

**MMA-E311**  
**VEDIC AND ANCIENT MATHEMATICS**

MM : 100  
Time : 3 hrs  
L T P  
5 2 0

Sessional : 30  
ESE : 70  
Pass Marks : 40

**NOTE:** The question paper shall consist of two sections (Sec.-A and Sec.-B ). Sec.-A shall contain 10 short answer type questions of six marks each and student shall be required to attempt any five questions. Sec.-B shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Questions shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper

Learning of Hindu Numerals, Vowels and Consonants.

Definitions and Tables, Place Values of Digits, Methods of Multiplication, Division, Methods of Finding Squares, Square Root, Methods to Find the Cube, Cube Roots, Eight Operations on Fractions, Addition and Subtraction of Fractions, Multiplication of Fractions, Division of Fractions, Squares, Cubes, Square Roots and Cube Roots of Fractions, Eight Rules Concerning Zero, Reverse Process , To Find an Unknown Quantity, Method of Transition, Square Transition, Quadratic Equation, Wood Cutting, Volume of a Heap of Grain, Shadows, Pulverization, Concatenation (Permutations, Partitions etc.)

Introduction to Śulbsūtrās : Study of Bāudhāyana Śulbsūtra, Pythagorus Theorem, Addition of many squares geometrically, converting squares into rectangle and vice-versa, squaring the circle and vice-versa.

Introduction to Jain Mathematics: Contribution of Mahaviracarya (Gaṇit Saar Sangreh), Piṅgala Śastra [Permutations and Combinations]

**Simple Arithmetic Operations using:** Ekādhiken Pūrveṇa, Nikhil am Navatascaramam Daśtah, Urdhva-triyagabhyam & Veśtanam, Application of mental multiplication techniques and decimal division .

**Brief Study About :**

1. Some Aćarya / Saints of Vedic era who knew mathematics.
2. Golden Era of Indian Mathematicians [400-1200 CE] who contributed to commercial applications, Indeterminate Analysis, Astronomical problems etc.: Āryābhatta, Brahmagupta, Bhāskara II, Vārahmihira. [Life Sketch (Lineage, Time Period and Contribution)], Indeterminate equations, Place value system and zero, Approximation of  $\pi$ , Trigonometry, Algebra
3. Kerala Mathematicians [1300-1600CE]
4. Srinivasan Ramanujan, a Man who reshaped 20<sup>th</sup> century Mathematics [ Dec. 1887-Jan. 1920]

**Reference books:**

1. 'Līlāvati of Bhaskaracarya' (Motilal Banarsidas publishers Pvt. Ltd.)
2. Krishnaji Shankara Patvardhan, Somashkhara Amrita Naimpally, Shyam Lal Singh Jagadguru swami sri
3. Bharti Krishna Tirthaji Maharaja, Vedic Mathematics (Motilal Banarsidas publishers Pvt. Ltd.)
4. 'The Sulbasutras of BALIDHAYANA, APASTAMBA, KATYAYANA AND MANAVA' with text, English translation and commentary by S.N. Sen & A.K. Bag. Publ. Indian National Science Academy, New Delhi.
5. The prosody of PINGALA, Dr. Kapil dev Dwivedi, Prof. Shyam Lal Singh. Publication Vishwavidyalya prakasan, Varanasi.
6. 'The Great Mathematical Heritage of India' Dr. Sudyumna Acharya, Parimal Publications, Delhi. [Chapter-8: Indeterminate Quadratic Equations with two variables and rule for making square numbers. And Chapter-9: Indeterminate Equations with two variables ]