June 14, 2024 02:30 pm - 05:30 pm 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: 10055893

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

N.B.: (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) Figures in the right margin indicate the marks.
(4) Assume suitable data, if required and state it clearly.

1		Attempt any **FOUR**	**[20]**
	a	Compare accuracy and precision with suitable examples.	**[5]**
	b	Using Routh's stability criterion, comment on the stability of the given system, having the characteristic equation $s^4+4s^3+13s^2+36s+5=0$.	**[5]**
	c	What are active and passive transducers? Explain the various criteria for the selection of a particular transducer.	**[5]**
	d	Explain how stability of the system can be analyzed using the Nyquist plot.	**[5]**
	e	Explain the correlation between the time domain and frequency domain characteristics.	**[5]**
2	a	Explain with a neat diagram the working principle of LVDT. State one application of LVDT.	**[10]**
	b	Discuss the working principle of Resistance Temperature Detector (RTD) and its use in detail.	**[10]**
3	a	Derive expression for inductance measurement using Hay's bridge along with a neat diagram.	**[10]**
	b	Explain Kelvin's double bridge and its application in very low resistance measurement. Derive the balanced equation of Kelvin double bridge.	**[10]**
4	a	Sketch the root locus for the system with an open-loop transfer function given by $G(s)H(s) = \frac{K}{S\,(S+1)(S+3)}$.	**[10]**
	b	Sketch the Bode diagram for the following transfer function and obtain Gain margin and Phase margin. $G(s)H(s) = \frac{0.75\,(1+0.2\,S)}{S(1+0.5S)\,(1+0.1S)}$	**[10]**
5	a	Sketch the polar plot for the system with an open-loop transfer function given by $G(s)H(s) = \frac{1}{S\,(S+2)}$.	**[10]**
	b	For a unity feedback system having open loop transfer function $G(s)H(s) = \frac{10(s+3)}{s(s+1)(s+2)}$. Find i) Position error constant ii) Velocity error constant and iii) Acceleration error constant.	**[10]**

6 Attempt any **FOUR** **[20]**

a Define the terms a) hysteresis b) sensitivity and d) linearity. **[5]**

b Write a short note on Mason's gain formula and its use. **[5]**

c Explain performance characteristics of a second order system. **[5]**

d Draw the phasor diagram and derive the balanced equation of Schering bridge for the measurement of unknown capacitance. **[5]**

e Explain the lead compensator in detail. **[5]**
