Remediation States of matter

1. #4-3c	2. #4-1c	3. #4-2c	4. #4-1a	5. #4-1a
6. #4-3b	7. #4-3c	8. #4-1c	9. #4-1c	10. #4-2c
11. #4-2c	12. #4-3b	13. #4-2c	14. #4-2b	15. #4-1c
16. #3	17. #4-2b	18. #4-4	19. #4-3c	20. #4-3c

On your test circle the question you got right and X the questions you got wrong?

Solids

(#4-1ab) _____/2 How to internal and external factors affect a solids/liquids?

(#4-1c) _____/4 Can I mathematically represent the composition of a solid?

Liquids

(#4-2b) _____/2How do environmental factors affect the properties of liquids.

(#4-2c) _____/4I can used mathematics to represent the relationship between two substances in a solution. Molarity, Percent by mass, and mole fraction.

Gases

(#4-3a) _____/0 I can differentiate between an ideal gas and a non-ideal gas.

(#4-3b)_____/2 I can utilize the kinetic molecular theory to describe relationships between pressure, volume and temperature.

(#4-3c)_____/4 I can use the combined gas law and PV= nRT to calculate needed characteristics of gases.

** IF YOU DID REALLY BAD AT ANY ONE STANDARD SEE YOUR TEACHER OF WATCH SOME VIDEOS ON LINE RELATIVE TO A PARTICULAR SKILL YOU ARE DIFFICIENT IN.

Remediation Questions

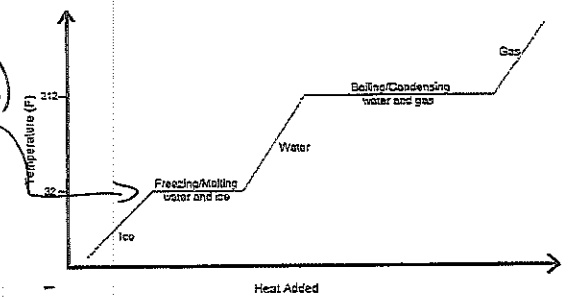
#4-1ab

1. When a sample of ice is heated at 32F Which of the following is true?

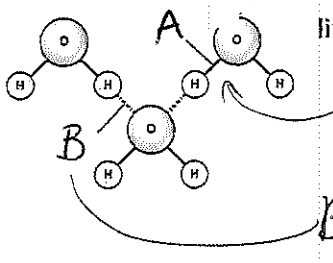
I. The substance will get warmer. false (same temp)

II. Intramolecular forces will be broken. true

III. The average kinetic energy is remaining static. true



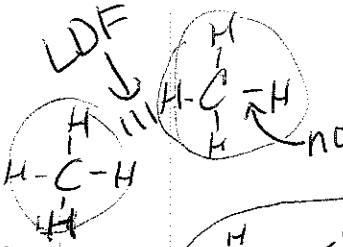
2. To the right is a series of water molecules. Label the two bonds identified with _____ lines. (be specific)



A: Polar Covalent Bond (intramolecular)

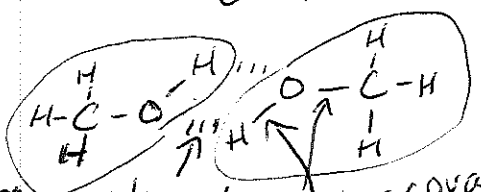
B: H bond (dupde dipole) (intermolecular force)

3. Methane (CH_4) and Methanol CH_3OH



a. What force is predominant in CH_4?

b. What force is predominant in CH_3OH?



c. Which of the substances are polar? Why or why not.

CH_3OH (Has O, not symmetrical)

d. Methanol is a liquid at room temperature. Justify using intermolecular forces and bonding.

H bonds are stronger and will keep CH_3OH molecules together as a liquid

#4-1c ("c" stands for calculations)

4. A factory is trying to use hydrogen for a chemical process. Which substance has the highest percent mass hydrogen. Methane(CH_4) or methanol(CH_3OH)? Calculate percent for each.

CH_4

C 1 x 12.0 = 12
H 4 x 1.0 = 4
16

$\frac{4}{16} \times 100 = 25\%$ H

C 1 x 12.0 = 12
H 4 x 1.0 = 4
O 1 x 16.0 = 16
32

$\frac{4}{32} \times 100 = 12.5\%$ H

5. A common substance used for synthesizing many organic substances is benzene. Benzene is 92.3%C and 7.69% H. The molecular weight of Benzene is 78g/mol.

a. Determine the empirical formula

$92.3\text{g C} \times \frac{1\text{ mol}}{12.0\text{g}} = 7.69\text{ mol C} / 7.69 = 1\text{ C}$

$7.69\text{g H} \times \frac{1\text{ mol}}{1\text{g}} = 7.69\text{ mol H} / 7.69 = 1\text{ H}$

empirical formula: CH

13 g/mol

b. Determine the molecular formula. $\frac{78\text{ g/mol}}{13\text{ g/mol}} = 6$

molecular formula: C_6H_6

6. Which of the following substances is an empirical formula? (if not empirical, convert to empirical).

NaCl $MgCl_2$ ~~C_2H_6~~ CH_3 $NaNO_3$ ~~$Na_2C_2O_4$~~ $NaCO_2$

↑ simplified or reduced

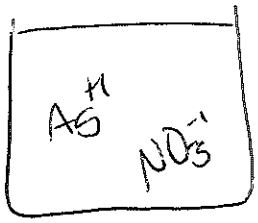
4-2b Properties of liquids

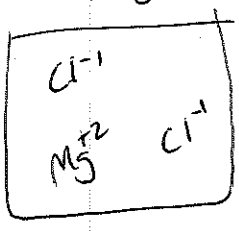
7. In the beaker to the right draw 1 of each of the following substances dissolving.

$AgNO_3(s) \rightarrow Ag^{+1} + NO_3^{-1}$

$MgCl_2(s) \rightarrow Mg^{+2} + 2Cl^{-1}$

$CO_2(g)$ (Covalent does not break apart)





8. Which of the following solutions above is the best conductor of electricity. ionic substances $AgNO_3$ + $MgCl_2$

9. Which of the following solutions is the worst conductor of electricity?

CO_2

10. If warmed which solution would become less soluble?

CO_2 - which is a gas

as temperature increase, the solubility of a gas decreases

#4-2c Can I calculate the relationships between solute and solvent?

11. 50 grams of $CaCl_2$ is dissolved in 200mL of water.

Ca - $1 \times 40.1 = 40.1$
Cl - $2 \times 35.5 = 71.0$
$\} 111.1$ g/mol

a. Determine the number of moles of $CaCl_2$. $50\text{g}\ CaCl_2 \left| \frac{1\text{ mol}}{111.1\text{g}} \right. = 0.45\text{ mol } CaCl_2$

b. Determine the moles of water. $200\text{mL} = 200\text{g}\ H_2O \left| \frac{1\text{mol}}{18\text{g}} \right. = 11.1\text{ mol } H_2O$

c. Determine the molarity of the solution. $\frac{0.45\text{mol}}{0.2\text{ L}} = 2.25\text{M } CaCl_2$ solution

d. Determine the mole fraction of water in the solution. $\frac{\text{part mol}}{\text{total mol}} = \frac{11.1}{(11.1+0.45)} = \frac{11.1}{11.55} = 0.96$

e. An additional 100 ml of water is added to the solution. What is the new molarity?

$M_1V_1 = M_2V_2$
$(2.25)(200\text{mL}) = M_2(300\text{mL})$
$M_2 = 1.5\text{M}$

OR $\frac{0.45\text{mol}}{0.3\text{L}} = 1.5\text{M}$

#4-3a. What are the internal/external factors affecting a gas? Pressure, Temperature, Volume

12. In the formula PV = nRT. Identify each variable.

P = Pressure in atm
V = Volume in L
n = moles
T = Temperature in K
$R = 0.0821 \frac{\text{atm}\cdot\text{L}}{\text{mol}\cdot\text{K}}$

13. In question #13 none of the variables are indicating the type or identity of the gas present. Why is this and does it need to be fixed to account for this?
We are assuming all gases behave the same (ideal gas) so the identity does not matter

14. What is an ideal gas? A gas with particles that move fast + are far apart, have no attraction or repulsions, have elastic collisions

#4-3b Kinetic molecular Theory

V P T

15. Two identical 2L ridged containers shown have a pressure of 1 atm and 35C. $35+273 = 308\text{K}$

He
4 g/mol

Ne
20.2 g/mol

a. Which has the most number of particles? same V, P, T → same moles

b. Which has the highest average kinetic energy? same T, same KE

c. Which has the highest molecular velocity? $KE = \frac{1}{2}mv^2$ (m ↓, v ↑) He
lower mass, higher velocity

d. Which container contains the largest mass of gas? Ne

e. Determine the moles of Ne gas. $PV = nRT$
$(1\text{atm})(2\text{L}) = n(0.0821)(308\text{K})$
$n = 0.079\text{ moles Ne}$ or He

16. If the He container is reduced to ¼ of its original size and has its temperature doubled to 70C. What will be the new pressure inside of the container? $273 + 70 = 343\text{K}$

$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$ $\quad \frac{(2\text{L})(1\text{atm})}{308\text{K}} = \frac{(0.5\text{L})P_2}{343\text{K}}$

$\frac{1}{4} \cdot 2 = \frac{1}{2}\text{L} = V_2$ $\quad \frac{(2)(1)(343)}{(308)(0.5)} = \frac{(308)(0.5)P_2}{(308)(0.5)}$

$P_2 = 4.5\text{ atm}$