Quarter 3 Review Worksheet-Chem

UNIT 7- KMT and Gas Laws

- 1. What is an elastic collision?
- 2. How does the kinetic energy of particles change when temperature changes?
- 3. Use KMT to describe how gases are compressible and expandable.
- 4. What are the 3 assumptions of KMT?
- 5. Use your knowledge of gas properties to describe what is happening in the following situations:
 - a. Your car tires appear flat in the morning after a cold night.
 - b. Your ears "pop" as you are driving up a mountain and increasing in elevation at quick rate.
- 6. If I have 20 liters of gas at a temperature of 30° C and a pressure of 20 atm, what will be the pressure of the gas if I raise the temperature to 45°C and decrease the volume to 15 liters?
- 7. What units do the following variables need to be in for the ideal gas law?
 - a. pressure: _____
 - b. volume: _____
 - c. "n": _____
 - d. temperature: _____
- 8. If I contain 20 g of chlorine gas in a container with a volume of 40 liters and at a temperature of 300 K, what is the pressure inside the container?
- 9. If I have 15 moles of gas held at a pressure of 10 atm and a temperature of 500 K, what is the volume of the gas?

Unit 8 Thermochemistry

Part 1: Enthalpy and Specific Heat

- 10. The symbol used to represent change in enthalpy is ______
- 11. When a chemical reaction gains heat, it is an ______ reaction, and its enthalpy value is (positive/negative)
- 12. When a substance goes from a solid to a liquid, it is an (endothermic/exothermic) process. The sign for ΔH is ______.
- 13. $H_2O(g) \rightarrow H_2O(s)$ is an (endothermic/exothermic) process. The sign for ΔH is _____.
- 14. When a chemical reaction releases heat, it is an ______ reaction, and its enthalpy value is (positive/negative)
- 15. Describe the difference between temperature and heat.

16. The amount of energy required to raise the temperature of 1 gram of a substance 1°C is called Calculate the following and show your work!

17. What is the mass of a piece of iron that absorbs 1100 J of energy when its temperature changes from 25°C to 175°C? (specific heat of iron: 0.450 J/g °C)

- 18. How many joules of heat are needed to raise the temperature of 15.0 g of aluminum from 20°C to 55°C, if the specific heat of aluminum is 0.90 J/g°C?
- 19. The products in an exothermic reaction have a (greater/smaller) enthalpy than the reactants.
- 20. Use the standard enthalpies of formation (your half sheet) to calculate the overall change in enthalpy for the reaction.

 $CH_4(g) + 2 O_2(g) ---> CO_2(g) + 2 H_2O(I)$

Part 2: Entropy

21. Define entropy.

- 22. What is the symbol used to represent change in entropy? ____
- 23. Predict the sign on the change in entropy for the following equations:
 - a. $2 SO_2(g) + O_2(g) \rightarrow 2 SO_3(g)$
 - b. $MgO(s) + CO_2(g) \rightarrow MgCO_3(s)$
 - c. $2H_2O_2(I) \rightarrow H_2O(I) + O_2(g)$
 - d. $H_2O(I) \rightarrow H_2O(g)$

UNIT 9- Solutions

- 24. What factors determine whether one substance will dissolve in another (solubility)?
- 25. What three factors influence the rate of solvation?
- 26. What are the two components of a solution? Define each component.
- 27. As the temperature increases, what happens to the solubility of a solid? Of a gas?
- 28. How is a supersaturated solution created?
- 29. Explain the meaning of the phrase "like dissolves like"?
- 30. How would you prepare 100.ml of a 0.500M HNO₃ solution if you have a 12.0M stock solution of HNO₃?
- 31. What volume of a 6.0M NaCl solution can be made from 3.51g of NaCl?
- 32. How many grams of solvent are necessary to dissolve 325g of lithium bromide at 50°C if the solubility of LiBr is 203g/100g water at this temperature?
- 33. What is the molar concentration (molarity) of a 125ml solution made by dissolving 34.2g of sucrose, C₁₂H₂₂O₁₁, in water?

34. What mass of water is needed to make a 1.35m solution with 8.20mol NaOH?

35. Calculate the molality of a solution of 50.0 g nickel (II) chloride in 100.0 g of water.

36. 12.5 g barium chloride dissolves in 250. ml of water. Calculate the mass percent concentration.

37. What is the new boiling point is 25.0 g of calcium chloride is dissolved in 500. ml of water?

38. Which of the following substances will affect the boiling point the most? CH₄, NaCl, or MgCl₂?