ASSOCIATE DEGREE IN SCIENCE
B-Course of Mathematics
Paper –II

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

SECTION-I (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, Ricatti 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-officients Methods. Reduction of order and variation of parameters methods for 2nd order linear DE. Cauchy-Euler equation. Power series solution about an arbitrary point.

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

Laplace Transformation, solution of ODEs. Error analysis. Solution of non-linear (algebraic and transcendental) equation in one variable using bisection method, false position method, Newton - Raphson method and fixed point method. Difference operators. Interpolation (Newton's and Lagrange's methods). Numerical differentiation (at a point of the data). Numerical integration (rectangular, trapezoidal and 1/3 Simpson's rules).

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

Co-ordinates in three dimension. Rectangular, cylindrical and spherical co-ordinates. Equations of plane, straight line, sphere, cylinder, cone, ellipsoid, hyperboloid and paraboloid. Longitude and latitudes. Spherical triangle and direction of Qibla. Inner Product Space, Eigen values and Eigen vectors, Dignalization of matrices.

Recommended Books.

1. Theory of Differential Equations of Dennis G.Zill. Books Thomson Learning Academic Resource Center. USA.8th Edition 2013
2. Mathematical Techniques by K.H. Dar, Irfan-ul-Haq and M.A. Jajja. The Carvan Books House. Kachehry Road, Lahore.9th Edition 1997
3. Mathematics Methods by S.M. Yousaf. Illmi Kitab Khana. Urdu Bazar, Lahore. 1998
4. Numerical Analysis by R.L. Burden and J.D. Faires. PES-Kent Publishing Company. Bostan. USA 9th Edition 2011
5. Operations Research by H.A. Taha. Prentice-hall Inc. Englewood. Cliffs USA.4th Edition 2011
6. Mathematical Statistics. By Dr. J.E.Freund. Prentice-hall Inc. Englewood. Cliffs USA. 7th Edition 2007
7. Vector and Tensor Methods, by Chorlton, Ellis Horwood Publishers. 1976
8. Elementary Vector Analysis. By Dr. Munawar Hussain. S.M. Hafeez. M.A. Saeed and Ch. Bashir Ahmed. The Caravan Book House, Kachhry Road , Lahore.
9. A Text Book by Dynamics by Chorlton, Van Nostrand Company Ltd. London.1967
10. Mechanics by O.K. Ghori. West Pakistan Publishing Company, Lahore. 1971