

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]
- Write down the steps for construction root locus of a system. [5]
 - What is a bridge circuit? Derive the generalized equation of a balanced bridge. [2+3]
 - Define linearity, precision and resolution of an instrument. [5]
 - Explain gain margin and phase margin in root locus. [5]
 - 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 measurement [10]
- b. For the feedback control system $G(s) H(s) = \frac{1}{(S+2)(S+4)}$ Draw the Nyquist plot [10]
- and comment on the stability of the System.
- Q5. a. $G(s) H(s) = \frac{10}{S(S+2)}$, Draw the polar plot of the system. [10]
- b. Explain the working of Wheatstone bridge for the measurement of medium resistance [10]
- 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]
