Syllabus for the written test to be conducted for appointment on the post of contract basis Assistant Professors of Mathematics in Government College of Engineering, Aurangabad (An autonomous institute of Government of Maharashtra)

1. Complex Numbers: Algebra of complex numbers, Argand's diagram, Properties of complex numbers, De'Moivre's Theorem, Circular and hyperbolic functions, Logarithm of Complex numbers.

2. Differential Calculus: Successive differentiation, Lebnitz's Theorem, Mean value theorems, Taylor's series, Maclaurin's series, inderminate forms of limits, curve tracing, Rectification of plane curves.

3. Partial Differentiation: Partial derivatives, Partial derivatives of composite function , implicit functions; Euler's theorem on homogeneous functions, Jacobian, Maxima and minima of functions of two variables.

4. Infinite series: Convergence of infinite series, D'Alembert's ratio test, Raabe's test, Logarithmic test Cauchy's Root Test, Cauchy's Integral test, Absolute convergence of a series, Uniform convergence of the series.

5. Integral Calculus: Beta function, Gamma function, Error function, Differentiation under integral sign, double integral, triple integration, Applications of multiple integral to find area ,volume, surface of revolution, volume of solid of revolution.

6. Vector Calculus: Vector differentiation, Gradient of a scalar point function, divergence and curl of a vector point function, vector identities, vector integration, Green' Theorem, Stoke's Theorem, Gauss divergence Theorem.

7. Differential equations: Ordinary differential equations of first order first degree and its applications, Linear differential equations with constant coefficients,homogenious linear differential equations, non-homogeneous linear differential equations, simultaneous linear differential with constant coefficients.

8. Integral transform: Laplace transform , properties and theorems in Laplace transform, application of Laplace transform to solve initial value problem , Fourier integral Theorem, Fourier transform, Fourier sine transform, Fourier cosine transform.

9. Fourier Series: Fourier series of period 2L or 2*(pi), half range series.

10. Z-transform: Z-transform, inverse Z-transform and its applications to solve difference equations

11. Probability distributions: Discrete and random variable,probality mass(density) function,Probablity distribution function, Binomial probability distribution, Poisson's Probability distribution, Normal Probability distribution.

12. Functions of one complex variable: Analytic function, harmonic function, complex integration, Cauchy's integral theorem, Cauchy's integral formulae Cauchy's residue theorem, conformal mapping, and bilinear transformation.

13. Matrices: Types of matrices, algebra of matrices, properties of matrices, operations on matrices, Rank of a matrix, solution of system of linear algebraic equations, linear dependence and independence of vectors, Eigen values and Eigen vectors,Caylay-Hamilton theorem, orthogonal matrix. Quadratic forms.