

MATHEMATICS

I/II/III PAPER

(Title of paper)

Time allowed: 3.00 hours

Max. Marks- 40/53

NOTE : Attempt any FIVE questions in all out of 11 questions without considering sections/units.

All questions carry equal marks..

Section - A

Q. 1. Attempt eight sub parts:

- (i)
- (ii)
- (iii)
- (iv)
- (v)
- (vi)
- (vii)
- (viii)
- (ix)
- (x)

(1 x 8 = 8 marks))

Section - B

UNIT - I

Q. 2 (a)

(b)

(4x2=8 marks)

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UNIT - II

Q. 3(a)
(b)

(4x2=8 marks)

UNIT - III

Q. 4(a)
(b)

(4x2=8 marks)

UNIT - IV

Q. 5(a)
(b)

(4x2=8 marks)

UNIT - V

Q. 6(a)
(b)

(4x2=8 marks)

Section - C

Q. 7

8 mark

Q. 8

8 marks

Q. 9

8 marks

Q.10

8 marks

Q. 11

8 marks



Maharaja Surajmal Brij University
Bharatpur (Raj)

SYLLABUS
MATHEMATICS

B. A./B. Sc. Part I

(Annual Scheme)

Session 2021-22

As per decision taken in the Examination Planning and Management Committee of the university the syllabus has been reduced by 30% only for the session 2021-22.

Note:-*The old students enrolled in the university in B. Sc. Part I before the session 2017-18 will have to appear in Part I, II, III due papers exam 2022 with this new syllabi. There will be no paper of old scheme in B.Sc. Part I, II, III due papers exam 2022

Session 2021-22

(Total number of pages-6)

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भारतपुर (राज.)

B. A./B. Sc. Part I Examination - 2022

MATHEMATICS

Teaching : 3 hours per week per theory paper

2 hours per week per batch for practical

(20 candidates in each batch)

Examination Scheme :


	Min. Pass Marks	Max. Pass Marks
Science	54	150
Arts	72	200

	Duration	Max Marks
Paper – I Discrete Mathematics	3 hrs	40 (Science) 53 (Arts)
Paper – II Advanced Calculus	3 hrs	40 (Science) 53 (Arts)
Paper – III Coordinate Geometry and Vector Calculus	3 hrs	40 (Science) 54 (Arts)
Practical	2 hrs	30 (Science) 40 (Arts)

Note :-

- Syllabus of each of three papers is divided into FIVE units.
- Each paper is divided into THREE sections A, B & C.
- Section-A :** TEN short answer type questions will be set taking two questions from each unit. Each question will carry 1 mark for Science and 1.5 mark for Arts. All questions will be compulsory .
- Section-B :** TEN questions will be set taking two questions from each unit. Each question will carry 3 marks for Science and 4 marks for Arts. Student has to attempt ONE question from each unit
- Section-C :** FIVE questions will be set taking one questions from each unit. Each question will carry 5 marks for Science in all three papers and 6 marks for Arts in paper I & II and 6.33marks in paper III. Student has to attempt ANY THREE Questions.
- Common paper will set for Faculty of Science and Faculty of Social Science .

Session 2021-22


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7. Each candidate is required to appear in the practical examination to be conducted by internal and external examiners. External examiner will be appointed by the University and internal examiner will be appointed by the principal in consultation with the head, department of Mathematics in the college.
8. An internal/external examiner can conduct practical examination of not more than 100 (one hundred) candidates (20 candidates in each batch).
9. Each candidate has to pass in theory and practical examinations separately.

Paper – I Discrete Mathematics

Teaching : 3 hrs per week

Duration of Examination : 3 hrs

Max. Marks 40 (Science)

53(Arts)

Note: This paper is divided into THREE Sections A, B, & C. Section-A consists TEN short answer type questions. Each question is of 1 mark for Science and 1.5 mark for Arts. All questions are compulsory. Section-B consists TEN questions taking two questions from each unit. Each question will carry 3 marks for Science and 4 marks for Arts. Student has to attempt FIVE questions selecting ONE question from each unit. Section-C consists FIVE questions taking one questions from each unit. Each question will carry 5 marks for Science and 6 marks for Arts. Student has to attempt any THREE questions.

Unit – I : Algebraic Structures – Binary operations, Definition and examples of groups, Elementary properties of groups, Order of an element, Cyclic groups, properties of cyclic groups.

Unit – II: Graph theory – Introduction, definition of graph, degree of vertex, Directed graphs, finite and infinite graphs, Regular graphs, Bipartite graphs, Sub graphs, Connected and Disconnected graphs, Euler circuit and Euler graphs, Weighted graphs, Shortest path problem.

Unit – III : Planner and non planner graphs, Euler's formula, Detection of planarity, Dual of planner graphs, Matrix representation of graphs. Trees, properties of trees, rooted tree, binary tree, Spanning tree.

Unit – IV : Boolean Algebra- Definition, duality, properties of Boolean algebra, Ordered relation in Boolean algebra, Lattices, Homomorphism, Boolean functions and expressions, Conjunctive and Disjunctive normal forms.

Unit – V : Generating functions – Discrete numeric function, ordinary generating function, Convolution of sequences, Summation using convolution, counting techniques, Partition of integers, Exponential generating function. **Recurrence Relation** - First order relation, second order linear homogeneous relation, Third and higher order linear homogeneous relations, Linear non homogeneous relations of second and higher order, Solution of recurrence relations using generating functions.

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Paper – II Advanced Calculus**Teaching : 3 hrs per week****Duration of Examination : 3 hrs****Max. Marks 40 (Science)****53 (Arts)**

Note: This paper is divided into THREE Sections A, B, & C. **Section-A** consists TEN short answer type questions. Each question is of 1 mark for Science and 1.5 mark for Arts. All questions are compulsory. **Section-B** consists TEN questions taking two questions from each unit. Each question will carry 3 marks for Science and 4 marks for Arts. Student has to attempt FIVE questions selecting ONE question from each unit. **Section-C** consists FIVE questions taking one questions from each unit. Each question will carry 5 marks for Science and 6 marks for Arts. Student has to attempt ANY THREE questions.

Unit – I : Convergence and Divergence of Infinite Series- Introduction, Tests for convergence, Comparison test, D' Alembert ratio test, Cauchy's n^{th} root test, Raabe's test, De Morgan and Bertrand test, Cauchy's condensation test.

Unit – II : Pedal equation of Cartesian and polar curves. Derivatives of arcs – Cartesian and polar forms. Curvature – Definition, radius of curvature for Cartesian, polar and parametric curves, curvature at the origin, centre of curvature, circle of curvature, chord of curvature. : Partial differentiation, Euler's theorem on homogeneous functions, Total differentiation.

Unit – III : Envelopes – Family of curves, Definition of envelope, Envelopes of Cartesian, polar and parametric curves. Asymptotes – Definition, methods to find asymptotes of Cartesian and polar curves, Intersection of curve and its asymptotes. Singular points, double point, Tracing of Cartesian and polar curves.

Unit – IV : Gamma and Beta functions – Definition, Transformations of Gamma functions, Relation between Beta and Gamma functions, Euler's functional equation, Double multiple formula. Double Integral- Evaluation of double integrals, Change of order of integration.

Unit – V : Rectification- Meaning, lengths of Cartesian and polar plane curves. Quadrature – Areas bounded by plane curves (Cartesian and polar), Use of double integrals to find areas:

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Paper – III Coordinate Geometry and Vector Calculus**Teaching : 3 hrs per week****Duration of Examination : 3 hrs****Max. Marks 40 (Science)****54 (Arts)**

Note: This paper is divided into THREE Sections A, B, & C. Section-A consists TEN short answer type questions. Each question is of 1 mark for Science and 1.5 mark for Arts. All questions are compulsory. Section-B consists TEN questions taking two questions from each unit. Each question will carry 3 marks for Science and 4 marks for Arts. Student has to attempt FIVE questions selecting ONE question from each unit. Section-C consists FIVE questions taking one questions from each unit. Each question will carry 5 marks for Science and 6.33 marks for Arts. Student has to attempt ANY THREE questions.

Unit – I : Two Dimensional Coordinate Geometry – Conic sections, Parabola , Intersection with straight lines, Condition of tangency, Tangent and Normals, Pair of tangents, Chord of contact, Pole and Polar lines, diameter, Parametric coordinates.

Unit-II : Three Dimensional Coordinate Geometry– Sphere, Plane sections of sphere, Intersection of a sphere with a line, Tangent plane, Plane of contact, Pole and Polar planes, Orthogonality of two spheres, Radical plane, Radical line and Radical centre of sphere. Cone – Definition and equation, Enveloping cone.

Unit-III: Cylinder – Definition and Equation of cylinder, Enveloping cylinder, Right circular cylinder. **Central Conicoid** – Definition and standard equation, Tangent lines and tangent planes , Director sphere.

Unit – IV: Generating lines of conicoids- condition for a straight line to be a generator, system of generating lines, properties of generating lines of hyperboloid.

Unit –V: Vector Calculus – Differentiation and Integration of vector point function, Gradient of scalar point function, Divergence and Curl of vector point functions, Identities on gradient, curl, divergence.

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Practical

Teaching : 2 hours per week

Examination Scheme:

Duration - 2 hours

	Science	Arts
Maximum Marks	30	40
Minimum Pass Marks	11	14
Distribution of Marks:		
Two Exercises one from each group		
10 marks each	= 20 marks	13 marks each = 26 marks
Practical record	= 05 marks	07 marks
Viva-voce	= 05 marks	07 marks
Total Marks	= 30 marks	40 marks

Group - A : Graphs of some standard functions- x^n (for different value of n), e^x , $\log_e x$, $\log_a x$ ($a < 1$ and $a > 1$), $\sin x$, $\cos x$, $\tan x$, $\cot x$, $\operatorname{cosec} x$, $\operatorname{sec} x$.

Group - B :

Classification of conicoid representing by general equation of second degree
 $ax^2 + by^2 + cz^2 + 2fyz + 2gzx + 2hxy + 2ux + 2vy + 2wz + d = 0$

Note :- Each candidate (Regular/Non-collegiate) has to prepare his/her record.

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Maharaja Surajmal Brij University
Bharatpur (Raj)

SYLLABUS
MATHEMATICS

B. A./B. Sc. Part II
(Annual Scheme)
Session 2021-22

As per decision taken in the Examination Planning and Management Committee of the university the syllabus has been reduced by 30% only for the session 2021-22.

Note:- The old students enrolled in the university in B. Sc. Part I before the session 2017-18 will have to appear in Part I, II, III due papers exam 2022 with this new syllabi. There will be no paper of old scheme in B.Sc. Part I, II, III due papers exam 2022

Session 2021-22

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 भारतपुर (राज.)

B. A./B. Sc. Part II Examination-2022

MATHEMATICS

Teaching : 3 hours per week per theory paper

2 hours per week per batch for practical

(20 candidates in each batch)

Examination Scheme :

	Min. Pass Marks		Max. Pass Marks
Science	54		150
Arts	72		200
		Duration	Max Marks
Paper – I	Real Analysis	3 hrs	40 (Science) 53 (Arts)
Paper – II	Differential Equations	3 hrs	40 (Science) 53 (Arts)
Paper – III	Numerical Analysis and Optimization Techniques	3 hrs	40 (Science) 54 (Arts)
Practicals		2 hrs	30 (Science) 40 (Arts)

Note :-

01. Syllabus of each of the three papers is divided into FIVE units .
02. Each paper is divided into THREE sections A, B, & C.
03. **Section-A** : TEN short answer type questions will be set taking two questions from each unit. Each question will carry 1 mark for Science and 1.5 mark for Arts. All questions will be compulsory .
04. **Section-B** : TEN questions will be set taking two questions from each unit. Each question will carry 3 marks for Science and 4 marks for Arts. Student has to attempt ONE question from each unit.

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- 05. **Section-C** : FIVE questions will be set taking one questions from each unit. Each question will carry 5 marks for Science in all three papers and 6 marks for Arts in paper I & II and 6.33marks in paper III. Student has to attempt ANY THREE Questions.
- 06. Common paper will set for Faculty of Science and Faculty of Social Science. Each candidate is required to appear in the practical examination to be conducted by internal and external examiners. External examiner will be appointed by the University and internal examiner will be appointed by the principal in consultation with the head, department of Mathematics in the college.
- 08. An internal/external examiner can conduct practical examination of not more than 100 (one hundred) candidates(20 candidates in each batch).
- 09. Each candidate has to pass in theory and practical examinations separately.

Paper – I Real Analysis

Teaching : 3 Hours per Week

Duration of Examination : 3 Hours

Max. Marks 40 (Science)

53 (Arts)

Note: This paper is divided into THREE Sections A, B, & C. **Section-A** consists TEN short answer type questions. Each question is of 1 mark for Science and 1.5 mark for Arts. All questions are compulsory. **Section-B** consists TEN questions taking two questions from each unit. Each question will carry 3 marks for Science and 4 marks for Arts. Student has to attempt FIVE questions selecting ONE question from each unit. **Section-C** consists FIVE questions taking one questions from each unit. Each question will carry 5 marks for Science and 6 marks for Arts. Student has to attempt ANY THREE questions.

Unit – I : The set of real numbers as a complete ordered field, Incompleteness of \mathbb{Q} , Archimedean and dense properties of \mathbb{R} , Absolute value of real numbers, Intervals, Limit point of a set, Bolzano-Weierstrass theorem, open and closed sets

Unit – II : Real sequences, Bounded and unbounded sequences, Monotonic sequence, Limit point and limit of a sequence, Convergence of sequences, Necessary and sufficient condition for convergence. Continuity of a function, Cauchy's and Heine's definition of continuity, Types of discontinuity, Properties of continuous functions on closed intervals.

Unit – III: Differentiability- Darboux theorem, Rolle's theorem, Algebraic and geometric interpretation of Rolle's theorem, Lagrange's and Cauchy's mean value theorems. Improper Integrals and their convergence, Comparison test, μ -test, Abel's test and Dirichlet's test.

Unit – IV: Reimann Integration – partition of an interval, Darboux sums, Lower and Upper Reimann Integrals, Definition of Reimann Integration, Integrability of continuous, discontinuous and monotonic functions, Fundamental theorem of integral calculus, Mean value theorems.

Unit – V : Uniform convergence of sequence and series of functions, Cauchy's criterion for uniform convergence, M_n - test, Weierstrass M-test, Abel and Dirichlet's tests. Fourier Series – Periodic functions, Dirichlet's conditions, Fourier series in the interval $(\alpha, \alpha+2\pi)$ and particular cases in the interval $(0, 2\pi)$, $(-\pi, \pi)$.

Paper – II Differential Equation

Teaching : 3 Hours per Week

Duration of Examination : 3 Hours

Max. Marks 40 (Science)

53 (Arts)

Note: This paper is divided into THREE Sections A, B, & C. **Section-A** consists TEN short answer type questions. Each question is of 1 mark for Science and 1.5 mark for Arts. All questions are compulsory. **Section-B** consists TEN questions taking two questions from each unit. Each question will carry 3 marks for Science and 4 marks for Arts. Student has to attempt FIVE questions selecting ONE question from each unit. **Section-C** consists FIVE questions taking one questions from each unit. Each question will carry 5 marks for Science and 6 marks for Arts. Student has to attempt ANY THREE questions.

Unit – I : Order and degree of differential equations, Differential equations of first and first degree, Method of separation of variables, Homogeneous differential equation, and equations reducible to homogeneous forms, Linear differential equation and equations reducible to linear forms. Exact differential equation. Differential equations of first order but not of first degree- Differential equations solvable for x, y and p.

Unit – II : Linear differential equations with constant coefficients, Complimentary functions and Particular integrals.

Unit – III : Homogeneous linear differential equations, Differential equations reducible to homogeneous linear differential equations. Simultaneous differential equations, Differential equations of the form $dx/P = dy/Q = dz/R$.

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Unit – IV : Linear differential equations of second order- Solution by finding a part of complimentary function, Solution by transformation into Normal form and by changing the independent variable, Factorisation of operators.

Unit – V : Partial differential equation of first order and first degree, Lagrange's linear equations, Non-Linear partial differential equations of order one: Charpit's method. Linear partial differential equations with constant coefficient.

Paper – III Numerical Analysis and Optimization Techniques

Teaching : 3 Hours per Week

Duration of Examination : 3 Hours

Max. Marks 40 (Science)

54 (Arts)


Note: This paper is divided into THREE Sections A, B, & C. **Section-A** consists TEN short answer type questions. Each question is of 1 mark for Science and 1.5 mark for Arts. All questions are compulsory. **Section-B** consists TEN questions taking two questions from each unit. Each question will carry 3 marks for Science and 4 marks for Arts. Student has to attempt FIVE questions selecting ONE question from each unit. **Section-C** consists FIVE questions taking one questions from each unit. Each question will carry 5 marks for Science and 6.33 marks for Arts. Student has to attempt ANY THREE questions. Students can use Non-programmable Scientific Calculator.

Unit – I : Calculus of Finite Differences- Introduction, Difference Operators, Differences of Polynomials, Factorial notation, Relation between difference and derivative, Separation of symbols. Newton-Gregory's formulae for Forward and Backward interpolation with equal intervals.

Unit – II : Central differences- Gauss's central difference interpolation formulae, Stirling and Bessel's interpolation formulae. Numerical integration – General quadrature formula, Trapezoidal rule, Simpson's one-third rule, Simpson's three-eight rule.

Unit – III : Numerical solution of algebraic and transcendental equations - Graphical method, Iterative method, Regula-Falsi method, Newton-Raphson method and their convergences. Solution of system of linear equations – Gauss's elimination method, Gauss-Jordan's elimination method, method of triangularisation of matrices.

Session 2021-22


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Unit – IV : Linear programming problem - feasible solution, optimal solution, Basic solution, Degenerate and non-degenerate basic solution, Convex sets and their properties, Optimality criterion, Simplex algorithm.

Unit – V : Duality in linear programming problem – Dual of l. p. p., use of duality to solve l. p. p. . Transportation problem – Basic feasible solution and methods to find it, North-west corner rule, least-cost method, Vogel's approximation method, Optimality criterion.,

Practicals

Teaching : 2 Hours per Week

Examination Scheme:

Duration - 2 Hours

	Science	Arts
Maximum Marks	30	40
Minimum Pass Marks	11	14

Distribution of Marks:

Two Exercises one from each group

10 marks each	=	20 marks	13 marks each	=	26 marks
Practical record	=	05 marks			07 marks
Viva-voce	=	05 marks			07 marks
Total Marks	=	30 marks			40 marks

Group – A : Numerical solution of algebraic and transcendental equations using Bisection method, Secant method, Newton-Raphson method.

Jacobi's method and Gauss-Seidal method to solve system of linear equations.

Group – B : Modelling of industrial and engineering problem into linear programming problem , its dual and their solution by simplex method.

Note :-1. Each candidate (Regular/Non-collegiate) has to prepare his/her record.

2. Students can use Non-programmable Scientific Calculators.

3. Student must know about all functions and operations of scientific calculator.

Session 2021-22

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Maharaja Surajmal Brij University
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SYLLABUS
MATHEMATICS

B. A./B. Sc. Part III

(Annual Scheme)

Session 2021-22

As per decision taken in the Examination Planning and Management Committee of the university the syllabus has been reduced by 30% only for the session 2021-22.

Note:- The old students enrolled in the university in B. Sc. Part I before the session 2017-18 will have to appear in Part I, II, III due papers exam 2022 with this new syllabi. There will be no paper of old scheme in B.Sc. Part I, II, III due papers exam 2022

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Session 2021-22

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B. A./B. Sc. Part III Examination-2022**MATHEMATICS**

Teaching : 3 hours per week per theory paper

2 hours per week per batch for practical

(20 candidates in each batch)

Examination Scheme :

	Min. Pass Marks		Max. Pass Marks
Science	54		150
Arts	72		200
		Duration	Max Marks
Paper - I	Modern Algebra	3 hrs	40 (Science) 53 (Arts)
Paper - II	Complex Analysis	3 hrs	40 (Science) 53 (Arts)
Paper - III	Mechanics	3 hrs	40 (Science) 54 (Arts)
Practicals		2 hrs	30 (Science) 40 (Arts)

Note :-

01. Syllabus of each of the three papers is divided into FIVE units.
02. Each paper is divided into THREE sections A, B, & C.
03. **Section-A** : TEN short answer type questions will be set taking two questions from each unit. Each question will carry 1 mark for Science and 1.5 mark for Arts. All questions will be compulsory.
04. **Section-B** : TEN questions will be set taking two questions from each unit. Each question will carry 3 marks for Science and 4 marks for Arts. Student has to attempt ONE question from each unit.

06. **Section-C** : FIVE questions will be set taking one questions from each unit. Each question will carry 5 marks for Science in all three papers and 6 marks for Arts in paper I & II and 6.33marks in paper III. Student has to attempt ANY THREE Questions.
06. Common paper will set for Faculty of Science and Faculty of Social Science . Each candidate is required to appear in the practical examination to be conducted by internal and external examiners. External examiner will be appointed by the University and internal examiner will be appointed by the principal in consultation with the head, department of Mathematics in the college.
08. An internal/external examiner can conduct practical examination of not more than 100 (one hundred) candidates(20 candidates in each batch).
09. Each candidate has to pass in theory and practical examinations separately.

Paper – I Modern Algebra

Teaching : 3 Hours per Week

Duration of Examination : 3 Hours

Max. Marks 40 (Science)

53 (Arts)

Note: This paper is divided into THREE Sections A, B, & C. **Section-A** consists TEN short answer type questions. Each question is of 1 mark for Science and 1.5 mark for Arts. All questions are compulsory. **Section-B** consists TEN questions taking two questions from each unit. Each question will carry 3 marks for Science and 4 marks for Arts. Student has to attempt FIVE questions selecting ONE question from each unit. **Section-C** consists FIVE questions taking one questions from each unit. Each question will carry 5 marks for Science and 6 marks for Arts. Student has to attempt ANY THREE questions .

Unit – I : Subgroups – Complex of a group, subgroup, criterion for a complex to be a subgroup, algebra of complexes, union and intersection of subgroups, cosets of a group, algebra of cosets.

Unit – II : Group homomorphism, Isomorphism and Isomorphic groups, properties of homomorphism, Cayley's theorem, Normal subgroups, Simple groups, Properties of normal subgroups.

Unit – III : Ring, Integral domain and Fields- Definition and their properties, Characteristics of Ring, Integral domain and Field. Subring, Subfield, Prime field and their properties.

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Unit - IV : Vector Space - Definition and examples of vector/linear space, Elementary properties of vector space, Linear combination of vectors, Linear span, Linear dependence and independence of vectors, Basis dimensions.

Unit - V : Linear transformation or homomorphism, Linear operator, Isomorphism, theorems on isomorphism, Quotient space and its dimensions, Rank and Nullity of linear transformation, Sylvester's law, Characteristic polynomials, Eigen values and Eigen vectors, Cayley-Hamilton's theorem.

Paper - II Complex Analysis

Teaching : 3 Hours per Week

Duration of Examination : 3 Hours

Max. Marks 40 (Science)

53 (Arts)

Note: This paper is divided into THREE Sections A, B, & C. **Section-A** consists TEN short answer type questions. Each question is of 1 mark for Science and 1.5 mark for Arts. All questions are compulsory. **Section-B** consists TEN questions taking two questions from each unit. Each question will carry 3 marks for Science and 4 marks for Arts. Student has to attempt FIVE questions selecting ONE question from each unit. **Section-C** consists FIVE questions taking one questions from each unit. Each question will carry 5 marks for Science and 6 marks for Arts. Student has to attempt ANY THREE questions.

Unit-I : Complex plane, curves and regions in complex plane, Jordan curve theorem, Extended complex plane. Complex valued function- limit, continuity, differentiability, Analytic function, necessary and sufficient conditions for a function to be analytic, Harmonic functions, Construction of an analytic function, Milne-Thomson's method.

Unit-II : Conformal Mapping- necessary and sufficient conditions for $w = f(z)$ to represent a conformal mapping., Bilinear transformation, Analytic continuation, Power series method of analytic continuation.

Unit-III : Complex Integration- complex line integral, Cauchy integral theorem, Indefinite integral, Fundamental theorem integral calculus for complex functions, Cauchy integral formula, Analyticity of derivative of an analytic function.

Unit-IV : Singularity of an analytic function, Branch point, Reimann Theorem, Cassorati Weierstrass theorem, Entire and meromorphic functions, methods of detecting singularities, Zeros and poles of meromorphic functions

Unit-V : Residue at singularity, Calculation of residues, Cauchy Residue theorem, Evaluation of real definite integrals by contour integration.

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Paper – III Mechanics

Teaching : 3 Hours per Week

Duration of Examination : 3 Hours

Max. Marks 40 (Science)

54 (Arts)

Note: This paper is divided into THREE Sections A, B, & C. **Section-A** consists TEN short answer type questions. Each question is of 1 mark for Science and 1.5 mark for Arts. All questions are compulsory. **Section-B** consists TEN questions taking two questions from each unit. Each question will carry 3 marks for Science and 4 marks for Arts. Student has to attempt FIVE questions selecting ONE question from each unit. **Section-C** consists FIVE questions taking one questions from each unit. Each question will carry 5 marks for Science and 6.33 marks for Arts. Student has to attempt ANY THREE questions.

Unit-I : Kinematics and Kinetics: Radial and Transverse Components of Velocity and Acceleration, Angular velocity and acceleration, Tangential and Normal Components of Acceleration, Kinetics: Force and Motion. Rectilinear Motion: Simple Harmonic Motion.

Unit-II : Motion in Resisting Medium- Resistance varies as velocity and square of velocity. Constrained Motion: Motion on a smooth curve in a vertical plane, motion on inside and outside of a smooth circle.

Unit-III : Moment of Inertia- M. I of rod, circular ring, circular disk, rectangular, elliptical and triangular lamina, solid and hollow spheres, solid ellipsoid, Product of Inertia, Theorem of Parallel Axis, Principal Axis, Equipomental Bodies.

Unit-IV : Equilibrium of a body under Coplanar Forces: Equilibrium of body Under Three Forces. Friction: Force of Friction, Angle of Friction, Coefficient of Friction, Cone of Friction, Limiting Equilibrium on an Inclined Plane.

Unit-V : Catenary: Equation of Common Catenary, Properties of Catenary Virtual Work: Principle of Virtual Work, Tension in a Strng, Thrust in a Rod, Problems involving Elastic String and Curves.

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Practicals

Teaching : 2 Hours per Week

Examination Scheme:

Duration - 2 Hours

	Science	Arts
Maximum Marks	30	40
Minimum Pass Marks	11	14
Distribution of Marks:		
Two Exercises one from each group		
10 marks each	= 20 marks	13 marks each = 26 marks
Practical record	= 05 marks	07 marks
Viva-voce	= 05 marks	07 marks
Total Marks	= 30 marks	40 marks

Group – A : C-Language Preliminaries, Operators, Input-Output statements, Conditional statements, Implementing loops in C-programs, Array variables, some elementary programs, Matrix addition, subtraction.

Group – B : Solution of some Numerical Analysis problems- Numerical Integration, Gauss elimination method to solve system of linear equations, Bisection method, Newton-Raphson method.

Note :-1. Each candidate (Regular/Non-collegiate) has to prepare his/her record.

2. Students have to practice in a computer lab.

Session 2021-22

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अकादमिक प्रभारी
 महाशय्या सुखलाल बूज विश्वविद्यालय
 बालपुर (राज.)