Answer Sheet for CHE654 Homework Set #3

(100 Points)

Remember to submit a hard copy of your flowsheet and input summary from Aspen Plus for each problem.

21. *Using ASPEN PLUS to Perform Simple Calculations* (20 points)

Answer the following questions:

(a) (i) At P = 1.01325 bar (1 atm):

Bubble point temperature of the mixture = _____ °C

Dew point temperature of the mixture = _____ °C

(ii) At T = 100 °C:

Bubble point pressure of the mixture = _____ bar

Dew point pressure of the mixture = _____ bar

(iii) Temperature at which the flash will produce a vapor stream containing

exactly 50 mol% acetone = _____ °C

(b) Composition (mass fractions) of the benzene-toluene feed = _____

22. *Simulation of a Cyclohexane Production Process* (20 points)

Answer the following questions:

1. Pressure of the column condenser = _____ psia

2. Purge fraction = _____

3. Temperature of the flash vessel = _____ °F

4. Purity of cyclohexane (mole%) in the product stream = _____ %

24. *Simulating an Acetone Production Process* (30 points)

Answer the following questions:

1. ΔP across the reactor = _____ psia

2. % conversion of the reaction based on IPA = _____ %

3. Temperature of the condenser in Column-1 = _____ °F

4. Product purity (mole%) of acetone in liquid distillate of Column-1 = _____%

26. *Solving a Highly Constrained Toluene Production Problem with A+* (30 points)

Answer the following questions:

1. Total flow rate of Stream FEED = _____ lbmol/hr

2. Flow rate of cooling water = _____ lbmol/hr

3. Reactor length = _____ feet

4. Vapor fraction in Stream LITE-GAS = _____

5. Purity of toluene in the product stream TOLUENE = _____ mole%