

M.Sc. (Mathematics) (NEW CBCS Pattern) Sem-IV
PSCMTH19 (A) : Core Elective Course : Fluid Dynamics - II

P. Pages : 2

Time : Three Hours



GUG/W/22/13770

Max. Marks : 100

- Notes : 1. Solve all **five** questions.
2. All questions carry equal marks.

UNIT – I

1. a) Explain the stress components in a Real fluid. **10**
b) Discuss energy dissipation due to viscosity. **10**

OR

- c) Discuss steady flow through a tube uniform circular cross section. **10**
d) Derive the Navier Stokes equation of motion of viscous flow. **10**

UNIT – II

2. a) Discuss Maxwell's electromagnetic field equation when the medium is at rest. **10**
b) Explain the magnetic body force. **10**

OR

- c) Discuss about rate of flow of charge. **10**
d) State the Ferraro's law of isorotation & show that $\frac{\partial(\omega, \Psi)}{\partial(R, Z)} = 0$. **10**

UNIT – III

3. a) Derive the integral equation due to Karman. **10**
b) State & prove Buckingham- π Theorem. **10**

OR

- c) Derive Prandtl's boundary layer equation. **10**
d) Discuss on Blasius solutions. **10**

UNIT – IV

4. a) Obtain the equation of motion of a turbulent flow. **10**

b) Explain the Eulerian correlations with respect to time. **10**

OR

c) Explain the features of the double longitudinal & lateral correlations in a homogeneous turbulence. **10**

d) Discuss the equation of the conservation of the transferable scalar quantity in turbulent flow. **10**

5. a) Explain the diffusion of vorticity. **5**

b) Explain the magnetic Reynold Number. **5**

c) Explain Dynamical similarity. **5**

d) Define integral scale of turbulence. **5**
