

ENGINEERING MATHEMATICS





LINEAR ALGEBRA

- Introduction of Matrices
- Types of Matrices
- PYQ on symmetric matrix
- Inverse of Matrices
- Determinants
- PYQ's on determinants
- Properties of determinants
- PYQ's on properties ofdeterminants
- Row reduced echelon form of matrices
- Rank of matrices
- Properties of rank of matrices
- System of Linear Equation
- Homogeneous System of Linear Equation
- Non-Homogeneous System of Linear Equation
- Eigen Values and Eigen Vectors
- Properties of Eigen Values and Eigen Vectors
- Cayley Hamilton Theorem
- LU Decomposition
- System of linear equations using LU Decomposition method

DISCRETE MATHEMATICS

• PROPOSITIONS AND THEIR FIRST ORDER LOGIC

- Introduction to discrete mathematics
- Introduction to Propositional LogicConnectives
- Translating English Sentences
- PYQ on Connectives
- Special Conditional Statements
- Types of Proposition based on Truth Values
- Propositional Equivalence
- GATE PYQ's on Propositional Equivalence
- Rules of Inference (Basic Terminology)
- Rules of Inference
- PYQ's on Rules of Inference
- Predicate Logic
- Quantifiers
- Translating English Sentences using Quantifiers
- PYQ's on Quantifiers
- Logical Equivalences involving Predicate and Quantifiers
- Quantifiers with restricted domains
- Negating Quantified statements
- Nested Quantifiers
- Negation of nested quantifiers
- Inference Rules of Predicate Logic
- Inference Rules of Predicate Logic (Continued)

• SET THEORY

- Introduction to Set Theory
- Introduction to Set Theory(Continued)
- Set Operations
- PYQ's on Set Operations
- Power Sets
- PYQ's on Power Sets
- Relations and their types
- PYQ's on Relations
- Composition of Relations
- Equivalence Relations and Equivalence Classes
- Closure of Relations
- Functions
- PYQ's on Functions
- Composite Functions and Increasing-Decreasing functions
- Counting of functions
- PYQ's on Functions(Continued)
- Partial Orders
- Hasse Diagrams
- Important Terms in Posets
- Lattices

• GROUP THEORY

- Groups
- Important Groups
- Order of an element and a group
- Subgroups
- Cyclic Groups
- PYQ's ON Groups
- PYQ's on Groups(Continued)

• GRAPH THEORY

- Graph Theory Basics
- Handshaking Lemma
- Some special simple graphs
- Walk in Graph Theory
- Isomorphism in Graph Theory
- PYQ's on Isomorphism
- Connected Graphs and Subgraphs
- Connected Component
- Euler Graph
- Hamiltonian Graph
- Planar Graphs
- PYQ's on Planar Graphs
- Graph Coloring
- PYQ's on Graph Coloring
- Independent Sets
- Graph Covering
- Matching in Graph Theory
- Matching in Graph Theory (Continued)
- GATE PYQ's on Graph Theory
- GATE PYQ's on Graph Theory (Continued)

• COMBINATORICS

- Combinatorics Basics
- The Pigeonhole Principle
- The Pigeonhole Principle strong form
- Binomial Theorem
- Generalized PnC-1 (Permutation with repititions)
- Generalized PnC-2 (Combination with repititions)
- Generalized PnC-3
- Generalized PnC-4
- Inclusion-Exclusion Principle
- Derangements
- Generating Function
- GATE PYQ's on Combinatorics

CALCULUS

- Limits
- L'Hospital's rule
- PYQ's on Limits
- PYQ's on Limits (Continued)
- Continuity
- Examples on Continuity
- PYQ's on Continuity
- Differentiability
- Examples on Differentiability
- Difference between Continuity and Differentiability
- PYQ's on Differentiability
- Rolle's theorem
- Lagrange Mean Value theorem
- Cauchy Mean Value Theorem
- PYQ's on Mean Value Theorem
- Indefinite Integrals
- Integration by Substitution
- Integration by Parts
- Integration by Partial Fraction
- Examples on Indefinite Integration
- Definite Integral
- Properties of Definite Integral
- PYQ's on Definite Integral
- PYQ's on DefiniteIntegral (Continued)
- Maxima and Minima
- PYQ's on Maxima and Minima
- PYQ's on Calculus

PROBABILTY

- Basics of Probability
- Sample Space and Events
- Different Types of Events
- Mean, Variance and Standard Deviation
- PYQ'S On Basis Of Probability

• Conditional Probability

- Introduction Of Conditional Probability
- Examples Of Conditional Probability
- Properties Of Conditional Probability
- Law of Total Probability
- Baye's Theorem
- PYQ'S On Conditional Probability

• Random Variable

- Random Variable
- Bernoulli Distribution
- Expectation of Bernoulli Distribution
- Binomial Distribution
- Expectation of Binomial Distribution
- Poisson Distribution
- Expectation of Poisson Distribution
- Exponential Distribution
- Expectation of Exponential Distribution
- Uniform Distribution
- Expectation of Uniform Distribution
- Normal Distribution
- Expectation of Normal Distribution

• PYQ'S on Probability

- PYQ's On Probability