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

Question Paper Code: 34063

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

Fourth Semester

Instrumentation and Control Engineering

01UIC403 - LINEAR CONTROL SYSTEMS

(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

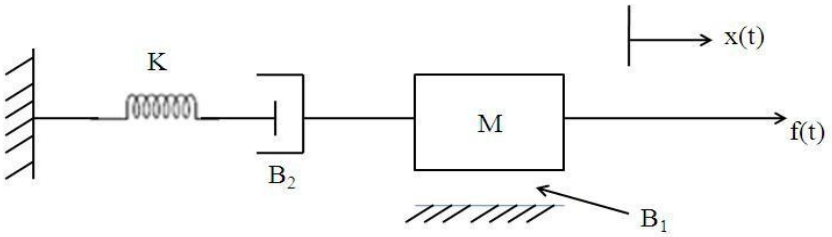
Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. Express the rule for eliminating positive feedback loop.
2. Distinguish between open loop and closed loop system.
3. Define PID controller.
4. Write the transfer function of PID controller
5. Mention the advantages of Bode Plot.
6. Define *M* and *N* circles.
7. Define absolutely stability system.
8. Give Nyquist stability criterion.
9. Give the electrical network of lag-lead compensator.
10. When lag compensation is employed?

PART - B (5 x 16 = 80 Marks)

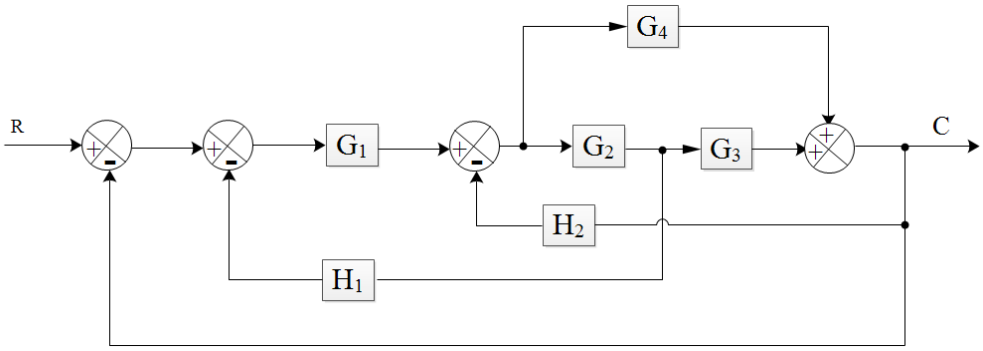
11. (a) Express the transfer function $\frac{X(s)}{F(s)}$ for the system shown in figure.



(16)

Or

(b) Using Block diagram reduction technique evaluate the transfer function of the system whose block diagram is shown in figure. (16)



12. (a) Discover the output response of the first order system for step input. (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) Analyze the correlation between time and frequency response of a second order system. (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) Construct the root locus of the system whose open loop transfer function $G(s) = \frac{K}{s(s+2)(s+4)}$. Determine the value of K so that the damping ratio of the closed loop system is *0.5*. (16)

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

Or

(b) A unity feedback system has an open loop transfer function $G(s) = \frac{K}{s(1+2s)}$. Design a suitable lag compensator so that phase margin is 40^o and steady state error for ramp input is less than or equal to *0.2*. (16)

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