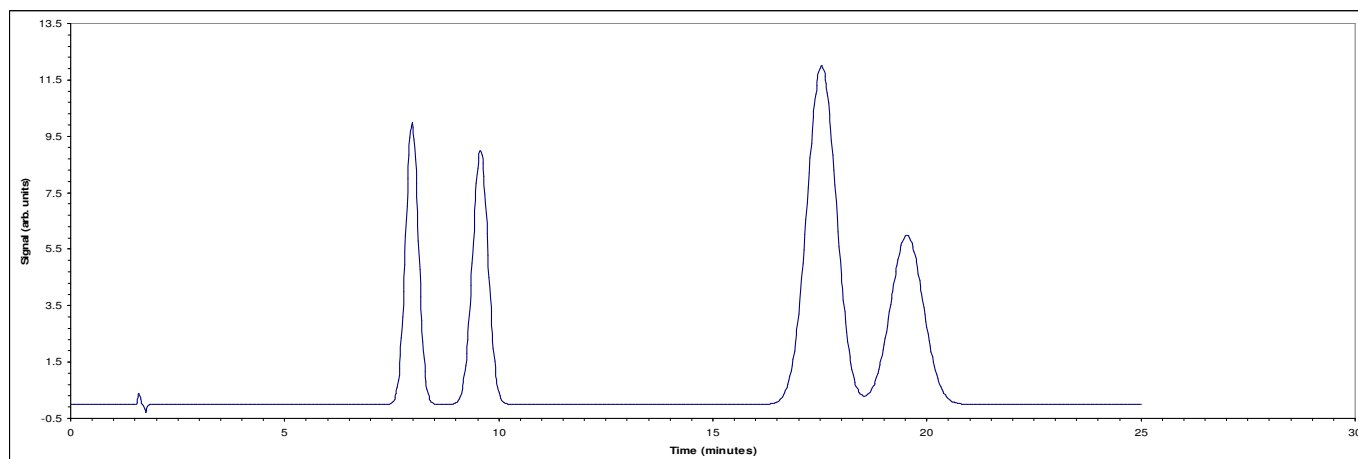


CHEMISTRY 312 ASSIGNMENT Part 1 **DUE DEC 1 @ beginning of class (no late hand-ins)**

I will correct/grade 2 of your answers – selected at random

- 1) We want to collect purified analyte. What volume do we need to collect for an analyte if the flow rate is 1 ml/min., the number of theoretical plates for the analyte is 5000 and the dead time is 2 minutes. Do the calculation using for analytes with  $k' = 2$  and 10.
- 2) For the following chromatogram calculate
  - i- plate numbers for each peak
  - ii- selectivity factors
  - iii- if the column is 25 cm long what is the average plate height
  - iv- if the MP is 40/60 H<sub>2</sub>O/ACN what would the  $t_r$ 's be in a 20/80 H<sub>2</sub>O/ACN mix? Is this an



appropriate MP mixture (one sentence answer, not War and Peace)?

- 3) In gas chromatography many factors are interdependent, which chromatographically important factors (*e.g.*  $\alpha$ ,  $k'$  **N and others**) will change significantly by varying the:
  - MP flow rate
  - Thickness of stationary phase
  - Temperature

Give a one-two sentence explanation for each factor. (hint: take a look at the equation sheet to come up with a comprehensive list of factors, I found 7)

- 4) An HPLC experiment was performed with a column that has 10000 theoretical plates. The unretained marker eluted at 2.15 minutes, compound A eluted at 5.67 minutes and compound B eluted at 5.93 minutes respectively. The mobile phase was 80% acetonitrile / 20% water. What is the resolution of compounds A & B? Calculate the resolution if the mobile phase was changed to 40% acetonitrile / 60% water (assume same flow rate)? Are the peaks separated?