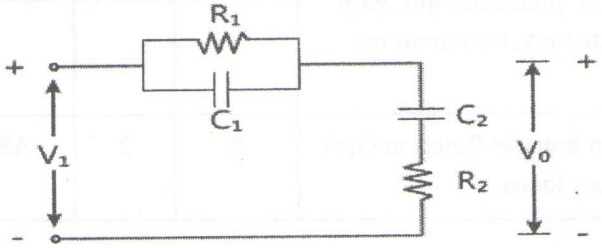
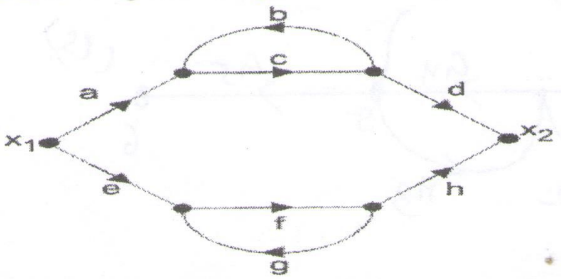
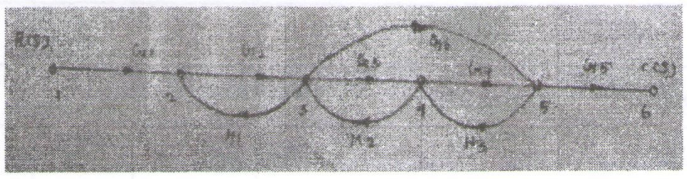
K. J. Somaiya Institute of Information Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)
End Semester Exam
Nov – Dec 2022 (Jan 2023)
(B. Tech) Program: Electronics and Telecommunication Engineering
Examination: SY Semester: III
Course Code: **EXC304** and Course Name: **Electronic Instrumentation & Control Systems**
Duration: 2.5 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)	What is break away point in root locus?	2	1	U
ii)	What is the working principle of thermistor?	2	1	U
iii)	Define accuracy and precision with proper example.	2	2	U
iv)	Define angle of departure in root locus.	2	2	U
v)	What do you understand by calibration in instrumentation?	2	3	R
vi)	Draw Wheatstone bridge and write balance condition equation.	2	4	U
vii)	State gain margin and phase margin.	2	5	U
viii)	Define transfer function?	2	6	U
Q.2	**Solve any four questions out of six.**	**16**	**1 - 6**	
i)	Find the transfer function of above electrical network. 	4	1	AP
ii)	Write short note on Mega ohms bridge.	4	2	U
iii)	Solve using mason's gain formula. 	4	3	Ap

iv)	Using Routh's stability criterion determine the number of roots in right half plane , comment on stability of the system ; $F(S) = S^5+2S^4+3S^3+6S^2+10S+15$	4	4	Ap
v)	Discuss how Schering bridge can be used for the measurement of capacitance with proper derivation and diagram.	4	5	Ap
vi)	Draw and explain a generalised block diagram of measurement system.	4	6	U
Q.3	**Solve any two questions out of three.**	**16**		
i)	Discuss how kelvin's double bridge can be used for the measurement of resistance with proper derivation and diagram.	8	1	U
ii)	For a unity feedback system, $G(s) = K / S (1+0.4S) (1+0.25S)$ find range of k, marginal value of k and frequency of sustained oscillations.	8	3	Ap
iii)	The signal flow graph for a feedback system is shown in fig. Determine the closed loop transfer function C(S)/R(S). 	8	5	Ap
Q.4	**Solve any two questions out of three.**	**16**		
i)	With the help of diagram explain thermocouple, its operation, mention the types of thermocouples with their temperature ranges in details	8	4	U
ii)	A unity feedback control system has $G(s) = 100 / S(S+1) (S+10)$, Draw the bode plot, determine gain margin, phase margin, gain crossover frequency, phase crossover frequency, comment on stability.	8	6	Ap
iii)	A unity feedback system has an open loop transfer function G(s) $H(s) = K / S (S+1) (S+3)$, construct the root locus.	8	2	AP