

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V (NEW) EXAMINATION – SUMMER 2024****Subject Code:2151705****Date:23-05-2024****Subject Name:Process Control Systems****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 term 1) Offset 2) dynamic error 3) Neutral Zone	03
	(b) List out process control objectives and explain any one in detail.	04
	(c) Explain two position controller with suitable waveform. Show the effect of neutral zone on controller output.	07
Q.2	(a) Define the terms: (1) manipulated variable (2) controlled variable (3) transfer function.	03
	(b) Explain open loop Zeigler Nichols tuning method of the PID controller.	04
	(c) Discuss closed loop Zeigler Nichols tuning method of PID controller, with suitable diagram.	07
OR		
	(c) What is discrete time control? Explain ZOH and sampling concept for discrete time control.	07
Q.3	(a) What is Self-Regulation? Give an example regulating process.	03
	(b) What do you mean by the term 'Dead Time'? What is its effect on the stability of system?	04
	(c) Explain the interacting and non-interacting processes in brief.	07
OR		
Q.3	(a) Discuss the mass balance equation of simple liquid level system.	03
	(b) Write short note on Proportional Derivative (PD) controller	04
	(c) Explain cascade control scheme with basic block diagram.	07
Q.4	(a) Compare servo and regulatory control systems with suitable example.	03
	(b) Explain multi position control in brief.	04
	(c) Define integral windup and explain how it can be prevented in process control.	07
OR		
Q.4	(a) Derive transfer function for any first order linear system.	03
	(b) Compare proportional-integral and proportional-derivative control mode.	04
	(c) Develop the mathematical model for CSTR system	07
Q.5	(a) Briefly explain the split range control scheme.	03
	(b) Explain shrinking, swelling and inverse response for drum boilers.	04
	(c) Compare feed forward and feedback control system.	07
OR		
Q.5	(a) Briefly explain the inferential control.	03
	(b) Explain feed forward control for heat exchanger.	04
	(c) Define adaptive control. Explain gain scheduling in the context of adaptive control with suitable diagram.	07
