53 (CE 303) FLMC

2018

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. State Buckingham's π theorem. The pressure difference Δp in a pipe of diameter D and length 'l' due to viscous flow depends on the velocity V, viscosity μ and density ρ. Using Buckingham's π theorem, obtain an expression for Δp. 20

2. *(a)* Derive Darcy-Weisbach equation for flow through pipes. 10

(b) A main pipe divides into two parallel pipes which again forms one pipe. The length and diameter of 2nd parallel pipe are 2000m and 0·8m and for 1st parallel pipe are 2000m and 1·0m. Find the rate of flow in each parallel pipe, if the total flow in the main is 3·0m^3/s. The co-efficient of friction in 1st pipe is 0·005 and 2nd pipe is 0·007. 10

3. (a) Classify different types of notches and weirs with figures. Differentiate between notch and weir. 10

(b) Derive the equation for maximum discharge over broad crested weir. 10

4. What are the different types of pressures. Explain with figures, the different types of pressure measuring instruments. 20

5. Write short notes on : 4×5=20

(a) Classification of fluids

(b) Classification of flow

(c) Venturimeter

(d) Orificemeter.

6. (a) State Bernoulli's Theorem with all its assumptions. 5

(b) The water is flowing through a taper pipe of length 100m having diameters 600mm at the upper end and 300mm at the lower end, at the rate of 50 l/s. The pipe has a slope of 1 in 30. Find the pressure at the lower end if the pressure at the higher level is 19·62N/cm^2. 15
