RAJASTHAN PUBLIC SERVICE COMMISSION, AJMER

SYLLABUS FOR EXAMINATION FOR THE POST OF
ASSISTANT CONSERVATOR OF FOREST,
FOREST DEPARTMENT

OPTIONAL - MATHEMATICS

1 Theory of equations : Relation between the roots and coefficients of general polynomial equation in one variable. Transformation of equations. Descartes' rule of signs, solution of cubic equations by Cardon's method, Biquadratic equations by Ferari's method.

2 Group Theory : Groups and their simple properties, order of an element, order of a group, permutation groups, cyclic groups and their properties, subgroups and their basic algebraic properties, cosets and their properties. Normal subgroups and quotient groups, theorems on homomorphism and isomorphism.

3 Real Analysis : Continuity and Differentiability convergence of sequence and series, Mean value theorems (Rolle's, Lagrange's and Cauchy's)

4 Complex Analysis : Complex numbers and their elementary properties. Argend plane, Polar representation of complex numbers. Continuity and Differentiability of complex functions, Analytic functions, Cauchy-Riemann's equations. Zero's and Singularities of complex functions.

5 Calculus : Partial derivatives, curvature, asymptotes, envelopes and evolutes, maxima and minima of functions upto two variables, Beta and Gamma functions, double and triple integrals, quadrature and rectification.

6 Ordinary and Partial differential equations : Linear differential equations of first order and higher degree, Clairaut's form, Linear differential equations of constant coefficients, ordinary homogeneous differential equations, Linear differential equations of second order with variable coefficients. Partial differential equations of first order, solution by Lagrange's method.

7 Vector Analysis : Dot and Cross product of vectors and their properties. Scalar and vector triple product. Gradient, Divergence and Curl. Line, surface and volume integrals. Simple problems related to Gauss, Stoke's and Green's theorems.

8 Co-ordinate Geometry :

(i) **Dimensional Geometry :**Distance between two points, Sections formula, area of triangle, locus. Equations of straight line, pair of straight lines, circles, parabola,

ellipse, hyperbola, their equations, general properties, tangent, normal, chord of contact, pair of tangents, conditions to represent a conic by a general equation of second degree in two dimension.

(ii) **Co-ordinate Geometry in 3 - dimensions –** Co-ordinate axes and co-ordinate planes in three dimensions, co-ordinates of a point, distance between two points and section formula, direction cosines/ratios of a line joining two points, Cartesian equation of a line, coplaner and skew lines, shortest distance between two lines, cartesian equation of a plane, Angle between (i) two lines, (ii) two planes (iii) a line and a plane, distance of a point from a plane, sphere, cone and cylinder.