Subject : Mathematics

Teacher name : Archana Jain Semester 1st

Name of the Paper : Paper 4

Class: MSc (Mathematics)

January2021

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| Power series, its convergence, radius of convergence, examples, sum and product, differentiability of sum function of power series, property of a differentiable function with derivative zero. expz and its properties, logz, power of a complex number (z ), their branches with analyticity. Path in a region, smooth path, p.w. smooth path, contour, simply connected region, multiply connected region, bounded variation, total variation, complex integration, Cauchy-Goursat theorem, Cauchy theorem for simply and multiply connected domains. |

February 2021

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| Index or winding number of a closed curve with simple properties. Cauchy integral formula. Extension of Cauchy integral formula for multiple connected domain. Higher order derivative of Cauchy integral formula. Gauss mean value theorem Morera’s theorem. Cauchy’s inequality. Zeros of an analytic function, entire function, radius of convergence of an entire function, Liouville’s theorem, Fundamental theorem of algebra, Taylor’s theorem.. |

March 2021

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| SMaximum modulus principle, Minimum modulus principle. Schwarz Lemma. Singularity, their classification, pole of a function and its order. Laurent series, Cassorati – Weiertrass theorem Meromorphic functions, Poles and zeros of Meromorphic functions. The argument principle, Rouche’s theorem, inverse function theorem. Residue : Residue at a singularity, residue at a simple pole, residue at infinity. Cauchy residue theorem and its use to calculate certain integrals, definite integral (∫0 2∏ f(cosθ, sinθ) dθ, ∫-∞ ∞ f(x)dx), integral of the type ∫0 ∞ f(x) sinmx dx or ∫0 ∞ f(x) cosmx dx, poles on the real axis, integral of many valued functions. Bilinear transformation, their properties and classification, cross ration, preservance of cross ration under bilinear transformation, preservance of circle and straight line under bilinear transformation, fixed point bilinear transformation, normal form of a bilinear transformation. Definition and examples of conformal mapping, critical points |