Appendix ‘A’
(Outlines of Tests)

Calculus (Differential and Integral Calculus) : 100 Marks

Appendix ‘B’
(Syllabi and Courses of Reading)

Calculus (Differential and Integral Calculus) 100 Marks

Note: Attempt six questions by selecting two questions from Section I, two questions from Section II, one question from Section III and one question from section IV.

Section-I (4/12)

Preliminaries:
- Real numbers and the real line
- Functions and their graphs
- Shifting and scaling graphs
- Solution of equations involving absolute values
- Inequalities

Continuity:
- Limit of a function, left hand and right hand limits, Theorems of limits (without proofs)
- Continuity, Continuous functions

Derivatives and its Applications:
- Differentiate functions
- Differentiation of polynomial, rational and transcendental functions
- Intermediate value theorem, Rolle’s theorem (without proofs)
- Mean value theorems and applications (without proofs)
- Higher derivatives, Leibniz’s theorem (without proofs)
- L’Hospital’s Rule
- Application of Taylor’s and Maclaurin’s theorem with their remainders

Section-II (4/12)

Integration and Definite Integrals:
- Techniques of evaluating indefinite integrals
- Integration by substitutions, Integration by parts
• Change of variable in indefinite integrals
• Definite integrals, Fundamental theorem of calculus
• Reduction formulas for algebraic and trigonometric integrands
• Improper integrals, Gamma functions
• Numerical integration

Plane Analytic Geometry:
• Conic section and quadratic equations
• Classifying conic section by eccentricity
• Translation and rotation of axis
• Properties of circle, parabola, ellipse, hyperbola Polar coordinates, conic sections in polar coordinates
• Graphing in polar coordinates
• Tangents and normal, pedal equations, parametric representations of curves

Section-III (2/12)
Applications of Integration:
• Asymptotes.
• Relative extrema, points of inflection and concavity
• Singular, points, tangents at the origin
• Graphing of Cartesian and polar curves
• Area under the curve, area between two curves
• Arc length aid intrinsic equations
• Curvature, radius and cent re of curvature
• Involute and volute, envelope

Section-IV (2/12)
Functions of Several Variables and Multiple Integrals:
• Limit and continuity of a function of two variables
• The partial derivative, Computing partial derivatives algebraically
• The second-order partial derivative
• Tangent planes and normal lines
• Maxima and minima of a function of two variables
• Double integral in rectangular and polar form
• Triple integral in rectangular, Cylindrical and spherical coordinates
• Substitution in multiple integrals
Recommended Books: