ROLL No: Total number of Pages:[02]

Total number of questions:06

May 2018

Reappear

2015 Batch onwards

B.Tech. || ECE || 5th Semester
Linear Control System
Subject Code: BTEC-503A

Time allowed: 3 Hrs   Max Marks: 60

Important Instructions:

- All questions are compulsory
- Assume any missing data

PART A (2×10)

Q. 1. Short-Answer Questions: All COs

(a) What is servomechanism?

(b) Define plant.

(c) State Mason's Gain Formula. Define each term clearly

(d) Define source node. sink node. Path Gain. Loop gain and all non-touching loops in a signal flow graph.

(e) What are necessary conditions for Routh Hurwitz Criteria?

(f) Define lead compensator with the help of its transfer function.

(g) Define Gain Crossover frequency.

(h) Define the damping ratio and explain how it affects the response of a system?

(i) Explain potentiometer error detectors.

(j) Draw the block diagram of a open loop system.

PART B (8×5)

Q2. What is closed loop system? Derive the expression for closed loop transfer function.   COa

OR

What are the Basic elements in thermal system? Derive the transfer function of thermal system.   COa

Q3. Draw the signal flow graph for the following system and calculate the transfer function using Mason's gain formula.   COa
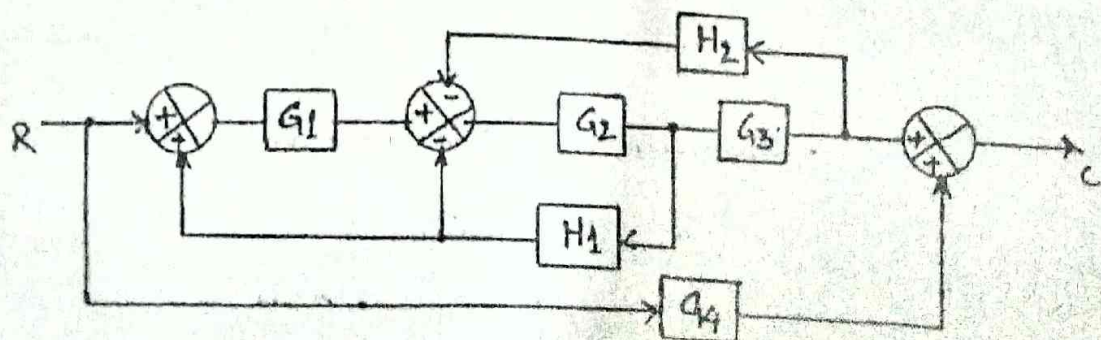
OR

What are the advantages of sampled data control system over the continuous data COa control system? Draw and Explain the block diagram of sampled data control system.

Q4. Define transient response. Draw a typical transient response output for an COb underdamped second order system and show the locations of all the transient responses specifications.

OR

For a unity feedback control system the forward path transfer function is given by COb

$$G(s) = 20/s \, (s+2) \, (s^2 + 2s +20)$$

Determine the steady state error of the system .When the inputs are (i) =5 (ii) 5t (iii) $3t^2/2$.

Q5. Discuss the Routh - Hurwitz criteria for determining the stability of a control COc system and calculate the range of K, for, stable operation of following characteristic equation

$$s^4 + 20Ks^3 + 5s^2 +10s + 15 = 0$$

OR

What are M and N circles? Explain the physical significance of these circles in COc stability study.

Q6. Why AC techo-generator is used in control system? Explain its function with the COd help of suitable diagram.

OR

What is Compensating Network? Explain the types of compensations and designs COd of compensations using Bode's Plot.