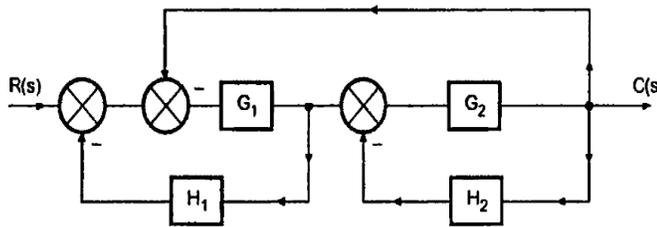


Duration: 3hrs

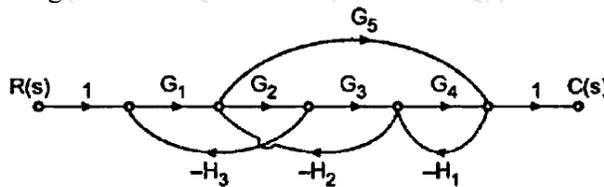
[Max Marks:80]

- N.B.:** (1) Question No 1 is Compulsory.
 (2) Attempt any three questions out of the remaining five.
 (3) All questions carry equal marks.
 (4) Assume suitable data, if required and state it clearly.

- 1 Attempt any **FOUR** [20]
- Define accuracy and precision with suitable examples. [5]
 - Explain working of Mega-ohm bridge for measurement of resistance of order of mega ohm. [5]
 - List name of bridges for RLC measurement with proper classification. [5]
 - Discuss steps for construction of root locus. [5]
 - Compare NTC and PTC thermistors. [5]
- 2 a Explain the construction & working of LVDT. List the Advantages & Disadvantages of LVDT. [10]
- b Determine the overall transfer function $C(S)/R(S)$ for the system shown below using block diagram reduction method. [10]



- 3 a For the Signal flow graph shown below, determine the transfer function $C(S)/R(S)$ using Mason's gain formula. [10]



- b For a unity feedback control system, the open loop transfer function $G(s) = \frac{100(S+1)}{S^2(S+2)(S+10)}$ [10]
 Determine (i) Type of system (ii) Error coefficients (iii) Steady state error if input is $1 + 4t + \frac{t^2}{2}$
- 4 a Use the Rouths stability criterion to check the stability of system whose characteristic equation is given by $S^6 + 2S^5 + 8S^4 + 12S^3 + 20S^2 + 16S + 16 = 0$ [10]
- b The open loop transfer function of system $G(s)H(s) = \frac{50}{(s+1)(s+2)}$. Using Nyquist criterion examine closed loop stability of system.

- 5 a Plot the root locus for a unity feedback control system has an open loop transfer [10]
$$G(s) = \frac{K}{s(s^2+6s+25)}$$
- b Sketch the Bode plot for the unity feedback control system $G(s) = \frac{100}{s(s+1)(s+2)}$ [10]
Determine the gain and phase margin.
- 6 Attempt any **FOUR**
- a Write a short note on requirements of good control system. [5]
- b List various types of temperature transducers and write application of each transducer. [5]
- c Explain advantages and limitations of Routh Hurwitz stability criterion. [5]
- d Write a short note on steady state errors in feedback control system. [5]
- e For a unity feedback system $G(s) = \frac{9}{s(s+4)}$. Determine resonant peak and resonant [5]
frequency.