12. PUBLIC ADMINISTRATION
B.A. Part III
(Local Government and Administration)

Maximum : 80

Internal Assessment : 20

Time : 3 Hours

Note : The Candidates will be required to attempt five questions, atleast one question form each unit.

Unit-I One Compulsory question comprising of 8 objective type questions of 2 Marks each covering the whole syllabus.

Unit-II Local Government: Meaning and Significance, Evolution of Local, Government in India since 1882. Administrative Growth of Rural Development, Institutions in India since Independence. 73rd and 74th Constitutional Amendment Acts..

Unit-III Urban Local Bodies: Municipal corporation, Municipal Council and Municipal Committee-their meaning, Composition, Features and significance with special reference to Haryana and Punjab. State Government's control over Muncuipal Bodies .

Unit-IV Rural Local Bodies: Composition, Functions, Sources of income of Gram Panchayat, Panchayat Samiti and Zila Parishad. Composition, Functions and Significance of District Planning Committee. Problems of Rural Urban Relationship.

Unit-V District Administration: its features, purposes and problems. Role of Deputy Commissioner in the context of planning and Development at district level. Role of Divisional Commissioner, State Headquarter's Control over district Administration. Rural Development and Information Technology.

Books Recommended:

1. K.K. Puri: Local Government, Bharat Prakashan, Jallandhar.

2. S.R. Maheswari: Local Government in India, Laxmi Narain Aggarwal, Agra.

3. Sahib Singh & Surinder Singh: Local Government, New Academic-Publishing Company, Jallandhar.

4. V.K. Puri: Local Government and Administration, Modern Publishers, Jallandhar

13. MATHEMATICS

Paper-I : BM-301 : Analysis

Maximum Marks : 27

Internal Assessment : 6

Time : 3 Hours

Section-I (3 Questions)

Riemann integral, Integrability of continous and monotonic functions. The fundamental theorem of integral calculus, Mean value theorems of integral calculus. Improper integrals and their convergence, Comparison tests, Abel's and Dirichlet's tests. Frullani's integral. Integral as a function of a parameter. Continuity, derivability and integrability of an integral of a function of a parameter.

Section-II (2 Questions)

Series of arbitrary terms. Convergence, Divergence and Oscillation. Abel's and Dirichlet's tests. Multiplication of series. double series.

Fourier Series Fourier Expansion of piece-wise monotonic functions.

Partial derivatives and differentiability of real-valued functions of two variables. Schwarz's and Youg's theorem. Implicit function theorem.

Section-III (2 Questions)

Stereographic projection of complex numbers.

Continuity and differentiability of complex Function's Analytic Functions.

Cauchy-Riemann equations. Harmonic functions. Elementary functions. Mapping by elementary functions.

Mobius transformations. Fixed Points Cross ratio. Inverse Points and critical mappings.

Section-IV (3 Questions)

Definition and examples of metric spaces. Neighbourhoods. Limit points. Interior points. Open and closed sets. Closure and interior. Boundary points Subspace of a metric space. Cauchy sequences. Completeness. Cantor's Intersection theorem. Contraction principle. Construction of real numbers as a complete ordered field. Dense subsets. Baire category theorem. Separable, Second Countable and first

countable spaces. Continuous functions. Extension theorem. Uniform continuity. Isometry and homeomorphism. Equivalent metrics. compactness. Sequential compactness. Totally bounded spaces. finite intersection property. Continuous functions and compact sets. Connectedness components. Continuous functions and connected sets.

Note : The examiner is required to set ten questions in all, selecting questions section-wise as indicated in the syllabus. The candidate is required to attempt five questions, selecting at least one question from each section.

Books Recommended :

1. T.M. Apostol : Mathematical Analysis, Narosa Publishing House, New Delhi, 1985.

2. R.R. Goldberg, Real Analysis, Oxford & IBH Publishing Co., New Delhi, 1970.

3. S. Lang: Undergraduate Analysis, Springer-Verlag, New York, 1983.

4. D. Somasundaram and B. Choudhary : A first Course in Mathematical Analysis, Narosa Publishing House, New Delhi, 1997.

5. Shanti Narayan: A Course of mathematical Analysis, S. Chand & Co., New Delhi.

6. R.V. Churchill & J.W. Brown : Complex variables and Applications, 8th Edition, McGraw-Hill, New York, 1990.

7. Shanti Narayan : Theory of Functions of a Complex Variable, S. Chand & Co. New Delhi.

8. E.T. Copson, Metric Spaces, Cambridge University Press, 1968.

9. G.F. Simmons : Introduction to topology and Modern Analysis, McGraw-Hill 1963.

Paper-I : BM-302 : Abstract Algebra

Maximum : 26

Internal Assessment : 7

Time : 3 Hours

Section-I (3 Questions)

Grous-Automorphisms, inner-automorphism, Automorphism groups and their computations. Conjugacy relation Normaliser. Counting Principle and the class equation of a finite group. Center for Group Prime-order Abelianizing of a group and its universal property. Sylow's Theorems. P-Sylow's subgroup. Structure theorem for finite Abelim groups.

Section-II (2 Questions)

Ring theory-Ring homeomorphism. Ideals and Quotient Rings. Field of Quotients of an Integral Domain. Edclidean Rings. Polynomial Rings Polynomials over the Rational Field. The Eienstein Criterion. Polynomial Rings over Commulative Rings. Unique factorization domain R unique factorisation domain implies so is R $[X_1, X_2.........X_n]$

Section-III (3 Questions)

Definition and examples of vector spaces, Subspaces. Sum and direct sum of subspaces. Linear span. Linear dependence, independence and their basic properties Basis. Finite dimensional vector spaces. Existence theorem for bases. Invariance of the number of elements of a basis set. Dimension. Existence of complementory subspace of a finite dimension. Existence of complementary Subspace of a finite dimensional vector space. Dimensional of sums of subspaces. Quotient space and its dimension. Linear transformations and their representation as matrices. The algebra of linear transformations. The rank nullity theorem. Change of basis. Dual space, Bidual space and natural isomorphism. Adjoint of a linear transformation. Eigenvalues and eigenvectors of a linear transformation Diagonalisation. Annihilator or a Subspace Bilinear, Quadratic and Hermitian forms.

Section - IV (2 Question)

Inner product spaces-Cauchy-Schwarz inequality. Orthogonal vectors. Orthogonal Complements. Orthonormal sets and basses. Bessel's inequality for finite dimensional spaces. Gram-Schmidt Orthogonalization process. Modules.

submodules. Quotient Modules. Homeomorphism and Isomorphism theorems.

Note: The examiner is requested to set ten questions in all, selecting questions section-wise as indicated in the syllabus. The candidate is required to attempt five questions selecting at least one question from each section.

Books Recommended:

1. I.N. Herstem : Topics in Algebra, Wiley Eastern Ltd. New Delhi, 1975.
2. N. Jacobsen: Basic Algebra Vols. I & II, W.H. Freeman, 1980 (also published by Hindustan Publishing Company.
3. P.B. Bhattacharya, S.K. Jain and S.R. Nagpal : Basic Abstract Algebra (2nd edition.)
4. K. Hoffiman and R. Kunze, Linear Algebra, 2nd Edition.
5. S.K. Jain, A. gunawardena & P.B. Bhattacharya : Basic Linear Algebra with MATLAB.
6. Vivek Sahai and Vikas Bist: Algebra, Narosa Publishing House.
7. I.S. Luther and I.B.S. Passi: Algebra, Vol. I, Groups Vol. II Rings, Narosa Publishing House.

Paper-III BM 303 : Programming in C and Numerical Analysis

(Theory & Practical)

(Non Programmable Scientific Calculator is allowed in this paper)

Max. Marks : 20

Internal Assessment: 14

Time: 3 Hours

Section-I (3 Questions)

Programmer's model of a computer. Algorithms. Flow Charts. Data Types Arithmetic and Input/Output instructions. Decisions control structures. Decision statements Logical and conditional operators. Loop Case control structures. Functions Recursions Preprocessor. Arrays Puppeting of strings. Structures. Pointers. File formatting.

Section-II (3 Questions)

Solution of Equations: Bisection, Sectim, Regular Falsi Newton's Raphson's Method, Newton's iterative method for finding p the root of a number, Order of convergence of above methods.

Interpolation: Language and Hermite Interpolation, Divided differences. Difference Schemes, Interpolation Formulas using Differences.

Numerical Differentiation.

Numerical Quadrature: Newton-Cote's Formulas, Trapezoidal rule, Simpson's one-third and three eight rule, Gauss Quadrature formulas. Chebychev's Formulas.

Numerical Differentiation.

Numerical Quadrature: Newton-Cote's Formulas, Trapezoidal rule, Simpson's one-third and three eighth rule, Gauss Quadrature formulas. Chebychev's Formulas.

Algebraic: Gauss-elimination method, Gauss-Jordan method, Simultaneous linear Linear Equations Triangularization method (LU Decomposition), Crait's method, Cholesky Decomposition, iterative methods. (Jacobi, Guass-Seidel, Relaxation Methods.)

Algebric Eigenvalue problem: Jacobi's Method, Given's Method. Heusehold Method, Power Method, QR Method Lanczos' Method.

Section-III (2 Questions)

Numerical solution of Ordinary Differential Equations: Euler Method modified Euler's method, Single -step Methods, Picard's method, Taylor's series method Runge-Kutta's Method, Multi-step Methods Predictor-Corrector method.

Approximation: Different types of Approximation, Least Square Polynomical Approximation, Polynomial Approximation using Orthogonal Polynomials, Approximation with Trigonometric Functions. Exponential Functions, Chebychev polynomials Rational Functions.

Section - IV (2Question)

Random number generation congruential generators, statistical tests of pseudorandom numbers.

Random variate genention, inverse transform method, Composition method, acceptance rejection method, generation of exponential, normal variates; binomial and poisson variates.

Monte Carlo integration, hit or miss Monte Carlo integration, Monte Carlo integration for improper integrals, error analysis for Monte Carlo integration.

Note: The Examiner is required to set ten questions in all, selecting questions section-wise as indicated in the syllabus. The candidate is required to attempt five questions selecting + at least one question from each section.

Practicals Practicals in C is based on Numerical Analysis as in Section-II and III above.

Books Recommended:

1. B.W. Kernighan and DM. Rithcie, The C programming Language, 2nd Edition.

2. V. Rajaraman, Programming in C, prentice hall of India, 1994.

3. Byron S. Gottfried, Theory and problems of Programming with C, Tata McGraw Hill Publishing Co. Ltd. 1998.

4. C.E. Froberg. Introduction to Numerical Analysis (2nd Edit ion).

5.   Melvin J. Maron, Numerical Analysis : A Practical Approach, Macmillan Publishing Co, Inc, New York.

6.   M.K. Jain, S.R.K. Lyengar, R.K. Jain, Numerical Methods-Problems and solutions, New Age international (P) Ltd. 1996.

7.   M.K. Jain, S.R.K. Lyengar, R.K. Jain, Numerical Methods for Scientific and Engineering Computation, New Age International (P) Ltd., 1999.

8.   R.Y. Rubistein : Simulation and the Monte Carlo Methods, John Wiley, 1981.