

## CH 3030 Tutorial 6

1. Consider a distillation column for separating of ethanol from water at 1 atm. The feed is a 10 mol% ethanol bubble-point liquid, the bottoms contains 1 mol% ethanol, and the distillate is 80 mol% ethanol.  $R=R_{min} \times 1.5$ . Constant molar overflow applies.

(a) How many theoretical plates are required above and below the feed if a plate column is used?

(b) How many transfer units are required above and below the feed if a packed column is used?

(c) Assuming the plate efficiency is 80% and the plate spacing is 18 inches, what is the height of the plated section of the column?

(d) Using an  $H_{OG}$  value of 1.2 ft, what is the packed height of the column?

Phase-equilibrium data is as below

x	y
0	0
0.019	0.17
0.0721	0.3891
0.0966	0.4375
0.1238	0.4704
0.1661	0.5089
0.2337	0.5445
0.2608	0.558
0.3273	0.5826
0.3965	0.6122
0.5079	0.6564
0.5198	0.6599
0.5732	0.6841
0.6763	0.7385
0.7472	0.7815
0.8943	0.8943