SYLLABUS FOR PRELIMINARY EXAMINATION FOR RECRUITMENT TO THE POSTS OF ASSISTANT MASTER/MISTRESS IN <u>MATHEMATICS</u>

Full Marks : 100   **Time : 1 Hour 30 Minutes**

<u>Algebra</u> :

Complex Number : Demoiver's theorem, its applications.
Exponential, Sine, Cosine, Logarithm of a Complex Number.

Theory of Equations : Relation between roots and co-efficients, symmetric function of roots, transformation of equation, multiple root.

Determinant and matrix : Properties and applications.

Inequality : AM $>=$ GM $>=$ HM and its applications.

<u>Set Theory</u> :

Basic concepts, mapping, group, ring, field.

<u>Boolean Algebra</u> :

Basic concepts. Boolean variables and functions and their truth tables. NOT, OR and AND gates. Binary systems.

<u>Vector</u> :

Vector addition, Scalar and vector product. Application of vector algebra in geometrical and trigonometrical problems.

<u>Calculus</u> :

Differential Calculus - Sequence, series, Limit, continuity, differentiability, Successive derivatives. Rolle's theorem, Mean value theorem.

Integral Calculus - Indefinite integral, definite integral and its properties, definite integral as limit of sum. Beta and Gama functions.

<u>Application of Calculus</u> :

Tangent & normal, curvature, pedal equation, curve-tracing, area, rectification.

<u>Differential Equation</u> :

Linear equation, Clairaut's equation, Complementary function, particular integral of higher order. Linear equations with constant Co-efficient.

<u>Geometry</u> :

Translation and rotation of axes. Reduction into Canonical form. Pair of straight lines. Circle, Parabola, ellipse, hyperbola – simple properties.

Equation of straight lines in space, equation of plane.

<u>Numerical Analysis</u> :

Errors in numerical computation – gross error, round off, truncation error, significant figure, absolute, relative, percentage error. Operators - $\Delta \ \nabla \ E$

Difference table, Newton's forward and backward interpolation formula.

<u>Probability</u> :

Basic concepts, addition and multiplication rule of probabilities. Conditional probability, Bay's theorem.

<u>Dynamics</u> :

Motion in a straight line under variable acceleration, motion under inverse square law, motion in resisting medium. Impact of elastic bodies, loss of KE in direct and oblique impact.

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