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Control System
Assignment-3

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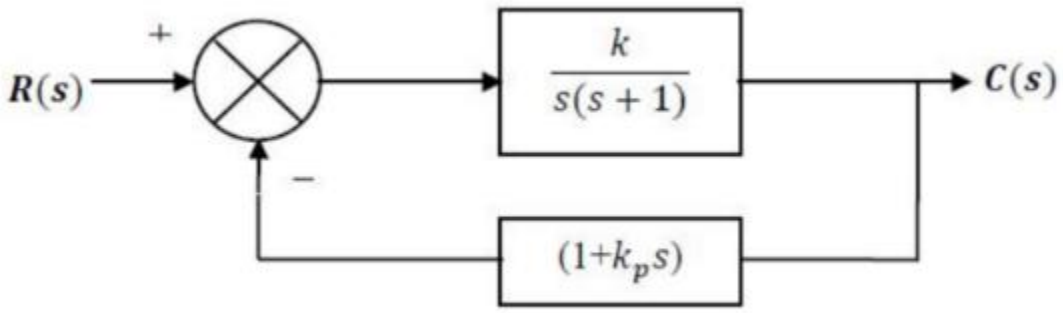
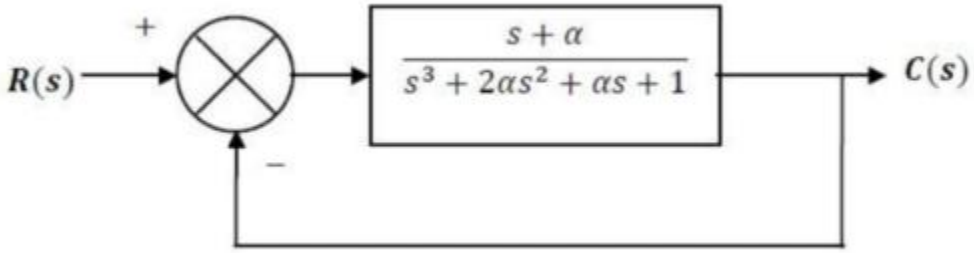
Ques-1: consider a standard negative feedback configuration with G(s) = $\frac{1}{(s+1)(s+2)}$ and H(s)= $\frac{s+\alpha}{s}$. For the close loop system to have poles on the imaginary axis, the value of α should be equal to (up to one decimal place) _____.

Ques-2: The loop transfer function of a closed-loop is given by G(s) H(s) = $\frac{k(s+6)}{s(s+2)}$. *The break away point of the root loci will be* _____

Ques-3: The block diagram of a closed-loop control system is shown in the figure. The values of k and k_p are such that the system has a damping ratio of 0.8 and an undamped natural frequency ω_n of 4 rad/s respectively. The value of k_p will be _____



Ques-4: A closed-loop system is shown in the figure. The system parameter α is not known. The condition for asymptotic stability of the closed loop system is



a) α < -0.5
b) -0.5 < α < 0.5
c) 0 < α < 0.5
d) α > 0.5

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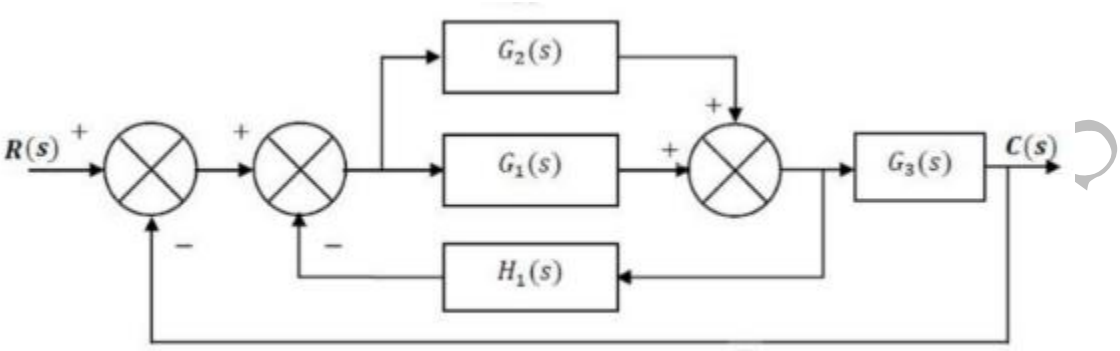
Ques-5: The overall closed loop transfer function $\frac{C(s)}{R(s)}$, *represented in the figure will be*



a) $\frac{(G1(s)+G2(s))G3(s)}{1+(G1(s)+G2(s))(H1(s)+G3(s))}$

b) $\frac{G1(s)+G3(s)}{1+G1(s)H1(s)+G2(s)G3(s)}$

c) $\frac{(G1(s)-G2(s))H1(s)}{1+(G1(s)+G3(s))(H1(s)+G1(s))}$

d) $\frac{G1(s)G2(s)H1(s)}{1+G1(s)H1(s)+G1(s)G3(s)}$

Ques-6: The number of times the Nyquist plot of G(s) = $\frac{s-1}{s+1}$ will encircle the origin clockwise is _____

Ques-7: The value of a0 which will ensure that the polynomial $s^3 + 3s^2 + 2s + ao$ has roots on the left half of the s-plane is

a) 11
b) 9
c) 7
d) 5

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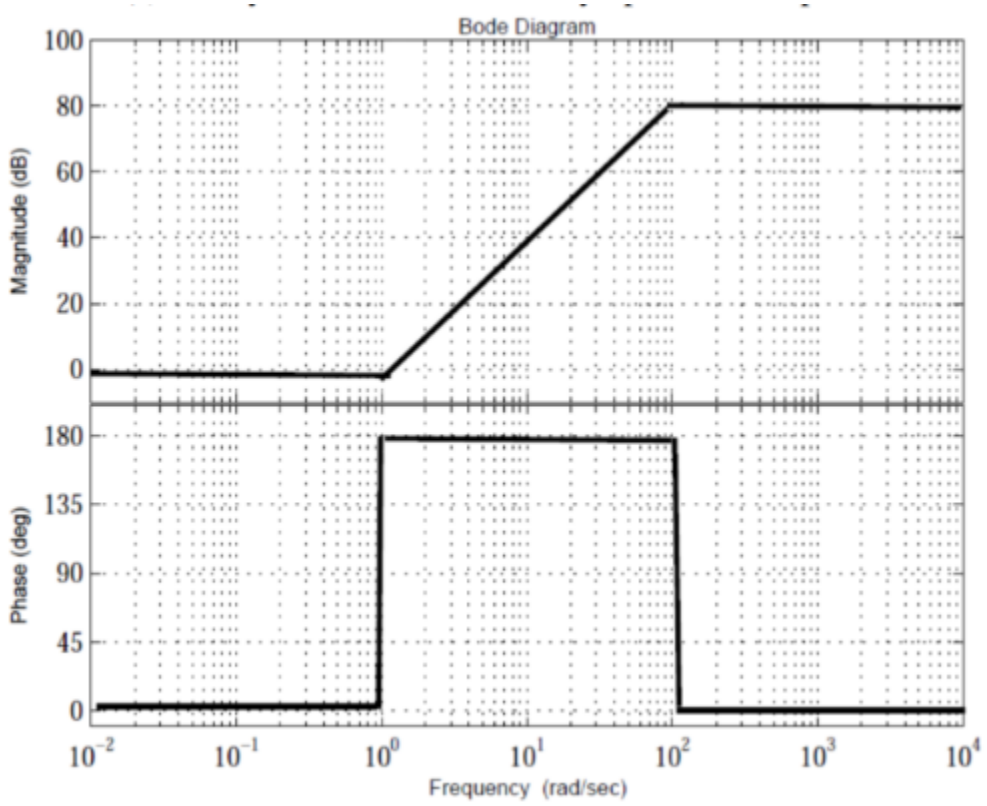
Ques-8: The transfer function G(s) of a system which has the asymptotic Bode plot shown below is



a) $10^4 \frac{(s-1)^2}{(s+100)^2}$

b) $10^4 \frac{(s+1)^2}{(s+100)^2}$

c) $10^4 \frac{(s+1)}{(s+100)^2}$

d) $10^4 \frac{(s-1)^2}{(s-100)^2}$

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