Seat No./Enrollment No.: _____

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 6 – EXAMINATION – SUMMER 2026

Subject Code: 3160412 **Date: 22/05/2026**

Subject Name: Chemical Engineering Fundamentals III

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.**

Q.1	**(a)**	Define absolute humidity.	**03**
	(b)	Explain time constant with respect to a first order system.	**04**
	(c)	Derive Rayleigh Equation for binary mixture. How it is useful experimentally.	**07**
Q.2	**(a)**	Define chemisorption.	**03**
	(b)	Explain relative humidity and percent saturation.	**04**
	(c)	Compare the reverse osmosis and pervaporation.	**07**
		OR	
Q.2	**(c)**	Explain with examples, classification of membrane separation process	**07**
Q.3	**(a)**	Explain process of crystallization.	**03**
	(b)	Explain relative volatility.	**04**
	(c)	Explain construction and working of steady state-moving bed and unsteady state-fixed bed adsorbers.	**07**
		OR	
Q.3	**(a)**	Explain crystal growth and nucleation.	**03**
	(b)	Explain the selection of feed stage in distillation column.	**04**
	(c)	Explain construction ad working of fluidized bed adsorber.	**07**
Q.4	**(a)**	Explain supersaturation in crystallization.	**03**
	(b)	Explain freeze drying.	**04**
	(c)	Discuss the principle, construction and working of thermocouple.	**07**
		OR	
Q.4	**(a)**	Explain the process of caking of crystals in crystallization.	**03**
	(b)	Explain classification of dryers.	**04**
	(c)	Explain the principle, construction and working of bourdon pressure gauge.	**07**
Q.5	**(a)**	Explain drift in measuring instruments.	**03**
	(b)	Explain equilibrium and free moisture in drying operation.	**04**
	(c)	Derive the transfer function of mercury thermometer.	**07**
		OR	

Q.5 **(a)** Explain hysteresis in measuring instruments. **03**

(b) Explain constant drying conditions. **04**

(c) Derive the transfer function of single tank liquid level system. **07**

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