GUJARAT TECHNOLOGICAL UNIVERSITY ME – SEMESTER-1 (NEW) EXAMINATION – WINTER 2016

Subject Code: 2712904		Code: 2712904 Date:05/01/2	Date:05/01/2017	
Su Tir	bject	Name: Control System Theory 30 pm to 5:00 pm Total Mark	a . 7 0	
I II Inst	ne: 2	s: 10tal Marks	5: 70	
IIIS	1. 2. 3.	Attempt all questions. Make suitable assumptions wherever necessary. Figures to the right indicate full marks.		
Q.1	(a)	Discuss the effect of load disturbance on control system with suitable Example.	07	
	(b)	Explain the implementation of Digital PI Controller.	07	
Q.2	(a) (b)	Explain the State Regulator Problem in detail. Explain the implementation of Digital PID Controller. OR	07 07	
	(b)	Write a brief note on optimal control system.	07	
Q.3	(a)	Construct the state model for a system characterized by the differential	07	
		equation, $\frac{d^3y}{dt^3} + 7\frac{d^2y}{dt^2} + 13\frac{dy}{dt} + 10y = u$		
	(b)	Explain Temperature & Position control system. OR	07	
Q.3	(a) (b)	Explain Quadratic Optimal Regulator System. Explain Jury Stability Criterion in detail.	07 07	
Q.4	(a)	The Transfer function of a control system is given by	07	
		$\frac{Y(s)}{U(s)} = \frac{(S+2)}{S^3 + 8S^2 + 24s + 26}$ Determine whether the system is completely controllable or not?		
	(b)	Find state space representation of DC motor. OR	07	
Q.4	(a)	Find Eigen value and Eigen vector of the system having,	07	
		$A = \begin{bmatrix} 1 & 6 & -5 \\ 2 & 0 & -3 \\ 5 & 6 & 4 \end{bmatrix}$		
	(b)	Explain variable structure control. Discuss, Where it is used?	07	
Q.5	(a) (b)	Explain the concept of Multivariable system in detail. Explain homogeneous state equations in time-domain. OR	07 07	
Q.5	(a) (b)	Explain Liapunov based stability analysis with suitable example. Discuss Parameter Optimization in optimal control system.	07 07	
