2.15 40106 NETWORK ENGINEERING

UNIT-1 ELEMENTS OF NETWORK ANALYSIS-
1.1 Mesh and node analysis. Network theorems

1.2 Thevenin's theorem, Norton's theorem, Super position theorem, Reciprocity theorem, Millman theorem,

1.3 Maximum Power Transfer theorem. Signal representation

1.4 Impulse, step, pulse and ramp function, waveform synthesis.

1.5 Laplace Transform in the Network Analysis

1.6 Initial and Final conditions, Transformed impedance and circuits, Transform of signal waveform.

1.7 Transient analysis of RL, RC, and RLC networks with impulse, step, exponential, pulse and sinusoidal inputs, use of initial and final value theorems.

1.8 Networks with transformed impedance and dependent sources.

UNIT-2 THE CONCEPT OF COMPLEX FREQUENCY
2.1 Network functions for the one port and two port

2.2 Driving point and transfer functions Poles and Zeros of network functions and their locations and effects on the time and frequency domain.

2.3 Restriction of poles and zeros in the driving point and transfer function.

2.4 Time domain behavior from the pole, zero plot.

2.5 Frequency response plots, Magnitude and phase plots, Plots from s-plane phasors, Bode plots, phase margin and gain margin.

2.5 Parameters of two-port network, impedance, admittance, transmission and hybrid, Conversion formulae.

2.6 Attenuators, propagation constant, types of attenuators, T and Balanced.

UNIT-3 RESONANCE IN SERIES AND PARALLEL CIRCUITS-
3.1 Resonant frequency- bandwidth - Q factor, Selectivity.

3.2 Coupled circuits, single tuned and double tuned circuits, coefficient of coupling,

3.3 Image Impedance, Characteristic impedance and propagation constant.

3.4 Introduction to filters- Filter approximations,

3.5 Poles of the Butterworth, Chebyshev and inverse Chebyshev functions,

3.6 Expression for transfer function of Butterworth Low pass filter,

3.7 Design for 2nd order and 3rd order low pass Butterworth filters,

3.8 Bessel-Thomson response. Frequency transformations

3.9 transformations to high pass, band pass and band elimination.

Reference Books:
1. Van Altenburg: Network Analysis, 3/e, Pearson Education.
2. Roy Choudhary: Networks and Systems, New Age International, 2005
3. Franklin F. Kuo: Network Analysis and Synthesis, 2/e, Wiley India.
4. M.E. Van Valkenburg: Analog Filter Design, Saunder's College Publishing, 1982.