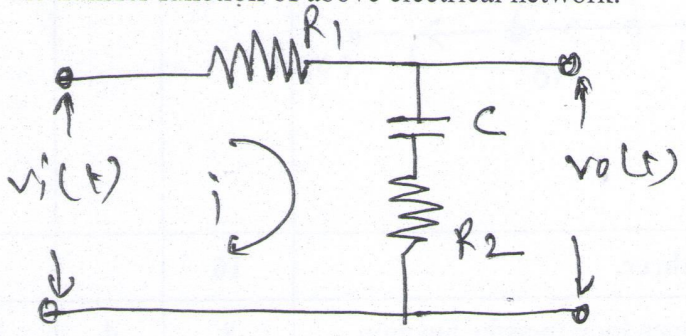
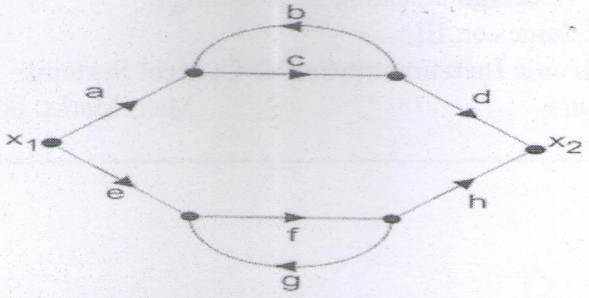
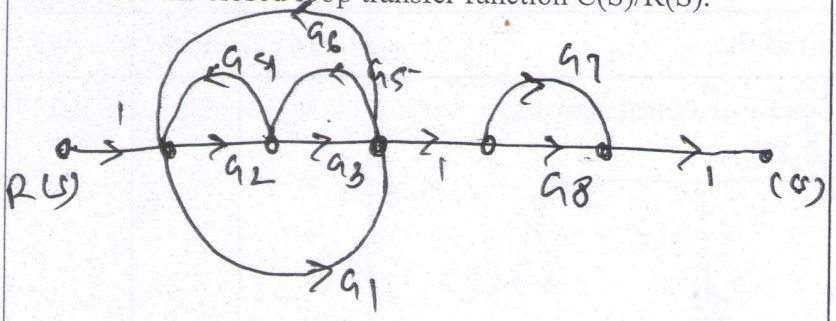
K. J. Somaiya Institute of Information Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)
Supplementary Examination of August 2023
(B. Tech) Program: Electronics and Telecommunication Engineering
Examination: SY Semester: III
Course Code: **EXC304** and Course Name: **Electronic Instrumentation & Control Systems**
Date :29/08/23 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)	Define linearity?	2	1	U
ii)	Define mason's gain formula.	2	1	U
iii)	Write balance equation for Schering bridge.	2	2	U
iv)	What is breakaway point in root locus.	2	2	U
v)	Define angle of arrival in root locus.	2	3	R
vi)	Define NTC and PTC ?	2	4	U
vii)	What is angle of asymptotes in root locus?	2	5	U
viii)	State gain cross over and phase crossover frequency.	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 Calibration.	4	2	U

iii)	Solve using mason's gain formula. 	4	3	Ap
iv)	Discuss how hay's bridge can be used for the measurement of inductance with proper derivation and diagram.	4	4	Ap
v)	Using Routh's stability criterion determine the number of roots in right half plane, comment on stability of the system; $F(S) = S^6+S^5+3S^4+3S^3+2S^2+2S+1 = 0$	4	5	Ap
vi)	Draw and explain a block diagram of measurement system.	4	6	U
Q.3	**Solve any two questions out of three.**	**16**		
i)	Discuss how kelvin's bridge can be used for the measurement of resistance with proper derivation and diagram.	8	1	U
ii)	For a unity feedback system, $G(s) = K / S (S+2) (S+4) (S+8)$ 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)	A unity feedback system has an open loop transfer function $G(s) H(s) = K / S (S+3) (S+5)$, construct the root locus.	8	4	U
ii)	A unity feedback control system has $G(s) = 80 / S(S+2) (S+20)$, Draw the bode plot, determine gain margin, phase margin, gain crossover frequency, phase crossover frequency, comment on stability.	8	6	Ap
iii)	With the help of diagram explain thermocouple and its operation.	8	2	AP