BM 101 Algebra And Trigonometry

SYLLABI OF MATHEMATICS I/II/III SEMESTER W.E.F. 2013-14

Maximum Marks: 27

Internal Assessment: 6

Time: 3 Hours

Section –I (3 Questions)

Mappings. Equivalence relations and partitions. Congruence modulon.

Symmetric, Skew symmetric. Hermitian and Skew Hermitian matrices.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, eignvectors and the characterstic equation of a matrix. Cayley Hamilton theorem and its use in finding inverse of a matrix. Application of matrices to a system of linear (both homogenous and non-homogenous) equations. Theorems on consistency of system of linear equations.

Section-II (2 Questions)

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

Section-III (3 Questions)

Definition of a group with examples and simple properties. Subgroups. Generation of group. Cylic group.Coset decomposition.Largrange's theorem and its conse3quences. Fermat's and Euler's theorems.Homomorphism and Lsomorphism. Normal Subgroupus.Quotient groups. The fundamental theorem of homomorphism.Permuation groups.Even and odd permutations. The alternating groups and Cayley's theorem. Indroduction to rings, subrings, integral domains and fields. Characteristic of a ring.

Section.IV (2 Questions)

De Moivre's theoreme 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.

Note; The examiner is requested to set ten questions in all, selecting questions sectionwise as indicated in the syllabus. The candidate is required to attempt five questions selecting at least one question from each section.

Books Recommended:

1. L.N.Herstein.Topics in Algebra, Wiley Eastern Ltd.,New Delhi,1975
2. P.B.Bhattacharya S.K.Jain and S.R.Nagpual. First Course in Linear Algebra, Wiley Eastern. New Delhi.1983
3. P.B.Bhattacharya.S.K.Jain and S.R.Nagpaul.Basic Abstract Algebra
4. H.S.Hall and S.R.Knight.Higher Algebra.H.M.Publications,1994
5. Shanti Narayan.A text-book of Matrices.
6. Chandrika Prasad..Text-Book on Algebra and Trigonometry and Therory of Equations. Pothishala Private Ltd.,Allahabad.
7. S.L.Loney.Plane Trigonometry Part-II.Macmillan and Company, London.
8. R.S.Verma and K.S.Shukla.Text-Book on Trigonometry, Pothishala Pvt.Ltd.,Allahabad.

BM 102 Calculus

Maximum Marks:26
Internal Assesment:7
Time:3 Hours

Section-I (3 Question)

Definition of the limit of a function.Basic properties of limits.Continuous function and classification of discontinuities. Diferentiability. Successive differentiation.Leibnitz theorem.Maclaurin and Taylor series expanstions Asymptotes. Curvature.Tests for concavity and convexity.Points in inflexion.Multiple Points.Tracking of Curves in Cartesian and polar coordinates.

Section-II (3 Questions)

Reduction formulae,Quadrature.Rectification.Volumes and surfaces of solids of revolution.

Section-III (3 Question)

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.

Section-IV (2 Questions)

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 different equations.

Note: The examiner is requested to set ten questions in all selecting questions section wise as indicated in the syllabus. The candidate is required to attempt five questions selecting at least one question from each section:

Books Recommended:

1. Differential & Intergral Calculus by Shanti Narayan.
2. Munary R.Spiegal.Theory and Problems of Advanced Calculus, Schaum's outline series.Schaum,Publishing Co.,New York
3. N.Piskunov.Differintial and Integral Calculus.Peace Publishers,Moscow.
4. Gorakh Prasad,Differintial Calculus,Pothishala Pvt.Ltd.,Allahabad.
5. Gorakh Prasad, Integral Calculus,Pothishala Pvt.,Allahabad
6. D.A.Murray, Introductory Course in Differential Equations,Orient Longman (India),1967
7. E.A.Codington,An Introduction to Ordinary Differential Equations,Prentice,Hall of India,1961
8. H.T.H.Piaggic,Elementary Treatise on Differential Equations and their Applications.C.B.S.Publisher & Distributors,Delhi,1985.

BM 103 Vector Analysis and Geometry

Maximum Marks: 27
Internal Assessment: 07
Time:3 Hours

Section-I (2 Questions)

Scalar and vector product of three vectors.Products of four vectors: Reciproca I Vectors. Vector differentiation. Gradient. Divergence and curl.

Section-II (2 Questions)

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

Section-III (3 Questions)

General equation of second degree. Tracing of conics. System of conics. Confocal, conics. Polar equation of a conic.Sphere, Cone, Cylinder.

Section-IV(3 Questions)

Central conicoids. Paraboloids. Plane Sections of Conicoids. Generating lines, Confocal Conicoids. Reduction of Second degree equations.

Note: The examiner is requested to set ten questions in all selecting question section wise as indicated in the syllabus. The candidate is required to attempt five questions selecting at least one question from each section.

Books Recommended :

1. Murray R. Spiegal. Theory and Problems of Advanced Calculus, Schaum Publishing Company, New York.
2. Murray R. Spiegal. Vector Analysis, Schaum Publishing Company,New York.

3. N. Saran and S.N.Nigam, Introduction to Vector Analysis, Pothishala Pvt.Ltd., Allahabad.
4. Shanti Narayana, A Text Book of Vector Calculus, S.Chand & Co.,New Delhi.
5. S .L. Loney, The Elements of Coordinate Geometry, Macmillan and Company, London.
6. Gorakh Prasad and H.C.Gupta, Text Book on Coordinate Geometry, Pothishala Pvt. Ltd., Allahabad.
7. R.J.T. Bell. Elementary Treatise on Coordinate Geometry of Three Dimensions. MacMillan India Ltd.,1994
8. N.Saran and R.S.Gupta. Analytical Geometry of Three Dimensions, Pothishala Pvt.Ltd. Allahabad.
9. Shanti Narayan. Solid Geometry.