GOVT. D.B. GIRLS' P.G. (AUTONOMOUS) COLLEGE
RAIPUR CHHATTISGARH

FACULTY OF MATHEMATICS

SYLLABUS

OF

B.Sc. MATHEMATICS PART-I

2020-21

Signature of Chairman

Signature of Member (Subject)
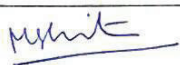
Part A   Theory

No.	Title	Marks		Total
		Max.	Min.	
Paper-I	Algebra and Trigonometry	50	17	50
Paper-II	Calculus	50	17	50
Paper-III	Vector Analysis and Geometry	50	17	50

APPROVED BY THE BOARD OF STUDIES ON

NAME	IN THE CAPACITY OF	SIGNATURE
Dr. MADHU SHRIVASTAVA	CHAIRMAN	Mshit
Dr. B.S. THAKUR	SUBJECT EXPERT (University Nominee)	
Dr. AMITABH BANERJEE	SUBJECT EXPERT (Principal Nominee)	Bnnrj
Mrs. RASHMI SENGUPTA	MEMBER OF THE DEPARTMENT	RSen
Mrs. KIRAN DEWANGAN	MEMBER OF THE DEPARTMENT	
Ku. SANDHYA SAHU	EX-STUDENT	

Mshit

Signature of Chairman

Signature of Member(Subject)
Principal
Govt. D.B. Girls' P.G. College,
Raipur (C.G.)

Kiraud

DEPARTMENT OF MATHEMATICS
B.Sc. PART – I
MATHEMATICS
SESSION :2020-21
PAPER - I
ALGEBRA AND TRIGONOMETRY

Maximum Marks: 50
Minimum Marks: 17

Number of Units : V

UNIT - I

Elementary operations on Matrices. Inverse of a matrix. Linear independence of row and column matrices. Row rank, column rank and rank of a matrix. Equivalence of column and row ranks. Eigenvalues, Eigenvectors and the characteristic equation of matrix. Cayley Hamilton theorem and its use in finding inverse of a matrix.

UNIT - II

Applications of matrices to a system of linear (both homogeneous and non-homogeneous) equations. Theorems on consistency of a system of linear equations. Relations between the roots and coefficients of general polynomial equation in one variable. Transformation of equations. Descarte's rule of signs, solution of cubic equations (Cardon method). Biquadratic equations.

UNIT - III

Mappings, Equivalence relations and partitions. Congruence modulo n. Definition of a group with examples and simple properties. Cyclic groups generators. Coset decomposition, Lagrange's theorem and its consequences. Fermat's and Euler's theorems.. Normal subgroups, Quotient groups. Permutation Groups, even and odd permutations. The alternating groups. Cayley's theorem An.

UNIT - IV

Homomorphism and Isomorphism The fundamental theorems of homomorphism. Introduction, properties and examples of rings, subrings, Integral domains and Fields. Characterstic of a Ring and field.

UNIT - V

(Trigonometry)

De Moivre's theorem and its applications. Direct and inverse circular and hyperbolic functions. Logarithm of a complex quantity. Expansion of Trigonometrical functions. Gregory's series. Summation of series.

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DEPARTMENT OF MATHEMATICS
B.Sc. PART – I
MATHEMATICS
SESSION : 2020-21
PAPER - II
CALCULUS

Maximum Marks: 50
Minimum Marks:17

Number of Units : V

DIFFERANTIAL CALCULUS

UNIT - I

$\in -\delta$ definition of the limit of a function. Basic properties of limits. Continuous functions and classification of Discontinuities. Differentiability, Successive differentiation. Leibnitz's theorem, Maclaurin and Taylor series expansions.

UNIT - II

Asymptotes, Curvature, Tests for concavity and convexity. Points of inflexion, Multiple points. Tracing of curves in Cartesian and polar coordinates.

INTEGRAL CALCULUS

UNIT – III

Integration of transcendental functions. Reduction formulae, Definite integrals, Quadrature, Rectification, Volumes and surfaces of solids of revolution.

ORDINARY DIFFERENTIAL EQUATIONS

UNIT - IV

Degree and order of a differential equation. equations reducible to the linear form. Exact differential equations, First order higher degree equations solvable for x, y, p. Clairaut's form and singular solutions. Geometrical meaning of a differential equation. Orthogonal trajectories. Linear differential equations with constant coefficients. Homogeneous linear ordinary differential equations.

UNIT - V

Linear differential equations of second order. Transformation of the equation by changing the Dependent variable / the Independent variable. Method of variation of parameters. Ordinary simultaneous differential equations.

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DEPARTMENT OF MATHEMATICS
B.Sc. PART – I
MATHEMATICS
SESSION : 2020-21
PAPER - III
VECTOR ANALYSIS AND GEOMETRY

Maximum Marks: 50
Minimum Marks: 17

Number of Units : V

UNIT - I

Scalar and vector product of three vectors, Product of four vectors, Reciprocal vectors, Vector differentiation, Gradient, Divergence and Curl.

UNIT - II

Vector Integration, Theorems of Gauss, Green, Stokes and problems based on these.

UNIT - III

General equation of second degree. Tracing of conics, System of conics, Confocal Conics, Polar equation of a Conic.

UNIT - IV

Sphere, Cone and Cylinder.

UNIT - V

Central Conicoids, Paraboloids, Plane section of Conicoids, Generating lines, Confocal Conicoids, Reduction of second degree equations.

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