B.Sc. MATHS

FIRST YEAR

Sl. No.	Papers	Max. Marks	Exam Hrs.
1.	Hindi	100	3
2.	English	100	3
3.	Algebra and Geometry	100	3
4.	Differential Calculus	100	3
5.	Allied Physics	100	3

SECOND YEAR

Sl. No.	Papers	Max. Marks	Exam Hrs.
1.	Hindi	100	3
2.	English	100	3
3.	Three Dimensional and Vector Analysis	100	3
4.	Differential Equations, Laplase Transformation, Fourier Seriese	100	3
5.	Statistics	100	3

THIRD YEAR

Sl. No.	Papers	Max. Marks	Exam Hrs.
1.	Numerical Analysis and Trigonometry	100	3
2.	Modern Algebra	100	3
3.	Complex and Real Analysis	100	3
4.	Mechanics	100	3
5.	Operations Research	100	3

FIRST YEAR

Paper – 1

Hindi I

Paper – 2
ENGLISH PAPER – I

Detailed Text

PROSE

1. In Prison – Jawaharlal Nehru
2. What is Science? – George Orwell
3. On Marriages – Nirad Chaudari
4. The Luncheon – N. Somerset Maugham
5. The Mourners – V. S. Naipaul
6. The Plane Crash – Juliane Koepcke
7. Better Late – R.K. Narayan

POETRY

1. Polonius' Advice t his Son – William Shakespeare
2. Every Town a Home Town - Kaniyan Purkunran
3. The Village Schoolmaster – Oliver Goldsmith
4. The Solitary Reaper – William Wordsworth
5. On his Blindness – John Milton
6. The Tyger – William Blake

Non-Detailed

Text : THE GIFTS AND OTHER STORIES abridged and simplified by Anthony Toyne – Oxford University Press, 1997.

The following stories

1. The Gifts – O. Henry
2. The Two Friends – Guy de Maupassant
3. The Bear Hunt – Leo Tolstoy

4. The Goblins and the Grave Digger – Charles Dickens
5. The Nightingale and the Rose – Oscar Wilde

GRAMMER

1. Articles and Prepositions
2. Infinitives and Gerunds
3. Five basic sentence patterns (SV SVC, SVO, SVOO, SVOC(A))
4. Arranging the component parts so as to form a sentence
5. Language work at the end of all lessons
6. Language work at the end of all lessons
7. Question Tag, Active and Passive Voice
8. Degrees of Comparison

COMPOSITION

1. Letter Writing (Formal and Informal)
2. Developing the hints
3. Comprehension
4. Writing Telegram
5. Completion of a passage
6. Precis Writing

Paper – 3

ALGEBRA & GEOMENTRY

UNIT I:

Power series, Binomial, Exponential and logarithmic theorems and their applications to summation of infinite series.

UNIT II:

Theory of Numbers. Prime Number, Composite number, Decomposition of a composite number as a product of primes uniquely (without proof); Divisions of a positive integer n:

Euler's function φ(n); formula for φ(n) (without proof); highest power of a prime P contained in n!; congruences; Format's and wilson's therems with proof; simple problems.

UNIT III:

Theory of Equation. Polynomial equations, irrational roots, complex roots, reciprocal equations, approximation of roots of a polynomial equation by Newton's and Horner's methods.

UNIT IV & V:

Matrices

Symmetric, skew symmetric, Hermitian, skew hermitian, orthogonal, unitary matrices; Rank of a matrix, consistency of equations, eigen values and eigen vectors, cayley – Hamilton theorem without proof, verification and computation of inverse Diagontisation of matrices, characteristic roots and vectors of a square matrix.

1. Algebra - T.K.Manickavachagam Pillai and others – S.Viswanathan publishers.
2. Matrices - A.R.Vashista – Krishnaprakashan Mandhir mmerut. N.Sharma S.N.Gole Kethar Natr Publisher Meerut.

Paper – 4

DIFFERENTIAL CALCULUS

UNIT I

Functions: Limits, continuity, Derivatives and Differentiation of standard functions, standard rules of differentiation.

Application of differentian to plane curves, Tangets, Normals Asympotes, Curvature, singular points and envelopes.

UNIT II

Successive Differentian and Leibnitz's theorem. Rolle's theorem, intermediate value theorem, cauchy's mean value theorem, Taylor's theorem with remainder applications of Taylor's theorem to expansions and approximations.

UNIT III

Maxima and Minima and standard problems intermediate forms and L. Hospital's rule. Functions of two variables, continuity and partial differentiation, Euler's theorem on homogeneous functions.

UNIT IV & V: Integral Calculus

Integration of irrational, trigonometric functions, Bernailli's formula for integration by parts, reduction formula; length of arc, surface area; properties of definite integral, valuation of double and triple integrals; changing the order of integration; simple applications to area volume and centroid.

BOOKS:

Differential Calculas

1. T. K. Manickavachagam Pillai and others – viswanathan Publishers
2. S. Narayanan and others – S. Viswanathan Publishers.

Paper – 5
ALLIED PHYSICS

UNIT – I PROPERTIES OF MATTER

Introduction – compound pendulum and its theory-Determination of g-Three moduli of elasticity-Relation between three moduli of Elasticity – Torsion Pendulum – special theory of Relativity – Lorentz transformation – variation of mass with velocity – Mass-energy equivalence.

UNIT – II MATERIALS SCIENCE

Introduction – Crystal systems and bravais lattices – Miller indices – Symmetry elements – Molecular bonding in crystals – chemical bonds in semiconductors like germanium and silicon

crystals – energy band in solids – Types of semconductros – Carrier concentration in intrinsic semiconductor – Conductivity of Extrinsic semiconductor – Types of super conductors – High temperature superconductors – Application of super conductors.

UNIT – III OPTICS

Lasers – Principles of laser (laser action) – Rubby, CO_2, semi conductor, He-Ne laser – Einstein theory of Laser – Application of Laser in Medicine – Einstein's quantum theory of radiation – Holography – Theory of Holography (quantitative) – Magnification of the reconstructed image – Used of holography – Principles of photography – Fluorescence and phosphorescence.

UNIT – IV BIOPHYSICS

Ultrasonics – Production Pezo – electric effect – Ultrasound picture of the human body – Use of ultra sound to measure motion – physiological effect of ultra sound therapy – Phonocardiography.

X-ray – Types of X-ray – Hard & Soft X-ray – Making x-ray image – Producing live X-ray – image – fluoroscopy – Radiography taken without film.

Sources of radioactivity for nuclear medicine-statistical aspects of nuclear medicine – nuclear – nuclear medicine imaging devices.

UNIT – V TECHNICAL ACOUSTICS

Introduction – Reverberation time and absorption coefficient of a hall-Sabines formula for reverberation time – measurement of absorption coefficient – sound absorbing materials – acoustics of buildings – factors affecting the acoustics of building – principles to be observed in the acoustical design of an auditorium – Ultrasonics – Applications of Ultrasonics.

UNIT – VI MODERN PHYSICS

Vector atom model – Periodic Table – Matter waves De Broglile's equation – Experimental verification – Shrodinger wave equation – particle in one dimensional box – Principle of uncertainty.

Nuclear fission – Nuclear fusion – conditions for sustained reaction – stellar energy – Nuclear reactors. General features – thermal reactors – LWR (PWR and BWR). X-rays – Production – Misoley's law – X-ray Diffraction – Applications. Planck's radiation formula – photoelectric effect and Applications.

Reference:

1. Applied Electronics – G.K. Mitta.
2. Basic Electronics – Solid State – B.C. Thera.
3. Modern Physics – Murugasen.
4. Text Book of Physics – Arumugam.

SECOND YEAR

Hindi I

ENGLISH PAPER – II

Detailed Text

PROSE

8. A Visit to India – Julian Huxley
9. University Days – James Thurber
10. I Have a Dream – Martin Luther King
11. The Story Teller – H.H. Munro (Saki)
12. George Bernard Shaw – Bertrand Russel
13. Only then shall we find Courage – Albert Einstein

POETRY

7. The Day is Done – Henry Wadsworth Longfellow
8. King Arthur's Farewell – Alfred Tennyson
9. O Captain! My Captain! – Walt Whitman

10. My Last Duchess – Robert Browning
11. Ode to a Nightingale – John Keats
12. Lochinvar –Walter Scott

Non-Detailed

A collection of One Act Plays -

1. Remember Ceasar – Gordon Daviot
2. The Proposal – Anotn Chekov
3. The Miracle Merchant – Saki
4. The Stepmother – Arnold Bennet
5. The Mahatma – Rama Sarma

GRAMMER

1. Relative Clauses
2. Conditional Sentences
3. Modal auxiliaries
4. Reported Speech
5. Transformation of Sentences
    a. Affirmative, Negative and Interrogative Sentences
    b. Simple, Compound and Complex Sentences
6. a,b,r clauses
7. Correction of Sentences based on
    a. Subject, Verb and Concord
    b. Tenses
    c. Articles and Prepositions.
    d. Question Tags

COMPOSITION

7. Paraphrasing
8. Dialogue Writing
9. Report Writing

10. Note Making
11. General Essay
12. Expansion of Idea.

Paper – 8

THREE DIMENSIONS AND VACTOR ANALYSIS

(Solid Geometry)

UNIT I

Vector analysis: Introduction, gradient, divergence curl, directional derivative, unit normal to a surface tangent and normal planes to a surface.

UNIT II

Line, Surface and volume integrals and their evaluation theorems of Gauss, stokes and Green (without proof); simple problems based on them.

UNIT III

Analytical solid geometry: planes and lines. Reduction to symmetric form for a line given by pair of planes. Condition for two lines to be coplanar and equation of the plane containing them; length and equation of the shortest distance between two skewlines; image of a point and of a line with respect to a plane; bisector plane. Sphere: equation of sphere in centre radius form diametric form, general form; section of a sphere by a plane, tangent plane, radical plane. Coaxal sphere of spheres, orthogonal spheres.

UNIT IV

Analytical solid geometry; cone and cylinder; equation of a cone with vertex as a origin; equation of a quadric cone given the vertex and the guiding curve; condition for a general equation of second degree to represent a cone, equation of right circular cone given the vertex, axis and semi-vertical angle equation of the enveloping cone of a sphere with centre at origin. General equation of a cylinder and a right circular cylinder.

BOOKS:

1. T. K. Manickavachagam Pillai and others – S. Viswanathan publishers.

Paper – 9

DIFFERENTIAL EQUATIONS, LAPLASE TRANSFORMATION, FOURIER SERIES

UNIT I Fourier Series

Fourier Series of periodic functions on interval (0, 2Π) even and odd functions – half –range series – simple problems. Complex form of fourier integral formula (no derivation); infinite fourier sine and cosine integrals; simple properties of fourier transform; convolution theorem for fourier transform (no proof) Perseval's identity.

UNIT II Differential Equations

First order and higher degree equations; second order differential equations with constant coefficients; particular integral of polynomial and $e^{m x v}$ where v is a polynomial or sin x or cos x; second other equations with variable co-efficients, homogeneous equations.

UNIT III

Total differential equations Pdx + Qdy + Rdz = 0; Partial differential equations; formation; complete integrals; general integrals; four standard types Legrange's equations.

UNIT IV & V: Laplace Transformation

Laplace transforms of standard functions; simple theorem; inverse laplace transform; solving ordinary differential equations using laplace transforms simple problems. Laplace transform – laplace transform of standard function – elementary theorem – laplace transform of periodic function. Inverse Laplace transform – application to second order linear differential equation – application simultaneous linear differential equation – application to differential equation with variable co-efficient.

Publishers:

1. T.K.Manickavachagam Pillai and others – Viswanathan publishers.
2. S. Narayan and others- S. Viswanathan publishers.

Paper – 10
STATISTICS

UNIT I:

Probability space – total probability – multiplication law on probability – conditional probability – independent events, Baye's theorem. Random variables discrete and continuous – distribution function expected value, moments, moment generating function, probability generating function.

UNIT II:

Characteristics function – statements of uniqueness theorem and inversion theorem on characteristic function; cumutants, chebychev;s inequality. Concept of bivariate distribution correlation and regression linear prediction – Rank correlation coefficient concepts of partial and multiple correlation coefficients.

UNIT III:

Standard distributions – Binomial, poisson, normal uniform distributions sampting distribution t, x^2, F distributions Geometric, Gamma and exponential distributions recurrence relation between moments inter relations between the distributions.

UNIT IV:

Point – estimation concepts of consistency unbiased efficiency and sufficiency- **row**-gramer inquality – maximum likelihood and minimum chi-square methods and their properties, interval estimation confidence interval based on normal, t and chi square.

UNIT V:

Test of hypothesis – large sample tests – small sample tests based on t, chi square and F distributions with respect to mean, variance and correlation co-efficient only- theory of attributes, tests of independence in contingency tables. Neyman – pearson lemma likelihood ratio tests – statement of results only.

THIRD YEAR

Paper – 11
NUMERICAL ANALYSIS AND TRIGNOMETRY

UNIT I:

Interpolation: Interpolation for equal intervals – Newton's forward and backward interpolation formulas and stirting's central difference interpolation formulas.

UNIT II: Numerical Differentiation and Integration

Newton's forward difference and backward difference formula to compute the derivatives – Trapezoidal rule, simpson's 1 / 3 rule for numerical integration.

UNIT III:

Solutions of Algebric and Transcendental Equations: Regula – False method – Newton – Raphson method – Successive Approximation Method – Graffee's Root squaring method.

Simultaneous Linear Algebric Equations: Gauss Elimination Method – Gauss – Seidal Elimination Method – Crovt's method.

UNIT IV: Trigonometry

Expansions of Sin , Cos , tan in terms of expansions of Sin n , Cos n , tan n expansions of Sin , Cos , Hyper **********

UNIT V:

Logarithm of a complex number; general value and principal value. Sum of Sines (Cosines) of n angles in AP; summation using telescopic method

BOOKS FOR REFERENCE

1. Numerical Methods in Science and Engineering by Dr.M.K.Venkataraman, National Publishing Company, T. kondichetty Street, Chennai – 600 001.
2. Trignometry by S. Narayanan and others S.Viswanathan Publishers.

Paper – 12
MODERN ALGEBRA

UNIT I:

Groups: Group, subgroup, cyclic group, Lagrange's theorem, homomorphism, somorphism, normal subgroups, quotient group, permutation groups, simple problems based on these concepts.

UNIT II:

Ring, integral domain, field, homomorphism and isomorphism, ideals, quotient fields, quotient rings, prime and maximal ideals.

UNIT III:

Factorisation of polynomials, simple problems on these concepts. Euclidean domain, principle ideal domain, unique factorization domain.

UNIT IV:

Polynomial rings, roots of polynomials, simple problems.

UNIT V:

Vector space, subspace, linear dependence and independence, basis, linear transformation isomorphism, Matrix of linear transformation teace and transpose.

CONTENT AND TREATMENT AS IN:

1. University Algebra (IInd Edition) N.S.Gopalakrishnan: Willey Eastern (New Age international Ltd).

BOOKS FOR REFERENCE

1. Text book of Algebra by R. Balakrishnan and N.Ramabadhran, Vikas Publishing Co.
2. Topics in algebra by I.N.Hostein, Vikas publishing co.

Paper – 13
COMPLEX AND REAL ANALYSIS

UNIT I:

Continuity derivatives; differentian formulas; Cauchy Riemann equations in Cartesian and polar coordinates; sufficient conditions for differentiability; analytic functions; harmonic functions.

UNIT II:

Linears Functions: Function I / Z; linears fractional transformations; Z^n transformation W = e X Pz, conformal mapping; definite integral; contours, line integrals; Cauchy – Goursat theorem (without proof).

UNIT III:

Cauchy's integral formula; Formulae for derivatives of analytic functions. Convergence of sequence and series; theorems without proof; Taylor's series, Lawrent's series, poles; residues.

UNIT IV:

Set, Function, real valued function, equivalence, countability, real numbers, least upper bound; limit of a function on the real line; limits; functions continuous at a point on the real line; metric spaces, functions continuous on a metric space.

UNIT V:

Open Set, closed set; connected set; Bolzano weierstrass theorem with suitable proof based on the above topics; Derivatives; Rolle's theorem; Law of the mean; Taylor's theorem, Definition of Riemann integral; elementary properties; simple examples.

Content and Treatment us in:

1. R. V . Churchill and J.W. Brown: Complex variables and applications – MC Graw Hill International Book Co.
2. R. R. Goldberg: Methods of Real Analysis: Oxford and IBH Publication.

Books for Reference:

1. Source Book on REAL ANALYSIS: edited by M.S. Rangachari; New Century book house.
2. Real Analysis by K. Viswanatha Naik; Emerald Publishers.
3. Mathematical Analysis by TOM M. Apostol; Addison Wesley.
4. Complex Analysis by P. Duraipandian.

Paper – 14
MECHANICS

UNIT I:

Types of forces: Forces acting on a particle triangle of a forces. Polygon law of forces, Lamis theorem: conditions of equilibrium of a particle under several coplanar forces, parallel forces, moments; couples; simple problems.

UNIT II:

Coplanar forces, acting on a body; Friction, laws, angle and force of friction, equilibrium of a body on a rough inclined plane acted on by external forces.

Centre of gravity of simple ****** bodies, triangular lamina, rods forming a triangle, trapezium, centre of gravity by integration for a circular arc, elliptic quadrant, solid and hollw hemisphere, solid and hollow cone.

DYNAMICS

UNIT III:

Kinematics of a particle, velocity, acceleration, relative velocity, relative acceleration, angular velocity; acceleration components in coplanar ***** along

a) Two fixed perpendicular directions;
b) Tangential and normal directions;
c) Radial and transverse directions.

Newton's Law of motion; work; power, energy, principal of work and energy.

Rectillimear motion with uniform acceleration. Simple Harmonic motion; motion in a resisting medium under gravity with resistance propotional to

(i) the velocity
(ii) the sequence of the velocity.

UNIT IV:

Peane motion: projectiles; range; motion on an inclined plane; circular motion; impulse and impuloive motion; collision of two smooth spheres (direct and obtique) – simple problems.

UNIT V:

Central Forces: Central orbit as a plane curve; p-r equation of central orbit; finding the law of forces, speed given a central orbit; finding the orbit given the law of forces; moment of inertia – paralled axis theorem and perpendicular axis theorem, moment of inertia of simple bodies; triangular lamina, circular lamina, circular ring; right circular cone, sphere (solid and hollw).

BOOK FOR REFERENCE

1. Mechanics : P. Durai Pandian; S.Chand and co.
2. Dynamics : M. K. venkat raman; National Publishing co.
3. Dynamic: K. V. Naik and M.S.Kasi Emerald publishing & co.
4. Statistics: K. V Nailk and M. S. Kasi, Emerald publishing co.
5. Dynamics : S. Narayanan; Viswanathan and co.

Paper – 15
OPERATIONS RESEARCH

UNIT I:

Characteristics of O.R – Necessity of O.R in industry – O.R and decision making – Role of computers in O.R, formulation and graphical solution (of 2 variables) canonical and standard terms of linear programming problem, simplex method.

UNIT II:

Channes method of penalties – two phase simplex method – concept of duality – properties of quality – dual simple method.

UNIT III:

Definiton – formulation and solution of transportation models. The Row- minima, Column – minima and vogel's approximation methods, Definition of assignment model – comparison with transportation – model – variations of assignment problem.

UNIT IV:

Processing each of n jobs through m machines processing n jobs through 2 machines – processing n jobs through 3 machines – processing 2 job through m machines processing n jobs through m machines – traveling salesman problem

UNIT V:

Network, Fulkerson's rule – measure of activity – PERT computation – CPM computation – Resource scheduling.

Books for Study

1. Operation Research – An introduction Hamdy, A. Tha**** 5th edition, Prentice Hall of India Pvt, Ltd, New Delhi, 1996.
2. Fundamentals of Operations Research
   ACK Off, R.L.and Sasieni M.W. John wiley and sons, New york, 1968.
3. PERT and CPM Principles and Applications.
   Srinath. L.S.Affiliated East West Press Pvt, Ltd, Newyork, 1973.