Subject : Mathematics

Teacher name: Archana Jain Semester 4th

Name of the Paper : Paper 4

Class: MSc(Mathematics)

April 2021

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| Fundamental Equations: Derivation of the equations of continuity and equation of motion in cylindrical and spherical coordinates. Two–dimentional inviscid incompressible flows, Stream function : Irrotatonal motion in two dimensions. Complex velocity potential. Sources, sinks, doublets and their images. Thomson circle theorem. Two- dimensional irrotational motion produced by motion of circular cylinder.  |

May 2021

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| Two dimensional motion : Motion due to elliptic cylinder in an infinite mass of liquid, Kinetic energy of liquid contained in rotating elliptic cylinder, circulation about elliptic cylinder. Theorem of Blasius. Theorem of Kutta and Joukowski. Kinetic energy of a cyclic and acyclic irrotational motion. Axisymmetric flows, Stoke’s stream function ,Stoke’s stream functions of some basic flows.  |

June 2021

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| Three –dimential motion : Motion of a sphere through a liquid at rest at infinity. Liquid streaming past a fixed sphere. Equation of motion a sphere. Alembert’s paradox, impulsive motion, initial motion of liquid contained in the intervening space between two concentric spheres. Vortex motion and its elementary properties. Kelvin's proof of permanence. Motions due to circular and rectilinear vortices. Infinite rowes of line vortices.  |

July 2021

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| Dynamical similarity . Buckingham pi- theorem , Reynolds number. Prandtl’s boundary layer, boundary layer equations in two dimensions. Blasius solution Boundary layer thickness. Displacement thickness, Karman integral conditions, separation of boundary layer. |