Analytical Division

ANALYTICAL CHEMISTRY CUME
September 17, 2011
Analytical Applications of Raman Spectroscopy
The cume will cover fundamentals of Raman spectroscopy and some recent applications in analytical chemistry. Be sure to review the basics of Raman scattering and Raman instrumentation and measurement techniques and the analytical applications discussed in the recent literature indicated below.
Review Material:
• Any modern text in instrumental analysis (i.e., Skoog) or analytical chemistry (i.e., Harris or Skoog).
Recent Literature:

OCTOBER 2011 ANALYTICAL DIVISION CUME EXAM

The exam will consider detectors for mass spectrometry, with a particular focus on recent advances in array detectors. A blue book will be provided for your use. Bring a calculator and something to write with. Please note that Gary Hieftje is an author on several of these references. Prof. Hieftje (U. Indiana) will soon be honored by this department through the invited Dasgupta lecture.

Valuable study resources are:

1) Chapters 11, and 20 (on atomic and molecular MS) of “Principles of Instrumental Analysis by Skoog, Holler, and Crouch. 6th Ed. Pay particular attention to key vocabulary, figures of merit, types / designs for mass spectrometers discussed, and the discussion of the different MS ion detectors.


See Carly Jenkins for a copy of the attachments

**November 2011 Analytical Chemistry Cumulative Exam**

Super-resolution optical microscopy is a group of techniques that aim to break the diffraction limit barrier to spatial resolution. There are many new optical, computational, and chemical approaches to achieving sub-diffraction resolution. These new methods are covered in this exam.

Students should also have a working knowledge of single-photon excitation microscopy (widefield and confocal) and what limits spatial (lateral) resolution.

Suggested Reading:
http://www.microscopyu.com/articles/superresolution/stormintro.html
Current Opinion in Chemical Biology 2010, 14:10–14
Annu. Rev. Biochem. 2009. 78:993–1016

**December 2011**

The topic of the Anal Chem cume for this month is

“Fundamentals and Applications of Ultra Performance Liquid Chromatography”.

Students will be expected to
- Describe the differences between HPLC and UPLC
- describe the fundamentals of UPLC
- describe and discuss the instrumental advances that have made UPLC possible
- describe UPLC column requirements and limitations
- discusses the major advantages of UPLC
- describe and evaluate different applications that demonstrate the impact of UPLC

**Biochemistry**

The Biochemistry division does not announce topics for cumulative exams

**Inorganic Division**

October 2011 Experimental Techniques in Inorganic Chemistry
November 2011 Safety in the Chemical Laboratory and Responsible Conduct of Research

INORGANIC CUME EXAM – please see text below in red for an update to the November inorganic cume topic
Chemical Safety and RCR
November 19, 2011

This cume will cover three topics. The first involves chemical safety. The readings for this portion of the cume are chapters 5, 6, and 8 of *Prudent Practices in the Laboratory* (National Academy Press). There is an on-line and PDF version available at [http://www.nap.edu/catalog.php?record_id=12654#toc](http://www.nap.edu/catalog.php?record_id=12654#toc). These chapters include management of chemicals, working with chemicals, and management of waste. The second topic includes the recent CSB report on the accident at Texas Tech. Details may be found on the TTU website. The third area involves the recent ethics case of Bengü Sezen at Colombia University. I am leaving it to you to research the case in preparation for the cume.

**After reconsidering the amount of material present in chapters 5, 6, and 8 of *Prudent Practices*,** I will base the cume only on these three chapters. **We will save the CSB report and the scientific misconduct discussion for another time.**

**Thanks!**

December 2011  Surface Chemistry  
February 2012  The Chemistry of Graphene  
March 2012  Organometallic Chemistry  
April 2012  Seminar and/or Literature

| April 2012 Cumulative Topics |

**Current Literature in Inorganic Chemistry**

Exam questions will cover material presented in reviews and research articles involving any area of inorganic chemistry that appeared in the journals *Science* or *Nature* during the period 1 April 2011 through 31 March 2012. Copies of the relevant articles will accompany the cumulative exam, but a familiarity with the material in advance of the exam will be beneficial.

**Recent Seminars in Inorganic Chemistry**

Exam questions will cover material presented in TTU Chemistry & Biochemistry departmental seminars or TTU Inorganic Chemistry divisional seminars during the period 1 September 2011 through 31 March 2012.

**Organic Division**

The organic division does not announce topics for cumulative exams.
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