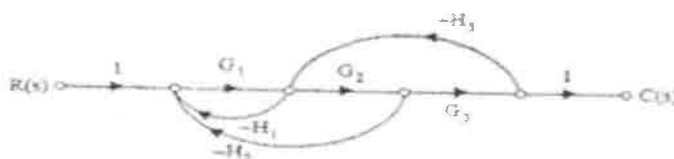


MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)
Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad**III B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY - 2019**Subject: Control SystemsBranch: **Common to EEE & ECE****Time: 3 hours****Max. Marks: 75**Answer any **FIVE** Questions of the following**5x15 Marks= 75 Marks**

1. a) Define Transfer function and write its limitations? [7M]
b) What is closed loop control systems and explain the characteristics of feedback? [8M]
2. a) Explain the rules in Block diagram reduction technique. [8M]
b) Obtain the transfer function for the following signal flow graph [7M]



3. Evaluate static error constants for unity feedback system having a forward path T.F $G(s) = \frac{50}{s(s+10)}$.
Estimate steady state errors for input given by $r(t) = 1 + 2t + t^2$.
4. A unity feedback control system is characterized by $G(s) = \frac{K}{s^2(s+2)}$
 - a. Show that the system is always unstable
 - b. Show that the system is always stable if a zero $(s+a)$ is added to above T.F where $0 < a < 2$.
5. a) What is frequency response analysis
b) Determine phase margin and gain margin using bode plot for T.F of

$$G(s) = \frac{40(s+1)}{(s^2+2s+4)(1+5s)}$$
6. Using Nyquist stability criterion, find range of 'K' for closed loops system stability for

$$G(s)H(s) = \frac{K(4s+1)}{s(s-1)}, K > 0$$
7. a) What is compensation
b) Explain different types of compensation networks clearly.
8. a) What is diagonalisation
b) Obtain the state transition matrix $\phi(t)$ for the following system

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$