Total number of printed pages: 2 **D/V Semester/DECE513B**

2024

Control Systems and PLC

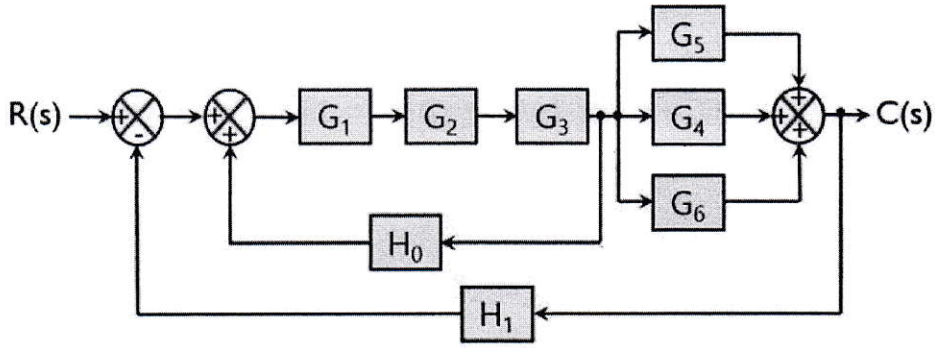
Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1.		Using the Routh Hurwitz criterion comment on the stability of the following system for which the open loop transfer function is A) $G(s)H(s) = \frac{2}{s^2+2}$ B) $G(s)H(s) = \frac{2}{s^2(s-2)}$ C) $G(s)H(s) = \frac{2}{s(s+2)}$ D) $G(s)H(s) = \frac{2(s+1)}{s(s+2)+10}$	5+5+5+5 =20
2.		Consider a control system with the open-loop transfer function $G(s)H(s) = \frac{K(s+2)}{s(s+1)(s+4)}$. You are required to analyze the stability of this control system using the following methods: **Routh-Hurwitz Criterion**: Determine the range of the gain K for which the system is stable using the Routh-Hurwitz criterion.	20
3.		For the following open loop transfer function draw the Nyquist plot by generating at least five points in *G(s)H(s)*-plane also comment on the stability of the control system. $G(s)H(s) = \frac{1}{s^2(s+1)}$	20

4.		A unity feedback control system has an open loop transfer function $$G(s)H(s) = \frac{K\,s}{(s+2)(s+4)}$$ Draw the root locus and determine the value of K, if the damping ration ζ=0.707.	20
5.		With an example explain linear time invariant system. Give an example of linear but time varying system.	20
6.		 Find the transfer function $\frac{C(s)}{R(s)}$ for the control system shown above.	20

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