Roll No.												

PRESIDENCY UNIVERSITY

BENGALURU

End - Term Examinations – MAY/ JUNE 2025

Date: 03-06-2025 **Time:** 09:30 am – 12:30 pm

School: SOE	**Program:** B. Tech	
Course Code : MEC3063	**Course Name:** CONTROL ENGINEERING	
Semester: VI	**Max Marks**: 100	**Weightage**: 50%

CO - Levels	CO1	CO2	CO3	CO4	CO5
Marks	14	14	28	44	-

Instructions:

(i) Read all questions carefully and answer accordingly.

(ii) Do not write anything on the question paper other than roll number.

Part A

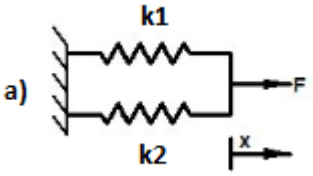
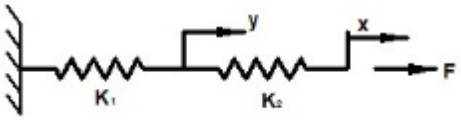
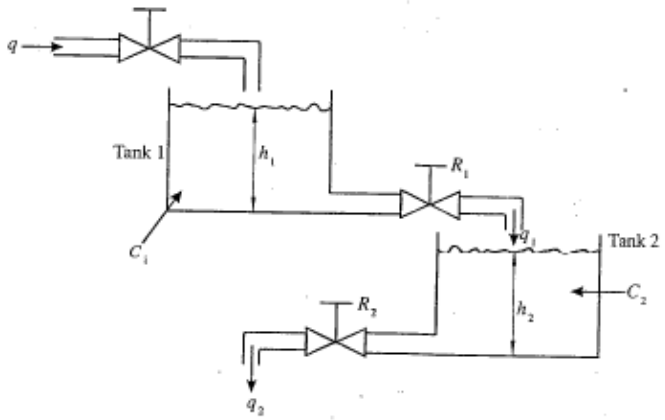
Answer ALL the Questions. Each question carries 2marks. **10Q x 2M=20M**

1.	Define control engineering.	**2 Marks**	**L1**	**CO1**
2.	What is disturbance?	**2 Marks**	**L1**	**CO1**
3.	What is Mathematical Model?	**2 Marks**	**L1**	**CO2**
4.	What is feedback control system?	**2 Marks**	**L1**	**CO2**
5.	What is Node in SFG?	**2 Marks**	**L1**	**CO3**
6.	Write Mason's gain formula.	**2 Marks**	**L1**	**CO3**
7.	Write the block diagram of closed loop system and name the terms.	**2 Marks**	**L1**	**CO3**
8.	Write the Transfer function for negative feedback system.	**2 Marks**	**L1**	**CO3**
9.	Define Root Locus.	**2 Marks**	**L1**	**CO4**
10.	What is break in point in Root Locus?	**2 Marks**	**L1**	**CO4**

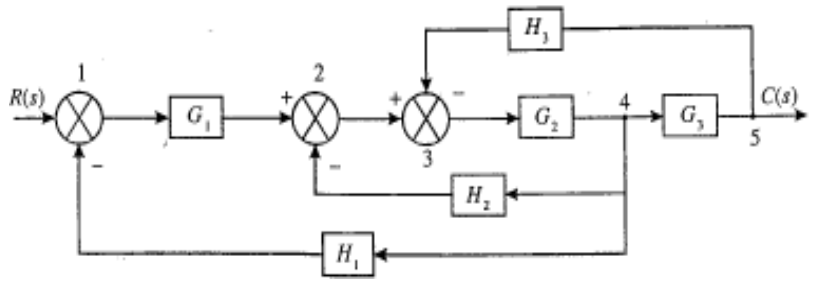
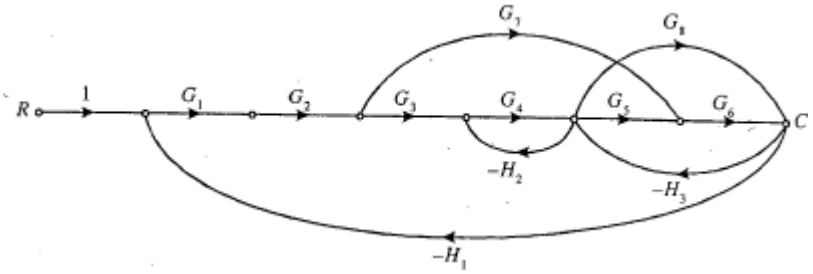
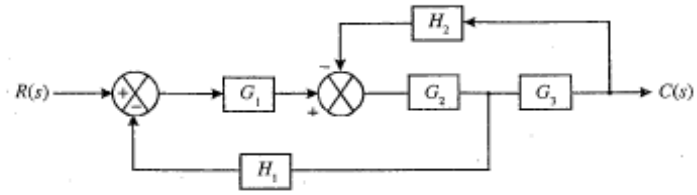
Part B

Answer the Questions. **Total Marks 80M**

11.	**a.**	List the advantages and disadvantages of open and closed loop control system	**10 Marks**	**L2**	**CO 1**
		Or			
12.	**a.**	What are the characteristics of an integral control system?	**10 Marks**	**L2**	**CO 1**

13.	**a.**	**Obtain the equivalent spring constant for the system** a)  b)  	**10 Marks**	**L3**	**CO 2**
		Or			
14.	**a.**	Obtain the transfer function Q2(s)/Q(s) for the hydraulic system shown in fig where q – flow rate C – Hydraulic capacitance R – Hydraulic resistance h – Head  	**10 Marks**	**L3**	**CO 2**

15.	**a.**	Obtain the over all transfer function of the block diagram shown in fig. by reduction technique.	**10 Marks**	**L3**	**CO 3**

					
Or					
16.	**a.**	For a given fig. determine C(S)/R(S) using Mason's gain formula 	**10 Marks**	**L3**	**CO 3**
17.	**a.**	Write the steps involved in the Mason's gain formula	**10 Marks**	**L2**	**CO 3**
Or					
18.	**a.**	obtain the signal flow graph of the system whose block diagram is given in the fig. determine the T.F using Mason's gain Formula 	**10 Marks**	**L3**	**CO 3**
19.	**a.**	Sketch the polar plot of the system having Transfer function $$G(s)H(s) = \frac{10s}{(1+4s)}$$	**10 Marks**	**L3**	**CO 4**
	b	The characteristic equation of the control system is using R-H criterion to ascertain its stability $$s^3 + 9s^2 + 26s + 24 = 0$$	**10 Marks**	L3	CO 4
Or					
20.	**a.**	**Sketch the polar plot of the system having Transfer function** $$G(s) = \frac{1}{(1+s)(1+2s)}$$	**10 Marks**	**L3**	**CO 4**

	b	The characteristic equation of the control system is using R-H criterion to ascertain its stability $\mathbf{S^3+9s^2+25s+21=0}$	**10 Marks**	**L3**	**CO 4**

21.	**a.**	Draw the complete root locus diagram for the system with open-loop transfer function, hence determine the range of variation of **K** over which the system remain stable. $G(s)\,H(s) = \frac{K(s+1)}{s^2(s+3)(s+5)}$	**20 Marks**	**L3**	**CO 4**
		Or			
22.	**a.**	Construct a Root Locus for the open-loop transfer function. $G(s)H(s) = \frac{K}{s(s+2)(s^2+8s+20)}$.	**20 Marks**	**L3**	**CO 4**