Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA ENGINEERING – SEMESTER – IV • EXAMINATION – WINTER • 2014

Subject Code: 3341701 **Date: 26-11-2014**

Subject Name: Control Instrumentation System

Time: 02:30 pm - 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. **English version is considered to be Authentic.**

Q.1	(a)	Compares open loop system with closed loop system.	**07**
	(b)	Give rules for block diagram reduction.	**07**
Q.2	(a)	Draw and explain Standard test signals with their equations.	**07**
	(b)	Derive transfer function for given figure-1 using signal flow graph.	**07**
		OR	
	(b)	Prepare table for analogous quantities in force- torque and voltage analogy.	**07**
Q.3	(a)	Determine stability of given characteristic equation using Routh-Hurwitz criteria $2S^4 + 2S^3 + 8S^2 + 4S + 3 = 0$	**07**
	(b)	State the rules for construction of Root Locus.	**07**
		OR	
Q.3	(a)	Describe steady state error and error constant of control system for step, ramp, parabolic input and type-0, 1, 2 systems.	**07**
	(b)	Classify control system stability according to location of the roots (poles) of characteristic equation.	**07**
Q.4	(a)	Describe concept of Polar plot in brief.	**07**
	(b)	(i) Define Gain Margin and Phase Margin.	**03**
		(ii) Explain Two position control action.	**04**
		OR	
Q. 4	(a)	Obtain mathematical model for series RLC circuit.	**07**
	(b)	Describe concept of Nyquist stability criteria in brief.	**07**
Q.5	(a)	Explain time response of 1st order system with unit step input.	**07**
	(b)	Define feed forward, cascaded control and Spilt range control.	**07**
		OR	
Q.5	(a)	Sketch output for P, I, P+I mode of control action for step input.	**07**
	(b)	Draw time response of second order system with unit step input and define following terms- delay time td, rise time tr, peak time tp, maximum overshoot Mp and settling time ts.	**07**

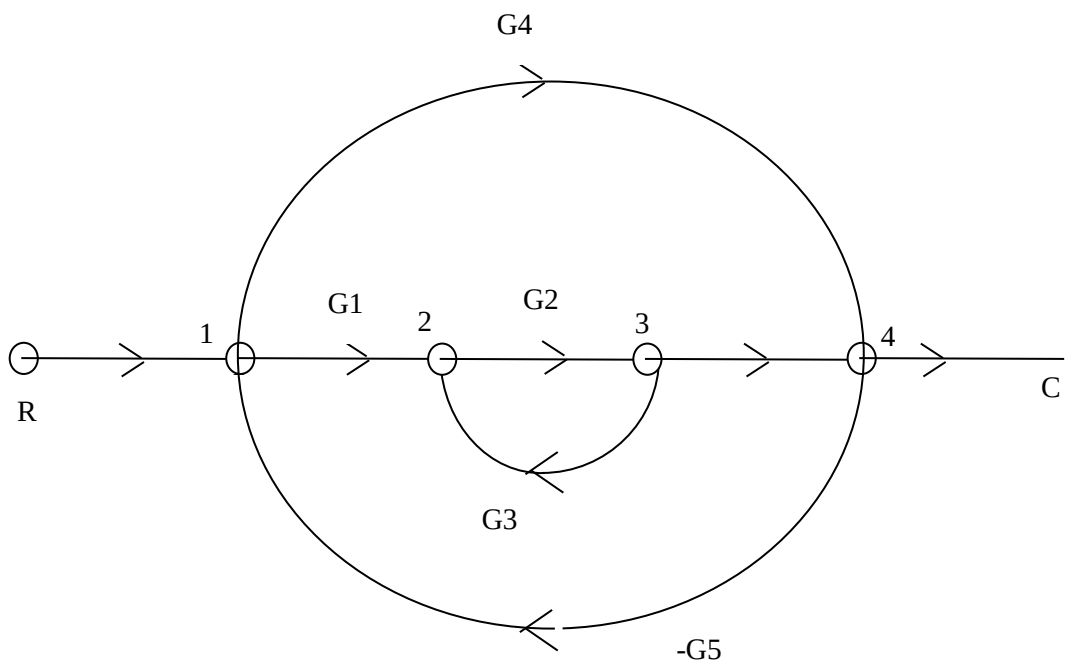

Figure • 1

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