Reg. No. : | | | | | | | | | | |

Question Paper Code: 31643

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

Fourth Semester

Instrumentation and Control Engineering

01UIC403 - LINEAR CONTROL SYSTEMS

(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. Distinguish between open loop and closed loop system.
2. State Mason's Gain Formula.
3. Define PID controller.
4. Define peak overshoot
5. Mention the advantages of Bode Plot.
6. List out any four advantages of frequency response analysis.
7. Define absolutely stability system.
8. State Nyquist stability criterion.
9. State compensation and compensators.
10. What are the merits of Lag-Lead network?

PART - B (5 x 16 = 80 Marks)

11. (a) Find C(S) / R(S) for the system shown in Fig. 1. using Mason’s Gain formula.

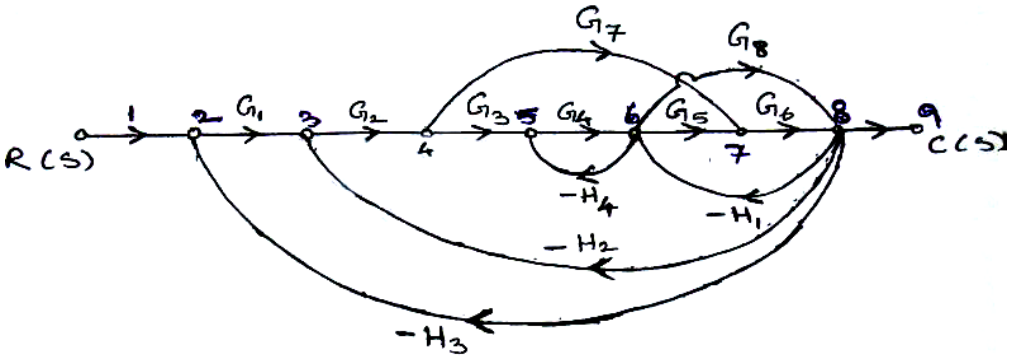
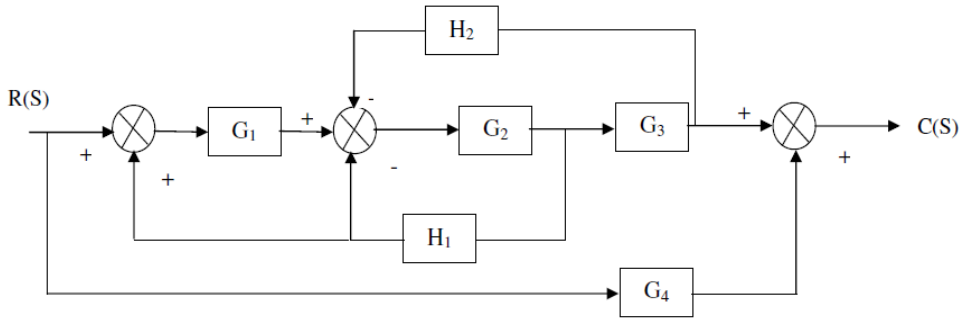


Fig. 1

Or

(b) Compute the overall transfer function *C(S) / R(S)* for the system shown in figure. (16)



12. (a) A unity feedback control system has an open loop transfer function $G(S) = \frac{10}{s(s+2)}$ Find the rise time, percentage overshoot, peak time and settling time for a step input of 12 units. (16)

Or

(b) Develop the expression for under damped second order system when the input is unit step and plot the response of the system. (16)

13. (a) Calculate the magnitude and phase of closed loop transfer function with unity feedback and prove that it is in the form of circles for every value of *M* and *N*. (16)

Or

(b) The open loop transfer function of a system with unity feedback is given by $G(s) = \frac{1}{s(1+s)^2}$. Find the gain margin and phase margin of the system using polar plot. (16)

14. (a) Sketch the complete root locus for the system having $G(S)H(S) = \frac{K(s+7)}{(s+2)(s+6)}$ (16)

Or

(b) Estimate the root locus for the unity feedback system whose open loop transfer function is $G(s)\,H(s) = \frac{K}{s\,(s+4)\,(s^2+4s+20)}$ and sketch the plot. (16)

15. (a) Compile the effects of Lead compensator. Generate the basic compensators using electrical network and develop the transfer functions. (16)

Or

(b) Realize a lead compensator using electrical network and also explain its frequency response. (16)

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