Exam 5, Part II   Name(s) _____
CHEM 222, Spring 2021   **Due *in class*, March 22, 2021**
25 Points

You may complete the following individually, or with one (1) partner. You may use your textbook and notes, but may not receive assistance from your classmates or anyone other than Dr. Lamp. *This signed sheet must accompany the completed assignment*. By signing below, you certify that you completed the problems in accordance with these rules. No credit will be given to unsigned papers.

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1. Consider a saturated aqueous solution of silver phosphate (Ag_3PO_4). Write the pertinent reactions and derive mass and charge balance equations that describe this system. *Include all acid-base equilibria involving phosphate, but ignore any acid-base equilibria involving silver*. (Subtle hint: Phosphate is the conjugate base of a weak acid.) (6 points)

2. Consider an aqueous solution that is saturated with silver chloride and silver chromate and also contains 0.20M Na_2CrO_4 and 0.10 M $NaNO_3$ (both strong electrolytes). Write the pertinent reactions and derive mass and charge balance equations that describe this system. *Ignore any acid-base equilibria involving silver*. (6 points)

3. You have prepared a solution by dissolving 0.20 mol adipic acid ($C_6H_{10}O_4$, pK_{a1} = 4.42, pK_{a2} = 5.42) and 0.10 mol benzoic acid ($C_6H_6O_2$, pK_a = 4.20) in 1.00 L of water. Write all equilibria occurring in solution as well as mass balance and charge balance expressions for this system. Determine the pH of this solution. You may make *valid* simplifying assumptions, use spreadsheets, or solve the system directly. If you use a computer to solve the system (which I encourage), be sure to either upload a copy of the spreadsheet, share any Google sheets, or include a printout of the computer output. (13 points)

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