

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VI (NEW) EXAMINATION – SUMMER 2023****Subject Code:3160507****Date:14-07-2023****Subject Name:Advanced Separation Processes****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.
4. Simple and non-programmable scientific calculators are allowed.

		<b>MARKS</b>
<b>Q.1</b>	(a) What are the essential properties of a good supercritical solvent?	<b>03</b>
	(b) Discuss why CO <sub>2</sub> is used as the most preferred supercritical fluid solvent.	<b>04</b>
	(c) With the help of a detailed flow diagram explain the ROSE process for deasphalting.	<b>07</b>
<b>Q.2</b>	(a) Write operating parameters of Ultrafiltration and Microfiltration membranes.	<b>03</b>
	(b) List out four applications of membrane gas separation.	<b>04</b>
	(c) Discuss the drawbacks of the conventional separation processes and need for advanced separation processes.	<b>07</b>
	<b>OR</b>	
	(c) Explain the Separation factor, equilibrium, and rate governed separation.	<b>07</b>
<b>Q.3</b>	(a) Discuss various membrane materials.	<b>03</b>
	(b) List out different working membrane modules.	<b>04</b>
	(c) Discuss the working principle of Reverse osmosis and Dialysis with its industrial applications.	<b>07</b>
	<b>OR</b>	
<b>Q.3</b>	(a) Discuss the principle of pervaporation.	<b>03</b>
	(b) Discuss Gas separation membranes.	<b>04</b>
	(c) Explain the Concept & working of the Membrane Reactor.	<b>07</b>
<b>Q.4</b>	(a) Compare short-path distillation with molecular distillation.	<b>03</b>
	(b) List the advantages and disadvantages of reactive catalytic distillation.	<b>04</b>
	(c) Describe the manufacturing of ETBE by reactive distillation process and compare it with the conventional process.	<b>07</b>
	<b>OR</b>	
<b>Q.4</b>	(a) Explain the concept of Reactive and Catalytic Distillation.	<b>03</b>
	(b) Discuss with a neat sketch: BALE and KATMAX packing for reactive and catalytic distillation.	<b>04</b>
	(c) Draw a neat sketch of the Short Path Distillation Unit (SPDU) and discuss the concept and working of SPDU.	<b>07</b>
<b>Q.5</b>	(a) Write the principle of the electrophoresis process.	<b>03</b>
	(b) List out the uses of Electrophoresis.	<b>04</b>
	(c) Explain thin layer and paper chromatography.	<b>07</b>
	<b>OR</b>	
<b>Q.5</b>	(a) With a neat diagram explain the principle of electrophoresis separation.	<b>03</b>
	(b) Explain Liquid chromatography.	<b>04</b>
	(c) List the advantages and disadvantages of chromatographic separation.	<b>07</b>

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