CHE 305 – Separation Processes Spring 2010 – In Class Exercise on Single Stages 2

Use the attached XY phase diagram for a system of ethanol and water to answer the following questions. The feed flow rate to the single stage flash is 100 moles/hr, and 15 mole % of the feed is ethanol.

- 1. Draw a q-line for operation at 30% vaporization.
- 2. What are the outlet vapor and liquid mole fractions of ethanol?

3. Using your answer from part 2, what would be the feed composition at 50% vaporization?

4. What would be the percent vaporization for an equimolar feed and an outlet liquid composition of 30 mole % ethanol?

Q-Line:
$$y_i = \left(\frac{\Psi - 1}{\Psi}\right) x_i + \left(\frac{1}{\Psi}\right) z_i$$