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		GUJARAT TECHNOLOGICAL UNIVERSITY BE - SEMESTER-IV (NEW) EXAMINATION – WINTER 2018	
Subj	ject	Code:2140307 Date:14/12/	/2018
Subj	ject 🛛	Name:Control System and Analysis	
Time: 02:30 PM TO 05:00 PM Total Mark			ks: 70
Instru	uctior	15:	
	1.	Attempt all questions. Make suitable assumptions wherever necessary	
	2. 3.	Figures to the right indicate full marks.	
		8 8	MARKS
Q.1	(a)	Write applications of control system.	03
-	(b)	Write properties of Transfer Functions.	04
	(c)	Explain different types of Control system with examples.	07
Q.2	(a)	Describe Linear Time Invariant system with example.	03
	(b)	The impulse response of a system is e^{-4t} . Find the transfer function.	04
	(c)	Obtain the transfer function of the lead network shown in Fig.1.	07
		OR	
	(c)	Write differential equation for mechanical system as shown in Fig.2. Find	07
0.2	(a)	F-1 & F-V analogous circuits.	02
Q.3	(a) (b)	While properties of Signal Flow Graph.	03
	(D) (C)	Using Block diagram Reduction technique find the transfer function for	04
	(0)	each input to the output C for the system shown in Fig.3.	07
		OR OR	
Q.3	(a)	Explain Mason's gain formula.	03
	(b)	Describe Electrical-Thermal analogy.	04
	(c)	Find the transfer function $C(s)/R(s)$ for the signal flow graph in Fig. 4.	07
Q.4	(a)	Explain Transient and Steady state Response of system.	03
	(b)	Find Unit Step response of First order system.	04
	(c)	Derive Steady state error of type 0,1, 2 closed loop control system for unit	07
		step, ramp, and parabolic input signal.	
04	(9)	Define Underdamped Overdamped and Critically damped system	03
7. 4	(a) (b)	before condendamped, overdamped and entitlearly damped system. k(1+2s) Find the system.	03
	(0)	For the system, $G(S) = \frac{1}{s(1+s)(1+0.4s^2)}$. Find value of k to limit the steady	04
		state error to 10% for an input t.	~-
	(c)	The response of a control system after applying unit step input is, $c(t) = 1 + e^{-40t}$. Determine time domain specifications	07
05	(a)	Write needs of Frequency Domain Analysis for Control system	02
Q.5	(a)	while needs of Frequency Domain Analysis for Control system. $D_{1} = \frac{1}{2} \frac{1}{2$	03
	(b)	Determine the stability of $S^{+}+2S^{+}+2S^{+}+3S+5=0$.	04 07
	(C)	Skeich the root locus of a unity feedback control system with $G(s) = k$	U/
		$\overline{s(s+1)(s+3)}$ and determine the value of k for marginal stability.	
0.7	()	OR	02
Q.5	(a)	Denne State variables, State vectors and State Space.	03
	(b)	Draw polar plot of $G(S)H(S) = \frac{100}{(S+2)(S+4)(S+8)}$.	04



FirstRanker.com First Charles the system having the open loop transfer function G(S)H(S) = 07 $\overline{s(s+2)(s+5)}$. Determine the stability of the system by plotting the bode plot

of the system.











