27. MATHEMATICS (GENERAL)

APPENDIX 'A'

(Outlines of Tests)

		Marks
Paper 'A' :	Calculus (Differential and Intergal Calculus)	100
Paper 'B' :	Mathematical Methods : (Geometry, Infinite Series, Complex Number, Vectors, Linear Algebra and Differential Equations)	100
	Total :	200

APPENDIX 'B'

(Syllabi and Courses of Reading)

(For Students of Natural and Social Sciences)

Paper A : CALCULUS (Differential and Intergal Calculus)

Paper B : MATHEMATRICAL METHODS : (Geometry, Infinite series, Complex Numberr, Vectors, Linear Algebra and Differetial Equations)

Paper A : (Calculus)

Note :

Attempt six questions by selecting two questions from Section I, two from Section II, one from Section III and one from Section IV.

Section I

(i) **(2/12)** (Limit and Differentiation)

Real Number system, Absolute values, Inequalities, Functions, Limits. And Continuity, Derivatives of algebraic and transcendental functions. Higher derivatives. Statements of (1) Leibniz theorem (2) Rolle's theorome, (3) Mean value theorems, (4) Taylor and Maclaurin series, Increasing and decreasing functions. Indeterminate forms.

(ii) **(2/12)** (Further Differentiation)

Differentials Related Rates. Extrema. Concavity. Singular Points. Asymptetes. Graphing or Cartesian Curvature and Radius of Curvature.

Section II

(i) **(2/12)** (Integration)

Antiderivate and indefinite integral. Techniques of evaluation indefinite integral. Difinite integral as area. Fundamental theorem of integral calculus properties of definite integral. Walli's sine and cosine formulas, Numerical intagration, Improper integrals.

(ii) (2/12) (length, Area and Volume)

Polar coordinates, Graphing curves in polar coordinates. Area between two curves. Lengths of plane. Volumes. Area of surface of revolution.

Section III

(2/12) (Infinite Series)

Sequences. Infinite series and their convergenc.. Ratio Test, Cauchy's root test. Comparison test. Integral tests. Absolute and conditional convergence. Power series. Taylor and Maclaurin series. Taylor's formula with remainder.

Section IV

(2/12) Calculus of Several variables)

Definitions : Limit and continuity of a function of two variables. Derivatives. Increments and differentials. Exterma of function two variables Simple cases,

Paper B : (Mathematical Methods)

Note :

Attempt six questions by selecting two questions from Section I, two from Section II, one from Section III and one from Section IV.

Section I

(i) (2/12) (Plane Analytic Geometry)

Translation and rotation rectangular axes. General equation of the second degree, properties of parabola, elipse and hyperbola. Tangent and normals. Paramatric representations of curves.

(ii) (2/12) Vectors)

Rectangular coordinates in space. Vectors in space. The dot prodoct, the cross product and triple products. Vector-valued functions, Limits. Derivatives. Scalar and vector fields. Gradients, Divergence and curl.

Section II

(i) (2/12) (Analytic Geometry of three dimentions)

Distauce between two points Direction angles. Direction angles, Direction numbers. Lines and planes. Skew lines. Cylindrical and spherical coordinate. Surfaces of sphere, cylinder, cone, paraboloid, hyberbolod.

(ii) (2/12) (Complex Numbers and Direction of (Qibla)

Complex numbers, de Moivre's theorem and its applications, Circular, logarithmic and hyperbolic functionr. Cosine, sine and four-part formulas, latitude and longitude. Determination of direction of Qibla.

Section III

(2/12) (Linear Algebra)

Algebra of matrices. Types of matrices. Operations within matrices. Determinant of a square matrix. Cofactors and minors. Laplace expansion of a determinant Properties of determinants. Elementary row and column operations of matrices equivelent and echelon matrics, Adjont and inverse of a matrix. Rank of a matrix. Solutions of linear algebraic (homogeneous and nonhomogeneous) systems of equation by the use of matrices. Vector spaces : Linearly independent sets. Basis and dimension. Subspaces. Spanning sets.

Section IV

(2/12) (Differential Equations)

Formation of differential equations. Families of curves. Orthogonal trajectories Initial and boundry value problems. Different methods of solving first order ODE. The Bernoulli, Ricatti and Clairat equations. Second and higher order liner differential equations with constant coefficients and their methods of Solution. Cauchy-Euler Equation.

Recommended Books :

C.W. Evans, Advanced Engineering Mathematics (Chapen and all, third edition, 1997
C.H. Edwards and D.E. Panney, Calculus Analytic Gemetry (Prentice Hall Inc. 1982, 1986, 1988).

E.W. Swokowski, Calculus with Analytic Geometry (PWS. Publisher. Boston. Masscuchoseted, 1983).

H. Anton, Calculus, (third edition) (John Wiley and Sons, New York).

G.B. Thomas, Jr. and R.L. Finney, Calculus and Analytic Geometry, (9th Edition) Addison Wesely Publishing Company, 1997.)

L.D. Hoffmann and G.L. Bradley, Calculus for Business, Economics, and the Social and Life Sciences.

E. Kreyszing, Advanced Engineering Mathematices, (J. Wiley)

D. G. Zill A First Course in Differential Equation with Applications (PWS. Publishers).

W.E. Boyee and R.E. Di Prima, Differential Equations and Boundry Value Problems.

(J. Wiley, 5th edition 1992).