GUJARAT TECHNOLOGICAL UNIVERSITY BE – SEMESTER – VI (NEW).EXAMINATION – WINTER 2016

Subject Code: 2161007 Date: 26/10/201		5	
Տ 1 հ	ime: Sime: Struc	ect Name: Digital Control : 10:30 AM to 01:00 PM Total Marks: 70 etions:	
		 Attempt all questions. Make suitable assumptions wherever necessary. Figures to the right indicate full marks. 	
Q.1	(a) (b)	Briefly discuss the block diagram of Digital Control System. Explain shifting Theorem of Z transform.	07 07
Q.2	(a)	Define Data-Hold circuits. Derive the transfer function of Zero order Hold circuits.	07
	(b)	Explain Stability Analysis by use of the Bilinear Transformation and Routh Stability Criterion.	07
	(b)	Explain pulse transfer function of cascaded elements with example.	07
Q.3	(a) (b)	Explain the realization methods for digital controllers. Explain the velocity form of the PID controller with Block diagram. OR	07 07
Q.3	(a)	Examine the stability of the following characteristic equation using Jury stability criterion. $P(z) = z^4 - 1.2z^3 + 0.07z^2 + 0.3z - 0.08 = 0$	07
	(b)	Consider the system shown in the figure. Assume that transfer function of the digital controller is $G_D(z) = K / (1 - z^{-1}) = K (z / (z - 1))$. Draw the root locus diagram for the system for the sampling period T = 0.5 sec	07
		$r(t) \qquad \qquad$	
		Digital control system.	
Q.4	(a) (b)	Explain state-space representations of Discrete-Time system. Explain discretization of continuous – time state space equations. OR	07 07
Q.4	(a) (b)	Explain similarity transformations. Obtain the pulse transfer function of the following continuous – time system. Assume the sampling period T = 1 sec. G(s) = Y(s) / U(s) = 1 / (s(s+2))	07 07
Q.5	(a) (b)	Explain the Controllability and Observability. Discuss necessary and sufficient condition for state Observation. OR	07 07
Q.5	(a) (b)	Explain Discretized Quadratic Optimal Control Problem. Explain Quadratic Optimal Control Problem. ********	07 07
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