Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VI EXAMINATION – WINTER 2025

Subject Code:3160412 Date:17-11-2025

Subject Name:Chemical Engineering Fundamentals III

Time:02:30 PM TO 05:00 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.**

			Marks
Q.1	**(a)**	Define Time Constant in process control.	**03**
	(b)	Explain terms in Freundlich adsorption isotherm equation.	**04**
	(c)	Explain Dry Bulb Temperature, Wet Bulb Temperature and Dew Point.	**07**
Q.2	**(a)**	Define Nucleation in crystallization.	**03**
	(b)	Discuss batch drying process.	**04**
	(c)	Explain McCabe and Thiele method to determine number of stages in continuous rectification.	**07**
		OR	
Q.2	**(c)**	Explain differential distillation with neat figure and material balance.	**07**
Q.3	**(a)**	What is the driving force for membrane separation?	**03**
	(b)	Explain the ‘q’-line in distillation.	**04**
	(c)	Discuss industrial applications of Adsorption.	**07**
		OR	
Q.3	**(a)**	Define a membrane?	**03**
	(b)	Explain the relative volatility.	**04**
	(c)	Write a short note on: i) Adsorption hysteresis ii) Adsorption from concentrated liquid solutions	**07**
Q.4	**(a)**	Explain Accuracy of an instrument.	**03**
	(b)	Explain in brief the mechanism of Reverse Osmosis.	**04**
	(c)	Explain Construction and working of Bimetallic Thermometer with neat sketch.	**07**
		OR	
Q.4	**(a)**	Explain Sensitivity of an instrument.	**03**
	(b)	Explain in brief the mechanism of ultrafiltration.	**04**
	(c)	Explain construction and working of manometers.	**07**

Q.5	**(a)**	Explain rate of drying.	**03**
	(b)	Derive Laplace Transform of Step function of magnitude M.	**04**
	(c)	Derive the transfer function of a mercury thermometer.	**07**

OR

Q.5	**(a)**	Explain equilibrium relationship in drying.	**03**
	(b)	Derive Laplace Transform of a ramp function.	**04**
	(c)	A mercury thermometer with time constant 7 sec, showing a steady state temperature of 30°C is suddenly immersed in heated oil bath at 150°C. Find i) Time required for temperature reading of 100°C. ii) Time required for the 80% response.	**07**

****