Name: **Per:**

Chemistry – First Semester Review 2018
Units 1-4

Unit 1:

_____ a tenth of a meter is called a _____

_____ how many mm in 1 meter

_____ how many grams in 1 centigram

_____ main unit for length

_____ prefix for a billionth

_____ metric temperature scale

How many significant figures are in the following:

_____ 225.25732 _____ 19.0403

_____ .0000800 _____ 502,000

Write in scientific notation:

_____ 538,000,000,000.

_____ .00000000613

Calculate the following: (put answers on blanks at left) **Use significant figures .**

_____ $\frac{3.567 \times 10^{-15}}{2.32 \times 10^{6}}$ _____ 2.305 + 7.2 + .0987

_____ $(4.79 \times 10^{-10}\text{cm})\ (6 \times 10^{23}\text{cm})$

Conversions:

_____ 28 hrs is how many seconds?

_____ 8.35 g is how many cg?

_____ 143.5 Km is how many m?

Density:

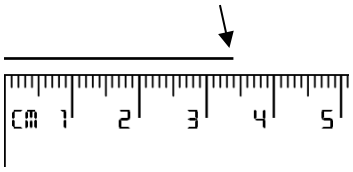
_____ An object weighs 255 g and has a volume of 22.5 ml. What is it's density?

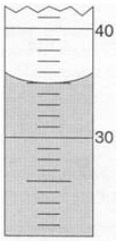
_____ A pure silver cup has a volume of .135 L. Silver has a density of 10.5 g/ml
What is the mass of the cup.

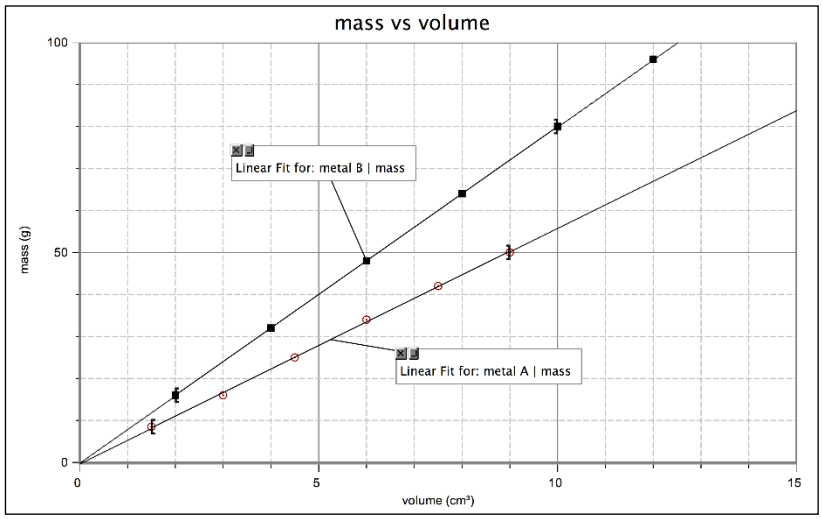
_____ A student measures the density of gold as 14.68 g/ml. The accepted value is 15.34 g/ml. Calculate the percent error that the student had from the data given.

_____ What does the graduated cylinder read?

_____ What does the ruler read?







A student graphed the following data:

1. Based on this graph, how does metal A differ from metal B?
(Explain your answer using a complete sentences).

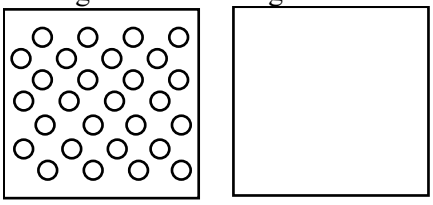
2. What is the density of metal A? Show all your work and include appropriate units.

3. What is the mass of 12.0 cm^3 of metal A? Find this in two different ways.

   a. Mark on the above graph how you might determine this.

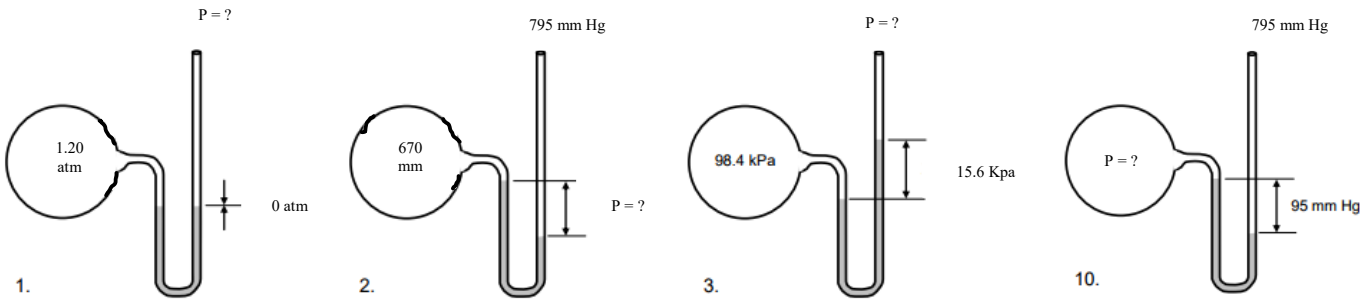
   b. **Show your work** on how you might also calculate this mathematically.

4. If the box at left contains atoms of iron in steel wool, represent the atomic structure of the steel wool after strong heating in the box at right.



Unit 2:

Directions: *Solve the following problems. Show your work, including proper units, to ensure full credit.*



5. Convert the following temperatures to Kelvin (K)
   a. 42.5 ºC
   b. –225 ºC

6. Convert the following temperatures to Celsius (ºC)
   a. 41.6 K
   b 156 K

7. Convert the following pressures from one amount to another

   a. 146Kpa to atm

4.

   b. 23.6 psi to torr

Solve the following gas problems and use a table to organize your data:

8. SO_4 gas is in a 325ml container at 23ºC, if the temperature increases to 47ºC, what is the new volume?

	P	T	V	n
Initial				
Final				
Effect				

9. 17.3L of gas exert a pressure of 132Kpa. Assuming there is no change in the temperature what is the pressure if the volume is reduced to 6.00L.

	P	T	V	n
Initial				
Final				
Effect				

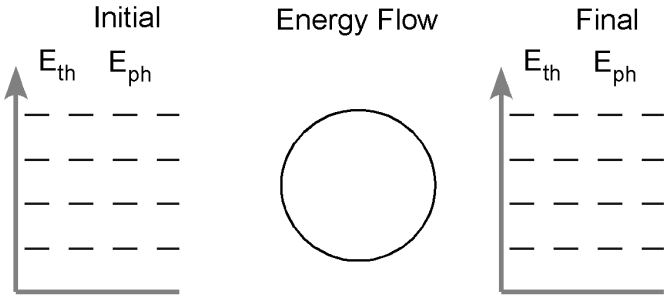
10. N_2 gas is in a 4.39L container at 54ºC and 3.19 atm. If the gas changes to STP what is the new volume?

	P	T	V	n
Initial				
Final				
Effect				

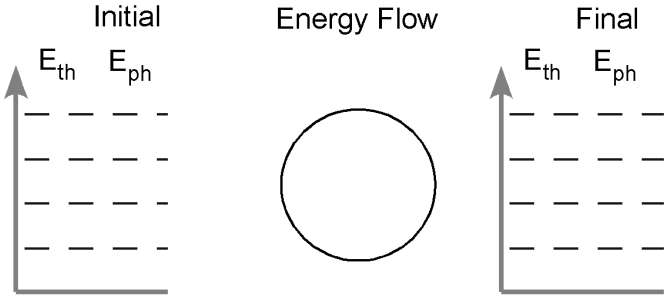
Unit 3:

For each of the situations described below, use an energy bar chart to represent the ways that energy is stored in the system and flows into or out of the system. Below each diagram describe how the arrangement and motion of the molecules change from the initial to the final state.

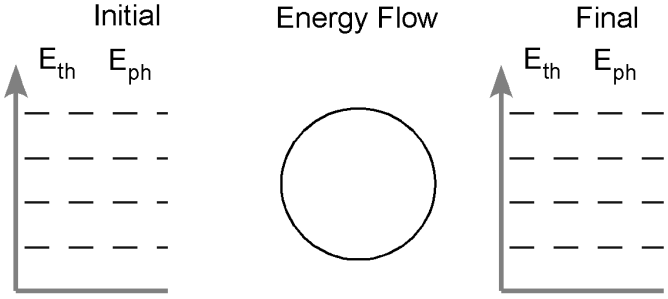
1. Some of the water you spilled on the counter evaporates.

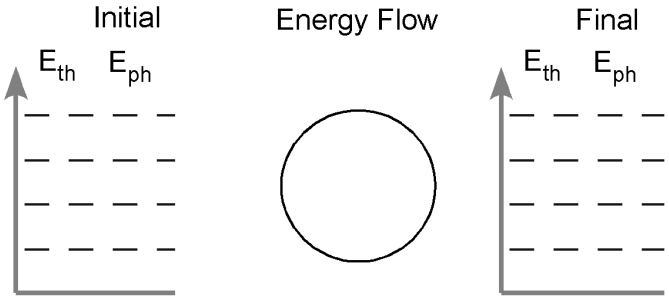


2. Water vapor in the room condenses on a cold surface



3. A pan of water (25˚C) is heated to boiling and some of the water is boiled away. Do separate energy bar charts for each stage of the process.





Using your chart, answer the following questions: Draw a graph to help.

4) Find the energy needed to make 250g of solid copper go from 10 ºC up 570ºC.

5) Find the mass of water if 7291 joules is released as it goes up in temperature from 67ºC to 99 ºC.

6) Find the energy needed to melt 129 grams of aluminum at 660 ºC.

7) How much energy is needed to raise the temperature of 100g of salt from 100ºC to 1365ºC? (3 steps)

8) 500g of gold at 300ºC is put on a block of ice at 0ºC. How many grams of ice will melt as the gold cools to 0ºC?

9) 2265 grams of gold at 600ºC are placed in 7.5 L of water at 25ºC until the temperature of the gold is 200ºC. What is the final temperature of the water?

10) 350g of metal X at 180ºC are placed in 350 grams of water at 31ºC. The final temperature of both is 50ºC. Find the specific heat of Metal X. (M.P. of metal X is 610ºC).

Unit 4:

Write whole atom electron configurations for the following:

Mo (#42) _____

In (#49) _____

_____Write the **Noble gas** electron configuration for Br (#35)

_____Write the **Noble gas** electron configuration for Ra (#88)

Give the last orbital **Electron configuration**	Give the symbol of the atom **last orbital given**
_____ Cl (#17)	_____ $6s^2$
_____ W (#74)	_____ $3p^5$
_____ Mg (#12)	_____ $5f^4$

Draw the whole atom electron configurations for the following:

Cl (#17)

Br (#35)

Draw the Lewis dot diagram for B (#5) _____ Zn (#30)_____ Se (#34)_____

$c = 2.998 \times 10^8\ ms^{-1}$ **$h = 6.626 \times 10^{-34}\ J\ s$**

The laser in a CD player uses light with a wavelength of 4.23×10^{-7}m. What is the frequency of this light?

An FM radio station has a frequency of 4.59×10^6 Hz. What is the wavelength of this radiation in **meters**?

Light has a wavelength of about 640 nm. What is its frequency? **What color is the light?**

Fireworks are often achieved by heating LiCl to about 1200°C. Then the compound emits light and gives off 5.90×10^{14} J. What is the wavelength in nm? **What color is the light?**

Answer the following questions about the isotopes:

Symbol	Protons	Neutrons	Electrons	Charge
	47	59		-1
			32	+2
Symbol	Protons	Neutrons	Electrons	Charge
$^{209}_{83}Bi$				0
$^{20}F^{-1}$				

Isotope Problems:

1. Element X has two natural isotopes. The isotope with a mass number of 6 has a relative abundance of 7.5%. The isotope with a mass number of 7 has a relative abundance of 92.5%. Determine the average molar mass for the element from these figures. What is the true identity and atomic number of element X?

2. The element copper is found to contain the naturally occurring isotopes $_{29}Cu^{63}$ and $_{29}Cu^{65}$. The relative abundances are 69.1% and 30.9% respectively. Calculate the average molar mass of copper.

3. Uranium has three isotopes with the following percent abundances: $_{92}^{234}U$ (0.0058%), $_{92}^{235}U$ (0.71%), $_{92}^{238}U$ (99.23%). What is the average atomic mass of uranium?