APPLIED MATHEMATICS

Max Marks : 40 Marks

ALGEBRA

DETERMINANTS.   **1 X 2 = 2M**

Definition, Order, Expansion of 2nd & 3rd order Determinants by means of examples. Problems on finding unknown quantity in a 2nd & 3rd determinant using expansion. Solving simultaneous linear equations by determinant method (Cramer's rule).

MATRICES.   **1 X 3 = 3M**

Determinant value of a square matrix. Singular and non singular matrices. Minor and co factor of an element of a matrix. Adjoint of a matrix. Inverse of a matrix. Characteristics equations of a square matrix and its roots, problems.

BINOMIAL THEOREM.   **1 X 2 = 2M**

Meaning of ^{n}Cr and its value. Binomial theorem for $(x + a)^{n}$, where n is a positive integer. Expansion. Finding constant term, co-efficient of x^{n}, particular term and middle term(s).

VECTOR ALGEBRA.   **1 X 3 = 3M**

Definition of vector. Magnitude of a vector. Position vector. Addition and subtraction of vector. Product of vectors, scalar and vector product. Geometrical meaning of scalar and vector product. Applications of dot(scalar) and cross(vector) product: Projection of a vector on another vector. Area of parallelogram and area of triangle. Work done by a force and moment of force, problems

TRIGONOMETRY

TRIGONOMETRIC RATIOS OF AN ACUTE ANGLE.   **1 X 2 = 2M**

Defination of Trigonometric ratios in terms of sides of a triangle for an acute angle. Trigonometric identities. Trigonometric ratios of standard angles: The numerical value of trigonometric ratios of standard angles like 0^{0}, 30^{0}, 45^{0}, 60^{0} and 90^{0}, problems

ALLIED ANGLES.   **1 X 2 = 2M**

Angle of any magnitude, sign of the trigonometric ratios. Meaning of allied angles. Trigonometric ratios of allied angles in terms of   . Complimentary angles and relation between trigonometric ratios of complimentary angles, problems.

COMPOUND ANGLES.   **1 X 2 = 2M**

Recall Sin(A + B) and Cos(A + B). Find Tan(A + B) using   Sin(A + B) and Cos(A + B). Write the formulae for Sin(A - B), Cos(A - B) and tan(A - B), problems.

Write ratios of multiple angles of 2A and 3A and sub multiple angle formulae, problems.

TRANSFORMATION FORMULAE.   **1 X 1 = 1M**

Express sum or difference of Sine and Cosine of an angles in to product form. Express product of Sine and Cosine of angles in to sum or difference form, simple problems.

INVERSE TRIGONOMETRIC FUNCTIONS.   **1 X 1 = 1M**

Definition. Principle values of inverse trigonometric functions. Results like $\sin^{-1}x + \cos^{-1}x = /2 = \tan^{-1}x + \cot^{-1}x = \csc^{-1}x + \sec^{-1}x$, $\tan^{-1}x + \tan^{-1}y = \tan^{-1}[(x+y)/(1-xy)]$ etc., problems.

ANALYTICAL GEOMETRY

BASIC CONCEPTS OF ANALYTICAL GEOMETRY.   **1 X 3 = 3M**

Defination of a point in a plane, Specification of a point using co-ordinate system. Points on X-axis and Y-axis. Distance formula. Section formulae. Co-ordinate of a point which divide the line internally and externally in the given ratio. Mid point formula. Centroid, area of a triangle and collinear points, problems.

STRAIGHT LINES.   **1 X 3 = 3M**

Inclination of a line with horizontal line and its slope. Intercept of a straight line. Slope of a line parallel to X-axis and Y-axis. Conditions for two lines to be parallel and perpendicular. Equations of straight lines $y = mx + c$, $y - y_1 = m (x - x_1)$, $y - y_1 = (y_2 - y_1 / x_2 - x_1) (x - x_1)$, $(x / a) + (y / b) = 1$. Equation of lines through a point and parallel or perpendicular to a given line. Angle between two lines, problems.

CALCULUS

LIMITS.   **1 X 2 = 2M**

Variables and Constants. Definition of function. Concept of x tends to 'a'. Definition of limit of a function. Problems on limit of a function by factorization, rationalization when x tend to '0', when x tend to ' ' and x tend to 'a'. Algebraic and Trigonometric limits, problems.

DIFFERENTIAL CALCULUS.   **1 X 4 = 4M**

List of standard derivatives. Rules of differentiation: Sum, product and quotient of functions. Derivatives of function of a function(Chain rule). Derivatives of inverse Trigonometric functions, Hyperbolic functions and inverse of hyperbolic functions, Implicit functions, Parametric functions. Logarithmic differentiation. Successive differentiation up to second order, problems.

APPLICATIONS OF DIFFERENTIATION.   **1 X 2 = 2M**

Geometrical meaning of derivative. Equation of tangent and normal to the curve y = f(x) at a given point. Derivative as a rate measure. Maxima and minima of a function, problems

INTEGRAL CALCULUS.   **1 X 3 = 3M**

Definition of Integration. List of standard integrals. Rules of integration (only statement) Integration by substitution method. Integration by parts. Rule of integration by parts, problems.

DEFINITE INTEGRALS.   **1 X 2 = 2M**

Definition of Definite integral. Theorems on definite integrals, problems.

APPLICATIONS OF DEFINITE INTEGRALS.   **1 X 1= 1M**

Find area, volume and r m s value of a function, problems.

DIFFERENTIAL EQUATIONS.   **1 X 2 = 2M**

Definition, example, order and degree of differential equation with examples. Formation of differential equation by eliminating arbitrary constants up to second order. Solution of D E of first degree and first order by variable separable method. Linear equations and its solution.