

KAKATIYA UNIVERSITY, WARANGAL, (TS)

PGCET – 2017

MATHEMATICS/STATISTICS/APPLIED MATHEMATICS

SYLLABUS

Part – A (50 Marks)

GROUP THEORY: Examples and elementary properties of groups - sub groups - Lagranges theorem - Normal sub-group - Homomorphism - Isomorphism - Automorphism - Kernal of Homomorphism - Cyclic groups - Permutation groups.

RINGS AND FIELDS: Definition and examples of rings and fields - Elementary properties of rings - Integral domains - Homomorphism - Fundamental theorem of homomorphism of rings - Ideals - Maximal ideals - Prime ideals - Principle ideals - Definition and examples of Euclidean rings.

REAL ANALYSIS: Sets of real numbers - Dedekind property - Bounded sets - Limit point of a set, sequences - Convergence - Divergence - Bounded and Monotonic sequence - Cauchy's sequence - Convergence of series - Comparison test - Ratio test - Absolute and conditional convergence - Alternating series - Leibnitz's test.

LIMITS AND CONTINUITY: Limits of functions - Left hand limit - Right hand limit and limit of a function - Theorems on limits - Continuous and discontinuous functions - Removable continuity - Properties of continuous functions on a closed interval $[a, b]$.

DIFFERENTIATION: Differentiability of function - Rolles, Lagranges and Cauchy's mean value theorems - Maclaurins expansion of functions.


INTEGRATION: Riemann integrability of function - Properties of integral functions - Primitive - Fundamental theorem of integral calculus.

Part – B (50 Marks)

ELEMENTARY TRANSFORMATION: Reduction of matrix to the normal forms - Rank of the matrix - Elementary Matrices - Computation of the inverse of matrix - system of linear equations and consistency - Characteristic equation - Caley-Hamilton theorem.

VECTOR CALCULUS: Vector differentiation - Differential operator - Gradient - Divergence - Curl - Vector integration - Theorems of Gauss, Green and Stokes and problems related to them.

DIFFERENTIAL EQUATIONS: Differential equations of first order and first degree - Variable seperable - Homogeneous equations - Non-Homogeneous equations - Exact equations - Linear equations of first order and higher degree equations - Second order equations with constant coefficient and variable coefficient, change of independent variable - Variation of parameters - Simultaneous differential equations.


Chairperson, BOS

VECTOR SPACES: Vector spaces - Sub spaces - Linear spaces - Linear independent - Linear dependent of vectors - Linear span - Basis - Dimension - Algebra of linear transformation - Rank-Nullity theorem.

INNER PRODUCT SPACES: Definition and examples of inner product spaces - Orthonormal set of vectors - Schwartz inequality - Bessel's inequality - Orthogonal complements - The adjoining, normal, self adjoint, unitary and orthogonal operators.

SOLID GEOMETRY: The plane - Equation of a plane, normal form, intercept form and passing through three points - Length of the perpendicular from a given point to a plane - Bisectors of angle between plane - The equation of line - Shortest distance between two straight lines - Sphere - Cone - Cylinder.

MULTIPLE INTEGRALS: The concept of plane curve - Line integrals - The area of a subset in a plane - Calculation of double integrals - Jordan curve - Area - Change of the order of integration.

MODEL QUESTION PAPER

Time: 90 Minutes

Max.Marks:100

The question paper consists of 100 questions(including Part-A and Part-B) in multiple choice. Choose the correct answer.

1. If $G = \{1, 2, 3, 4\}$ is a group under multiplication then $|G|$ is
(a) 2 (b) 1 (c) 3 (d) 4
2. The number of generators for a cyclic group of order 8 are
(a) 2 (b) 3 (c) 4 (d) 6

Dr. S. S. Chakraverty, B.S.