SV-446

Total No. of Pages : 3

Seat No.

T.E. (Electronics and Telecommunication) (Semester - V) (Revised) Examination, April -2019

CONTROL SYSTEMS

Sub. Code : 66315

Day and Date : Saturday, 27 - 04 - 2019 **Total Marks : 100**

Time : 2.30 p.m. to 5.30 p.m.

Instructions :
1) All Questions are compulsory.
2) Assume data wherever necessary.
3) Figures to the right indicate full marks.

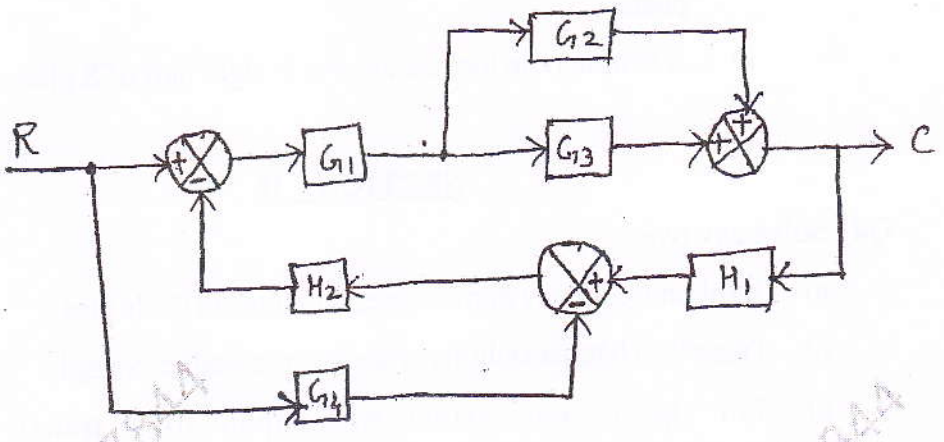
SECTION - I

Q1) Solve any TWO. [2×9=18]

a) Derive transfer function of field controlled DC motor.

b) Define Mason's gain formula and using it explain the procedure for solving signal flow Graph.

c) Draw a signal flow graph and evalute the closed loop transfer function of a system whose block diagram is given below.



P.T.O.

Q2) Solve any two. **[2×8=16]**

a) Derive steady state error constant for type 0 and type 1 system.

b) For unity feedback system $G(s)=\frac{60}{s(s+10)}$

Determine

i) Type of system.

ii) Steady state error constant.

iii) Steady state error if input is r(t) = 8t

c) Derive relation for impulse response of unit step and ramp for first order system.

Q3) Solve any two. **[2×8=16]**

a) State and explain Hurwitz and Routh Criteria.

b) For unity feedback system $G(s)=\frac{K}{(s+1)^3(s+4)}$

i) Find range of K for stability.

ii) Find frequency of oscillations when system is marginally stable.

c) Explain the effect of location of poles on stability in case of

i) A complex conjugate pole pair located at s = -a ± jb in left half of S plane.

ii) A simple pole located at s = a in right half of S plane.

SECTION - II

Q4) Solve any two **[2×9]**

a) Explain frequency domain specifications in Bode plot.

b) Describe Nyquist stability criteria with suitable example.

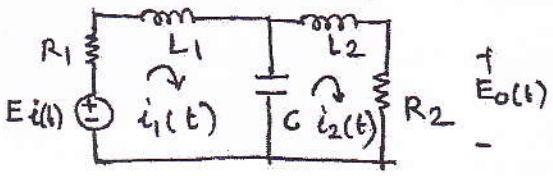
c) For the given system with open loop transfer function $G(s)H(s)=\frac{10}{s(s+1)(s+10}$ determine stability of the system by Bode plot.

Q5) Solve any two. [2×8]

a) Derive state model of linear system.

b) Derive state equations from transfer function of linear continuous time system.

c) Derive state model for the given RLC ciruit.



Q6) Solve any two. [2×8]

a) Explain lag compensator with advantages and limitations.

b) Write short note on PID controller.

c) Define polar plot and sketch plot for unity feedback with open loop system below $G(s)H(s)=\frac{1}{s(s+2)}$.

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