## Paper / Subject Code: 51225 / Electronics Instrumentation and Control System

1T01033 - S.E.(Electronics and Telecommunication )(SEM-III)(Choice Base Credit Grading System ) (R- 19) (C Scheme) / 51225 Electronics Instrumentation and Control System QP CODE: 10027784 DATE: 05/06/2023

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 accuracy and precision with suitable examples.

[5]

[5]

- b Explain working of Mega-ohm bridge for measurement of resistance of order of mega ohm.
- c List name of bridges for RLC measurement with proper classification.

[5]

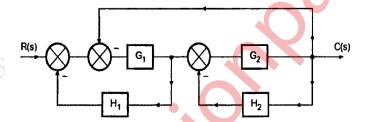
d Discuss steps for construction of root locus.

[5]

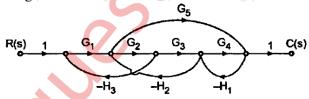
e Compare NTC and PTC thermistors.

[5]

- 2 a Explain the construction & working of LVDT. List the Advantages & Disadvantages of [10] LVDT.
  - Determine the overall transfer function C(S)/R(S) for the system shown below using [10] block diagram reduction method.



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



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 [10] equation is given by  $S^6 + 2S^5 + 8S^4 + 12S^3 + 20S^2 + 16S + 16 = 0$ 
  - 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  $G(s) = \frac{K}{S(S^2 + 6S + 25)}$ [10]
  - 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.
  - b List various types of temperature transducers and write application of each transducer. [5]

[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.