

# CH328N Homework 4

**Due:** 2/15/16 by 5PM.....in the "box"

**Read:** Section 20.3 and pages 873-883

**Do:** 20.5, 20.26 and work on the practice tests

## Supplemental Problems:

1. We have a beautiful new dye with an absorbance maximum at 520nm. Your job is to establish the extinction coefficient for this substance. So, you dissolve  $10^{-3}$  moles of the substance in 1 liter of water and measure the UV-Vis spectrum of the resulting solution in a 1.000cm path length cell. The transmission of the solution is 30% at 520nm. What is the extinction coefficient?
2. Garret has isolated an interesting toxic substance from wipes of the tables at Dirty Dave's Pizza Place. Exposure to even minute quantities of this substance causes malaise, loss of all motivation to study and an intense desire to sleep during daylight hours. There is an unsubstantiated rumor that the effects of this toxin can be reversed in part by treatment with homeopathic remedy known as Red Bull. Michael measured the mass spectrum of the toxin and reports a molecular ion at 216 amu. He ran the IR spectrum and he tells us that the compound has no absorbance above  $3000\text{cm}^{-1}$  but does have a very strong, sharp peak at  $1737\text{cm}^{-1}$  and another at  $1100\text{cm}^{-1}$ . There were no other particularly strong peaks in the spectrum. Zach ran the  $^1\text{H}$ -nmr spectrum and that is reproduced below. Garrett ran the  $^{13}\text{C}$ -nmr spectrum, which is also provided below. The peaks marked with arrows disappeared when he ran the DEPT experiment but the other peaks were unchanged. Please list all of the structural elements you can establish from these data and then draw a proposed structure of this horrible stuff. Show the peak assignments for the  $^1\text{H}$ -nmr by labeling the protons on your structure and with the letters on the  $^1\text{H}$  nmr spectrum provided below.

