) Please name the following groups and indicate charge as an ion:
 - Group 1A:**
 - Group 2A:**
 - Group 6A:**
 - Group 7A:**
- 2.) Would the element in period 4, group 6A be classified as a metal or nonmetal?
- 3.) Would the element in period 5, group 2A be classified as a metal or nonmetal?
- 4.) Avogadro's number dictates that there are 6.02×10^{23} molecules or atoms in one mole
 - a. How many ethanol **molecules** are in 1 mole of ethanol (C_2H_6O)?
 - b. How many **atoms** of oxygen are in 1 mole of ethanol (C_2H_6O)?
 - c. How many **atoms** of hydrogen are in 1 mole of ethanol (C_2H_6O)?

5.) Molar mass is the mass, in grams of one mole of a substance. Answer the following questions given that: C = 12.0 amu, H = 1.0 amu, O = 16.0 amu

a. What is the molar mass of H₂O?

b. What is the molar mass of ethanol (C₂H₆O)?

c. Wine is 12.0 % ethanol by volume, meaning a 1.50 L bottle of wine contains approximately 182 mL of ethanol (density = 0.7892 g/mL), how many moles of ethanol are in the bottle of wine?

6.) There are 780. grams of phosphorous (AW P = 31.0 g/mol.) in the human body, how many moles of phosphorous does this represent?

7.) Using your answer from questions 6, how many atoms of phosphorous does this represent?

8.) You have a headache and take a 625 mg tablet of aspirin (C₉H₈O₄), how many molecules of aspirin did you take? Given C = 12.00 amu, H = 1.000 amu, and O = 16.00 amu.