**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]
	a	Explain the Criteria for the selection of transducers.	[5]
	b	A unity feedback system has $G(S) = \dfrac{40(s+2)}{s(s+1)(s+5)}$. Determine	[5]

      1. Type of system
      2. All error coefficients

	c	Explain HART communication protocol.	[5]
	d	Differentiate between open loop system and close loop system.	[5]
	e	Explain the advantages of the digital control system.	[5]

2 a Using the block diagram reduction technique find the close loop transfer
function of given system. [10]
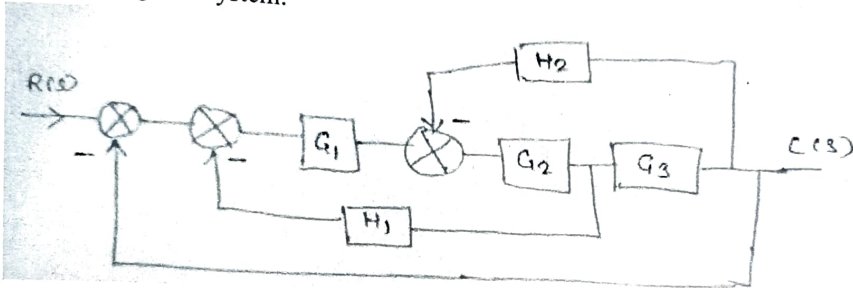
b Using meson's gain formula find transfer function $\dfrac{C(S)}{R(S)}$ of given System. [10]
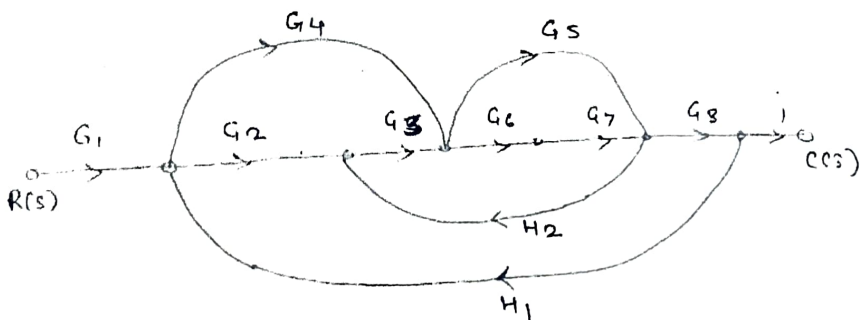
3 a Draw the root locus of a unity feedback control system with $G(S) =$ [10]
$\dfrac{K}{S(S+5)(S+10)}$. Comment on the stability of the system.

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b   Using Routh Harwitz's criterion for the unity feedback system with open loop   [10]
    transfer function $G(S) = \dfrac{K}{S(S+1)(S+2)(S+5)}$ Find

    1) The range of k for stability
    2) The value of k for marginally stable system.

4   a   A unity feedback system is characterized by an open loop transfer function   [10]
        $G(S) = \dfrac{K}{S(S+10)}$. Determine the gain k so that the system will have damping ratio
        of 0.5. For this value of k determine, setting time, peek overshoot and time to
        peak overshoot for unit step input.

    b   Construct the bode plot for given Transfer function $G(S)H(S) = \dfrac{10(S+10)}{S(S+2)(S+5)}$ [10]

5   a   Explain Construction and Working of LVDT. Also list applications of LVDT.   [10]
    b   Explain different types of temperature transducers in detail with suitable   [10]
        diagram.

6   a   Explain Architecture of SCADA System.   [10]
    b   Explain Telemetry system and list types of telemetry system.   [10]

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