

## **Syllabus for 2011-12, 2012-13 and 2013-14 Sessions**

### **B.A./B.Sc.(Mathematics) Part-I (Sem-I)**

#### **Paper-I : Calculus**

Maximum Marks: 75

External: 60

Teaching hours: 55

Time allowed: 3 Hrs.

Internal: 15

Minimum Pass Marks: 35%

#### **INSTRUCTIONS FOR THE PAPER-SETTER**

The question paper will consist of three sections. A, B and C. Sections A and B will have four questions from the respective sections of the syllabus. Section C will have only one question, which will consist of 8 or 10 objective/ very short answer type parts covering the whole syllabus. All the questions from sections A, B and C will carry equal marks.

#### **INSTRUCTIONS FOR THE CONDIDATES**

Candidates are required to attempt two questions each from the sections A and B of the question paper and entire section C. All questions carry equal marks.

#### **SECTION-A**

Limit, Continuity and differentiability of a function (Review), Derivatives of inverse and hyperbolic functions. Successive differentiations . Maxima and Minima . Concavity and Convexity. Multiple points. Asymptotes, Curve tracing (including polar form). Curvature, envelopes and evolutes.

#### **SECTION-B**

Integration of irrational algebraic functions, integration of transcendental functions. Reduction formulas, Definite integrals. Rectification. Quadrature. Volume and Surface of Solid of revolutions. Multiple integrals. Gamma and Beta functions.

#### **BOOKS RECOMMENDED**

- 1) Gorakh Prasad : Differential Calculus, Pothisala Pvt. Ltd.
- 2) Gorakh Prasad : Integral Calculus and Differential Equations, Pothisala Pvt. Ltd.

**B.A./B.Sc.(Mathematics) Part-I (Sem-I)**

**Paper-II : Algebra and Trigonometry**

Maximum Marks: 75

External: 60

Teaching hours: 55

Time allowed: 3 Hrs.

Internal: 15

Minimum Pass Marks: 35%

**INSTRUCTIONS FOR THE PAPER-SETTER**

The question paper will consist of three sections A, B and C. Sections A and B will have four questions from the respective sections of the syllabus. Section C will have only one question, which will consist of 8 or 10 objective/ very short answer type parts covering the whole syllabus. All the questions from sections A, B and C will carry equal marks.

**INSTRUCTIONS FOR THE CONDIDATES**

Candidates are required to attempt two questions each from the sections A and B of the question paper and entire section C. All questions carry equal marks.

**SECTION-A**

Elementary operations on matrices, Inverse of a matrix, evaluation of inverse by elementary row operations LU-factorization, Linear independence of row and column vectors. Row rank, Column rank and Rank of matrix, Equivalence of column and row ranks.

Eigen values, eigen vectors and the characteristic equation of a matrix, Cayley-Hamilton theorem and its use in finding inverse of matrix, Properties of eigen values of symmetric skew-symmetric, Hermitian, orthogonal and other matrices. Applications of matrices to a system of linear (both homogeneous and non-homogenous) equations, Theorems on consistency of a system of linear equations.

**SECTION-B**

Relations between the roots and coefficients of general polynomial equation in one variable, Transformation of equation, Descartes's rule of signs, Solution of cubic equations (Cardon method), Biquadratic equations.

De Moivre's theorem and its applications, expansion of trigonometric functions. Direct and inverse circular and hyperbolic functions. Logarithm of a complex quantity. Gregory's series. Summation of series. Infinite products.

### **BOOKS RECOMMENDED**

- 1) S.L. Loney : Plane Trigonometry, Part-II, . AITBS Publishers and Distributors.
- 2) R.S. Verma and K.S.Shukla : Text Book on Trigonometry. Pothisala Pvt. Ltd
- 3) K.B.Datta : Matrix and Linear algebra. Prentice Hall of India Pvt. , New Delhi, 2000.
- 4) Chandrika Prasad : Theroy of equations and applications. Pothisala Pvt. Ltd., Allahabad.

### **Reference Book**

- 1) Schaum Series : Linear Algebra.

## **B.A./B.Sc.(Mathematics) Part-I (Sem-II)**

### **Paper-III : Differential Equations**

Maximum Marks: 75

External: 60

Teaching hours: 55

Time allowed: 3 Hrs.

Internal: 15

Minimum Pass Marks: 35%

### **INSTRUCTIONS FOR THE PAPER-SETTER**

The question paper will consist of three sections A, B and C. Sections A and B will have four questions from the respective sections of the syllabus. Section C will have only one question, which will consist of 8 or 10 objective/ very short answer type parts covering the whole syllabus. All the questions from sections A, B and C will carry equal marks.

### **INSTRUCTIONS FOR THE CONDIDATES**

Candidates are required to attempt two questions each from the sections A and B of the question paper and entire section C. All questions carry equal marks.

### **SECTION-A**

**First order differential equations** : Order and degree of a differential equation, separable differential equations, Homogeneous differential equations, equations reducible to Homogenous differential equations form, Linear differential equations and equations reducible to linear differential equations form, integrating factor and Exact differential equations.

**Higher order differential equations** : Solution of Linear homogeneous and non-homogeneous differential equations of higher order with constant coefficients and with variable coefficients. Wronskian, method of Variation of Parameters, method of Undetermined Coefficients, differential operator method. Linear non-homogeneous differential equations with variable coefficients, Euler's method.

## SECTION-B

**Partial differential equations** : Partial differential equation of first order, Lagrange's solution, some special types of equation which can be solved easily by methods other than general method, Charpit's general method of solution.

**Partial differential equations of second and higher order** : Classification of linear partial differential equations of second order, Solution in series of some Standard differential equations. Homogeneous and non-homogeneous partial differential equations with constant coefficients. Partial differential equations reducible to equations with constant coefficients. Monge's method.

### BOOKS RECOMMENDED

1. H.T.H. Piaggio : An Elementary Treatise on Differential equations : Barman Press.
2. R. K. Jain and S. R. K. Iyengar : Advanced Engineering Mathematics, Narosa Publishing House.
3. E. Kreysig : Advanced Engineering Mathematics, John Wiley & Sons Inc., New York.
4. I. N. Sneddon : Elements of Partial Differential Equations, Mc Graw Hill Book Co.
5. A. R. Forsyth : A Treatise on Differential Equations, Macmillan & Co. Ltd., London.

## **B.A./B.Sc.(Mathematics) Part-I (Sem-II)**

### **Paper-IV : Analytic Geometry**

Maximum Marks: 75

External: 60

Teaching hours: 55

Time allowed: 3 Hrs.

Internal: 15

Minimum Pass Marks: 35%

### **INSTRUCTIONS FOR THE PAPER-SETTER**

The question paper will consist of three sections A, B and C. Sections A and B will have four questions from the respective sections of the syllabus. Section C will have only one question, which will consist of 8 or 10 objective/ very short answer type parts covering the whole syllabus. All the questions from sections A, B and C will carry equal marks.

### **INSTRUCTIONS FOR THE CANDIDATES**

Candidates are required to attempt two questions each from the sections A and B of the question paper and entire section C. All questions carry equal marks.

#### **SECTION-A**

Transformation of axes, shifting of origin, Rotation of axes, Reduction of the second degree equation into standard forms by transformation of co-ordinates. The invariants and Identification of curves represented by second degree equation.

Pole and polar, pair of tangents from a point, chord of contact, equation of the chord in terms of midpoint and diameter of conic. Polar equations of conics and equations of chords, tangents and normal only.

#### **SECTION-B**

Conjugate diameters, Conjugate hyperbola, Asymptotes of a hyperbola, rectangular hyperbola. Special properties of parabola, ellipse and hyperbola.

Plane, Straight lines, Sphere, Cone. Cylinder. Central conicoids. Paraboloids. Plane of Conicoids. Generating lines. Confocal Conicoids. Reduction of Second degree equation to standard form.

### **Text Books**

1. S.L. Loney : The Elements of Coordinate Geometry, Macmillan and Company, London.
2. Gorakh Prasad and H.C.Gupta : Text Book on Coordinate Geometry, Pothishala Pvt. Ltd., Allahabad.
3. P.K. Jain and Khalil Ahmad : A Text Book of Analytical Geometry of two Dimensions, Wiley Eastern Ltd. 1994.
4. N.Saran and R.S. Gupta, : Analytical Geometry of Three Dimensions, Pothishala Pvt. Ltd. Allahabad.

### **RECOMMENDED READINGS**

1. R. J.T. Bell : Elementary Treatise on Coordinate Geometry of Three Dimesions, Macmillan India Ltd., 1994.