DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/
COMMERCIAL PRACTICE –NOVEMBER -2021.

CONTROL ENGINEERING

(Maximum Marks : 75)

[Time : 2.15 hours]

PART–A

Marks

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

1. Define Control system.

2. What is a Dummy node in Signal flow Graph.

3. What is static velocity Error.

4. What is frequency response of a system.

5. Define peak time.

(3x2=6)

PART - B

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

1. Find laplace transformation of e^{-at}

2. State and prove real integration theorem.

3. Derive the transfer function of a mechanical Rotational system.

4. Explain any six block diagram reduction Rules.

5. Find the steady state error of a unity feedback closed loop system having the

   following open loop transfer function subjected to an input of 5t u(t)

$$\frac{125}{s(s + 10)}$$

6. Derive an expression for steady state error of a unity feed back closed loop system.

7. Sketch Bode plot for G(s) =K

[4x6 =24]

PART - C

(Answer **any of the three units** from the following. Each full question carries 15 marks)

UNIT I

III	(a)	Find the Laplace transform of (i) At (ii) Cos at	(7)
	(b)	Compare Open loop system and Closed Loop System.	(8)

OR

IV	(a)	State and prove initial value theorem.	(7)
	(b)	Find the inverse Laplace transform of	

$$\frac{10(S^2+2S+2)}{S^2+9S+20}$$

(8)
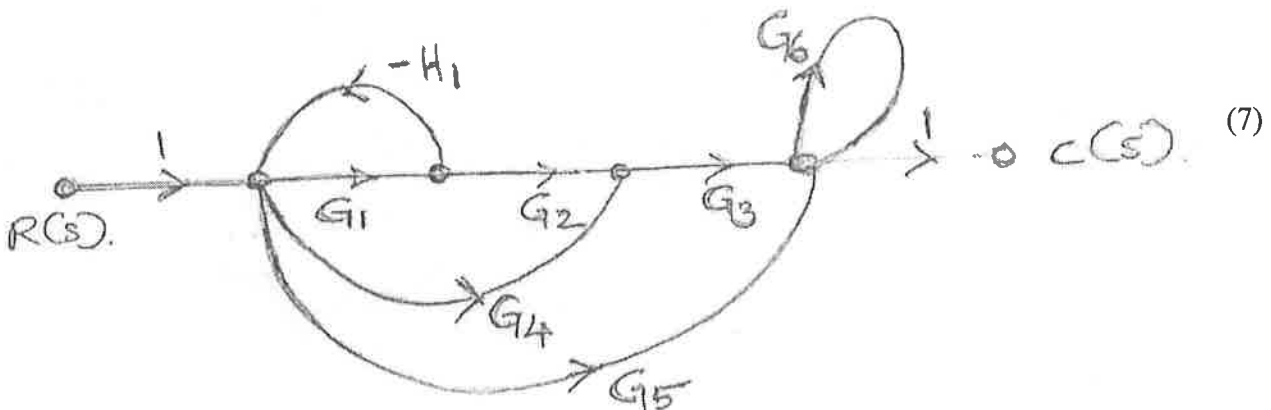
UNIT- II

V	(a)	Derive transfer function of a series RLC circuit.	(8)
	(b)	Using block diagram reduction rules find the overall transfer function of the given block diagram.	
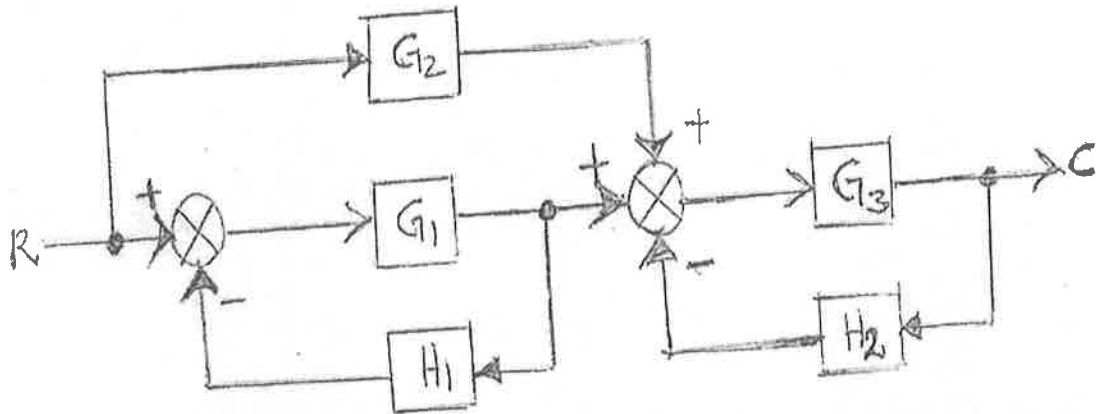
(7)

OR

VI	(a)	Describe Force- Voltage analogous system with examples.	(8)
	(b)	Find the overall transfer function of the given signal flow graph.	

(7)

UNIT- III

VII (a) Obtain the response of a first order system subjected to unit step

input signal and draw the response curve. (7)

(b) Describe the transient response specifications of a system. (8)

OR

VIII (a) Obtain the response of a first order system subjected to unit Ramp input

signal and draw the response curve. (7)

(b) Describe Standard test signals. (8)

UNIT – IV

IX (a) Determine the range of values of K for stability of the system whose transfer

function is given by

$$G(S) = \frac{K}{(S+1)^3(s+3)}$$ (8)

(b) Construct Bode plot for the transfer function(s) =1+TS. (7)

OR

X (a) Sketch the Root Locus for the following transfer function and comment

on stability.

$$G(s) = \frac{K}{S(S+3)(S+5)}$$

(10)

(b) Define Absolute stability and Relative Stability. (5)

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