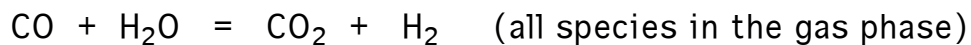


20 points each

- 1) A vessel contains 0.50 M CO, 0.05 M H₂O, 0.30 M CO₂ and 0.10 M H₂. All are gasses. At the temperature of the vessel K= 88 for the reaction below. In what direction will the reaction proceed in order to reach equilibrium? (You must show your calculation of Q to justify your answer. Simply stating a direction will receive no credit).



- 2) Calculate the pH and pOH of the following aqueous solutions:

a) 0.0035 M HNO₃

b) 0.005 M Ba(OH)₂

CHM 1143

Exam 3

20 points each

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3) Calculate the pH of 0.25 M HF ($K_a = 6.8 \times 10^{-4}$)

4) Calculate the pH of 0.30 M potassium fluoride.

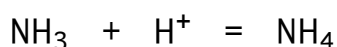
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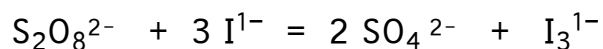
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- 5) Titration of a 0.301 g sample of our blue copper complex required 13.67 mL of 0.254 M HCl to react with the NH_3 in the sample. How many mmoles of NH_3 are present per gram of the complex?



- 6) Data for the aqueous reaction below are given in the table:

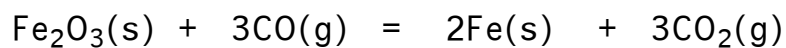
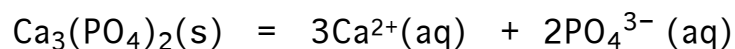
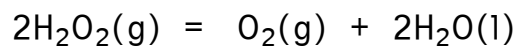
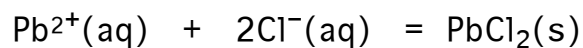


Determine the order of the reaction with respect to $\text{S}_2\text{O}_8^{2-}$ and to I^{1-} and write the rate expression. Determine the numeric value (with correct units) of k , the specific rate constant.

Exp #	$[\text{S}_2\text{O}_8^{2-}]$	$[\text{I}^{1-}]$	Rate M/sec
1	0.012	0.050	7.0×10^{-6}
2	0.024	0.050	1.4×10^{-5}
3	0.024	0.10	2.8×10^{-5}

20 points each

7) a) Write the equilibrium constant expression for the following reactions:



20 points each

- 8) The half-life of phenobarbital in the blood is 60 hours. If your epileptic black and white cocker spaniel receives a dose of 75 mg at 8 am, how much is still in his body 7 hours later?

- 9) Fill in the table:

[H ⁺]	[OH ⁻]	pH	pOH
0.005 M			
			3.00
		11.00	

- 10) a) Circle the compounds which would result in basic solutions when dissolved in water:

HCl NaNO₃ NH₃ KBr MgCl₂ KF FeI₃ Mg(ClO)₂ Mg(ClO₄)₂

- b) Calculate the pH of a solution of 4.0 g HF plus 8.4 g of NaF in enough water to make 250 mL of solution.