

B.Sc./B.A. Part I Examination 2020

TEACHING AND EXAMINATION SCHEME

Subject/Paper	Period/Week		Exam. Hours	Max Marks	Min.Pass Marks
	L	P			
MATHEMATICS					
Paper I	3	-	3	75	} 81
Paper II	3	-	3	75	
Paper III	3	-	3	75	

B.Sc./B.A. Part I Examination 2020
Mathematics

Paper I : Algebra and Co-ordinate Geometry of Two Dimensions.
Paper II : Calculus
Paper III: Co-ordinate Geometry of three Dimensions and Vector Calculus.

Total Marks: 75

Time: 03:00 Hrs.

Paper I

Algebra and Co-ordinate Geometry of Two Dimensions

Note: Each theory paper is divided in three parts i.e. Section – A, Section – B and Section – C

Section A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited up to 30 words. Each question will carry 2 marks.

Section B: Will consist of 10 questions. Each unit will be having two question; students will answer one question from each Unit. Answer of each question shall be limited up to 250 words. Each question will carry 5 marks.

Section C: Will consist of total 05 questions one from each unit. Students will answer any 03 questions and answer of each question shall be limited up to 500 words. Each question will carry 10 marks.

Unit1: The characteristic equation of a matrix, Eigen values and Eigen vectors, Cayley-Hamilton theorem and its usage in finding the inverse of a matrix. *Rank of Matrix*, Inequalities. Continued fractions.

Unit 2: Relations between the roots and coefficients of general polynomial equations in one variable, Symmetric functions of roots, Transformation of equations. Descarte's rule of signs. Solution of cubic equations (Cardon's method). Biquadratic equations (Ferrari's Method).

Unit 3: Infinite series. Convergent series, tests for convergence of a series, comparison test, D'Alembert's Ratio test, Cauchy's root test, Logarithmic Ratio Test. Raabe's test, De Morgen and Bertrand's test, Cauchy's condensation test, Gauss's test. Alternating series, Leibnitz test (Derivation of above tests not required).

Unit 4 : Polar equation of a conic, polar equations of tangent, normal, asymptotes, chord of contact, auxiliary circle, director circle of a conic and related problems.

Unit 5 : General equation of second degree. Tracing of conics (Cartesian coordinates).

SUGGESTED BOOKS

M. Ray : A Text Book of Higher Algebra, S.Chand & Co., New Delhi.

J.L. Bansal, S.L. Bhargva, & S.M. Agarwal : Algebra (Hindi Ed.), Jaipur Publishing House, Jaipur.

J.L. Bansal & S.L.Bhargava:2-D Coordinate Geometry (HindiEd)Jaipur Publishing House, Jaipur.

Sharma, C.L.Varshney : Coordinate Geometry, Pragati Prakashan, Meerut.

D.C. Gokhroo, S.R. Saini & J.P.N.Ojha : 2-D Geometry (Hindi Ed.), Navkar Publication, Ajmer.

Paper – II **Calculus**

Note: Each theory paper is divided in three parts i.e. Section – A, Section – B and Section – C

Section A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited up to 30 words. Each question will carry 2 marks.

Section B: Will consist of 10 questions. Each unit will be having two question; students will answer one question from each Unit. Answer of each question shall be limited up to 250 words. Each question will carry 5 marks.

Section C: Will consist of total 05 questions one from each unit. Students will answer any 03 questions and answer of each question shall be limited up to 500 words. Each question will carry 10 marks.

Total Marks: 75

Time: 03:00 Hrs.

Unit 1: Polar Co-ordinates. Angle between radius vector and the tangent. Angle between curves in polar form. Length of polar subtangent and polar subnormal, Pedal equation of a curve, Derivatives of an arc, curvature, various formulae, Centre of curvature and chord of curvature and related problems.

Unit 2: Partial differentiation, Euler's theorem on homogeneous functions, chain rule of partial differentiation, Maxima and Minima of functions of two independent variables and of three variables connected by a relation, Lagrange's Method of undetermined multipliers.

Unit 3: Asymptotes, double points, curve tracing, Envelopes and evolutes.

Unit 4: Theory of Beta and Gamma functions. Rectification. Volume and Surfaces of solids of revolution. Differentiation and integration under the sign of integration.

Unit 5: Evaluation of double and triple integrals and their applications in finding areas and volumes. Dirichlet's integral. Change of order of integration and changing into polar co-ordinates.

SUGGESTED BOOKS

Gorakh Prasad: A Text Book of Differential Calculus; Pothishala Pvt.Ltd.Allahabad.

J.L.Bansal, S.L.Bhargava and S.M.Agarwal : A Text Book of Differential Calculus II (Hindi Ed.) and Integral Calculus, Vol. II (Hindi Ed.); Jaipur Publishing House, Jaipur.

D.C. Gokharoo & S.R. Saini : Differential Calculus (Hindi Ed.); Navkar Prakashan, Ajmer.

O.P.Tandon, and Sharma, K.C. : Integral Calculus; Jaipur Publishing House, Jaipur.

Gupta, Juneja and Tandon : Differential Calculus (English Ed.);Ramesh Book Depot, Jaipur.

Gorakh Prasad : Integral Calculus; Pothishala Pvt.Ltd.Allahabad.

Paper – III

Co-ordinate Geometry of 3-Dimensions and Vector Calculus.

Note: Each theory paper is divided in three parts i.e. Section – A, Section – B and Section – C

Section A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited up to 30 words. Each question will carry 2 marks.

Section B: Will consist of 10 questions. Each unit will be having two question; students will answer one question from each Unit. Answer of each question shall be limited up to 250 words. Each question will carry 5 marks.

Section C: Will consist of total 05 questions one from each unit. Students will answer any 03 questions and answer of each question shall be limited up to 500 words. Each question will carry 10 marks.

Total Marks: 75

Time: 03:00 Hrs.

Unit 1 : Sphere, Cone and Cylinder (Rectangular Coordinates only)

Unit 2 : The Central Conicoids (referred to principal axes). Tangents and tangent planes, Polar planes and polar lines, Section with a given centre, Enveloping cone, Enveloping cylinder and related problems.

Unit 3 : Equations of the normal to an ellipsoid, number of normals from a given point to an ellipsoid, Cone through six normals, Conjugate diameter and diametral planes and their properties. Cone as a Central surface. Paraboloids.

Unit 4 : Plane Sections of Conicoids, Umbilics, Generating lines of hyperboloid of one sheet and its properties.

Unit 5 : Vector Calculus : Curl, Gradient and Divergence & Identities involving these operators. Theorems of Stoke, Green and Gauss (Statement, application and verification only).

SUGGESTED BOOKS

Gupta, Juneja : Vector Analysis; Ramesh Book Depot, Jaipur.

D.C. Gokhroo, S.R. Saini, S.S.Bhati : Vector Calculus (Hindi Ed.); Navkar Prakashan, Ajmer.

S.L.Bhargava, Banwari Lal : Vector Calculus (Hindi Ed.); Jaipur Publishing House, Jaipur.

R.J.T.Bell.; Coordinate Geometry of Three dimensions; Macmillan India Ltd., New Delhi.

Vasistha, Agarwal : Analytical Solid Geometry; Pragati Prakashn, Meerut.

Gokhroo, Saini & Rathi : Analytical 3-D Geometry (HindiEd); Jaipur Pub. House, Jaipur.

J.L.Bansal, S.L. Bhargva & S.M. Agarwal : 3-D Coordinate Geometry II; Jaipur Pub. House, Jaipur.