Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) - EXAMINATION – SUMMER 2017

Subject Code: 2160507 **Date: 05/05/2017**

Subject Name: Advance Separation Techniques

Time: 10:30 AM to 01:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1		**Short Questions**	**14**
	1	List commonly used super critical solvents.	
	2	Name the packing elements used for catalytic distillation.	
	3	What is the use of roller wiper system in a SPDU?	
	4	Which process is used for manufacture of MTBE?	
	5	Which process is used for decaffenation of coffee?	
	6	What is disadvantage of H_2O as supercritical fluid?	
	7	Which process is used for separation of heat sensitive products?	
	8	Which are the processes used for separation of air?	
	9	List the membrane modules.	
	10	Name some commonly used membrane material.	
	11	What is driving force for RO process?	
	12	What is MWCO? What is its unit?	
	13	Give examples of concentration driven membrane process.	
	14	Name the membrane process used for dehydration of alcohol.	
Q.2	**(a)**	What are the advantages of reactive distillation?	**03**
	(b)	What are the essential properties of a good supercritical solvent?	**04**
	(c)	Explain ROSE process for deasphalting with a neat sketch.	**07**
		OR	
	(c)	Explain the process of purification of gases by pressure swing adsorption.	**07**
Q.3	**(a)**	Compare short path distillation with molecular distillation.	**03**
	(b)	List the advantages & disadvantages of PSA over cryogenic distillation.	**04**
	(c)	Describe the manufacturing process of ETBE by reactive distillation with a neat process flow sheet.	**07**
		OR	
Q.3	**(a)**	Classify the membrane process based on driving force.	**03**
	(b)	List the major applications of short path distillation process.	**04**
	(c)	Explain the concept of pressure swing distillation. Compare PSD with azeotropic distillation.	**07**
Q.4	**(a)**	Draw a neat sketch of a cross-flow membrane process.	**03**
	(b)	Write short note on nanofiltration.	**04**
	(c)	Explain in detail melt crystallization process with a neat sketch of equipment.	**07**

OR

Q.4	**(a)**	Write short note on membrane distillation.	**03**
	(b)	List the commercial application of melt crystallization process.	**04**
	(c)	Explain the concept and working of a membrane reactor.	**07**
Q.5	**(a)**	Describe in brief a spiral wound membrane module.	**03**
	(b)	What is membrane fouling and how it can be mitigated?	**04**
	(c)	Explain the basic principle of pervaporation and its commercial applications.	**07**

OR

Q.5	**(a)**	What is concentration polarization?	**03**
	(b)	Describe a thin film composite membrane with diagram.	**04**
	(c)	Explain reverse osmosis process and its application in desalination.	**07**

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