Homework 13

Due: Monday 4/25/16 by 5PM…in the Box

Read: Carothers, W.H., J. Am. Chem. Soc. 1929, *51*, 2548-58

Supplemental Problems:

1. What is the fourth word in the last line of the text on page 2549 in the Carothers paper?
2. In reference 3 of the Carothers paper, there is disagreement with Staudinger….please explain.
3. Calculate the freezing point of a 0.2 molar aqueous solution of $CaCl_2$.
4. Bubba, A local resident of College Station was trying to transport some livestock into Travis County for sale. He fell asleep and ran off the road. He was unhurt, but his entire herd was killed. His pickup carried 5 chickens, 3 dogs, and his pet pig. The chickens each weighed 5 pounds, the dogs each weighed 50 pounds, and the pig weighed 1500 pounds. Bubba hired a lawyer from A&M, who successfully sued the insurance company. This lawyer negotiated a payment for Bubba of $1.00 times the number average mass of the population. The lawyer charged only $0.50 times the weight average mass of the population as his fee.

   How much does the insurance company pay? _____

   How much does the lawyer make? _____

   How much does Bubba get? _____

5. The polydispersity of a polymer sample is defined as the ratio, Mw/Mn. This value is measure of the molecular weight distribution.   I have a 100 gram sample of poly(centuracene) that was made by blending several monodisperse (Mw/Mn = 1) samples of this valuable polymer. The ceturacene monomer has a molar mass of 100 Daltons (amu). My polymer blend consists of 25 grams of polymer with DP = 20 , 25 grams of polymer with DP = 15 and 50 grams of polymer with DP = 10.   Disregarding end groups, what is the polydispersity of this blended sample?   Show your work.

6. When the bromoketone **1** is treated with potassium t-butoxide in t-butanol the reaction produces exclusively the bicyclo[3.3.0] ketone **2**.   When **1** is treated with a slight molar excess of lithium diisopropylamide in THF at -78^0C, the bicycle[5.3.0] ketone **3** is formed almost exclusively. Use the curved arrow convention to show the mechanism of the formation of each of the products and briefly explain why the different reaction conditions favor formation of the different products.