K. J. Somaiya Institute of Engineering and Information Technology, Sion, Mumbai-22

(Autonomous College Affiliated to University of Mumbai)

End Semester Exam

Feb-2022

(B.Tech) Program: Electronics and Telecommunication

Examination: SY Semester: III

Course Code: 1UEXC304 Course Name: Electronic Instrumentation & Control system
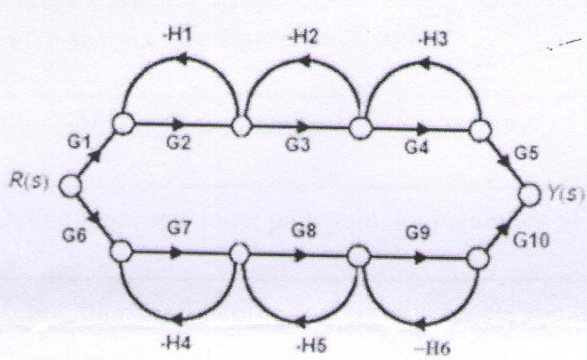
Duration: 03 Hours   Max. Marks: 60

Instructions:

(1)All questions are compulsory.

(2)Draw neat diagrams wherever applicable.

(3)Assume suitable data, if necessary.

		Max. Marks	CO	BT level
Q 1	**Solve any six questions out of eight:**	12		
i)	Why calibration of instrument is important?	2	1	U
ii)	Define loop, self-loop, path gain, loop gain for SFG.	2	3,5	U
iii)	Define transfer function state its advantages and limitations	2	3, 5	U
iv)	State the disadvantages of Hay's bridge.	2	1	U
v)	State Nyquist stability criterion	2	4,6	U
vi)	What is frequency response and list out the different frequency domain specifications?	2	4,6	U

vii)	Define a stable system.	2	3,5	U
viii)	Draw Schering bridge and write balanced condition for the same.	2	1, 2	U
Q.2	**Solve any four questions out of six.**	16		
i)	Consider a system with open loop transfer function as G(s) H(s) $= \frac{10}{s}$, obtain its polar plot.	4	4,6	AP
ii)	Determine the stability of a system with characteristic equation. $S^5 + 4S^4 + 2S^3 + 8S^2 + S + 4 = 0$	4	3,5	AP
iii)	State the Bode Plot magnitude curve characteristics of a type 1 system. $$G(jw) = \frac{K_1}{jw(1 + jwT_1)}$$	4	4,6	AP
iv)	Construct SFG of the system described by the following equations; where R is input & C is output and x1, x2, and x3 are the system nodes. $x1 = R + 7x1 + 2x2 + 5x3$ $x2 = -6x1 + 4x2 + 8x3$ $x3 = 3x1 - 9x2 + 6x3$ $C = 2x1 + x2 + 3x3$	4	3,5	AP
v)	Compare temperature transducer thermistor and thermocouples based on principle, characteristics, and applications.	4	1	U
vi)	Derive the expression for the resistance using Wheatstone bridge for balanced condition.	4	1	U
Q.3	**Solve any two questions out of three.**	16		

i)	Sketch the root locus for $$G(s) = \frac{K}{s(s^2 + 6s + 12)} \,, H(s) = 1$$	8	3,5	AP
ii)	Explain different static characteristics of an instrument.	8	1	U
iii)	Sketch the bode plot for the transfer function. $$G(s) = \frac{1000}{s(1 + 0.1s)(1 + 0.001s)}$$	8	4,6	AP
Q.4	**Solve any two questions out of three.**	16		
i)	Explain thermocouple with their types in details.	8	4,6	U
ii)	For a system with characteristics equation, i) $S^6 + 3S^5 + 4S^4 + 6S^3 + 5S^2 + 3S + 2 = 0$ ii) $S^6 + 2S^5 + 8S^4 + 12S^3 + 20S^2 + 16S + 16 = 0$ Examine stability.	8	3,5	AP
iii)	Using Mason's Formula, Find the T.F.	8	3,5	AP