

Exam 4 Review CHEM 212

Mass Spectrometry

Describe the function of an ICP-MS

The general pieces of a mass spectrometer and how they work together

Relative aggressiveness of ionization methods and when each would be best

Diagram, label, and briefly describe these instrument pieces: ICP-MS, electron ionization, chemical ionization, electrospray ionization, MALDI, magnetic sector, quadrupole, time of flight (TOF), electron multiplier, channeltron

Terms to know: isobaric interference, base peak, parent peak, molecular ion, protonated molecule, reagent gas (and examples), partitioning coefficient, distribution coefficient, mobile phase, stationary phase, eluent, eluate, elution

Separations

Be able to perform solvent extraction calculations given the appropriate equations

Describe the different types of chromatography (eg. Affinity, partitioning, etc)

Know relationships between bandwidth and column length, retention time, plate height, etc.

Be able to define diffusion and describe the importance to chromatography

Explain phenomena that broaden peaks, be able to calculate standard deviation of peak width.

Be able to calculate the concentration of an unknown based on an internal standard

Diagram, label, and briefly describe these instrument pieces: GC-MS, HPLC

Be sure that you can suggest appropriate sample prep, stationary phase, mobile phase, and detectors for each instrument

Terms to know: partitioning coefficient, distribution coefficient, mobile phase, stationary phase, eluent, eluate, elution, retention time, adjusted retention time, volume flow rate, linear flow rate, relative retention, retention factor, FWHM, Resolution, diffusion, band width, theoretical plate, plate height, finite equilibration time, multiple flow paths, fronting, tailing, carrier gas, septum, solid phase microextraction, thermal conductivity detector, flame ionization detector, electron capture detector, isocratic elution, gradient elution, evaporative light scattering detector, normal phase chromatography, reverse phase chromatography.

Things that **will** be on the exam:

- Diagram, label, and describe mass spectrometry and separation instruments
- Conceptual questions and calculations related to separations

Things to do to study:

- Review worksheets, videos, and homework problems, Work old exams
- Practice doing label, diagram, and describe type problems

Things you can use on the exam:

- Non programmable calculator
- **Equation sheet? You tell me what you need. Table 22-2 will be provided**