Roll No:_____

Total no. of Questions: 06

Time: 03 hours

Total no. of pages: 01

M.M: 60

B.Tech ECE 5th Sem
Linear Control Systems
Subject Code: BTEC-503A (Paper ID:)

Note: All questions are compulsory.

Section A (10 x 2marks=20)

1. Write answers to the point
   a) Compare open Loop and closed loop control system. Give examples.
   b) Define and draw phase lag-lead network.
   c) Explain servomechanism in short.
   d) State Mason's Gain Formula.
   e) Differentiate between linear and non-linear systems with examples.
   f) Draw time response of a first order control system subjected to a unit step function.
   g) State Nyquist Criteria of stability.
   h) Define poles, zeros, type and order of a control system, with the help of an example.
   i) Define gain margin and phase margin and relate them with stability of a system.
   j) Draw the bode plot for the gain term 'K'

Section B –(5 x 8marks = 40)

2.	Explain the modeling of the thermal system and find its transfer function. OR Draw the signal flow graph and determine the overall transfer function of the given block diagram. 	CO1
3.	Explain various frequency domain specifications. OR Explain the time response of a second order critically damped control system subjected to unit step input function.	CO2
4.	Determine the stability by Routh criteria of a closed loop control system whose characteristic equation is $s^5 + s^4 + 2s^3 + 2s^2 + 11s + 10 = 0$ OR A unit step input is applied to a unity feedback control system whose open loop transfer function is given by $G(s) = k / (s(sT+1))$. Determine the values of K and T given that maximum overshoot $M_p = 26\%$ and resonant frequency $\omega_r = 8$ red/sec. Calculate the resonance peak M_r, gain crossover frequency and phase margin.	CO3
5.	Discuss in detail the design procedure for a phase lead compensator network. OR Discuss in detail the design procedure for a phase lag compensator network.	CO4
6.	Explain the construction, principle and working of potentiometer. How is it used as error detector? OR Write short notes on a) Dc tachogenerators and b) Magnetic amplifiers	CO4