

ASSOCIATE DEGREE IN ARTS / SCIENCE

General Mathematics

Paper-II

NOTE: Each section having four questions, please attempt two questions from each section.

SECTION-I (4/12: 17,17,17,17)

Vectors in three-dimensions. Scalar and vector products with applications. Scalar and vector triple products. Differentiation and integration of vector functions. Gradient, divergence and curl. Sequences. Bounded Sequences. Convergence and divergence of sequences. n th-term test, comparison test, ratio test, root test and integral test for convergence and divergence of infinite series. Convergence and divergence of alternating series. Complex numbers and their properties. De Moivre's theorem and its applications. Circular, logarithmic and hyperbolic functions. Separation into real and imaginary parts.

SECTION-II (4/12: 16,16,16,16)

Algebra of matrices. Determinants with properties. Co-factors, minors, adjoint and inverse of a matrix. Elementary row and column operations. Echelon form and rank of matrix. Solution of the system of linear equations (Homogeneous and non-homogeneous) by use of matrices. Network flow problems. Vector spaces and sub spaces. Linearly dependent and independent vectors. Bases and dimension. Linear transformation. Matrix of linear transformation (relevant theorems of bases and linear transformation with out proofs)

SECTION-III (4/12: 17,17,17,17)

Basic concepts of differential equations. Classification and formation of DEs. Various methods of solutions of first order ODE (linear and non-linear). The Bernoulli's, Riccati and Clairaut's equations. Singular solutions. Orthogonal trajectories. Application of first order ODE in problems of decay and growth, population dynamics, logistic equations. Linear DE of higher order (homogeneous and non-homogeneous). Solution by: D-operator and undetermined co-efficients Methods. Reduction of order and variation of parameters methods for 2nd order linear DE. Cauchy-Euler equation.

Recommended Books

1. Calculus by H. Anton. John Wiley and Sons New York. (Latest Edition)
2. Calculus By C.H Edwards and D.E. Penney. Prentice Hall. Inc. (Latest Edition)
3. Calculus By S.I. Grossman. Academic Press Inc (London) Ltd. (Latest Edition)
4. Calculus and Analytic Geometry by S.M. Yousaf. Illmi Kitab Khana. Urdu Bazar Lahore 1998
5. Calculus and analytic geometry by G.B Thomas and R.I. Finney., Addison-Wesley Publishing Company. (Latest Edition)
6. Elementary Linear Algebra by C.H. Edwards. Jr and David Penney. Prentice Hall International Inc. 1988
7. Mathematical Techniques by K. H. Dar. Irfan-ul-Haq and M.A. Jajja. The Carvan Book House. Kachehry Road Lahore. 9th Edition 1997
8. Mathematics Methods by S.M. Yousaf. Illmi Kitab Khana. Urdu Bazar Lahore. 2000
9. Set Theory and Logic by Stoll. Robert R.S chand & Co. New Delhi.
10. Number Theory by Dr. Manzoor Hussain. The Carvan Book House, Kachachry, Lahore
11. Elementary Linear Algebra by Howard Anton and Chris Rorres John Wiley & Sons Inc 10th Edition 2010

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