

ALLIED COURSE I (AC) - ALGEBRA AND CALCULUS

UNIT I

Theory of Equations: Relation between roots & coefficients – Transformations of Equations – Diminishing ,Increasing & multiplying the roots by a constant- Forming equations with the given roots –Rolle’s Theorem, Descarte’s rule of Signs(statement only) –simple problems.

UNIT II

Matrices : Singular matrices – Inverse of a non-singular matrix using adjoint method - Rank of a Matrix –Consistency - Characteristic equation , Eigen values, Eigen vectors – Cayley Hamilton’s Theorem (proof not needed) – Simple applications only

UNIT III

Differentiation: Maxima & Minima – Concavity , Convexity – Points of inflexion - Partial differentiation – Euler’s Theorem - Total differential coefficients (proof not needed) –Simple problems only.

UNIT IV

Integration : Evaluation of integrals of types

$$1] \int \frac{px+q}{ax^2+bx+c} dx \quad 2] \int \frac{px+q}{\sqrt{ax^2+bx+c}} dx \quad 3] \int \frac{dx}{a+b\sin x} \quad 4] \int \frac{dx}{a+b\cos x}$$

Evaluation using Integration by parts – Properties of definite integrals – Fourier Series in the range (0 , 2 π) – Odd & Even Functions – Fourier Half range Sine & Cosine Series

UNIT V

Differential Equations: Variables Separables – Linear equations – Second order of types (a D² + b D + c) y = F (x) where a,b,c are constants and F (x) is one of the following types (i) e^{Kx} (ii) sin (kx) or cos (kx) (iii) xⁿ, n being an integer (iv) e^{Kx} f (x)

TEXT BOOK(S)

- [1] T.K.Manickavasagam Pillai & others, Algebra, Volume I, S.V Publications, 1985 Revised Edition (Units I, II)
- [2] S. Narayanan, T.K. Manicavachagam Pillai, Calculus, Vol.II, S. Viswanathan Pvt Limited, 2003. (Units III, IV and V)

REFERENCE(S)

- [1] M.L. Khanna, Differential Calculus, Jaiprakashnath and Co., Meerut-2004.