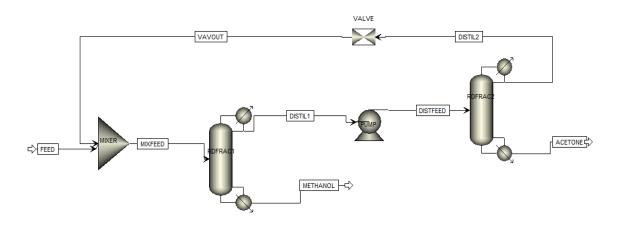
# Assignment- 04

# Roll no- 234107206

## 1

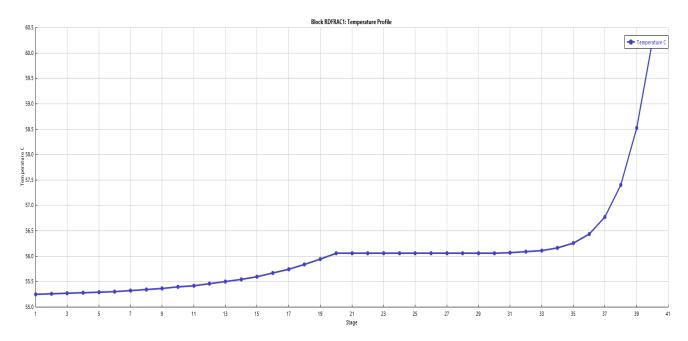
### Flowsheet



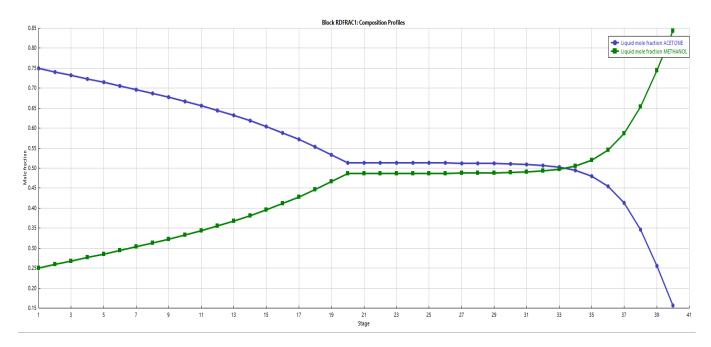
### **Stream Result**

		Units								
4		Units	DISTIL1 -	DISTIL2 ▼	FEED ▼	ACETONE ▼	METHANOL ▼	VAVOUT ▼	MIXFEED *	MIXFEED ▼
Þ	Molar Solid Fraction		0	0	0	0	0	0	0	0
Þ	Mass Vapor Fraction		0	0	0	0	0	0.352653	0.0625107	0.0625107
ŀ	Mass Liquid Fraction		1	1	1	1	1	0.647347	0.937489	0.937489
Þ	Mass Solid Fraction		0	0	0	0	0	0	0	0
•	Molar Enthalpy	cal/mol	-57515	-54307.3	-57283.8	-54767.8	-56341.6	-54307.3	-56539.7	-56539.7
Þ	Mass Enthalpy	cal/gm	-1115.71	-1246.36	-1271.25	-943.012	-1560.17	-1246.36	-1265.18	-1265.18
ŀ	Molar Entropy	cal/mol-K	-66.1689	-54.3035	-62.6332	-62.983	-56.539	-53.0311	-60.2411	-60.2411
Þ	Mass Entropy	cal/gm-K	-1.28358	-1.24628	-1.38996	-1.08446	-1.56563	-1.21707	-1.34801	-1.34801
ŀ	Molar Density	mol/cc	0.0146457	0.0147499	0.0170318	0.0107727	0.020778	0.000108897	0.000600298	0.000600298
-	Mass Density	gm/cc	0.754989	0.64269	0.767471	0.62565	0.750347	0.00474496	0.0268268	0.0268268
Þ	Enthalpy Flow	cal/sec	-6.39056e+06	-2.71537e+06	-8.59257e+06	-3.34692e+06	-5.00814e+06	-2.71537e+06	-1.13079e+07	-1.13079e+07
>	Average MW		51.5503	43.5726	45.0611	58.0775	36.1125	43.5729	44.6891	44.6891
-	<b>◆</b> Mole Flows	kmol/hr	400	180	540	220	320	180	720	720
Þ	- Mole Fractions									
ŀ	ACETONE		0.749222	0.442833	0.5	0.999903	0.156324	0.442846	0.485711	0.485711
ŀ	METHANOL		0.250778	0.557167	0.5	9.66543e-05	0.843676	0.557154	0.514289	0.514289
Þ	+ Mass Flows	kg/hr	20620.1	7843.07	24333	12777.1	11556	7843.13	32176.1	32176.1
Þ	<b>◆</b> Mass Fractions									
Þ	Volume Flow	l/min	455.197	203.392	528.424	340.368	256.681	27548.9	19990.1	19990.1
Þ	+ Vapor Phase									

## Graphs for RDFRAC1

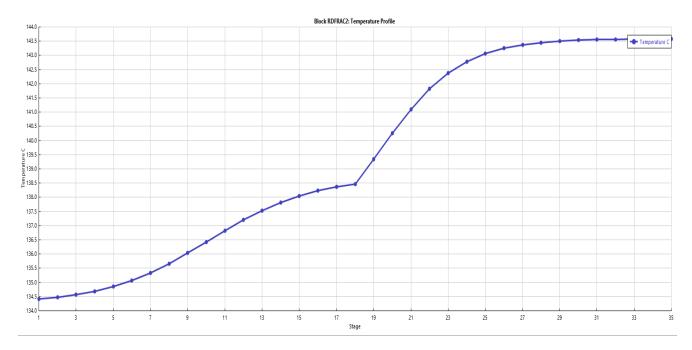


Temperature Profile

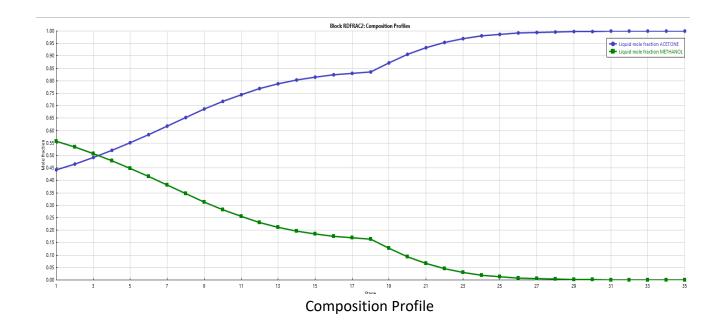


**Composition Profile** 

## Graph for RDFRAC2



Temperature Profile



# Optimum Stages for RDFRAC 1

	mmary	V-I	IIia.							
		Value	Units							
۲	Number of Trayed/Packed stages	38								
	Total height		meter							
	Total head loss (Hot liquid height)		meter							
	Total pressure drop		bar							
	Number of sections	1								
	Number of diameters	1								
	Pressure drop across sump		bar							
Sec	ctions									
Sec	Start End Dia	ameter	Section Height	Internals	Tray Type or	Section Press	sure Drop	% Approach	Limiting	
Sec		ımeter	Section Height	Internals Type	Tray Type or Packing Type	Section Pres	sure Drop	% Approach to Flood	Limiting Stage	

# Optimum Stages for RDFRAC 2

					Value	Un	its							
١	Number of Ti	ayed	/Packed	stages	3	3								
	Total height					meter								
	Total head lo	ss (H	ot liquid	height)		meter								
	Total pressure	dro	р			bar								
	Number of sections				1									
	Number of d	iame	ters			1								
	Pressure drop	acro	oss sump	)		bar								
Sec	ctions													
		tart age	End Stage	Dian	neter	Section	Height	Internals Type	Tray Type or Packing Type	Section Press	ure Drop	% Approach to Flood	Limiting Stage	
	CS-1	3	33	2.01061	meter	18.8976	meter	TRAY	SIEVE	0.195325	har	80.0008	33	

### **ASSUMPTION:-**

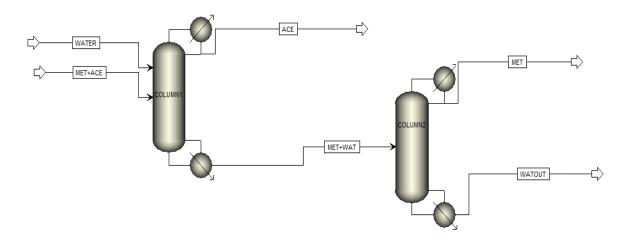
Feed Flow Rate = 540 Kmol/Hr

RDFRAC 1 :- Reflux Ratio = 2.8 ; Distillate Rate = 400 Kmol/Hr

RDFRAC 2 :- Reflux Ratio = 4.2 ; Distillate Rate = 80 Kmol/Hr

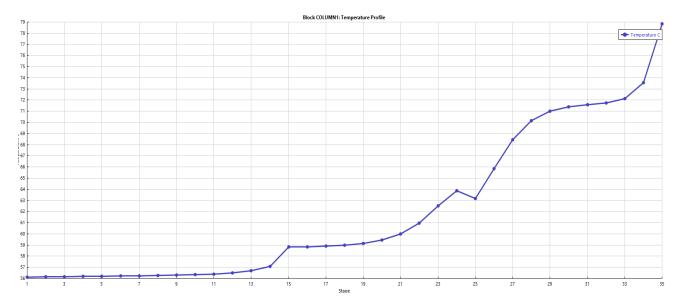
# **Extraction-Water**

### Flowsheet

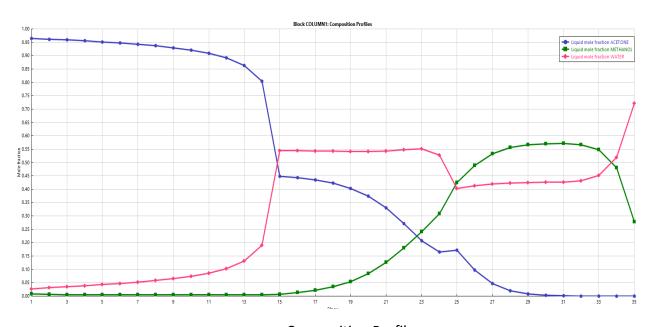


### Stream Result

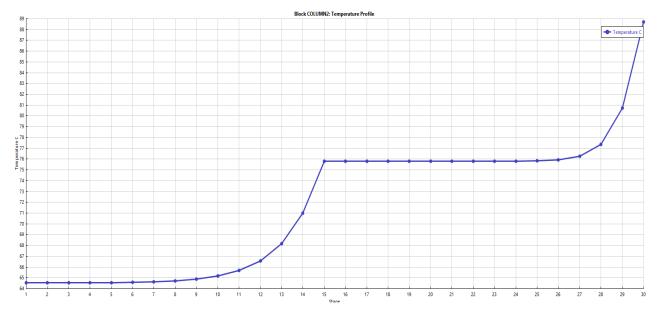
			1				
4		Units	MET+ACE -	WATER →	ACE →	MET+WAT ▼	-
Þ	Pressure	bar	1.01325	1.01325	1.01325	1.01325	
Þ	Molar Vapor Fraction		0	0	0	0	
Þ	Molar Liquid Fraction		1	1	1	1	
⊳	Molar Solid Fraction		0	0	0	0	
Þ	Mass Vapor Fraction		0	0	0	0	
þ.	Mass Liquid Fraction		1	1	1	1	
ŀ	Mass Solid Fraction		0	0	0	0	
▶	Molar Enthalpy	cal/mol	-57279	-67870.7	-58356.5	-64147.8	
Þ	Mass Enthalpy	cal/gm	-1271.14	-3767.4	-1028.11	-2925.42	
Þ	Molar Entropy	cal/mol-K	-62.6187	-37.7034	-70.1874	-40.2956	
ŀ	Mass Entropy	cal/gm-K	-1.38964	-2.09286	-1.23654	-1.83765	
▶	Molar Density	mol/cc	0.0170318	0.0539888	0.0132525	0.0381123	
Þ	Mass Density	gm/cc	0.767471	0.972623	0.752221	0.835718	
Þ	Enthalpy Flow	cal/sec	-8.59186e+06	-1.31971e+07	-4.53884e+06	-1.71061e+07	
Þ	Average MW		45.0611	18.0153	56.7609	21.9278	
ŀ	+ Mole Flows	kmol/hr	540	700	280	960	
Þ	<ul> <li>Mole Fractions</li> </ul>						
▶	ACETONE		0.5	0	0.964238	1.39972e-05	
Þ	METHANOL		0.5	0	0.00810202	0.278887	
Þ	WATER		0	1	0.0276603	0.721099	
Þ	DMSO		0	0	0	0	
Þ	+ Mass Flows	kg/hr	24333	12610.7	15893	21050.6	
Þ	+ Mass Fractions						



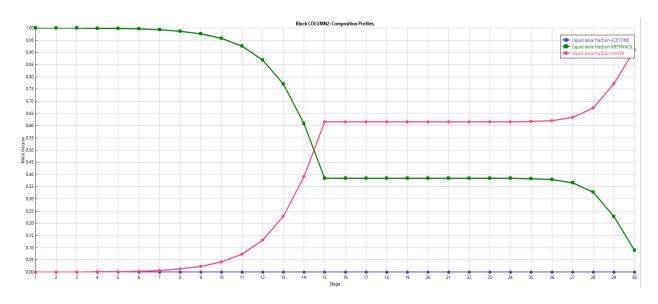
Temperature Profile



**Composition Profile** 



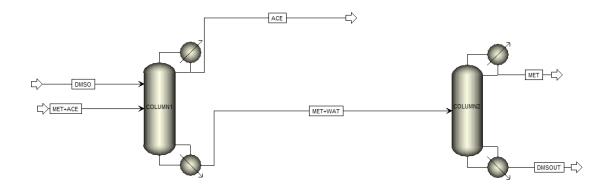
Temperature Profile



Composition Profile

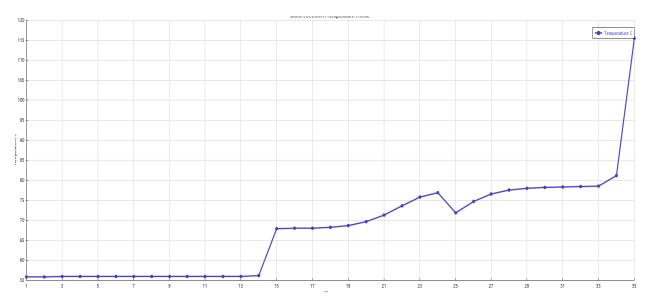
# Extraction-DMSO

### Flowsheet

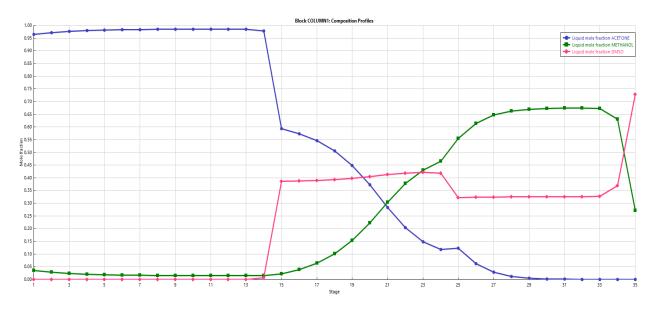


### Stream Result

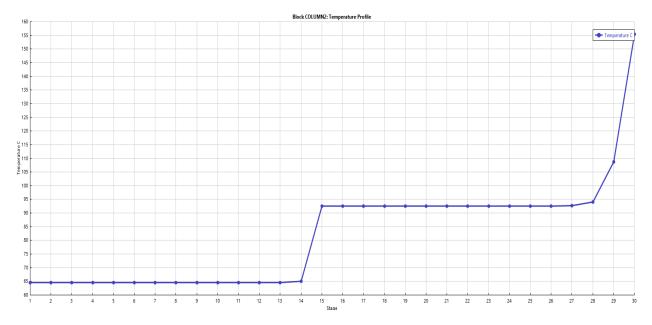
4		Units	ACE -	DMSO →	DMSOUT →	MET →	MET+ACE ▼	MET+WAT ▼	
Þ	Molar Solid Fraction		0	0	0	0	0	0	
Þ	Mass Vapor Fraction		0	0	0	0	0	0	
<b>▶</b>	Mass Liquid Fraction		1	1	1	1	1	1	
<b>&gt;</b>	Mass Solid Fraction		0	0	0	0	0	0	
<b>&gt;</b>	Molar Enthalpy	cal/mol	-57952.9	-47772.7	-44667.6	-55990.4	-57279	-48003.8	
<b>&gt;</b>	Mass Enthalpy	cal/gm	-1014.06	-611.412	-599.597	-1747.33	-1271.14	-731.187	
<b>&gt;</b>	Molar Entropy	cal/mol-K	-70.3995	-80.8706	-68.1679	-54.5391	-62.6187	-66.6901	
<b>•</b>	Mass Entropy	cal/gm-K	-1.23185	-1.03501	-0.915053	-1.70203	-1.38964	-1.01582	
<b>&gt;</b>	Molar Density	mol/cc	0.0131518	0.0137252	0.012773	0.0232189	0.0170318	0.0145182	
<b>&gt;</b>	Mass Density	gm/cc	0.751613	1.07242	0.951542	0.744016	0.767471	0.953148	
-	Enthalpy Flow	cal/sec	-4.50745e+06	-9.28914e+06	-9.42983e+06	-3.11058e+06	-8.59186e+06	-1.2801e+07	
<b>-</b>	Average MW		57.1491	78.135	74.4961	32.0435	45.0611	65.6518	
	+ Mole Flows	kmol/hr	280	700	760	200	540	960	
-	<ul> <li>Mole Fractions</li> </ul>								
<b>&gt;</b>	ACETONE		0.964248	0	2,31183e-13	5.22282e-05	0.5	1.08809e-05	
-	METHANOL		0.0357516	0	0.0789474	0.999948	0.5	0.270822	
<b>&gt;</b>	WATER		0	0	0	0	0	0	
<b>&gt;</b>	DMSO		1.04268e-27	1	0.921053	3.9769e-34	0	0.729167	
<b>&gt;</b>	+ Mass Flows	kg/hr	16001.8	54694.5	56617.1	6408.7	24333	63025.8	
<b>&gt;</b>	+ Mass Fractions								
Þ	Volume Flow	l/min	354.831	850.018	991.672	143.561	528.424	1102.06	



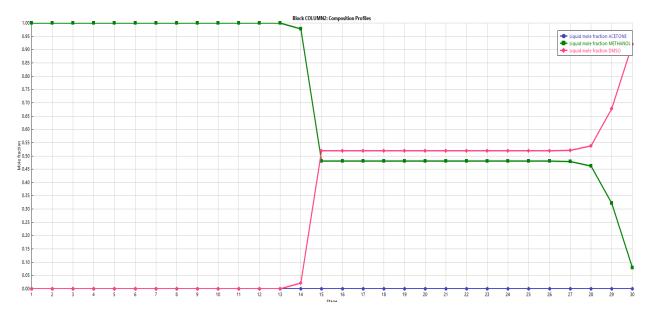
Temperature Profile



Composition Profile



Temperature profile



Composition Profile