53 (CE 303) FLMC

2019

FLUID MECHANICS

Paper : CE 303

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. The water is flowing through a pipe having diameter of 20m and 10cm at section 1 and section 2 respectively. The discharge through the pipe is 35 *litre/sec.* The section 1 is 6m and section 2 is 4m above the datum level. If the pressure at section 1 is 39.24 N/cm^2, find the pressure at section 2. 20

2. The velocity vector in a fluid flow is given by $V = 4x^3\hat{i} - 10x^2y\hat{j} + 2t\hat{k}$.

   Find the velocity and acceleration at (2,2,3) at time = 2 units. 20

3. State Buckingham's theorem. The efficiency η of a fan depends on density ρ, dynamic viscosity μ of the fluid, angular velocity ω, diameter D of the rotor and the discharge Q. Express η in terms of dimensionless parameters. 20

4. *(a)* Differentiate between Notches and Weirs Classify Notches and Weirs in different categories. 10

   (b) Set a relationship among Absolute, gauge; atmospheric and vacuum pressures along with the definition of each type of the pressure. 10

5. *(a)* Derive Bernoulli's equation and mention its assumptions. 10

   (b) Derive the Darcy-Weisbach equation for pipe flow. 10

6. Write short notes on : 5×4=20

   (a) Types of orifice

   (b) Types of fluid flow

   (c) Siphon

   (d) Pipes in series.
