TED (15) – 5043
(Revision – 2015)

A23 – 1505230084

Reg.No……..
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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/ COMMERCIAL PRACTICE , APRIL – 2023

CONTROL SYSTEM

(Maximum Marks : 100) (Time : 3 hours)

PART – A

(Maximum Marks : 10)

Marks

I. Answer **all** questions in one or two sentences. Each question carries 2 marks.

1. State type of a system.
2. Write the Laplace Transform of unit step signal.
3. Define Transfer Function.
4. Define Gain Margin.
5. Define Break in points in control system.

(5x2=10)

PART – B

(Maximum Marks : 30)

II. Answer any **five** of the following questions. Each question carries 6 marks.

1. Draw the block diagram of a closed loop control system and explain each block.
2. Describe Gain crossover frequency and Phase cross over frequency.
3. Define static position and static velocity error constants.
4. State absolute stability and relative stability.
5. Draw the Root locus for the transfer function G(s)= (S+3)/ (S+1).
6. Derive the transfer function of a series RLC circuit.
7. Derive Laplace Transform of e^{-at} and Cosat.

(5x6=30)

PART – C

(Maximum Marks : 60)

(Answer **one full** question from each unit. Each full question carries 15 marks)

UNIT – I

III. (a) State and prove integration theorem. (5)

(b) Find Inverse Laplace Transform of the function $(2s^2-4)/ (s+1)(s-2)(s-3)$. (10)

OR

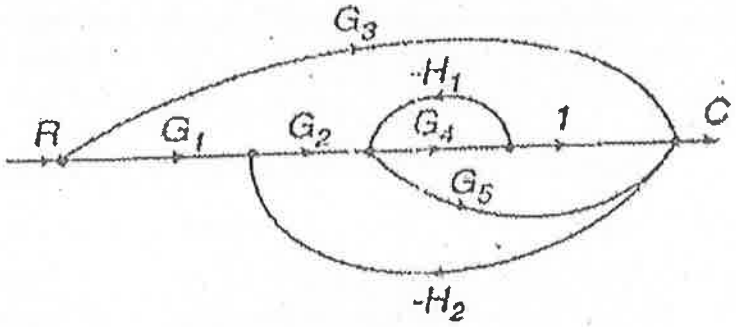
IV. (a) Obtain the solution of the equation. (10)

$$\ddot{y}(t) + \dot{y}(t) + 6y(t)=12,\ Y(0)=\dot{y}(0)=0$$

(b) Derive the Laplace of Ramp signal. (5)

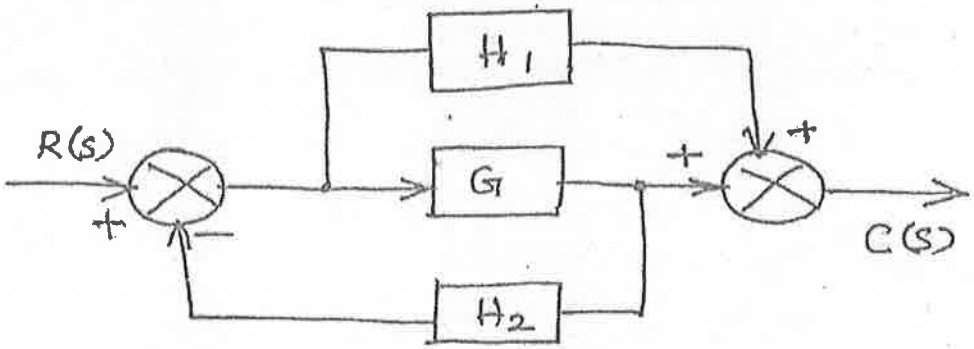
UNIT – II

V. Obtain overall transfer function of the system shown below using signal flow graph method.(15)



OR

VI. (a) Reduce the block diagram and find the overall transfer function. (9)



(b) Define analogus systems. Derive force voltage analogy. (6)

UNIT –III

VII. (a) Determine the stability of the system using Routh Hurvitz Criteria.

$S^6 + S^5 + 5S^4 + 3S^3 + 2S^2 - 4S - 8 = 0$ (10)

(b) Find the response of first order system for unit ramp input. (5)

OR

VIII. (a) Explain Routh Hurwitz criterion to determine the stability of a system. (10)

(b) Derive steady state error in terms of Kp for type 0 system with unit step input. (5)

UNIT – IV

IX. (a) Write procedure for constructing Root Locus of a control system. (10)

(b) List advantages of Bode Plot. (5)

OR

X. (a) Draw Bode plot for the system with transfer function.

$H(s)=1/(S+30)$ (9)

(b) Write short notes on phase Margin. (6)

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