

| Paper No. | Name of the paper | Course | Marks | Lectures |
|------------------|---|--|--------------|-----------------|
| MTMH-101 | Classical Algebra & Trigonometry | A. Classical Algebra B. Trigonometry | 30 20 | 75 |
| MTMH-102 | Differential Calculus & Integral Calculus-I | A. Differential Calculus B. Integral Calculus-I | 40 10 | 75 |
| MTMH-103 | Geometry | Geometry | 50 | 75 |
| MTMH-201 | Modern Algebra | Modern Algebra | 50 | 75 |
| MTMH-202 | Integral Calculus-II & Differential Equations | A. Integral Calculus-II B. Differential Equations | 10 40 | 75 |
| MTMH-203 | Vectors & Computer Fundamentals | A. Vectors B. Computer Fundamentals | 30 20 | 75 |
| MTMH-301 | Real Analysis | Real Analysis | 50 | 75 |
| MTMH-302 | Statics | Statics | 50 | 75 |
| MTMH-303 | Linear Algebra | Linear Algebra | 50 | 75 |
| MTMH-401 | Complex Analysis | Complex Analysis | 50 | 75 |
| MTMH-402 | Dynamics | Dynamics | 50 | 75 |
| MTMH-403 | Topology | Topology | 50 | 75 |
| MTMH-501 | Numerical Analysis | Numerical Analysis | 35 | 60 |
| MTMH-502 | Linear Programming Problem | Linear Programming Problem | 50 | 75 |
| MTMH-503 | Optional | OP-1 Advanced Algebra OP-2 Special Functions | 50 | 75 |
| MTMH-601 | Computer Programming, C | Computer Programming, C | 35 | 60 |
| MTMH-602 | Number Theory | Number Theory | 50 | 75 |
| MTMH-603 | Optional | OP-1 Advanced Analysis OP-2 Hydrodynamics | 50 | 75 |
| MTMH-604 | Practical (Based on Paper-601) | | 30 | 45 |
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Total: Six Semesters: 19 Papers: Marks: 900(Theory: 870 + Practical: 30): 1365 Lectures
(Duration: One Hour Per Lecture)

MTMH-101
CLASSICAL ALGEBRA & TRIGONOMETRY

(To answer one question from each unit. Each unit will have provision for internal choice.)

GROUP-A
CLASSICAL ALGEBRA

(Marks –30)

Unit –I

Marks-10

Idempotent , nilpotent , involutory matrices, transpose of a matrix , conjugate of a matrix, symmetric and skew symmetric, Hermitian , skew Hermitian, orthogonal, unitary matrices; Adjoint of a square matrix , Jacobi's Theorem ; inverse of a square matrix , Elementary transformation on matrices , rank of a matrix ,echelon form, normal form, elementary matrices, inverse of a matrix from elementary matrices; Solution of a system of linear equations by matrix inverse and by Gaussian elimination method.

Unit –II

Marks-10

Relation between the roots and coefficients of a polynomials equations of nth degree , symmetric function of roots ; Transformation of equations ; Cardan's Method of solution of cubic equation; Descartes rule of signs. Inequalities involving Arithmetic and Geometric means; Cauchy-Schwarz's inequality; Minkowski's inequality.

Unit –III

Marks-10

Sequences and their convergence and divergence , Monotonic and Bounded Sequences ,Cauchy sequence , sub sequence and theorem involving them. Cauchy's General principle of convergence and divergence and the theorems involving them.
Series of non negative terms , convergence and divergence of series of positive terms ; tests of convergence – Comparison tests , d'Alembert's ratio tests ; Raabe's tests , logarithmic tests , Cauchy root tests , Gauss test , alternating series- Leibnitz test; Absolute and conditional convergence.

GROUP-B
TRIGONOMETRY

(Marks –20)

Unit IV

Marks 10

De' Moivre's Theorem (for rational indices), Expansions of $\sin n\theta$ & $\cos n\theta$, Expansions of $\sin\theta$ & $\cos\theta$ in ascending powers of θ , Expansions of $\sin^n \theta$ & $\cos^n \theta$.

Unit V

Marks 10

Functions of complex arguments, Gregory's series, Summation of trigonometric series, Hyperbolic functions.

MTMH-102
DIFFERENTIAL CALCULUS & INTEGRAL CALCULUS-I

(To answer one question from each unit. Each unit will have provision for internal choice.)

GROUP-A
DIFFERENTIAL CALCULUS

(Marks –40)

Unit –I

Marks-10

Limits, Cauchy's criterion for existence of limits, problems on limits, Continuity, Problems on continuity, Uniform continuity, Bounded functions – l.u.b., g.l.b., Properties of continuous and bounded functions, Differentiability, problems on differentiability, Relation between continuity and differentiability.

Unit –II**Marks-10**

Successive differentiation – Standard cases, Leibniz's theorem and its application (including values of $(y_n)_0$, Indeterminate forms – forms $0 \cdot \infty$, $\infty - \infty$, 0^0 , 1^∞ , ∞^0 , $\frac{\infty}{\infty}$, $\frac{0}{0}$,

Application of L Hospital's Theorem, General Theorems – Rolle's Theorem, Lagrange and Cauchy forms of mean value Theorems. Statement, Proof and applications of Taylor's and Maclaurin's Theorems.

Unit –III**Marks-10**

Taylor's and Maclaurin's Series, Expansions of functions e^{ax} , $\sin x$, $\cos x$, $\tan x$, $\sinh x$, $\cosh x$ (Assuming $R_n \rightarrow 0$ as $n \rightarrow \infty$), Tangent and Normals – Equation and Properties of tangents and normal, sub tangents and sub normal of cartesian and polar curves.

Unit IV**Marks 10**

Function of two or more variables- partial derivatives, Euler's Theorem Maxima and Minima – One variables function, necessary and sufficient conditions, Geometrical problems, Radius of curvature – Cartesian and polar curves, pedal curves.

GROUP-B
INTEGRAL CALCULUS-I

(Marks –10)

Unit V**Marks 10**

Integrals- Definition and properties of definite integrals, Fundamentals theorem, Reduction formulae.

MTMH-103
GEOMETRY

(Marks –50)

(To answer one question from each unit. Each unit will have provision for internal choice.)

Unit –I

Marks-10

Change of axes, Pair of straight lines, General equation of second degree, Reduction to standard forms.

Unit –II

Marks-10

Tangent, Normal, Pole, Polar, Diameters and Conjugate diameters, Pair of tangents and Director circle.

Unit –III

Marks-10

Properties of Parabola, Ellipse, Hyperbola and applications , Polar equation of conic, Equations of chord, tangent , normal, Confocal conics.

Unit- IV

Marks 10

Equation of straight lines, Shortest distance between lines and its equation, Sphere.

Unit- V

Marks 10

Cone, cylinder, Conicoids; Tangent lines, Normals, Polar lines, Polar planes , Director sphere.

MTMH-201

MODERN ALGEBRA

(Marks –50)

(To answer one question from each unit. Each unit will have provision for internal choice.)

Unit –I

Marks-10

Mapping s, Countability of sets, Equivalence relations; Group,; permutation group ,cyclic group
Subgroup; Cosets and their properties ; Lagrange theorem for order of subgroup

Unit –II

Marks-10

Normal subgroups, Quotient groups, Homomorphism, Monomorphism, epimorphism,
isomorphism and automorphism of groups and the theorems related to them(including three
isomorphism theorems), Cay ley's theorem.

Unit –III

Marks-10

Definitions, Examples and simple properties of Rings . Integral domains, Skew fields, Fields

Unit -IV

Marks 10

Sub rings and subfields; characteristics of a ring ; quotient rings ; Ideals; algebra of Ideals

Unit- V

Marks 10

Principal ideal, Prime ideal , and Maximal ideal , definition , examples and elementary result of
Ring homomorphism

MTMH-202

INTEGRAL CALCULUS-II & DIFFERENTIAL EQUATIONS

GROUP-A

INTEGRAL CALCULUS-II

(Marks –10)

(To answer one question from each unit. Each unit will have provision for internal choice.)

Unit –I

Marks-10

Rectification of plane curves- Cartesian and polar curves, Area bounded by plane curves- polar curves, Volumes and surface of solid of Revolution about axes- Cartesian and polar curves.

GROUP-B

DIFFERENTIAL EQUATIONS

(Marks –40)

Unit –II

Marks-10

Solution of first order and first degree differential equations-.Homogeneous equations., Exact equations. Linear equations(including Bernoulli's equation, and other simple cases reducible to linear equations), Differential equations of first order but of higher degree, Clairauts's equations.

Unit –III

Marks-10

Higher order linear differential equations- with constant coefficients, Homogeneous linear differential equations. Method of variation of parameters.

Unit -IV

Marks 10

Application of differential equations to simple cases, Orthogonal Trajectories, Higher order linear differential equations-Exact differential equations (with variable coefficient, Linear only), Reducing to exact by integrating factors.

Unit- V

Marks 10

Linear differential equations of 2nd order (Reducing to standard and normal forms only). Simultaneous differential equations and single(total) differential equations.

MTMH-203

VECTORS & COMPUTER FUNDAMENTALS

GROUP-A

VECTORS

(Marks –30)

(To answer one question from each unit. Each unit will have provision for internal choice.)

Unit –I

Marks-10

Vector equation- Vector equations of lines, Planes, Spheres.

Vector functions – Differentiation of vector point functions, properties and applications.

Unit –II

Marks-10

Operation with del. Operator- Gradient , divergence and curl, their identities and application in simple problems.

Unit –III

Marks-10

Green's theorem, Stoke's theorem, Gauss theorem and their applications to simple problems.

GROUP-B

COMPUTER FUNDAMENTALS

(Marks –20)

Unit -IV

Marks 10

Introduction to computer and its components, bits, bytes, computer memory, RAM, ROM, I/O devices, on line and off line data entry, magnetic tape, disks etc., Software and Hardware concepts, computer generations, types of computer systems, field , record, files.

Unit- V

Marks 10

Basic concept of Operating systems, Concepts of Compiler, Interpreter, study of MS-DOS Operating system. Concept of different levels of languages, computer oriented procedures, Algorithms and flow charts.

MTMH-301

REAL ANALYSIS

(Marks –50)

(To answer one question from each unit. Each unit will have provision for internal choice.)

Unit –I

Marks-10

Differentiation of function of several variables, Young's theorem, Schwartz's theorem, Jacobian.

Unit –II

Marks-10

Maxima, Minima of more than one variables, Lagrange's method of multipliers.

Unit –III

Marks-10

Riemann integral, condition for integrability, classes of integrable function, Mean value theorems, Fundamental theorem of integral calculus

Unit- IV

Marks 10

Function defined by integrals- their continuity and differentiability. Improper integrals and their convergence, Beta, Gamma functions, Differentiation under integral sign.

Unit- V

Marks 10

Multiple integrals (in \mathbb{R}^2 & \mathbb{R}^3), Green's theorem, Gauss's Theorem, and Stoke's theorem and applications.

MTMH-302

STATICS

(Marks –50)

(To answer one question from each unit. Each unit will have provision for internal choice.)

Unit –I

Marks-10

Coplanar forces – Their resultant , condition of equilibrium and example involving contact with smooth planes, Friction – Laws of statical friction , equilibrium on rough planes and spheres..

Unit –II

Marks-10

Centre of gravity – C.G of a triangle formed by three rods, C.G. of an arc and a sector of circle, of a quadrant of an ellipse ,of a cardiode, of an astroid, and of a lamina bounded by a parabola and a line. C.G. of solid and surfaces of revolution, Three systems of pulleys..

Unit –III

Marks-10

Virtual work – Virtual displacement and virtual work, principle of virtual works for a system of coplanar forces, forces which can be omitted in the equation of a virtual work, simple problems.

Unit- IV

Marks 10

Equilibrium - Stable and unstable equilibrium, condition of stability and unstability, Energy tests for stability, simple problems

Unit- V

Marks 10

Catenary – The common catenary, important relation for the common catenary, Equilibrium of a string under any given force in a plane, deduction of equations

$$\frac{d}{ds} \left(T \frac{dx}{ds} \right) + mX = 0 \quad , \quad \frac{d}{ds} \left(T \frac{dy}{ds} \right) + mY = 0$$

MTMH-303

LINEAR ALGEBRA

(Marks –50)

(To answer one question from each unit. Each unit will have provision for internal choice.)

Unit –I

Marks-10

Vector space, subspace, Linearly independence , basis and dimension, finitely generated vector spaces, Direct sum.

Unit –II

Marks-10

Linear transformation between two vector spaces, Isomorphism, Matrix of a linear transformation, Rank and Nullity of Matrices

Unit –III

Marks-10

Row and column reduction. Echelon form, homogeneous and non-homogeneous system of linear equations and their solution, existence theorem.

Unit -IV

Marks 10

Characteristic roots, Characteristic polynomial , Characteristic vector of a Linear transformation / matrix, Determination of Eigen value and Eigen vector,

Unit- V

Marks 10

Cayley-Hamilton's theorem; its application in finding inverse of matrix, Inner product space, Cauchy-Schwartz's inequality, Bessel's inequality, Dual space.

MTMH-401

COMPLEX ANALYSIS

(Marks –50)

(To answer one question from each unit. Each unit will have provision for internal choice.)

Unit –I

Marks-10

Algebra of complex numbers, Geometry of complex numbers, representation of complex numbers, geometrical interpretation of

$$\arg \frac{z - \alpha}{z - \beta}$$

family of straight lines and circles, locus representation by

$$\left| \frac{z - \alpha}{z - \beta} \right| = \text{const}$$

Unit –II

Marks-10

Complex functions- limit, continuity and derivability; Cauchy-Riemann equation, Harmonic functions.

Unit –III

Marks-10

Rectifiable curves, integral along an oriented curve, Cauchy's theorem, Cauchy's integral formula.

Unit- IV

Marks 10

Liovilis theorem, Morera's theorem, Fundamental theorem, Poles and Singularities.

Unit -V

Marks 10

Calculus of residues and evaluation of standard integrals.

MTMH-402

DYNAMICS

(Marks –50)

(To answer one question from each unit. Each unit will have provision for internal choice.)

Unit –I

Marks-10

Motion in a line with variable acceleration (under some law of velocity ,inverse square law and other laws of acceleration) , Simple Harmonic motion , Angular velocity , Tangential and normal components of velocity and acceleration in a plane.

Unit –II

Marks-10

Motion in a plane – Projectile , Range of projection on horizontal & on an inclined plane , Central Orbits(polar and pedal forms), Apses and apsidal distances.

Unit –III

Marks-10

Uniplanar motion – Motion under inverse square law, planetary motion, Kepler's laws (Statement and geometrical implication only), Motion in resisting medium under gravity (only upward and downward motions).

Unit- IV

Marks 10

Impulse, Work, Energy – Impulse of a force, work, power, energy., principle of energy, conservation of linear momentum and energy.

Impact – Direct impact of two elastic bodies, Direct impact of an elastic body on a smooth fixed plane, oblique impact of two perfectly smooth spheres(Direction and magnitudes of velocity components , impulse of blow.).

Unit- V

Marks 10

Dynamics of a rigid body – Moments and product of inertia, theorems of parallel and perpendicular axes, M I about any line in terms of M I and P I about any three mutual perpendicular lines, Principal axes, Principal moments, d' Alembert's principle.

MTMH-403

TOPOLOGY

(Marks –50)

(To answer one question from each unit. Each unit will have provision for internal choice.)

Unit –I

Marks-10

Metric space- Definition and examples , usual metric on \mathbf{R}^n , $n \geq 1$, Open and close sets and Their properties.

Unit –II

Marks-10

Sequences in metric space, Complete metric spaces, Completeness of \mathbf{R}, \mathbf{R}^2 and \mathbf{R}^3 , Compact metric spaces.

Unit –III

Marks-10

Topological space- Definition and examples, lower and upper limit topologies, metric space as a topological space, usual topology on \mathbf{R}^n

Unit- IV

Marks 10

Open and closed sets, basis for a topology interior , exterior and boundary points. Continuity & Homeomorphism in metric and topological spaces.

Unit -V

Marks 10

Compactness and connectedness of topological spaces , Heine-Borel theorem in \mathbf{R} .

MTMH-501

NUMERICAL ANALYSIS

(Marks –35)

(To answer one question from each unit. Each unit will have provision for internal choice.)

Unit –I

Marks-7

Error estimation, types of errors (round off, truncation, relative, absolute), interpolation: forward, backward, divided differences and their relations, Lagrange's interpolation formula.

Unit –II

Marks-7

Newton's forward, Newton's backward interpolation formulae and related problems, errors in interpolation.

Unit –III

Marks-7

Central difference- Bessel's, Sterling's, Gauss' interpolation formulae.

Unit IV

Marks-7

Numerical solutions of algebraic and transcendental equations, Numerical solution of equations: introduction, Bisection method, Regula-falsi method, Functional iteration method, Newton-Raphson method, the geometrical interpretation, convergence and error of all the methods.

Unit- V

Marks-7

Numerical differentiation and integration: Introduction, numerical differentiation using interpolation. Numerical integration for equidistant ordinates, Trapezoidal rule, Simpson's one third rule, Simpson's three-eighth rule.

MTMH-502

LINEAR PROGRAMMING PROBLEM

(Marks –50)

(To answer one question from each unit. Each unit will have provision for internal choice.)

Unit –I

Marks-10

Introduction, brief idea about O.R. and its applications, formation of a L.P.P., different models, Solution by graphical method.

Unit –II

Marks-10

General L.P.P., Convex sets and their properties, Hyper plane, convex functions, special cases of L.P.P.s-multiple optimal solution.

Unit –III

Marks-10

Standard forms of L.P.P. feasible, basic, optimal, unbounded solution of the standard L.P.P. by simplex method. Big-M method, Two phase method, Degeneracy in L.P.P.

Unit- IV

Marks 10

Concept of duality formulation of the dual problems, standard result on duality, advantage of duality, Transportation problem, loop in transportation table, method for finding initial solution of a Transportation problem - North-West corner rule, Row minima method, Matrix minima method, Vogel's approximation method.

Unit -V

Marks 10

Degeneracy in Transportation problem, Test for optimality, Modi method for finding optimal solution, Assignment problems and its formulation, Hungarian method of its solution.

MTMH-503

Option-I

ADVANCED ALGEBRA

(Marks –50)

(To answer one question from each unit. Each unit will have provision for internal choice.)

Unit –I

Marks-10

Groups : The center of a Group and its properties, Inner Automorphisms; conjugate elements, Conjugacy class.

Unit –II

Marks-10

Normalizer of an elements; class equation, conjugate subgroups, Normalizer of subgroup.

Unit –III

Marks-10

Direct products and Direct product decompositions; Solvable groups.

Unit -IV

Marks 10

Rings, Polynomial rings, Euclidean domains; Unique factorization domains, Embedding of rings.

Unit- V

Marks 10

The field of quotients of an integral domain; Rings with chain conditions-Noetherian and ArtinianRings; modules; Noetherian & Artinian modules.

MTMH-503

Option-II

SPECIAL FUNCTIONS

(Marks –50)

(To answer one question from each unit. Each unit will have provision for internal choice.)

Unit –I

Marks-10

Legendre's equation, Legendre's Polynomials, generating function, Laplace's definite integral for $P_n(x)$

Unit –II

Marks-10

Orthogonal properties and recurrence formulae for $P_n(x)$, Rodrigues formula, Bessel's equation of order 0, 1, and n, Bessel's functions for $J_n(x)$, Recurrence formula for $J_n(x)$.

Unit –III

Marks-10

The Laplace transform, the inverse Laplace transform.

Unit -IV

Marks 10

Application of Laplace transform to differential equations of first and second order with constant coefficients only.

Unit- V

Marks 10

Fourier series and Fourier integrals, Fourier transform (infinite), Relation between Laplace and Fourier transforms problems related to Fourier integral.

MTMH-601

COMPUTER PROGRAMMING

(Marks –35)

(To answer one question from each unit. Each unit will have provision for internal choice.)

Unit –I

Marks-7

Introduction to C language, C characters, C constants and variables, Arithmetic expression and statements. Input/Output, statements, Assignment statements, printf and scanf statements, Declaration statements.

Unit –II

Marks-7

Simple computer program, Logical expression and statements, logical and relational operators..

Unit –III

Marks-7

Decision control structures, loops, **if** statements **if-else** statements, **for** statements, **while** statements, **Do-while loop**, **Switch** statements, **break** statements, **continue** statements, command operator, **go to** statements.

Unit- IV

Marks 7

Functions-defining a function, function prototypes, passing arguments to a function.

Unit- V

Marks 7

Return statements Arrays, defining an arrays , multi dimensional arrays.

MTMH-602

NUMBER THEORY & TENSORS

(To answer four question taking one from each section. Each section will have provision for internal choice.)

GROUP A
NUMBER THEORY

(Marks –30)

Unit –I

Marks-10

Well ordering principle, Principle of finite induction ,The Division Algorithm, The Euclidean Algorithm ,Divisibility Theory ,Linear Diophantine equations, congruence's.

Unit –II

Marks-10

The Chinese Remainder Theorem ,Primes and their distribution, Goldbach conjecture, Fermat's Little Theorem, Wilson's Theorem, Euler's Phi (Φ) function, Arithmetic functions σ & τ , The Mobious inversion formula, greatest integer function

Unit –III

Marks-10

Basic combinatorial numbers, basic counting principle, permutations and combinations, the C inclusion & exclusion principle.

GROUP B
TENSOR
Marks : 20

Unit -IV

Marks 10

Tensor and its order, summation convention and Kronecker delta, transformations of coordinates, (basic conception only), contravariant and covariant tensor of first and second order.

Unit -V

Marks 10

Addition and subtraction of tensors, contraction, inner and outer product of tensors, Symmetric and skew- symmetric tensors, conjugate symmetric tensor, Quotient law.

MTMH-603

OPTION-1

ADVANCED ANALYSIS
(Marks –50)

(To answer one question from each unit. Each unit will have provision for internal choice.)

Unit –I

Marks-10

Complete Metrics spaces: Examples of complete and incomplete metric spaces, \mathbb{R}^n , $C[a,b]$, l_p , ($p \geq 1$)-spaces.

Unit –II

Marks-10

Cantor's intersection theorems; Baire's category theorems; Completion of a metrics space; Compact metrics spaces.

Unit –III

Marks-10

Definitions Examples and Simple properties of Banach spaces

Unit -IV

Marks 10

Hilbert spaces, Normed linear spaces; spaces.

Unit -V

Marks 10

Bounded linear transformations- their elementary theorem , Linear functionals; Conjugate spaces.

MTMH-603

OPTION-II

HYDRODYNAMICS

(Marks-50)

(To answer one question each section. Each section will have provision for internal choice.)

Unit –I

Marks-10

Types of fluids(real and ideal fluids), description of fluid motion(Eulerian and Lagrangian methods), stream lines, path lines, velocity potential, irrotational motion

Unit –II

Marks-10

Equation of continuity-Lagrangian and Eulerian forms and their equivalence, Cartesian, polar, and curvilinear forms of equation of continuity.

Unit –III

Marks-10

Stream functions- Definition and simple problems only, Rate of motion – Local and individual rates and their relation, acceleration of a fluid particle (vector form and its equivalence in cartesian and polar forms), Related problems.

Unit -IV

Marks 10

Equation of motion – Equation of motion of an inviscid fluid (Eulerian and Lamb's Hydrodynamics forms) , The basic dynamical principles (the principle of linear momentum, angular momentum and energy definition only).

Unit -V

Marks 10

Pressure at a point in moving fluid of known velocity, Bernoulli's theorem (derivation only).

MTMH-604
PRACTICAL
(Marks-30)

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|------------------------|----------|
| 1. Viva voce | 5 Marks |
| 2. Practical Note book | 5 Marks |
| 3. Two Experiments | 20 Marks |

Recommended Books

MTMH-101

| Serial No. | Title of the Book | Author |
|-------------------|--------------------------|--------------------|
| 1. | Higher Algebra | Das and Mukherjee |
| 2. | Higher Algebra | B Das |
| 3. | Higher Algebra | Bernard and Child. |
| 4. | Classical Algebra | S.K .Mapa. |
| 5. | Higher Trigonometry | Das and Mukherjee |

MTMH-102

| Serial No. | Title of the Book | Author |
|-------------------|--------------------------|--------------------|
| 1. | Differential Calculus | Das and Mukherjee. |
| 2. | Differential Calculus | Maity and Ghosh |
| 3. | Differential Calculus | Shanti Narayan |
| 4. | Differential Calculus | P.N. Chatterjee |
| 5. | Integral Calculus | Das and Mukherjee |
| 6. | Integral Calculus | Maity and Ghosh |
| 7. | Integral Calculus | Shanti Narayan. |

MTMH-103

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|----|---|------------------------|
| 1. | Analytical Geometry | Ghosh and Chakraborty. |
| 2. | Analytical Geometry | J.M. Kar. |
| 3. | Solid Geometry | Shanti Narayan. |
| 4. | Co-ordinate Geometry | S.L. Loney. |
| 5. | Analytical Geometry of two and three Dimensions with vector analysis | B. Das |

MTMH-201

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|----|----------------------|----------------------|
| 1. | Modern Algebra | Surjeet Singh et al. |
| 2. | . University Algebra | Gopal Krishna. |
| 3. | Abstract Algebra | J.B. Fraleigh. |
| 4. | Abstract Algebra | A.R. Kalra |

MTMH-202

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|----|---|--------------------|
| 1. | Differential equation | J.M. Kar |
| 2. | Differential equation | M.L. Khanna. |
| 3. | Differential equation | M.D. Rai Singhania |
| 4. | Differential equation | J.N. Sharma. |
| 5. | Differential Equation and their Application | Z. Ahsan |
| 6. | Integral Calculus | Das and Mukherjee |

7. Integral Calculus Maity and Ghosh
8. Integral Calculus Shanti Narayan.

MTMH-203

1. Vector Analysis Maity and Ghosh.
2. Vector Analysis Shanti Narayan
3. Vector Calculus Shanti Narayan
4. Fundamentals of Computers V. Rajaraman
5. Fundamentals of Computers Vasundra
6. Fundamentals of Computers Sinha and Sinha
7. DOS Guide Peter Norton

MTMH-301

1. Mathematical Analysis Shanti Narayan
2. Advanced Analysis David Widder
3. Principle of real Analysis S,C.Malik and S.Arora
4. Analysis (Part I & II) S,C.Malik

MTMH-302

1. Statics S.L.Loney.
2. Statics J.M. Kar
3. Statics P.N.Chatterjee
4. Statics A.R Vasistha & M.K.

MTMH-303

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|----|---------------------------------------|---------------------------------|
| 1. | Topics in Algebra | I.N.Herstein. |
| 2. | A First Course in Linear algebra | Bhattacharjee ,Jain and Nagpal. |
| 3. | Linear Algebra | J.N.Sharma |
| 4. | Linear Algebra | Hoffman & Kunze. |
| 5. | Linear Algebra | S.D.Sharma |
| 6. | Theory and Problems of Linear Algebra | Seymour Lipschutz |

MTMH-401

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|----|--|-----------|
| 1. | Function of Complex Variable | Copson |
| 2. | Complex Variable (Schaum out line Series) | Spiegel |
| 3. | Complex Analysis | B.S.Tyagi |

MTMH-402

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|----|-------------------------|----------------------|
| 1. | Dynamics | M. Roy & H.S. Sharma |
| 2. | . Dynamics of particles | S.L Loney |
| 3. | . Dynamics of particles | A.R.Vasistha. |
| 4. | . Dynamics of particles | A.S. Ramsey. |
| 5. | Rigid Dynamics | B.D. Sarma. |
| 6. | Rigid Dynamics | P.P. Gupta. |
| 7. | Dynamics | P.N.Chatterjee |
| 8. | Rigid Dynamics | R,K,Gupta |

MTMH-403

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|----|------------------------------|--------------|
| 1. | Topology and Modern Analysis | G.F.Simmons. |
| 2. | Topology | J.N Sharma. |

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| 3. | Topology | B.D. Gupta |
| 4. | Topology | R.S.Agarwal. |
| 5. | Topology | Munkers |

MTMH-501

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|----|--|---------------------------|
| 1. | Numerical Analysis | Hildebrand. |
| 2. | Introductory method to Numerical Analysis | S.S. Sastry. |
| 3. | Finite Difference and Numerical Analysis | H.S. Saxena. |
| 4. | Calculus of Finite Difference and Numerical Analysis | P.P.Gupta and G.S. Malik. |
| 5. | Numerical Analysis | Scarborough |
| 6. | Numerical Analysis | A.R.Vasistha |

MTMH-502

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|----|--------------------|--------------------------|
| 1. | Linear programming | Shenoy. |
| 2. | Linear programming | G. Hedley. |
| 3. | Linear programming | Kanti Swarup , P.K.Gupta |
| 4. | Operation Research | R.K.Gupta |
| 5. | Operation Research | Kanti Swarup ,Manmohan |

MTMH-503

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|----|------------------------------|----------------------------|
| 1. | Modern Algebra | Surjeet Singh, Zameeruddin |
| 2. | Abstract Algebra | J.B. Fraleigh |
| 3. | A Course in Abstract Algebra | Khanna & Bhambri |
| 4. | Topics in Algebra | I.N. Herstein |
| 5. | Special Functions | B.D, Sharma |
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| 8. | Special Functions | M.D.Raisinghanian |

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