

Experiments are to be done *individually*. Data for Part B will be *shared* between students in the class.

• **Pre-lab:**

Read: Experiment 4 Parts A, B and D (pp. 32 – 37, 38 – 40), Technique 12 (pp. 669 – 688)

Prepare for class on Tuesday, January 29: “Purpose,” and “Materials and methods”.

In addition, within the “Materials and methods” section, perform the “Pre-lab Calculation” on page 34.

Also, make a prediction for Part D: for the acid/base extraction, will K be greater than, equal to, or less than one? Justify your answer with a semi-quantitative derivation and some common sense.

Reserve the next few pages for “Procedure” and “Data” and “Results”.

Data section: Prior to lab, lay out some data tables to fill in during lab. For instance, for Part A, the data table may be as simple as:

Data table for Part A	
Mass of caffeine before extraction (g)	
Mass of caffeine after extraction (g)	
Mass of caffeine theoretically recoverable from extraction (g)	
Percent recovery	

Similar tables should be made for Parts B and D (D is trickier – what quantities, like melting point, do you actually have to measure?).

• **During lab**

If your melting point range is greater than 2°C for any product, take an NMR (use CDCl_3 as a solvent) of your “purified” product and determine what the impurity or impurities are.

Perform the **calculation** of the partition (distribution) coefficient for the solid you used in Part B in the “Calculations” section (part 5).

In the “Results” section (part 6), make a table and copy into it the **Part B results for the whole class** (the coefficients for all three solids), as well as the initials of the experimenter for each data point.

• **Post-lab**

Write a **conclusion** that summarizes:

- Part A – how effective your recovery was of the caffeine (give percent recovery).
- Part B – calculate the mean and standard deviation of the partition coefficient K for each compound. Compare the mean K for each compound to the literature value given in class, and give a percent error. Comment on whether the class was close to the literature values and give a reason why this might have been so.
- Part D – What is your unknown? Calculate K for your unknown. How does your actual K compare to the prediction you made in the pre-lab? Comment.

• **Lab Result Report: (Due Tuesday, February 5 at the beginning of lab)**

Photocopy the lab, all parts.

The following should be included in your “Conclusions” section.

Part A: Do point 2 (p. 41), especially the comment on the similarity or difference.

Part B: Do point 2 (p. 41), especially the “explain”.

Part D: Do points 1, 3 and 4 (p. 41).

Answer questions

End of Technique 12 (pp. 692, 693): 1, 8

[For #8, the question is asking you to explain exactly what you would do when performing the lab instructions given in (a) and (b). A drawing or two might illustrate your point nicely]

Abstract:

- attach this to the **front** of your report
- must be **word-processed** on a **separate sheet of paper**

Your name, North Seattle Community College
PURIFICATION OF _____ BY EXTRACTION

Using the format like in the previous abstract, write a 75 to 100 word abstract summarizing what happened to you in part D, the extraction of a neutral compound. Use the setup of the previous abstract to guide you in writing this abstract: the first sentence explains what was done and how – it also should state the name of the neutral compound.

The second sentence gives numerical results on percent recovery. The third sentence, which is different than before, explains whether the methods employed were effective in purifying the original sample; for this you should cite melting point data and the phrase “which was used to determine the compound’s identity”.