Subject Code : RNR11

NETWORK THEORY

UNIT – I : Network Equations and Theorems:

Kirchhoff's laws – Mesh and nodal analysis – Duality – Delta and star transformations.

Thevenin's and Norton's theorems – Reciprocity – Compensation – Maximum power – Super-position – Fourier series - application.

Network containing the op-amp-the inverting and non-inverting amplifiers and the op-amp-integrator.

UNIT – II : Operational Methods:

Integral Transform – Fourier Transform – Laplace Transform –Solution of ordinary differential equations with variable coefficients- examples.

Examples of the solution of network problems with the Laplace transformations – Laplace transform of step, ramp and impulse functions – convolution integral.

UNIT – III : Polyphase and Coupled Circuit:

Polyphase system – Advantage of 3ø system – generation of 3ø voltage – phase sequence – Inter connection of 3ø sources and loads-star to Delta and Delta to star transformation – Voltage, current, power in star Delta connected systems – Balanced and unbalanced circuit in 3ø circuit – power measurement in 3ø circuit.

Mutual inductance – coefficient of coupling. Ideal transformer – Analysis of multi winding coupled circuits – Series connections of coupled Inductors – Tuned and Double tuned circuits.

UNIT – IV : Two-Port Network Parameters:

Z, Y, h, g and ABCD parameters, parameter conversion. Bartlett's bisection theorem. Matching section. Image and iterative parameters. Insertion loss, Reflection loss and reflection factor. Design of attenuators.

UNIT – V : Network Functions

Review of complex variables - One port and two port – Ladder and General Networks – Poles and Zeros – Restrictions on pole and zero locations for driving point functions and transfer functions – Time domain behaviour.

Books for Reference:

1. Network Analysis, Van Valkenburg, Prentice Hall of India, New Delhi 1988.
2. Elementary Linear circuit Analysis, Leonard S. Babrow, Holt Sounders International Editions 1981.
3. Theory & Problems of Electric circuits, J.A.Edministor, Schaum's Outline Series, McGraw Hill, 1965.
4. Engineering Circuit Analysis, W.H.Hayt and J.E.Kemmerly, McGraw Hill International Edition, 1993.
5. Circuits and Network Analysis and Synthesis, A.Sudhakar S.P.Shyam Mohan, Tata McGraw Hill.
6. Applied Mathematics for Engineers and Physicists: L.A. Pipes and L.R. Harvell, McGraw Hill, Singapore, 1971.