REG.NO.: 24BEE0103

VIT
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

SLOT:B1+TB1

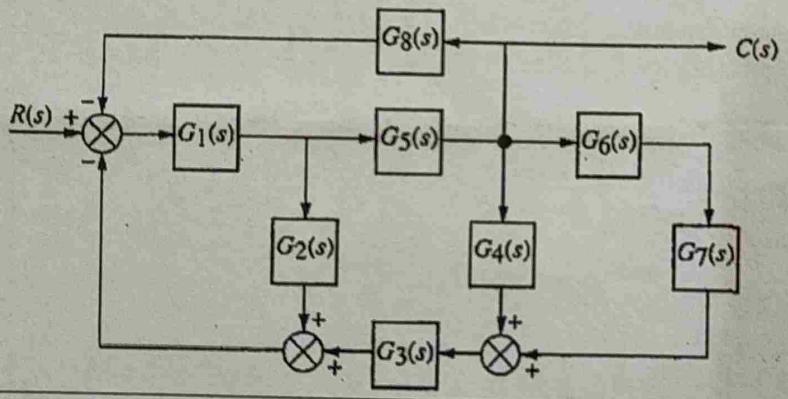
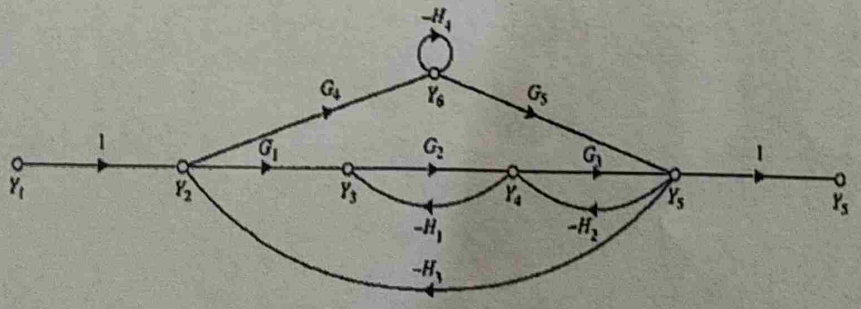
SCHOOL OF ELECTRICAL ENGINEERING
WINTER SEMESTER 2025-2026
CONTINUOUS ASSESSMENT TEST - I

Programme Name & Branch	**: B. Tech, EEE &EIE**
Course Code and Course Name	**: BEEE303L – Control Systems**
Faculty Name(s)	**:Dr. P. Geethanjali, Dr.N. Arun & Dr.M.Manimozhi**
Class Number(s)	**: VL2025260502247, 2262, 6624**
Date of Examination	**:28 /01/2026**
Exam Duration	**: 90 minutes** **Maximum Marks: 50**

General instruction(s):

- Answer All Questions
- Rough work should not be done on question paper. It will be treated as malpractice.

CO. 1: Formulate mathematical models of the physical systems.
CO. 2: Analyze the system performance in time and frequency domains.

Q. No	Question	M	CO	BL
1.	Reduce the block diagram given below to obtain the transfer function. 	10	1	4
2	Obtain the transfer function between Y5/Y1 for the signal flow graph shown below using Masons gain formula  Hint: $G(s)=\frac{C(s)}{R(s)}=\frac{\sum_k T_k \Delta_k}{\Delta}$	10	1	4

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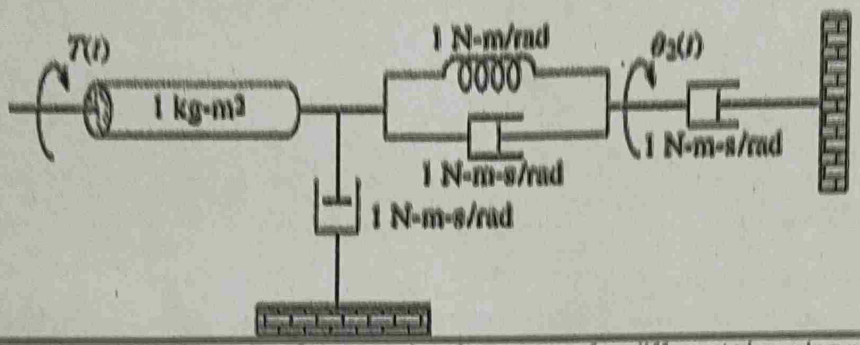
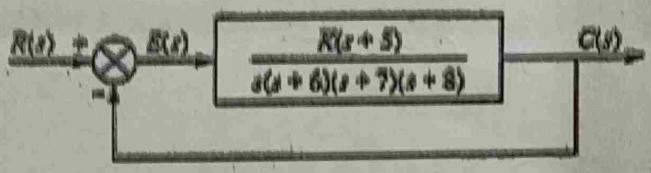
Q. No	Question	M	CO	BL
3.	Find the transfer function between $\theta_2(s)$ / T(s) for the rotational mechanical system shown in Fig1. 	10	1	3
4.	(a) Plot the poles and zeros of a second order system for different damping ratio and draw the corresponding responses for a unit step input. (b). Find the value of K for the system shown below so that there is 10% error in steady state for the system shown below.  Hint: $E(s) = \frac{R(s)}{1 + G(s)}$	10	2	4
5.	The open-loop transfer function of a unity-feedback system is given by $G(s) = \frac{K}{s(\tau s + 1)}$. By what factor should the K be reduced so that (a) The peak overshoot of unit-step response of the system is reduced from 75 to 25%? (b) The damping ratio increases from 0.1 to 0.6. Hint: $\%OS = \frac{c_{max} - c_{final}}{c_{final}} \times 100$	10	2	3