

**Chem 3034 Exam 3 In-Class portion**  
**Name** \_\_\_\_\_

(1)(30 points) Why are high pressures needed in HPLC? What are the advantages of working at high pressure?

(2)(30 points) Sketch a box diagram of an GC with a TCD detector and a syringe injector.  
Expand each part of the diagram and explain how it works

(3)(30 points) Explain how a monochromator works (use pictures and words). Why is a monochromator needed in an AA spectrometer?

(4)(30 points) Explain how two different mass analyzers work in Mass Spectrometry.

(5)(30 points) Atomic Absorption Spectroscopy

(a) What process is involved in AA (what is being observed)?

(b) Why can AA be used to detect one element in a mixture without interference from other elements?

## Chem 303 Exam 3 Take-Home portion

Name \_\_\_\_\_

Due Friday at 5:00 PM You may use your book, notes, and the internet, but you may not discuss the exam with others.

*Answer the Following Questions from the article "Solvent Microextraction Flame Atomic Absorption Spectrometry for Determination of Ultratrace Amounts of Cadmium in Meat and Fish Samples".*

(1)(15 points) What solvent microextraction, how does it work, and what are its advantages?

(2) (10 points) What variables were investigated in the solvent microextraction process?

(3)(10 points) Why was the solvent microextraction needed, and how well did the technique work?

*Answer the following questions from the article "Online ESI-MS Analysis of Reactions under High Pressure".*

(4)(10 points) What are the advantages of connecting the high pressure reactor directly to the mass spectrometer?

(5)(15 points) They were mostly interested in neutral species. Why was this problematic with this system? How did they solve the problem?

Answer the following questions from the article "Grazing Exit Micro-X-Ray Fluorescence Analysis of a Hazardous Metal Attached to a Plant Leaf Surface Using an X-Ray Absorber Method"

(6) (10 points) What is X-Ray Fluorescence and what were they trying to use it?

(7) (15 points) What was the problem with applying X-Ray fluorescence to this problem?