Analytical Cumulative Exam
1 December 2016

Please answer all questions and use complete sentences unless a drawing or equation is requested.

1. What is meant by the idea of unified chromatography? (10 pts.)

2. What is the more efficient chromatographic separation, GC or LC? Why? Discuss the importance of efficiency when deciding between using a GC or LC method. (10 pts.)

3. In academic settings chromatography (and electrophoresis) is typically discontinuous or zonal. In industry, continuous methods are much more common. What is the difference between discontinuous and continuous methods? Why would continuous methods be useful in industrial settings? (10 pts.)

4. The ideal detector for separation methods would be universal. A UV-Vis detector is considered a near universal detector for LC. Why is it not fully universal? What are the disadvantages of UV-Vis detection? (10 pts.)

5. What does the van Deemter equation describe and how is this equation related to separating components of an analyte? (10 pts.)

6. What is electroosmotic flow and how is this phenomena realized? Explain how it impacts a CZE separation. (10 pts.)

7. How is capillary isotachophoresis performed and what is the most common result of performing cITP? (10 pts.)

8. Explain how the ionic strength of the run buffer can impact analyte migration in CZE. Note any relevant equations and describe any effects at the particle level. (10 pts.)

9. Describe how a separation is performed by size exclusion chromatography. What limits the range of molecules that can be separated and how can it be improved? (10 pts.)

10. Describe two relatively new format of stationary phase that are not just micron diameter, porous spheres. (10 pts.)