

# Cumulative Exam Topics Spring 2012

## Analytical Division

### February 2012

#### "Interfacing Microfluidic Devices to Mass Spectrometry"

Students need to know

- Limitations associated with microfluidic devices interface to MS
- Solutions to overcome some of the limitations
- Approaches that have been employed thus far to interface microfluidics to MS
- Pros and Cons of these approaches
- Practical applications of microfluidics-MS

(There is an article attached to this cume topic that should be helpful in preparing for this cume. Please contact Carly Jenkins if you need a copy)

### ANALYTICAL CUMULATIVE EXAM

#### MARCH 24 2012

**Topic:** Fundamental skills associated with laboratory work in Analytical Chemistry – broadly defined. More specifically:

- a) Buffers & calculation of pH – buffering range, calculation of pH, function of buffers etc...**
- b) Propagation of uncertainty in cases of random error**
- c) Use of significant figures in lieu of "b"**
- d) Confidence Intervals – computation and meaning of them. Theoretical basis for them.**
- e) Tolerances and use of common research laboratory equipment (pipets, balances etc...)**
- f) Handling of laboratory chemical waste.**

#### **Instructions for Preparation and Required Materials:**

- Several study aids can help you prepare prior to the exam. I suggest use of an undergraduate textbook such as "Quantitative Chemical Analysis" by D. Harris to prepare for this exam. For chemical waste section consult "Prudent Practices in the Laboratory." Product literature for equipment in your laboratory may also be useful to prepare for topic "e."

-You **WILL** be allowed to use a calculator for the exam. You will need to supply this.

-The calculator may **NOT** have any communication ability, and **CANNOT** be programmable.

-You will **NOT** be allowed to have a cellular or smart phone in your possession during the exam. If you are found with one your exam will be confiscated (e.g. leave it at home).

-You **WILL** need something to write with (pen or pencil).

-Your answers **WILL** be recorded in a blue book that will be provided for you at the time of the exam. No other information or aids can be used to complete the exam.

-Students may **NOT** work together and cannot consult anyone else regarding the exam.

## **April 2012 Analytical Chemistry Cumulative Exam**

This exam will cover acid-base equilibria, buffers, titrations, etc. Any good Analytical Chemistry textbook should aid in preparation for the exam.

Examples of what the exam will cover include, but are not limited to the following:

Weak Acid/Weak Base Equilibria

Weak Acid/Weak Base Titrations

Polyprotic Acid Equilibria

Polyprotic Acid Titrations

Titrations of mixed acids

Buffer Action

### **Biochemistry**

The Biochemistry division does not announce topics for cumulative exams

### **Inorganic Division**

February 2012            The Chemistry of Graphene

March 2012             Organometallic Chemistry

#### **April 2012                Seminar and/or Literature**

The April Inorganic Cumulative Exam will cover material from seminars and the current literature. More specifically, this will include the presentations for the weekly Inorganic Division seminar for the Spring Semester 2012, as well as review topics and research articles involving any area of inorganic chemistry that appear in the journal *Science* during the period 1 January 2012 through 15 April 2012.

### **Organic Division**

The organic division does not announce topics for cumulative exams

### **Physical**

February 2012

Kinetics

March 2012

Statistical Methods

April 2012

General Topics