



13	a) For a unity feedback system given by $G(s) = \frac{20(s+2)}{s(s+3)(s+4)}$. Find the steady state error for $r(t) = 3u(t) + 5tu(t)$. b) Categorize the different standard test signals.	7M 3M	2	L2
	OR			
14	What are the time response specifications? Derive the expression for each of them.	10M	2	L2
15	Sketch the root locus plot of $G(S) H(S) = \frac{K}{s(s+2)(s+4)}$. Also investigate the range of 'K' for system to be stable.	10M	3	L2
	OR			
16	Plot the Bode diagram for the following transfer function and obtain the gain and phase cross over frequencies. $G(s) = \frac{10}{s(1+0.1s)(1+0.4s)}$.	10M	3	L2
17	Sketch the Nyquist plot for the following system and verify whether the system is stable or not. $G(S) = \frac{100}{(s+2)(s+4)(s+8)}$	10M	4	L2
	OR			
18	Draw the polar plot for the following system $G(S) = \frac{1+4S}{s(1+S)(1+2S)}$.	10M	4	L2
19	Given $X(t) = \begin{bmatrix} -3 & 2 \\ -1 & 0 \end{bmatrix} \begin{bmatrix} x_1(t) \\ x_2(t) \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$ and $y = \begin{bmatrix} 1 & 0 \end{bmatrix} \begin{bmatrix} x_1(t) \\ x_2(t) \end{bmatrix}$. a) Find Transfer function of the system b) Analyze the system stability with transfer function.	10M	5	L2
	OR			
20	A linear time invariant system is representation by the state equation $X(t) = \begin{bmatrix} 0 & 3 \\ -1 & -4 \end{bmatrix} \begin{bmatrix} x_1(t) \\ x_2(t) \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$ and $y = \begin{bmatrix} 1 & 1 \end{bmatrix} \begin{bmatrix} x_1(t) \\ x_2(t) \end{bmatrix}$. Find the characteristic equation, state transition matrix and analyze the stability of the system.	10M	5	L2