

Jan-Feb ~~Nov-Dec~~ 2025

B. Tech Program / Electronics and Telecommunication Engineering - Scheme III
Supplementary ~~Regular~~ Examination SY Semester III

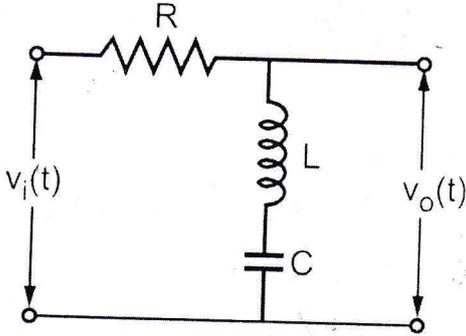
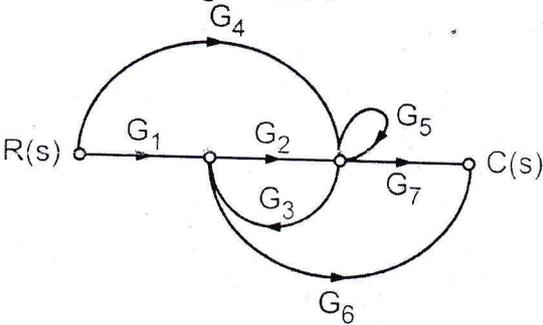
Course Code: EXC304 and Course Name: Electronic Instrumentation and Control System

Date of Exam: ~~29/11/2025~~ 03/02/26 Duration: 02.5 Hours

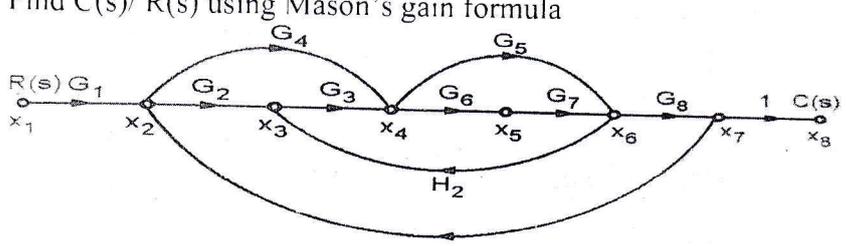
Max. Marks: 60

Instructions:

- (1) All questions are compulsory.
- (2) Draw neat diagrams wherever applicable.
- (3) Assume suitable data, if necessary.

Q. No.	Question	Max. Marks	CO	BT level
Q 1	Solve any two questions out of three: (05 marks each)	10		
a)	Obtain the transfer function of the given circuit. 		3	AP
b)	Determine the overall transfer function $C(s) / R(s)$ for the Signal Flow Graph shown in the figure below 		5	AP
c)	Explain how stability analysis is done using the Bode Plot.	6	U	
Q 2	Solve any two questions out of three: (05 marks each)	10		

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a)	Define Accuracy, Precision, Linearity, and Sensitivity with suitable examples.		1	U
b)	Compare RTD, thermistor and thermocouple		2	U,A
c)	Find the stability of given equation $C_S = S^5 + 2S^4 + 3S^3 + 6S^2 + 10S + 15$		5	AP
Q.3	Solve any two questions out of three. (10 marks each)	20		
a)	Draw a Bode Plot of the system with open-loop transfer function: $G(s) = \frac{8}{s(s+2)(s+4)}$ Determine stability margins (gain and phase) and corresponding frequencies. Comment on stability. (Semi-Log Paper Needed)		4.6	AP
b)	Using Routh-Harwitz criterion for the unity feedback system with open loop transfer function $G(s) = \frac{K}{s(s+5)(s+1)(s+2)}$ find: Range of K, marginal value of K (K_{Mar}), location of poles when system is marginally stable		5	AP
c)	Find $C(s)/R(s)$ using Mason's gain formula 		3	AP
Q.4	Solve any two questions out of three. (10 marks each)			
a)	Explain the principle, working, and construction of LVDT. What is meant by residual voltage?		2	U
b)	Sketch the Root Locus for the open-loop Transfer function $G(s)H(s)$ as below		4	AP

K. J. Somaiya Institute of Technology, Sion, Mumbai-22
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	$G(s)H(s) = \frac{K(S + 2)}{(S + 1)(S^2 + 6S + 13)}$ <p>(Graph Paper Needed)</p>			
c)	<p>1. Determine the number of roots on the imaginary axis for the characteristic equation given below: (5M)</p> $B(s) = S^5 + 6S^4 + 15S^3 + 30S^2 + 44S + 24 = 0$ <p>2. Write a short note on: Steady state error in a feedback control system.(5M)</p>	3	AP	
		3,4	AP	
