Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – SUMMER 2024

Subject Code:3171710 Date:22-05-2024

Subject Name:Process Dynamics And Control

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)	What is inferential control? Which variable is used to infer product composition data in a distillation column?	03
	(b)	Explain the dynamics of CSTR reactor.	04
	(c)	Explain furnace draft control in boiler.	07
Q.2	(a)	What is inverse response? Explain it with example.	03
	(b)	Explain burner management system in boiler.	04
	(c)	Explain boiler air-fuel ratio control.	07
		OR	
	(c)	Enlist types of heat exchangers according to flow configuration.	07
Q.3	(a)	Explain dynamic mathematical model of a system with example.	03
	(b)	Explain dynamic behavior of second order linear system.	04
	(c)	What is hydraulic lag in distillation column? Explain how it can be modelled as SOPDT model.	07
		OR	
Q.3	(a)	Explain controller tuning for a pH control loop in a reactor.	03
	(b)	Compare batch reactor, packed bed and continuous reactor.	04
	(c)	Write a short note on boiler optimization.	07
Q.4	(a)	Draw block diagram describing process of fertilizer Industry	03
	(b)	Draw and explain Cascade control scheme of heat exchanger.	04
	(c)	Explain control degree of freedom in a binary distillation column. Enlist different control structures in the column.	07
		OR	
Q.4	(a)	What is internal reflux in distillation column?	03
	(b)	Compare two and three element level control for boiler.	04
	(c)	Explain dynamic response of heat exchanger to change in steam temperature	07
Q.5	(a)	Explain measurement lag in heat exchanger.	03
	(b)	Compare different system identification methods.	04
	(c)	Explain the unit operations used in sugar industry with suitable process flow diagram.	07
		OR	
Q.5	(a)	Explain semi empirical mathematical modeling.	03
	(b)	Explain dynamic behavior of pumps in brief.	04
	(c)	Explain the unit operations used in pharma industry with suitable process flow diagram.	07

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