HW 7 – Column Design

1. A distillation column with a total condenser is separating acetone from ethanol. A distillate concentration of xD=90 %mol acetone is desired. Assume CMO. if L/V=0.8, find the composition of the liquid leaving the fifth stage of the column.

2. A distillation column separating acetone from ethanol has a partial reboiler (therefore, acting as a equilibrium stage). If the bottoms composition is xB=13 mol% acetone and the boilup ratio $\overline{V}/B = 1.0$, find the vapor composition leaving the second stage above the partial reboiler.

3. The distillation column in questions (1) and (2) is separating acetone from ethanol. If the feed composition is z=30 %mol acetone, find the optimum feed plate location, total number of stages, and required q value. Use the data from (1) and (2) as required.

Equilibrium data from Perry et al, 1963, p.13-4.

xA	yA
0.10	0.262
0.15	0.348
0.20	0.417
0.25	0.478
0.30	0.524
0.35	0.566
0.40	0.605
0.50	0.674
0.60	0.739
0.70	0.802
0.80	0.865
0.90	0.929