SJ - 784

Seat No.	

Total No. of Pages : 3

T.E. (E & TC) (Part - III) (Semester - V) (Revised) Examination, November - 2016

CONTROL SYSTEM

Sub. Code : 66315

Day and Date : Saturday, 19 - 11 - 2016

Time : 02.30 p.m. to 05.30 p.m. **Total Marks : 100**

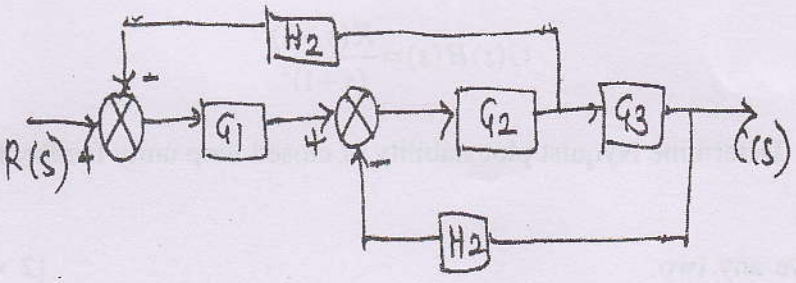
Instructions : 1) All questions are compulsory.
2) Figures to the right indicates full marks.

Q1) Solve any two : **[2 × 9 = 18]**

a) Compare openloop and closed loop system

b) Explain block diagram reduction rules.

c)



Find Transfer function.

Q2) Solve any two. **[2 × 8 = 16]**

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

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

c) $\frac{C(s)}{R(s)} = \frac{25}{s^2+6s+25}$ find Tr, Tp Mp & Ts.

P.T.O.

Q3) Solve any two. **[2 × 8 = 16]**

a) State and Explain Routh criteria special cases.

b) $S^8 + 5S^6 + 2S^4 + 3S^2 + 1 = 0$ determine stability.

c) $G(s) = \dfrac{k(s+13)}{s(s+3)(s+7)}$ find range of 'k' for which system is stable.

Q4) Solve any two. **[2 × 9 = 18]**

a) Explain the system stability using Bode Plots.

b) Sketch Bode plot and determine gain crossover and phase crossover frequency.

$$G(s)=\frac{1000(1+0.2s)(1+0.1s)}{s(0.01s^2+0.2s+1)}$$

c) Consider system with open loop zero in right half s-plane with

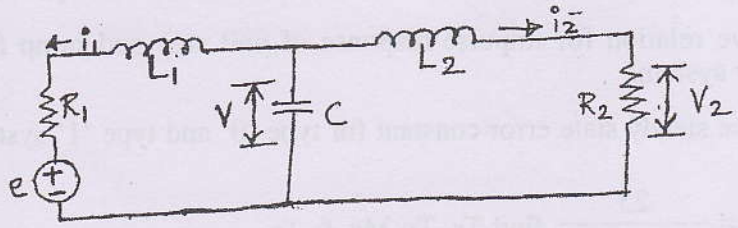
$$G(s)H(s)=\frac{K(s-2)}{(s+1)^2}$$

Determine Nyquist plot stability of closed loop unity feedback system.

Q5) Solve any two. **[2 × 8 = 16]**

a) Derive the equation for transfer function from state model for continuous time system.

b) Obtain the state model for RLC Network shown below



c) Explain the term state, state variable, state vector and state space of the system.

Q6) solve any two. [2 × 8 = 16]

a) Explain the need of compensation and explain lead compensation.

b) Write note on PID controllers.

c) Define polar plot and sketch polar plot for circuit