

Honors 2009 Chemistry final review
Chapters 9,10,11, 12, pH and redox

The final will be 60 multiple choice questions. The final is 60 minutes long. Some questions will be easy such as;

How many liters does one mole of gas occupy?

And other questions will be more difficult and you will have to figure out ,(calculate) , the answer; such as a mass to volume problem at non STP conditions; example, if you have 50 grams of nitrogen gas what is the volume of NH_3 produced when the pressure is at 1.5 atm and the temperature at 30 C?

We will take 3 days to review for the final. There are 110 questions on this study guide. Therefore we will cover approx. 20 questions each day. You are responsible for having the questions completed before each class. The schedule is as follows.

1-25 ---June 1
26-50---June 2
51-76---June 3

- 1) Calculate the empirical formula of a compound whose percentage composition is 0.58% H, 44.89% K, 36.74% O and 17.79% P.
- 2) An organic molecule has the empirical formula CH and a molar mass of 78 g/mol, what is the molecular formula?
- 3) How many moles of CaCl_2 are found in 146 grams of CaCl_2 ?
- 4) What is the chemical formula for magnesium iodide?

5) How many mole of hydrogen atoms are in 4 mol of ammonium phosphate $(\text{NH}_4)_3\text{PO}_4$?

6) Balance the equation below, then answer the following questions.



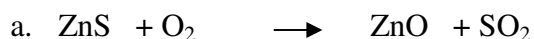
- b. What type of reaction is this _____
c. How much chlorine will be needed to react with 3.44 grams of arsenic?

7) Write and balance equation for the following description.

8) Potassium metal + water yields potassium hydroxide and hydrogen gas

- a. What type of reaction is this _____ -
b. What is the molar mass of the potassium hydroxide?
c. If 20 grams of potassium metal are used, what mass of potassium hydroxide is produced?

9) **Balance** the following equation and answer the questions about the equation.



- b. What type of reaction is this? _____
c. What mass of ZnO could be produced from 418 g of ZnS and 185L of O_2 ?

d. What volume of O_2 , at STP is needed when 4.66 g ZnS is used?

10) Find the percent water in $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$. What special name so we give to this crystal that contains a know quantity of water?

11) How many grams of lead (II) sulfate are in a mole of the compound?

12) Write the formula for aluminum sulfate.

13) Write the formula for iron (III) carbonate.

14) What is the formula mass for magnesium chloride?

15) How many molecules of sulfur dioxide are present in 4 moles of sulfur dioxide?

16) How atoms are there in 5 moles of a substance?

17) What is the mass of 5.5 moles of bromine molecules?

18) Know the general formulas for the following;

- a. Single replacement
- b. Double replacement
- c. Decomposition
- d. Synthesis
- e. Combustion

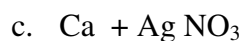
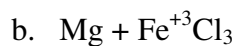
19) What is a diatomic molecule, which elements are diatomic?

20) How would you write the molecule nitrogen gas?

21) $AB + CD \rightarrow AD + CB$ is what type of reaction _____

22) Know how to use the activity series, what it is etc.

23) Complete the following equations, and **indicate which element reduced and which is oxidized.**



24) Methanol CH_3OH is the simplest of the alcohols. It is synthesized by the reaction of hydrogen and carbon monoxide.



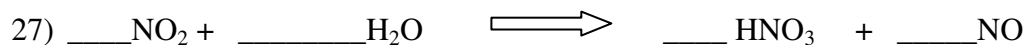
b. If 500 mol of CO and 750 mol of hydrogen are present, which is the limiting reactant?

c. How many grams of CH_3OH will be produced?

d. How much of the excess reactant is left over?

25) If you used 100 grams of propane how many grams of carbon dioxide will you produce? You first need to write the balanced equation, and then do a mass to mass problem.

26) Be sure to review you mole to mass, mole to mole mass to mole, mass to mass notes.



Use: N = 14 amu, O = 16 amu H= 1 amu

28) If you reacted 100 grams of NO_2 , how many grams of HNO_3 are produced?

29) If you reacted 50 grams of water, how many grams of HNO_3 are produced

30) If 50 grams of HNO_3 are produced, how many grams of NO_2 were reacted?

31) Write a balanced equation for butane, the molar heat of combustion for butane is 2859 kJ/mol. Include the proper amount of heat, kJ, in the balanced equation.

32) How many moles of butane must be burned to produce 1000 kJ of energy? The molar heat of combustion is 2859 kJ/mol.

33) In kinetic terms, explain how a gas exerts pressure on its container. If no other conditions are changed, how does the addition of more gas affect the pressure? Explain why either doubling the amount of gas or compressing the gas by half would have the same effect on pressure.

34) Use the ideal gas equation to determine the volume of 0.5 mol of NH_3 gas at STP

- 35) If a sample of gas occupies 642 L at 93.9 kPa, what volume will it occupy at 109.0 kPa if the temperature remains constant? (101 kPa = 1 atm)
- 36) What pressure is exerted by 5 moles of a gas in a 200 L container at 10 C?
- 37) What is an ideal gas?
- 38) Convert 93K to Celsius.
- 39) What is temperature?
- 40) If two molecules have the same KE which molecule will have more velocity the lighter or the heavier molecule?
- 41) Know the different gas laws:
- Boyles Law
 - Charles Law
 - Gay Lussac's
 - Combined gas
 - Dalton's law of partial pressures
 - Ideal gas
- 42) What are the various pressures for atmospheric pressure?
- 43) How many liters does 1 mole of a gas occupy at STP?, 2 moles of a gas at STP?

- 44) Is F_2 a molecule or an atom or an ion? What physical state is it in at room temperature? Describe this state in terms of kinetic theory.
- 45) If the pressure of fluorine gas were increased, according to Boyle's law what happens to its volume?
- If the pressure were increased by a factor of 3, what would happen to the volume?
- 46) If the volume of fluorine gas were increased, according to Charles' law what would happen to the temperature?
- 47) Write the equation if F_2 gas reacts with H_2 gas . If 50 grams of fluorine gas reacts, what volume of hydrogen fluoride gas is produced at STP?
- 48) What volume of oxygen is required to burn 401 L of butane, C_4H_{10} completely?
- 49) If you collect 90 L of O_2 at standard conditions, how many moles of gas will you have?
- 50) If 2 moles of gas are collected at 20 C and 96 kPa, What volume will it occupy under these conditions? 101 kPa = 1 atm
- 51) Under what conditions will a gas act the most like an ideal gas?

52) How many moles of a gas are present in 10 L under standard conditions?

53) A balloonist had 500 L of air at 60 C inside his hot air balloon. The Temperature of the air was increased to 100 C. What is the new volume? And B) will the balloon rise or sink with this new set of conditions?

54) The energy that an object has because of its motion is _____

55) Temperature is a measure of _____

56) What is the difference between boiling and vaporization?

57) If the vapor pressure of a liquid reaches 101.3 kPa the liquid will _____.

58) As the intermolecular forces between molecules increase, the boiling point will _____.

59) What is the concentration of OH^- and H^+ ions in a solution with pH of 9

60) Describe melting and boiling points in terms of vapor pressure.

63) Which pH value is associated with the solution that has the highest concentration of hydronium ion, a pH of 1,5,7,or 13?

64) What household product could be used to neutralize an acid?

65) Given a pH of 11, what is the concentration of H^+ ions and of OH^- ions?

66) What is the pH of a 1×10^{-5} NaOH solution?

67) If the pH is 4, what is the $[OH^-]$? the $[H_3O^+]$?

68) What is the pH of a 2×10^{-7} M solution of $Mg(OH)_2$?

69) What is the $[H_3O^+]$ for a pH of 7.2?

70) review pg 505 15-23

71) know how to read solubility charts

Chapter 12

72-72) Pg 901 #328, 239

73-76) page 901 332, 333, 328,329

Chapter 15 should be fresh in your mind

