Chemical Engineering 201
Fall 2000
Exam Five

Name _____

Problem # 1 _____

Problem # 2 _____

Problem # 3 _____

Problem # 4 _____

Total _____

Problem 1: (30 pts)
One thousand liters/s of air at 25^{o}C and 1 atm that is saturated with water is fed to a condenser where it is cooled to 10 ^{o}C. How much water is condensed out?

Problem 2: (25 points)
If you adiabatically mix one liter of liquid benzene at 25^{o}C with toluene that is originally at 100^{o}C, and the final temperature ends up to be 75^{o}C, how much toluene did you add (in moles)?

Problem 3: (25 points)
1000 kg of superheated steam at 200 ^{o}C and 1 bar is condensed to form saturated liquid water at 100 ^{o}C. If this stream was used to heat 8000 kg of water from 0^{o}C in a heat exchanger, what would the final temperature of the liquid water be?

Problem 4: (20 points)

a) What is the temperature that you would have to cool air at $25^{o}C$ with 20 percent relative humidity to in order to start condensing liquid out if it was done adiabatically? What is this temperature called?

b) How much air would be needed to burn 50 moles of methane if there was 50% conversion of methane and there was 200 % excess air?