

Name: \_\_\_\_\_

Per: \_\_\_\_\_

**Reference Tables Review-** Use your Reference Tables to answer the following review questions.

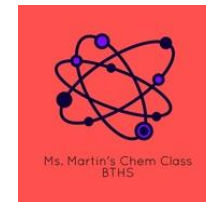
**Table A**

1. What does STP stand for?
2. What are the two units of pressure represented in the table?
3. What are the two units of temperature represented in the table?
4. Describe the movement of particles in a sample of  $H_2$  gas at  $-273^\circ C$ .
5. Convert 2 atm to kPa.
6. Convert 373K to  $^\circ C$ .

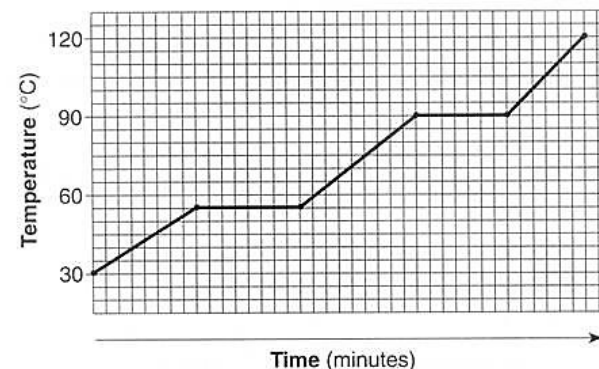
**Table B**

1. Define Heat of Fusion.
2. Based on the definition of the heat of fusion, make up a theoretical problem.

3. Define Heat of Vaporization.



4. Label the Heat of Vaporization on the heating curve below.



5. In what type of problem would you use the specific heat capacity of  $H_2O(l)$ ?
6. Relate the heat of fusion/vaporization with the strength of interparticle/molecular forces of a sample.

### Tables C & D

1. Why are prefixes used?
2. How many grams are in 10kg?
3. How many meters are in 100 nanometers?
4. Convert 45pm to cm.
5. What are the units for molarity?
6. How many particles are in a mole?
7. A calorimeter is used to measure the amount of heat absorbed/ released in chemical reactions. What units are used?

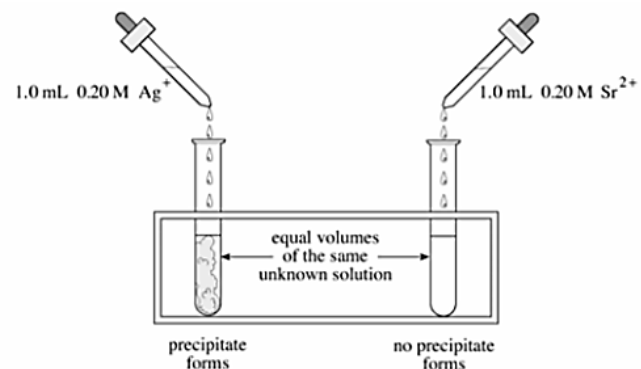
### Table E

1. What is a polyatomic ion?
2. What type of bonds are present in the compound,  $\text{Na}_2\text{SO}_4$ ?
3. What is the formula and charge of the permanganate ion?

4. What is the formula of copper (II) nitrate?

### Table F

1. Is the compound  $\text{NH}_4\text{Cl}$  soluble in water? Explain.
2. Is the compound  $\text{CaCO}_3$  soluble in water? Explain.
3. What is a precipitate in a chemical reaction?
4. Consider the following experiment:



The unknown solution could contain:

- |                          |                             |
|--------------------------|-----------------------------|
| A) .20 M $\text{OH}^-$   | C) .20 M $\text{CO}_3^{2-}$ |
| B) .20 M $\text{NO}_3^-$ | D) .20 M $\text{PO}_4^{3-}$ |

5. Complete and balance the following precipitation reaction (include phases of products).



#### Table G

1. Define solute.
2. Is water a polar or nonpolar solvent? Draw the lewis structure of water and use it to explain your answer.
3. Which compounds show a decrease in solubility as temperature increases? What is the reason for this?
4. Which salt is most soluble at 60°C?
5. Which compound is least soluble at 100°C?
6. How many grams of KCl can be dissolved in 500g of H<sub>2</sub>O at 30°C?
7. At 30°C, 90g of NaNO<sub>3</sub> is dissolved in 200g of H<sub>2</sub>O. Is this solution unsaturated, saturated, or supersaturated?

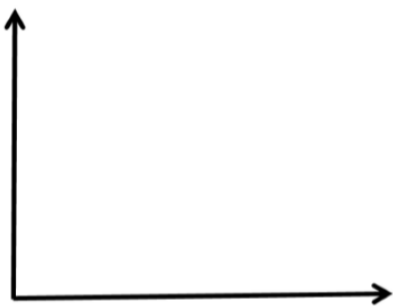
8. What is the solubility of sulfur dioxide at 40°C?
9. Compare the rate of solute dissolving to the rate of crystallization in a solution containing 50g of ammonium chloride in 100g of water at 45°C.
10. A saturated solution of KClO<sub>3</sub> is formed in 100g of water. If the solution is cooled from 90°C to 60°C, how many g of solute will precipitate out?

#### Table H

1. What is vapor pressure?
2. What is the vapor pressure in kPa and atm of propanone at 75°C?
3. What is the normal boiling point of ethanoic acid? \_\_\_\_\_
4. Compare the vapor pressure of the 4 liquids at 70°C and relate the trend in vapor pressure to the normal boiling point and strength of the intermolecular forces in each of the liquids.

### Table I

1. What is heat of reaction?
2. What does the sign of the  $\Delta H$  value tell you about the reaction/process?
3. Is the dissolving of ammonium nitrate in water endo or exothermic? How can you tell?
4. Is the formation of water from its elements endothermic or exothermic?
5. How much heat is released for every **one mole** of octane that is combusted? Show your work.
6. Draw the potential energy diagram for the synthesis of ammonia below and label each part of the diagram.

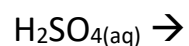


### Table J

1. Is a more active metal more easily oxidized or reduced?
2. Is a more active nonmetal more easily oxidized or reduced?
3. Will Sn gain or lose electrons when it reacts with Cu? Explain.
4.  $\text{CrCl}_2$  will spontaneously react with which of the following?  
a. Cu      b. Al      c. Ni      d. Fe
5. Will the following reaction be spontaneous? (If yes, write out the chemical reaction and state the type of chemical reaction that it is)  
A copper penny is placed in a silver nitrate solution.
6. Will  $\text{Cl}_2$  spontaneously react with HF to produce  $\text{F}_2$  gas? Explain.

**Table K**

1. List two properties of acids.
2. What is an Arrhenius acid?
3. What is the formula of carbonic acid?
4. Complete the dissociation equation of sulfuric acid.



5. Are acids electrolytes or nonelectrolytes? Why?
6. What is the pH range for acidic solutions?

**Table L**

1. List two properties of bases.
2. What is an Arrhenius base?

3. How does an Arrhenius base differ from an alternate theory base?
4. Give the formula of an Arrhenius base.
5. Give the formula of an alternate theory base.
6. What is the pH range for basic solutions?
7. In the process of neutralization, an Arrhenius acid and base react to form a salt and water. Write out and balance a neutralization reaction below using an acid from table k and a base from table l .

**Table M**

1. What is an acid base indicator?
2. Use the pH values given below and table M to answer the following questions.

Liquid	pH
Tap water	6.8
Lemon juice	2.3
Human blood	7.3
Liquid bleach	11

- a. What color would tap water be in bromocresol green?
- b. What color would phenolphthalein be in bleach?
- c. Using one of the indicators from the reference table, state how you could distinguish tap water from lemon juice.

7. How many half-lives will it take for 50g of Tc-99 to decay to 6.25g?
8. Iodine-131 is used to destroy thyroid tissue in the treatment of an overactive thyroid. The half-life of iodine-131 is ~8 days. If a hospital receives a shipment of 200g of iodine-131, how much would remain after 32 days?

**Table N**

1. What is the decay mode of plutonium-239?
2. What is the half-life of neon-19?
3. Which radioisotope will decay the fastest?
4. Write out the decay equation for Co-60.
5. Write out the decay equation for plutonium-239.
6. According to the big bang theory, the universe started  $1.5 \times 10^{10}$  years ago. How many half-lives has uranium-238 undergone since the big bang?

9. Why could U-238 pose a serious health risk if a nuclear power plant melts down?

**Table O**

1. What is the difference between a beta particle and a positron?
2. During what type of nuclear reaction will an alpha particle be emitted from an unstable nucleus?
3. Compare the penetrating power of alpha, beta, and gamma radiation.
4. Which particles will be deflected towards the negative plate in an electrical field?

### Table P

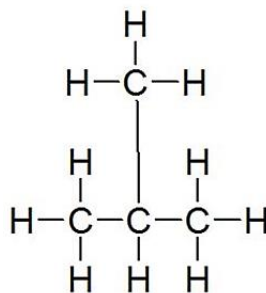
1. How many carbon atoms does heptane have?

2. Base your answers to the following questions on the organic compound represented in the diagram to the right.

a. What is the prefix of the parent chain?

b. What is the prefix of the branch?

c. Name the compound.



4. If you built a model of butane, how many sticks (bonds) would you need to use?

5. Which hydrocarbon series contain compounds that are unsaturated?

6. Draw the structural formula and name any member of the series with the general formula  $C_nH_{2n-2}$  below.

### Table Q

1. What is a hydrocarbon?

2. Which hydrocarbon series would a compound containing the molecular formula  $C_{32}H_{64}$  belong to? How can you tell?

3. Each member of the alkyne series differs from the preceding member by one additional carbon atom and how many hydrogen atoms?

### Table R

1. What is a functional group?

2. Make up one more example for each class of compounds (do not just use the one given on the table). Draw the structure and write the name of the compound.

Halocarbon-

Alcohol-

Amine-

Ether-

Amide-

Aldehyde-

**Table S**

1. What is the name of the element with the symbol Sn?
2. What is the symbol of gold.
3. On the blank periodic table below, draw and label arrows showing the trends in atomic radius, electronegativity, first ionization energy, and metallic character.

Ketone-

A blank periodic table grid consisting of 7 rows and 18 columns. The grid is shaped like a standard periodic table with gaps for the noble gases and the lanthanide/actinide series.

Organic acid-

A blank horizontal grid consisting of 2 rows and 14 columns.

Ester-



4. Which elements are liquids at STP?
5. Name two noble gases.
6. Why don't the noble gases have electronegativity values?
7. Name two metalloids.
8. What is the density of  $O_{2(g)}$  at 298K and 101.3 kPa?
9. What is the melting point of Zinc in K?
3. How many moles are in 65g of sodium chloride?
4. What is the concentration in parts per million if a 500g solution of copper (II) sulfate contains 5g of copper (II) sulfate?
5. At STP, a sample of hydrogen gas has a volume of 10L. If the temperature is raised to 50°C and the pressure is decreased to .5 atm, what is the new volume of the hydrogen gas?

#### Table T

1. An object has a mass of 23 kg and a density of  $10.0 \text{ g/cm}^3$ . What is the object's volume to the correct number of sig figs?
2. A student calculates the density of iron to be  $8.956 \text{ g/cm}^3$ . What is the student's percent error?
6. If the temperature of 10g of water increased from 15°C to 45°C, how much heat was absorbed by the water?
7. How much heat is released when 50g of  $H_2O_{(g)}$  condenses to  $H_2O_{(l)}$  at 100°C?

8. How many moles of sodium hydroxide are in .5L of a 3M aqueous solution?
9. What is the percent composition by mass of water in the hydrate  $\text{MgSO}_4 \cdot 2\text{H}_2\text{O}$ ?
10. What is the molarity of a solution containing  $\text{HNO}_3$  if 10.0 milliliters of 0.40 M  $\text{LiOH}$  are required to neutralize 200 milliliters of the  $\text{HNO}_3$  solution?
11. What laboratory technique is used to carry out the neutralization reaction described in question 9?
12. How many L of .5 M  $\text{NaOH}$  are required to neutralize 2 L of a 1.5 M solution of  $\text{H}_2\text{SO}_4$ ?
13. 50g of  $\text{CuCl}_2$  are dissolved in water to make 500mL of an aqueous solution. What is the molarity of the solution?
14. To what volume should you dilute 75 mL of a 10.0 M  $\text{HCl}$  solution to obtain a 1.20 M  $\text{HCl}$  solution?