



GIET UNIVERSITY, GUNUPUR - 765022
M. Tech (Second Semester) Examinations, May - 2024
MPEMD2042 - Instrumentation and Automatic Control Systems
(Machine Design)

Time: 3 Hrs

Maximum: 70 Marks

(The figures in the right hand margin indicate marks.)

PART – A**(2 x 10 = 20 Marks)**

Q.1. Answer all questions

CO#	Blooms Level
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- Explain use of Root Contours.
- State the merits and demerits of PI Controller
- Mention the steps used to derive the transfer function of a physical system
- Write short notes on Block diagram reduction technique
- Write about Routh Stability Criterion
- State the purpose of control system.
- Mention the advantages of integral control.
- Define the term transfer function
- State the use of Nichol's Chart.
- Define a Transfer Matrix

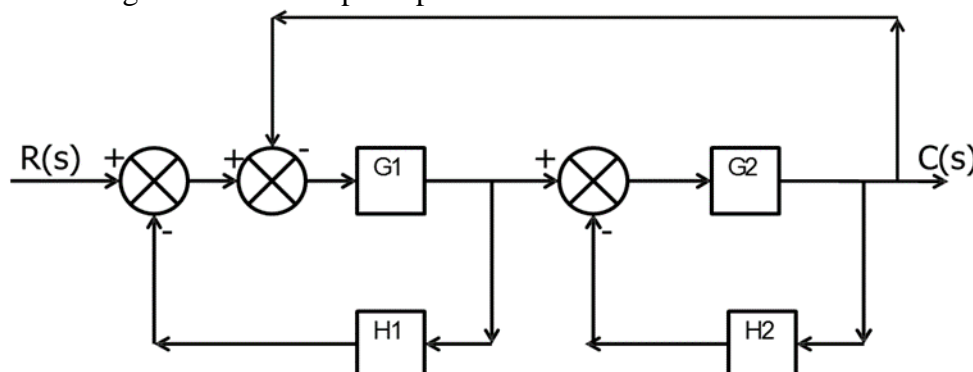
CO3	K2
CO1	K1
CO2	K1
CO3	K1
CO3	K2
CO1	K1
CO1	K1
CO2	K1
CO4	K1
CO4	K1

PART – B**(10 x 5=50 Marks)**Answer ANY FIVE questions

Marks	CO#	Blooms Level
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- Find the transfer function of following control system as shown in figure using block diagram reduction principles.

10	CO2	K3
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- Explain with neat diagrams bubbler level indicators.
 - Explain the use turbine flow meter? Discuss in detail.
- Given the open loop frequency response $G(j\omega) = U + jV$; Obtain the radii and center locations of constant M and N circles
 - Define minimum phase, non-minimum phase and All pass system.

5	CO3	K3
5	CO3	K2
7	CO3	K2
3	CO3	K1

5.a.	Why measure surface strain? Discuss about temperature compensation in strain gauges.	5	CO2	K3
b.	Describe the different instruments used for static strain measurement. Discuss in detail with neat sketches.	5	CO3	K3
6. a.	Describe the terms	5	CO3	K2
	(i)Linearity			
	(ii)Calibration			
b.	Explain the relationship between sensitivity and range?	5	CO1	K1
7.a.	Explain the design of state observer	5	CO1	K1
b.	Illustrate and explain pole placement by state feedback	5	CO1	K1
8.	A feedback system has a closed loop transfer function	10	CO4	K3
	$\frac{Y(s)}{R(s)} = \frac{10s + 40}{s^3 + s^2 + 3s}$			
	Obtain a state space representation of the system			

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