

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(EE)PT (Sem.-4)
LINEAR CONTROL SYSTEMS
Subject Code : BTEE-402
Paper ID : [72448]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION 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. Answer briefly :

- Differentiate between time variant and time invariant control systems.
- Write down the analogies of electrical and mechanical systems.
- Compare absolute stability and relative stability.
- Define poles and zeros of a system.
- What is unit step signal? Determine the Laplace transform of unit step signal.
- Discuss the advantages of frequency domain analysis.
- Explain the term breakaway point w.r.t. root locus.
- What do you mean by peak time and rise time? Explain.
- List the advantages of Bode plot.
- How servo motor is different from ordinary motor? Explain.

SECTION-B

2. Explain :
 - a. Continuous and sampled data control systems.
 - b. Open loop and closed loop control systems.
3. Determine the unit ramp response of a system having the closed loop transfer function given below :

$$\frac{C(s)}{R(s)} = \frac{1}{sT + 1}$$

4. Determine the value of K such that the roots of the characteristics equation given below lie to the left of the line $s = -1$

$$S^3 + 10s^2 + 18s + K = 0$$

5. Determine the transfer function of the Signal Flow Graph shown in Figure 1.

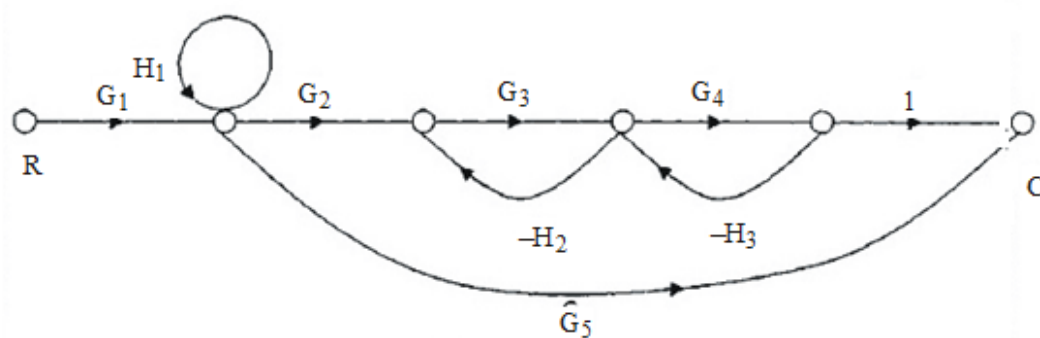


Fig.1

6. What do you mean by compensation? Why is it required? Explain the series and parallel compensation.

SECTION-C

7. Draw the Nyquist plot for the open loop transfer function given below and comment upon the closed loop stability

$$G(s) H(s) = \frac{2.2}{s(s+1)(s^2 + 2s + 2)}$$

8. Sketch the root locus plot for the system when open loop transfer function is given by

$$G(s) H(s) = \frac{K}{s(s+6)(s^2 + 4s + 13)}$$

9. Discuss potentiometers and synchros error detectors in detail.