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53 (CE 303) FLMC

2016

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. (a) Classify notches and weirs. Derive equation for maximum discharge for broad-crested weir. $C_d = 0.3849$ 10
- (b) State Pascal's law. Show proof of Pascal's law. 10

2. The power input P to a centrifugal pump is a function of the volume flow Q , impeller diameter D , rotational rate Ω and the density ρ and viscosity μ of the fluid. Find the dimensionless relationship. 20

Contd.

3. (a) Derive the Darcy-Weisbach equation for pipe flow. 10
- (b) A main pipe divides into 2 parallel pipes which again forms one pipe. The length and diameter for 1st pipe are 2000m and 1m, while the length and diameter for 2nd pipe are 2000m and 0.8m. Find discharge in each pipe, if the flow in main pipe is $3.0\text{m}^3/\text{s}$, $f = 0.005$. 10
4. (a) Derive Bernoulli's equation. 10
- (b) Derive discharge equation for venturimeter and orifice meter. 10
5. (a) Derive differential form of Continuity equation. 10
- (b) A 30cm diameter pipe, conveying water, branches into 2 pipes of diameter 20cm and 15cm. If the average velocity in the 30cm pipe is $2.5\text{m}/\text{s}$, find the discharge in 30cm pipe. Also determine the velocity in 15cm pipe if the velocity in 20cm pipe is $2\text{m}/\text{s}$. 10

6. Write short notes on : 4×5=20

- (a) Buckingham's Ω theorem
 - (b) Classification of types of flow
 - (c) Classification of types of fluid
 - (d) Pitot Tube.
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