Navrachana University
School of Engineering & Technology
End-Semester Examination May 2023
B. Tech Mechanical Engineering
Second Year and Fourth Semester
ME323 Automation and Control System

Date: 22/05/2023
Time: 10:00 to 12:00

Max. Marks: 40

Instructions:

- ➔ Write each answer on a new page
- ➔ Use of calculator is permitted
- ➔ COs=Course Outcome mapping. # BTL=Bloom's Taxonomy Level mapping

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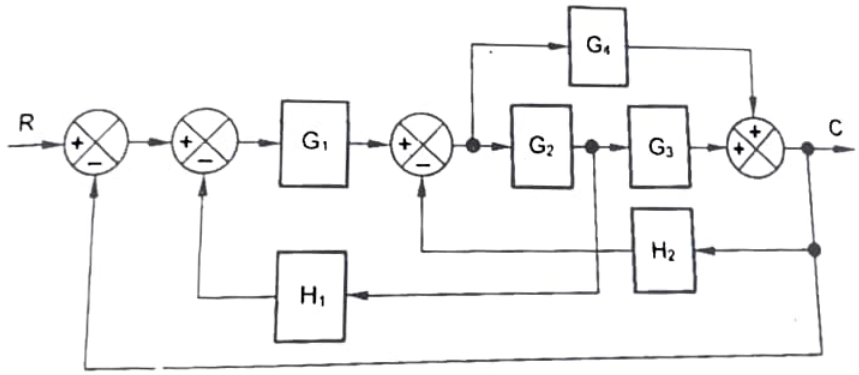
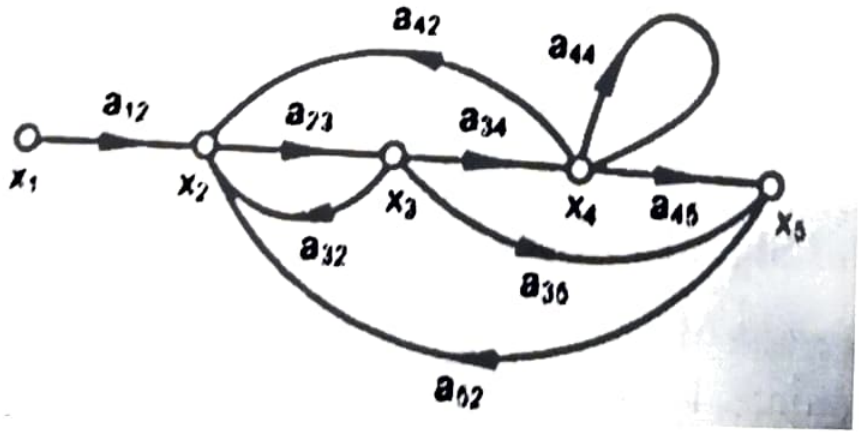
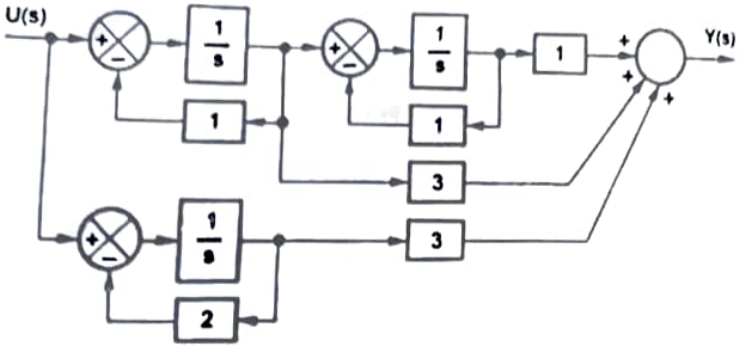
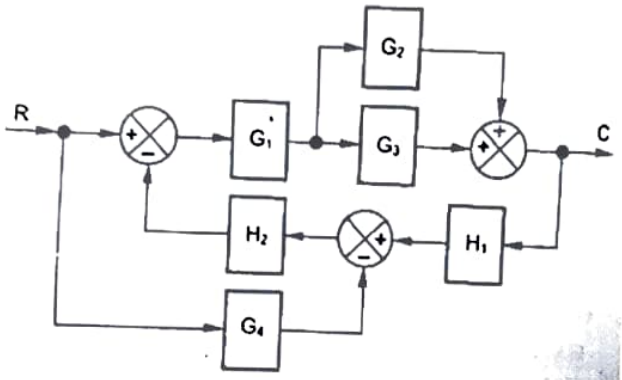
Ques No	Details	Marks	COs	BTL
Q-1.	Find the transfer function of the given below block diagram using block diagram reduction techniques. C(s)/R(s) 	7	CO3	**BTL3 BTL4**
Q-2.	Find the transfer function of the system using Mason's Gain Formula 	7	CO3	**BTL3 BTL4**

Q-3.	Convert the below block diagram into a signal flow graph and find the transfer function of the system using Mason's Gain Formula  	**8**	**CO3**	**BTL3** **BTL4**
	OR			
Q-4.	Find the transfer function for the given block diagram  	**8**	**CO3**	**BTL3** **BTL4**
Q-5.	Derive the time response of a second-order system subjected to unit step input for Underdamped systems	**5**	**CO4**	**BTL1**
Q-6.	Derive the Time response of the First order system subjected to a unit step input. And explain the significance of time constant T	**5**	**CO4**	**BTL1**
Q-7.	The characteristic equation of a closed loop system is given by $s^4 + 20ks^3 + 5s^2 + 10s + 15 = 0$ Determine the range of values K for the system to be stable.	**8**	**CO5**	**BTL5** **BTL6**
	OR			
Q-8.	Check the stability of the following systems 1. $s^5 + 6s^4 + 3s^3 + 2s^2 + s + 1 = 0$ 2. $s^5 + 2s^4 + 4s^3 + 4s^2 + 3s + 8 = 0$	**8**	**CO5**	**BTL5** **BTL6**

---------End of Question Paper---------