Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Summer Examination-2018

Subject Name: Control System Engineering

Subject Code: 4TE04CSE1 **Branch: B.Tech (EC)**

Semester: 4 **Date: 03/05/2018** **Time: 10:30 To 01:30** **Marks: 70**

Instructions:

(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1 **Attempt the following questions:** **(14)**

a) Define rise time.
b) Define steady state error.
c) State any two disadvantages of digital control system over an analog data control system.
d) State the limitation of transfer function.
e) What mean by critically stable system?
f) State the advantage of lead compensation.
g) What is asymptote?
h) State the condition for stable system.
i) Define Break away point.
j) Draw close loop system with its parameters.
k) Define centroid.
l) What is peak time?
m) What is time invariant system?
n) Define linear system

Attempt any four questions from Q-2 to Q-8

Q-2 **Attempt all questions** **(14)**

1	Explain servomechanism system with suitable example.	**07**
2	What is bode plot? Write the procedure to bode plot with example.	**07**

Q-3 **Attempt all questions** **(14)**

1	Explain Routh's stability in detail.	**07**
2	State and explain Nyquist stability criterion. Write advantages and limitations of the Nyquist stability criterion	**07**

Q-4 **Attempt all questions** **(14)**

1	Compare Closed loop system and open loop system.	**06**

	2	What is transfer function? State the advantage and disadvantage of it.	**06**
	3	Write a Mason's gain formula. State the meaning of each term.	**02**
Q-5		**Attempt all questions**	**(14)**
	1	Define system error and derive the expressions for error constants	**07**
	2	Why compensator is required? Explain Phase-lead compensator in detail	**07**
Q-6		**Attempt all questions**	**(14)**
	1	What is Close loop Control System? Explain with suitable example and sketch.	**07**
	2	Explain different types of signals which is used in control system.	**07**
Q-7		**Attempt all questions**	**(14)**
	1	Sketch the root locus of the system whose open-loop transfer function is $G(s) = K / [S (S+1) (S+3)]$.Find the values of K so that the damping ratio of the closed-loop system is 0.5.	**07**
	2	A linear feedback control system has the block diagram shown in Fig. 1. obtain overall transfer function C(s)/R(s)	**07**
Q-8		**Attempt all questions**	**(14)**
	1	Draw the Bode plot for a system having $G(s) H (s) = 1000/ [S(S+3)(S+2)]$ Find out Gain margin, Phase margin, Gain crossover frequency and phase cross over frequency	**07**
	2	Explain force/current analogy and force/voltage analogy for any system.	**07**

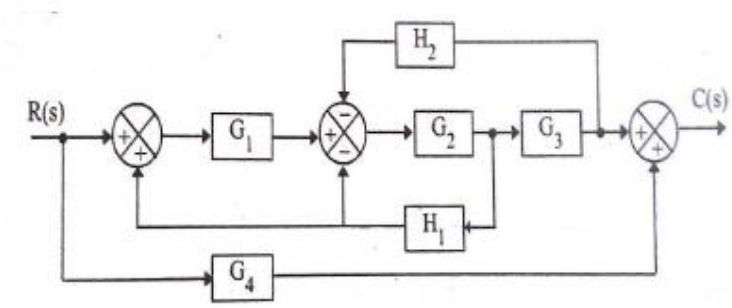

Fig-1