Name: _____Per: _____Date: _____

Final Exam Study Guide #4

Topic 1: Organic Chemistry

1.What is the molecular formula of an:

a. alkene w/ 24 C's b. alkyne w/ 10 C's c. alkane w/ 45 C's d. alkyne w/ 3 C's

2. Alkane/alkene/alkyne? a. C_8H_{16} b. C_6H_{14} c. $C_{21}H_{40}$ d. $C_{10}H_{22}$ e. C_5H_8

3. Complete p. 732 #61, p. 733 #62, 67a, 68, p. 735 #3, 5 p. 772 #69, 73, p. 773 #1, p. 886, Chapter 22 #1a, 3abc

Topic 2: K_{eq} and the equilibrium constant

1. Write the expression for the equilibrium constant for each of the following reactions.

a. $H_2 + Cl_2 <==> 2HCl$ b. $2SO_2 + O_2 <==> 2SO_3$ c. $N_2 + 3H_2 <==> 2NH_3$

d. $2CO + O_2 <==> 2CO_2$ e. $Ba(OH)_{2(s)} <=> Ba^{2+}_{(aq)} + 2OH^-_{(aq)}$ f. $2H_2O_{(l)} <==> 2H_{2(g)} + O_{2(g)}$

2. What is the concentration for each substance at equilibrium for the following gaseous reaction if the initial concentration of ethene (C_2H_4) is 0.335 *M* and that of hydrogen is 0.526 *M*?

$C_2H_4 + H_2 \dashrightarrow C_2H_6$ $K_{eq} = 0.99$

3. 1.0 mol of SO_2 and 1.0 mol of O_2 are placed in a 1.0 L flask at 1000 K. When equilibrium has been achieved, 0.925 mol of SO_3 has formed. Calculate K_{eq} at 1000K for the following reaction:

$2\ SO_2(g) + O_2(g) \dashrightarrow 2SO_3(g)$

4. The reaction $N_2(g) + O_2(g) \dashrightarrow 2\ NO\ (g)$contributes to air pollution whenever a fuel is burned in air at a high temperature, as in a gasoline engine. At 1500 K, the Kc = 1.0×10^{-5} A sample of air is heated in a closed container to 1500 K Before any reaction occurs $[N_2] = 0.80$ M and $[O_2] = 0.20$ M What is the equilibrium concentration of NO?

Topic 3: K_a & K_w & pH

Fill in the following chart:

	pH	pOH	$[H^+]$	$[OH^-]$
1.	3.01			
2.		8.56		
3.			2.61×10^{-4}	
4.				4.51×10^{-6}
5.		1.02		

6. Complete the following problems: p. 884 #20, 21, 24, 25

Topic 4: Redox (LEO the lion goes GER!!!!)

1. Complete the following: p. 884 #1, 2, p. 885 #3-12

Topic 5: Miscellaneous

1. What is a colligative property? What does it depend on? Why is salt better than sugar in melting ice?
2. What makes polymers stronger? What is benzene?