

Test Codes: UGA (Multiple-choice Type) and UGB (Short Answer Type) 2023

Questions will be based on the following and related topics.

Algebra: Sets, operations on sets. Prime numbers, factorization of integers and divisibility. Rational and irrational numbers. Permutations and combinations, basic probability. Binomial Theorem. Logarithms. Polynomials: Remainder Theorem, Theory of quadratic equations and expressions, relations between roots and coefficients. Arithmetic and geometric progressions. Inequalities involving arithmetic, geometric and harmonic means. Complex numbers. Matrices and determinants.

Geometry: Plane geometry. Geometry of 2 dimensions with Cartesian and polar coordinates. Equation of a line, angle between two lines, distance from a point to a line. Concept of a Locus. Area of a triangle. Equations of circle, parabola, ellipse and hyperbola and equations of their tangents and normals. Mensuration.

Trigonometry: Measures of angles. Trigonometric and inverse trigonometric functions. Trigonometric identities including addition formulae, solutions of trigonometric equations. Properties of triangles. Heights and distances.

Calculus: Sequences - bounded sequences, monotone sequences, limit of a sequence. Functions, one-one functions, onto functions. Limits and continuity. Derivatives and methods of differentiation. Slope of a curve. Tangents and normals. Maxima and minima. Using calculus to sketch graphs of functions. Methods of integration, definite and indefinite integrals, evaluation of area using integrals. Homogeneous differential equations of first order and first degree