17.   Mathematics

<div align="center">

B.A. Mathematics-Opt   **Total Mark: 100**

Appendix 'A'

(Outlines of Tests)

</div>

Calculus ½ and Algebra ½   :   100 Marks

<div align="center">

Appendix 'B'

(Syllabi and Courses of Reading)

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Note: Attempt five questions by selecting at least two questions from each Section.

Section-I: (4/8)

Calculus

- Real numbers and the real line
- Inequalities
- Limit of a function, left hand and right hand limits, Theorems of limits
- Continuity, Continuous functions
- Differentiable functions
- Differentiation of polynomial, rational and transcendental functions
- L'Hospitals Rule
- Taylor's and Maclaurin's series
- Techniques of evaluating indefinite integrals
- Integration by substitutions, Integration by parts
- Change of variable in indefinite integrals

Section-II: (4/8)

Algebra

- Definition of matrix, various types of matrices
- Algebra of matrices
- Determinant of square matrix, cofactors and minors
- Laplace expansion of determinants
- Elementary matrices, Adjoint and inverses of matrices
- Rank of a matrix
- Introduction to systems of linear equations
- Cramer's rule, Gaussian elimination and Gauss Jordan method
- Real vector spaces, subspaces
- Linear combination and spanning set

- Linear independence and linear dependence
- Basis and dimension

Recommended Books:

1. Thomas, Calculus, 11th Edition. Addison Wesley Publishing Company, 2005
2. Howard Anton and Chris Rorres, Elementary Linear Algebra Applications Version, John Wiley and Sons Inc. 9th Edition, 2005