

Name: _____

Fall 1999
Chemistry 30475 – Organic Chemistry Laboratory
Quiz #1 – 25 points

Your exam should have a total of three pages.

- 1) [5 pts] The following questions relate to crystallization techniques.
- a) Which of the following would be the best single solvent for the crystallization of an impure sample?

	Solubility (cold)	Solubility (hot)
Solvent A	Very low	Low
Solvent B	Low	High
Solvent C	High	Very high

- b) Given the solubility information above, which combination of solvents should be used for a mixed solvent crystallization (assume all of these solvents are miscible). Briefly describe this technique.
- c) Rather than attempting filtration to remove the liquid from a collection of crystals, a student decides to let the solvent evaporate off. Is this a problem? Explain.
- d) A student attempts to crystallize a sample from methanol. All of the sample dissolves in hot solution, but no crystals (or any precipitate) were obtained after cooling. What could the student try to get crystals?
- e) A student weighs the product obtained from crystallization of an impure sample using methanol/water as the crystallization solvent. This student finds that the crystals weigh more than the impure sample (>100% recovery). Assuming no errors were made in weighing the samples, what is the most probable source of error?
- 2) [2 pts] What is the difference between sublimation and melting ?

- 3) [2 pts] The melting point of pure urea is 132.5-133.0° C. Predict the effect of each of the following changes on the melting point of this sample.
- (i) Mixing the urea with a small amount of cinnamic acid (m.p. = 132.5-133.0° C).
(a) m.p. increases (b) m.p. decreases (c) m.p. remains the same
- (ii) Mixing the urea with a small amount of salicylic acid (m.p. = 158.5-159.0° C).
(a) m.p. increases (b) m.p. decreases (c) m.p. remains the same
- 4) [3 pts] The temperature at the head of a fractional distillation column was measured at selected times during the distillation of a mixture of toluene (b.p. = 111° C) and hexane (b.p. = 69° C). Initially, the temperature is 25° C. After a while, the temperature rises to ~69° C, where it hdds for several minutes. Then, the temperature drops briefly to ~ 40° C before rising again to 111° C, where it remains steady. Describe what is happening and what is causing each of these temperature changes.
- 5) [4 pts] In the “Eugenol from Cloves” lab, whole cloves were placed in a round bottom flask along with water, and the mixture distilled.
- a) The product collected from this distillation is cloudy. Why?
- b) This distillate is placed in a separatory funnel, and dichloromethane added. The contents are shaken thoroughly to mix, and the dichloromethane layer collected. What is the purpose of this step?
- c) The clove obtained from this experiment is a mixture of eugenol and acetyeugenol. This mixture can be separated by TLC. In a TLC experiment, the eugenol was observed to move 5.0 cm, the acetyeugenol moved 7.5 cm, and the solvent moved 10.0 cm. Calculate the R_f values for eugenol and acetyeugenol given this data.

