

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Electronics & Communication Engg.) (Sem.-5)

CONTROL SYSTEMS

Subject Code : BTEC-504-18

M.Code : 78300

Date of Examination : 20-06-2024

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

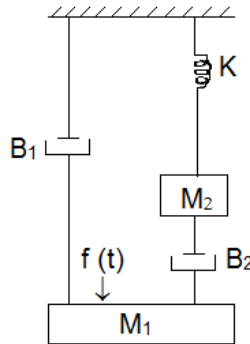
SECTION-A

1. Write briefly :

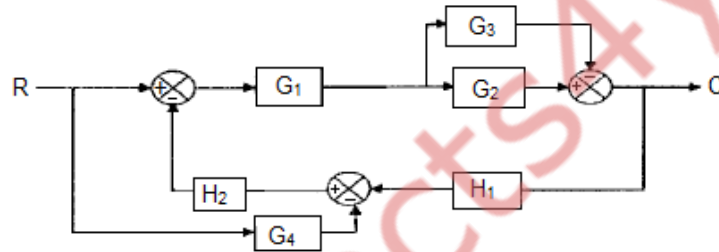
- a. Define linear control system.
- b. State Mason's Gain formulae
- c. What is meant by relative Stability of a control system?
- d. Define rise time for a second order control system
- e. Define Nyquist stability criteria
- f. What is gain margin?
- g. List the standard test signals used in control system.
- h. Define bandwidth
- i. Define Servomechanism
- j. Define non-linear control system.

SECTION-B

2. Draw the force-voltage analogy and force current analogy for the mechanical system shown in figure.



3. Develop the transfer function for the block diagram shown in fig. using block diagram reduction technique.



4. Explain the co-relationship between time and frequency response for second order systems.
5. What are the steps to apply Routh criterion? Solve using Routh Hurwitz criterion $s^6+2s^5+8s^4+12s^3+20s^2+16s+16=0$
6. **Differentiate:** AC and DC tacho generators.

SECTION-C

7. For the unity feedback control system $G(s) = \frac{1}{(s+1)(1+2s)}$. Sketch the Bode plot.

Determine the gain and phase margin

8. Sketch the root locus for a unity feedback control system has an open-loop transfer function

$$G(s) = \frac{K(s+9)}{s(s^2+4s+11)}$$

9. Distinguish between transfer function and state space representation of linear time invariant system and hence define the state transition matrix with its importance in system study.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.