

BM-361

(Semester-VI)

Real and Complex Analysis

External Marks: 40/27

Internal Marks: 10/6

Time: 3 Hours

Note: Paper setter will set nine questions in all, selecting two questions from each section and one Compulsory question consisting of five parts distributed over all four sections. Candidates are required To attempt five questions, selecting at least one question from each section and the compulsory Question.

Section-I

Jacobians, Beta and Gamma functions, Double and Triple integrals, Dirichlet's integrals, change of order of integration in double integrals.

Section-II

Fourier's series: Fourier expansion of piecewise monotonic functions, Properties of Fourier Co-efficients, Dirichlet's conditions, Parseval's identity for Fourier series, Fourier series for even and odd functions, Half range series, Change of Intervals.

Section-III

Extended Complex Plane, Stereographic projection of complex numbers, continuity and differentiability of complex functions, Analytic functions, Cauchy-Riemann equations. Harmonic functions.

Section-IV

Mappings by elementary functions: Translation, rotation, Magnification and Inversion. Conformal Mappings, Mobius transformations. Fixed points, Cross ratio, Inverse Points and critical mappings..

REFERENCES

- . T.M. Apostol: Mathematical Analysis, Narosa Publishing House, New Delhi, 1985
- R.R. Goldberg : Real analysis, Oxford & IBH publishing Co., New Delhi, 1970
- D. Somasundaram and B. Choudhary : A First Course in Mathematical, Analysis, Narosa Publishing House, New Delhi, 1997
- Shanti Narayan : A Course of Mathematical Analysis, S. Chand & Co., New Delhi
- R.V. Churchill & J.W. Brown: Complex Variables and Applications, 5th Edition, McGraw-Hill, New York, 1990
- Shanti Narayan : Theory of Functions of a Complex Variable, S. Chand & Co., New Delhi.N.
Herstein : Topics in Algebra, Wiley Eastern Ltd., New Delhi, 1975

BM-362
(Semester-VI)
Linear Algebra

External Marks: 40/26

Internal Marks: 10/7

Time: 3 Hours

Note: Paper setter will set nine questions in all, selecting two questions from each section and one Compulsory question consisting of five parts distributed over all four sections. Candidates are required To attempt five questions, selecting at least one question from each section and the compulsory Question.

Section-I

Vector spaces, subspaces, Sum and Direct sum of subspaces, Linear span, Linearly Independent and dependent subsets of a vector space. Finitely generated vector space, Existence theorem for basis of a finitely generated vector space, Finite dimensional vector spaces, Invariance of the number of elements of bases sets, Dimensions, Quotient space and its dimension.

Section-II

Homomorphism and isomorphism of vector spaces, Linear transformations and linear forms on vector spaces, Vector space of all the linear transformations Dual Spaces, Bidual spaces, annihilator of subspaces of finite dimensional vector spaces, Null Space, Range space of a linear transformation, Rank and Nullity Theorem,

Section-III

Algebra of Linear Transformation, Minimal Polynomial of a linear transformation, Singular and non-singular linear transformations, Matrix of a linear Transformation, Change of basis, Eigen values and Eigen vectors of linear transformations.

Section-IV

Inner product spaces, Cauchy-Schwarz inequality, Orthogonal vectors, Orthogonal complements, Orthogonal sets and Basis, Bessel's inequality for finite dimensional vector spaces, Gram-Schmidt, Orthogonalization process, Adjoint of a linear transformation and its properties, Unitary linear transformations.

REFERENCES

- I.N. Herstein : Topics in Algebra, Wiley Eastern Ltd., New Delhi, 1975
- P.B. Bhattacharya, S.K. Jain and S.R. Nagpal : Basic Abstract Algebra (2nd edition).
- Vivek Sahai and Vikas Bist : Algebra, NKarosa Publishing House.
- I.S. Luther and I.B.S. Passi : Algebra, Vol.-II, Norsa Publishing House.

BM-363
(Semester-VI)

Dynamics

External Marks: 40/27

Internal Marks: 10/6

Time: 3 Hours

Note: Paper setter will set nine questions in all, selecting two questions from each section and one Compulsory question consisting of five parts distributed over all four sections. Candidates are required To attempt five questions, selecting at least one question from each section and the compulsory Question.

Section-I

Velocity and acceleration along radial, transverse, tangential and normal directions. Relative velocity and acceleration. Simple harmonic motion. Elastic strings.

Section-II

Mass, Momentum and Force. Newton's laws of motion. Work, Power and Energy. Definitions of Conservative forces and Impulsive forces.

Section-III

Motion on smooth and rough plane curves. Projectile motion of a particle in a plane. Vector angular velocity.

Section-IV

General motion of a rigid body. Central Orbits, Kepler laws of motion. Motion of a particle in three dimensions. Acceleration in terms of different co-ordinate systems.

REFERENCES

- S.L.Loney : An Elementary Treatise on the Dynamics of a Particle and a Rigid Bodies, Cambridge University Press, 1956
- F. Chorlton : Dynamics, CBS Publishers, New Delhi
- A.S. Ramsey: