**Honors Chemistry Final Exam**

**Review**

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**Practice Questions:**

**1)** What is the formula for chloric acid?

**A**  HCl **B**  HClO **C**  HClO2 **D**  HClO3

**2)** What volume of a 5.0 M NaOH solution is required to prepare 500.0mL of a 1.50M solution?

**A**  150mL **B** 0.067 mL **C**  1700 mL **D** 0.015 mL

**3)** How many grams of ice will melt at 0⁰C if the ice absorbs 420.0J of energy?

**A**  0.1860g **B**  0.7950g **C**  1.260g  **D**  45.38g

**4)** What is the pH of a solution with a hydroxide concentration of [OH -] = 1.0 x 10-8 M?

**A**  7 **B**  6 **C**  5  **D**  8

**5)** What is the concentration of phosphoric acid if it takes 25.0mL of 1.50M calcium hydroxide to   
 titrate 30.0mL of phosphoric acid?

1. 1.25M **B** 0.833M **C** 1.88M **D** 2.7

**6)** What is the name of H2SO3 (*aq*)?

**A**  hydrosulfuric acid **B**  sulfurous acid   
**C**  hyposulfurous acid **D**  sulfuric acid

**7)** Consider this reaction: 3H2SO4 + 2Al Al2(SO4)3 + 3H2

How many grams of aluminum sulfate should be produced if 7.35 grams of aluminum react with excess sulfuric acid?

**A**  46.6 g **B**  93.2 g **C**  1.16 g **D**  15.0 g

**8)** An aqueous solution of silver nitrate is added to an aqueous solution of iron (II) chloride. Which is the precipitate?

**A**  AgCl **B** Fe(NO3)2 **C**  AgNO3 **D** FeCl2

**9**) Which of the following would turn phenolphthalein pink?

**A** HCl **B** NaOH **C**  NaCl **D** H2SO3

**10)** What products are formed when the metal lithium is added to hydrochloric acid?

**A**  Li and H2O **B**  LiCl and H2 **C**  LiOH and H2 **D** Li2O and H2O

**11)** How many grams of carbon dioxide gas occupy 44.8L at STP?

**A**  88.0 g **B**  2.0 g **C**  56.0 g **D** 22.8 g

**12)** If the temperature of a 2.0L container of gas at 45C and 1.0 atm is increased to 75C and   
 4.0L, what is the pressure?

**A** 0.30 atm **B** 0.46 atm **C** 0.55 atm **D** 0.83 atm

**13)** Analysis shows a compound to be, by mass, 43.8% N, 50.0% O, and 6.20% H. Which is the   
 empirical formula for the substance?

**A**  N3O3H6 **B**  NH2O **C**  N2OH2 **D** N2OH

**14)** What is the molarity of a solution containing 15.0 g of potassium fluoride dissolved in 1.50 L of   
 solution?

**A**  17.2 M **B**  5.81 M **C**  0.172 M **D** 10.0 M

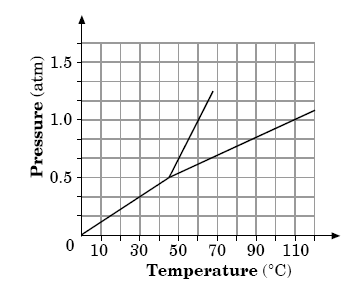
**15)** 40.9 J of heat is applied to 2.0 grams of a gray colored metal which causes it’s tempeature to increase 20.0°C. What is the identity of that metal?

**A**  aluminum **B**  copper **C**  iron **D** magnesium

**16)** Which of the following gases diffuses fastest?

**A**  oxygen **B**  nitrogen **C**  sulfur **D** chlorine

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| **17)** Which point on the titration curve to the right represents the equivalence point?  **A** 1 **B** 3  **C** 5 **D 6** |  |

**18)** Consider the phase diagram to the right:

At what temperature does the triple

point occur?

**A**  60C

**B**  110C

**C**  37C

**D**  45C

**19)** A compound has an empirical formula of CH2O and a molecular mass of 120 g/mol. What is the compound’s molecular formula?

**A**  CH2O **B**  C4H8O4 **C**  C6H12O6 **D** C12H22O11

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| **20)** Which of the following substances is least  soluble at 80°C?   1. NaNO3 2. KNO3 3. SO2 4. NH4Cl |

**21)** What is the pressure, in mmHg, exerted by a 1.35 mol sample of fluorine in a 3.50 L container   
 at 155C ?

**A**  62.4 mmHg **B**  1377 mmHg  **C**  10300 mmHg **D** 13.5 mmHg

**22)** Which of the following phase changes is exothermic?

**A** Sublimation **B**  freezing **C**  vaporizing **D** melting

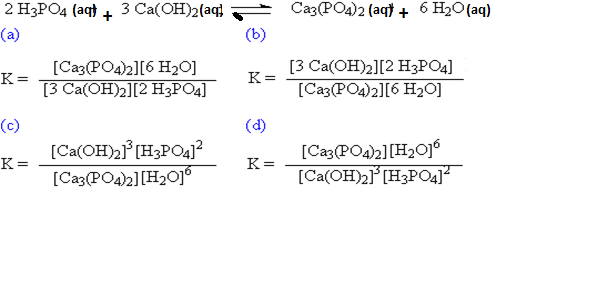
**23)** Given the following reaction, which of the following stresses will cause the equilibrium to shift   
 to the right? N2 (g) + 3H2 (g) ⇌2NH3(g)

**A** increase the concentration of ammonia **B** decrease the concentration of hydrogen

**C** increase the pressure **D** increase the volume

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| **24)** According to the diagram to the right,   which of the following statements is true  **A** the reaction is exothermic  **B**  the energy of the reactants is   greater than the products  **C** the activation energy of the   forward direction is greater than   the reverse.  **D** a catalyst was used |  |

**25)** Which of the following equations represents the equilibrium equation for the   
 following reaction?



26)  If you start with 5.5 grams of sodium fluoride, how many grams of magnesium fluoride will be produced?  
 Mg + 2 NaF → MgF2 + 2 Na

27) A 15.00 gram sample of a sodium sulfate hydrate was found to contain 7.05 grams of water.

1. Calculate the percent of water in the hydrate.

1. Determine the formula of the hydrate & name it.

*28) Use the diagrams below to answer questions 1-5*

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| http://www.kentchemistry.com/images/links/Kinetics/practice_3-2.gif | 1. Is this potential energy diagram, endothermic or exothermic?  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 2. What is the energy of the activated complex?  \_\_\_\_\_\_\_\_\_\_ 3. What is the energy of the reaction (ΔH)? \_\_\_\_\_\_\_\_\_\_ 4. What is the activation energy?  \_\_\_\_\_\_\_\_\_ 5. The sign of ΔH is \_\_\_\_\_\_\_\_\_\_\_\_\_\_ for endothermic reactions and \_\_\_\_\_\_\_\_\_\_\_\_\_\_ for exothermic reactions. |

1. **29)** How many grams of ammonium sulfate can be produced if 40.0 mol of H2SO4 react with excess NH3
2. according to the equation 2 NH3(*aq*) + H2SO4(*aq*) → (NH4)2SO4(*aq*)?

**30)** The volume of a gas is 350.0 mL when the pressure is 2.00 atm. At the same temperature, what is the pressure at which the volume of the gas is 1.0 L?

**31)** A sample of oxygen occupies 880 mL when the pressure is 760.00 mm Hg. At constant temperature, what volume does the gas occupy when pressure falls to 810.00 mm Hg?

**32**) A solution contains 85.0 g of NaNO3 and has a volume of 950 mL. Find the molarity of the solution.

**33)** How many grams of NaOH are required to prepare 550. mL of a 0.450 M solution?

3 **34)** What is the pH of a solution with a [OH–] of 4.55 x 10–7 M?

2 **35)** What is the pH of a 0.0870 M KOH solution?

**36)** Find the percentage composition of each element for the following substances:

a. C6H12O6

b. N2O4

c. lead(II) oxide

**37)** Copper (II) Sulfate is frequently found as a bluish compound, containing water. If you heated a sample of hydrated Copper (II) Sulfate that had a mass of 2.576 g, and drove off all the water, leaving you with Copper (II) Sulfate, the resulting compound had a mass of 1.646 g. Find:

1. The mass of the water your drove off.
2. The empirical formula of the hydrate.
3. The name of the hydrate.

**38)** a) Lithium bromide and chloride react to form lithium chloride and bromide. Write and balance the equation.

b) Calculate the mass of lithium chloride produced when 1.04 g of lithium bromide reacts.

**40)** How many grams of CO2 and H20 are formed from 8.36 mol of propane (C3H8)?

(hint: combustion)

**41)** Given the following equation answer the questions below:

4Al + 3O2----> 2 Al2O3

1. If I had 64.00 grams of O2 how many grams of Al would be needed to react with that oxygen?
2. If you wanted to produce 4.00 grams of Al2O3 how many grams of O2 would be needed for the reaction?

**42)** If 4.95 g of ethylene (C2H4) are combusted with 3.25 g of oxygen.

a. What is the limiting reagent?

b. How many grams of CO2 are formed?

c. How much excess reagent would be left over based off your answer above?

43) 43) Write the Equilibrium Expression for the reaction for each of the following:

* 1. N2(g) + 3 H2(g) ↔ 2 NH3(g)
  2. HC2H3O2(aq) + H2O(l) ↔ H3O+(aq) + C2H3O2-(aq)
  3. Find the value for the equilibrium expression, Keq, shown in #25.a.

if [H2] = 0.1 M, [N2] = 0.06 M and [NH3] = 6 M

44) A mixture of four gases (nitrogen, helium, argon, and oxygen) exerts a total pressure of 860 torr. Argon is 42% of the mixture. What is the partial pressure of argon?

45) How many moles of gas need to be removed from a balloon to decrease the volume from 500. mL to 175 mL if the balloon initially contains 7.25 moles of gas and the pressure and temperature remain constant?