

EC : ELECTRONICS AND COMMUNICATIONS Networks

INDEX

Sr. No.	Contents	Topics	Pg. No.
1. Network Elements and Graphs			
	Notes	Network Elements	1
		Energy Sources	5
		Network Graphs	7
		Incidence Matrix	8
		Circuit Matrices	9
		Cutset Matrices	11
		Graph Theory for Network Analysis	12
		List of Formulae	16
		LMR (Last Minute Revision)	18
	Assignment–1	Questions	19
Test Paper–1	Questions	24	
2. Network Theorems			
	Notes	Basics	28
		Mesh and Nodal Analysis	30
		Network Theorems	33
		Star – Delta Transformation	42
		Source Transformation	43
		Source Shifting	44
		Coupled Circuit	44
		List of Formulae	46
		LMR (Last Minute Revision)	48
	Assignment–2	Questions	49
Test Paper–2	Questions	54	
3. Laplace Transform			
	Notes	Introducton	58
		Laplace Transformation	58
		Inverse Laplace Transformation	59
		Laplace Theorems	60
		Circuits in the s–Domain	62
		Application of Laplace Transform to Electrical Network	63
		Partial Fraction Expansion	67
		Heaviside Expansion Formulae	67
		List of Formulae	67
		LMR (Last Minute Revision)	68

Sr. No.	Contents	Topics	Pg. No.
	Assignment–3	Questions	70
	Test Paper–3	Questions	75
4. Linear Differential Equations			
	Notes	Introduction	79
		Order of the Circuit	82
		Initial Conditions	82
		Step Function Response of Different Circuits	85
		List of Formulae	89
		LMR (Last Minute Revision)	90
	Assignment–4	Questions	92
	Test Paper–4	Questions	97
5. Frequency Response			
	Notes	Introduction	100
		Resonance	101
		Tank Circuit analysis	106
		Frequency Response & Network Functions	108
		Natural Frequency and Damping ratio	109
		Series Parallel Conversions	110
		List of Formulae	110
		LMR (Last Minute Revision)	111
	Assignment–5	Questions	113
	Test Paper–5	Questions	118
6. Steady State Analysis			
	Notes	Introduction	121
		AC Signal Analysis	121
		Properties of Sinusoid	122
		Sinusoidal Steady State Response	122
		Sinusoidal Steady State Analysis using Exponential $e^{+j\omega t}$ and $e^{-j\omega t}$	123
		Sinusoidal Steady State Analysis	124
		Phasor and Phasor Diagrams	125
		Impedance and Admittance	126
		Voltage and Current Division in Frequency Domain	127
		The Mesh current Method	127
		The Node voltage Method	128
		Thevenin's And Norton's Theorems	128
		List of Formulae	129
		LMR(Last Minute Revision)	130
	Assignment–6	Questions	131
	Test Paper–6	Questions	136

Sr. No.	Contents	Topics	Pg. No.
7. Network Functions & Two Port Network			
	Notes	Introduction	139
		Open-circuit Impedance Parameters	139
		Short-circuit Admittance Parameters	140
		Transmission Parameters	140
		Inverse Transmission Parameters	141
		Hybrid Parameters	141
		Inverse Hybrid Parameters	142
		Condition for Reciprocity and Symmetry	143
		Equivalent Circuits	144
		Network Functions	145
		Application	146
		Interconnected Two Port Network	148
		Inter-relationship Between Parameters	151
		List of Formulae	151
LMR(Last Minute Revision)	152		
Assignment-7	Questions	153	
Test Paper-7	Questions	159	
8. State Space Analysis			
	Notes	Introduction	163
		Important Definition	163
		State Space Representation	163
		State Variable Model Representation	165
		Transfer Function to State Variable Form	165
		State Equations	168
		Computation by Taylor's Series Expansion	169
		Computation by Technique Based on the Cayley – Hamilton Theorem	169
		Solution of State Equations–Laplace Transform Method	170
		LMR(Last Minute Revision)	170
Assignment-8	Questions	172	
Practice Test-8	Questions	176	
Practice Problems	Questions	180	
ID Problems	Questions	197	
SOLUTIONS			
Assignments	Answer Key	209	
	Model Solutions	211	
Test Papers	Answer Key	253	
	Model Solutions	255	
Practice Problems	Answer Key	286	
	Model Solutions	287	
ID Problems	Answer Key	305	
	Model Solutions	306	