

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 Define sensitivity with suitable examples. [5]
  - b State the differences between accuracy and precision with suitable examples [5]
  - c Explain the block diagram of a generalized measurement system [5]
  - d Explain the general rules for constructing a root locus plot. [5]
  - e State the advantages and disadvantages of frequency domain analysis of a system. [5]
- 2 a Discuss the process of measurement of low resistance by a Kelvin Double bridge. [10]
  - b Derive an expression for measurement of capacitance by Schering bridge. [10]
- 3 a Explain the process of measurement of inductance by a Maxwell bridge. State the applications of Maxwell bridge. [10]
  - b State the procedure of measurement of high resistance by a mega-ohm bridge. [10]
- 4 a Sketch the root locus of the system with open loop transfer function [10]
 
$$G(s) = \frac{k}{s(s^2 + 8s + 15)}$$
  - b A unity feedback system has an open loop transfer function  $G(s)H(s) = \frac{k}{s(s^2 + 2s + 2)}$ . Sketch the root locus and determine the limiting value of k for stability [10]
- 5 a Draw the bode plot of the system having  $G(s) = \frac{100}{s(1+0.5s)(1+0.1s)}$   $H(s) = 1$  [10]
  - b Draw the Bode plot for the following transfer function  $G(s)H(s) = \frac{800}{s^2(s+10)(s+40)}$ . Comment on the stability of the system. [10]
- 6 Attempt any FOUR
  - a Define the terms with suitable examples a) resolution b) hysteresis [5]
  - b Write a short note on measurement of medium resistance using Wheatstone bridge [5]
  - c Explain how stability analysis is done using Root locus in time domain. [5]
  - d Explain advantages and disadvantages of polar plots [5]
  - e Derive the equation of measurement of inductance by a Hey bridge. [5]

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