

Answer Sheet for CHE654 Homework Set #1 (100 Points)

1. Mass Balances and Constraints with Elementary Modules, I (20 points)

(a) Draw the flowsheet in terms of elementary modules

(b) Is the problem constrained? Circle: Yes or No

How many standard inputs are missing? ____

How many constraints are present? ____

List the missing standard input:

(c) Selectivity of Reaction 1: $A + B \rightarrow C =$ _____

Fractional conversion of reaction 3: $2C \rightarrow D + F =$ _____

Pure component E feed flow rate into absorber = _____ lbmol/hr

Mole-recovery of light key in column overhead = _____

Total molar flow rate of streams:

S4: _____ lbmol/hr; S7: _____ lbmol/hr; S8: _____ lbmol/hr

2. Mass Balances and Constraints with Elementary Modules, II (20 points)

(a) Draw the flowsheet in terms of elementary modules

(b) Is the problem constrained? Circle: Yes or No

How many standard inputs are missing? ____

How many constraints are present? ____

List the missing standard input:

(c) Answer the following questions:

Fractional conversion of Reaction 1 = _____

Fractional conversion of Reaction 2 = _____

Flow rate of Component D in the bottom of Flash Vessel = _____ lbmol/hr

Flow rate of Component C in the overhead of Flash Vessel = _____ lbmol/hr

5. Mass Balances and Constraints with Elementary Modules, V (20 points)

(a) There are ____ standard inputs that are missing from the problem.

There are ____ constraints in the problem.

The problem is: under-specified fully specified over-specified

(b) Fill in the following table:

Streams	Component Flow Rates (lbmol/hr)			Total Flow
	A	B	C	
S1		0	0	
S2				
S3				
S4				
S5				
S6				150.00

9. Determination of Tear Streams and Computation Order, II (15 points)

The minimum number of tear streams = _____

The tear stream locations are: _____

A complete computational sequence: _____

11. Finding Tear Streams and Computational Sequence Using A+ (15 points)

(a) Output from A+ Control Panel showing tear streams and computational sequence

(b) Write down 3 exclusive tear sets from Forder-Hutchison's loop analysis

14. Determination of Tear Streams and Computation Order, VI (10 points)

The minimum number of tear streams = _____

The tear stream locations are: _____

A complete computational sequence: _____
