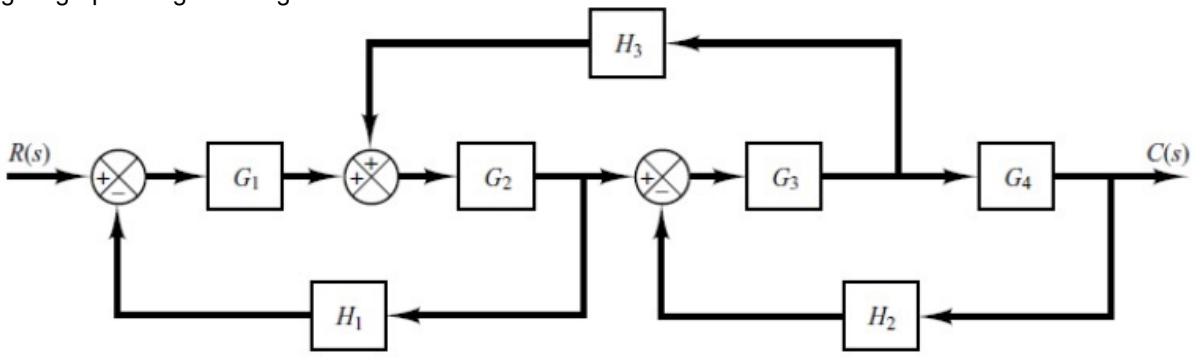
School of Electrical Electronics and Communication Engineering

Electrical Engineering
ETE - Jun 2023

Time : 3 Hours **Marks : 100**

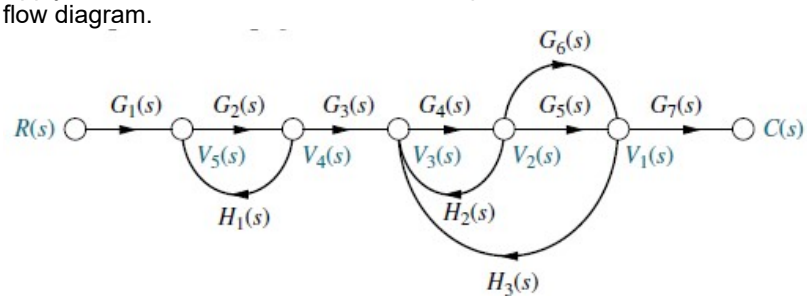
Sem IV - G2UB401B - Control Systems
Your answer should be specific to the question asked
Draw neat labeled diagrams wherever necessary

1.	Contrast the application of gain and phase margin in the calculation of a system stability.	K2 CO2	(5)
2.	List the five devices name of open loop control and closed loop control system.	K1 CO1	(5)
3.	Interpret the transients and steady state stability of a closed loop system.	K2 CO2	(5)
4.	Identify peak time, rise time and settling time for the second order transfer function.	K2 CO3	(10)
5.	Formulate the sensitivity function (S_G^T) of a negative feedback system with respect to feedforward gain G(s).	K3 CO4	(10)
6.	Construct the Polar plot for a given open-loop transfer function: $G(s) = \frac{s+6}{s(s+1)(s+4)}, H(s) = 1$	K3 CO5	(10)
7)	Develop signal flow graph from the given block diagram and also obtain $\frac{C(s)}{R(s)}$ from obtained signal graph using Mason gain formula.	K4 CO4	(10)



OR

	Apply Mason Gain method and obtain simplified transfer function $\frac{C(s)}{R(s)}$ of the following signal flow diagram.	K4 CO4	(10)



8.	Construct the proportional-derivative (PD) controller with a neat diagram and, also list out its merits.	K4 CO5	(15)
9.	Sketch the Root Locus of a given open-loop system as: $G(s) = \frac{K(s+1)}{s(s+2)(s+3)}, H(s) = 1$	K5 CO3	(15)

PTO

10) Elaborate the variation of K trajectories using the Root Locus method of a given open loop system as: K5 CO5 (15)

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

OR

Discover the general second order transfer function response c(t) in presence of unit step input for underdamped system. K5 CO5 (15)