Duration: 3hrs   **[Max Marks:80]**

N.B.:   (1) Question No 1 is Compulsory.

         (2) Attempt any three questions out of the remaining five.

         (3) Assume suitable data, if required and state it clearly.

Q1.   Attempt any **FOUR**   [20]

    a.   Write down the steps for construction root locus of a system.   [5]

    b.   What is a bridge circuit? Derive the generalized equation of a balanced bridge.   [2+3]

    c.   Define linearity, precision and resolution of an instrument.   [5]

    d.   Explain gain margin and phase margin in root locus.   [5]

    e.   Define Phase crossover frequency and Phase Margin in Bode Plot.   [5]

Q2.   a.   Explain measurement of inductance using Maxwell bridge with proper circuit diagram.   [10]

    b.   Sketch the Root locus for the system having open loop transfer function,   [10]

$$G(s)\ H(s) = \frac{K}{S(S+3)(S+6)}$$

Q3.   a.   For a unity feedback system given below, explain and sketch the Bode Plot.   [10]

$$G(S) = \frac{10}{S(S+1)\ (S+5)}$$

    b.   Sketch the root locus of the unity feedback control system with   [10]

$$G(s) = \frac{k}{s(s+5)(s+10)}$$ and comment on the stability.

Q4.   a.   Explain Kelvin's Double Bridge and its application in very low resistance   [10]
measurement

    b.

For the feedback control system $G(s)\ H(s) = \dfrac{1}{(S+2)\ (S+4)}$ Draw the Nyquist plot   [10]

and comment on the stability of the System.

Q5.   a. $G(s)\ H(s) = \dfrac{10}{S\ (S+2)}$, Draw the polar plot of the system.   [10]

    b.   Explain the working of Wheatstone bridge for the measurement of medium   [10]
resistance

Q6.   a.   Discuss the correlation between time domain and frequency domain parameters.   [7]

    b.   Explain the working of Megohm Bridge.   [7]

    c.   Explain Hey Bridge and its applications in the measurement of inductance.   [6]

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