



Iden.1202

Fluid Mechanics and Open Channel Hydraulics (2+1)

Marks: 50

Time: 2 hours

(10x1=10)

I A Fill in the blanks.

- 1 For laminar flow Reynolds's number value will be _____
- 2 Pitot tube is used for measurement of _____
- 3 Coefficient of discharge for Triangular Notch is _____
- 4 If the velocity, pressure, density etc at a point do not change with time, the flow is called _____
- 5 One atm of pressure is equivalent to _____
- 6 Continuity equation deals with the law of conservation of _____
- 7 The ratio of inertia force to viscous force is known as _____
- 8 The hydraulic mean depth is given by _____
- 9 Stoke is the unit of _____
- 10 The flow rate through a circular pipe is measured by _____

II Write Short notes on any FIVE of the following

(5x2=10)

- 1 Forces acting on fluid in motion.
- 2 Major and minor energy losses in pipe
- 3 Hydraulic jump
- 4 Derive the conditions for most economical rectangular channel section
- 5 Distinguish between Sub critical and super Critical flow
- 6 Distinguish between Notches and Weirs
- 7 Differential manometers and mechanical gauges

III Answer any FIVE of the following.

(5x4=20)

- 1 Derive an equation for Darcy-weisbach formula for loss of head in pipes.
- 2 Derive Bernouli's equation of fluid in motion
- 3 The flow is at the rate of $0.015 \text{ m}^3/\text{s}$ through a 100 mm diameter. Orifice used in a 200 mm pipe. What is the difference of pressure head between the upstream section and the vena contraction section? Take co-efficient of contraction $C_c=0.60$ & $C_v=1.0$.
- 4 A simple U tube Manometer is installed across an orifice meter. The manometer is filled with mercury (Sp. Gravity = 13.6) and the liquid above the mercury is carbon tetrachloride (Sp. gravity = 1.6). The manometer reads 200 mm. What is the pressure difference over the manometer in newtons per square metre.
- 5 The water is flowing through a pipe having 200 mm and 100 mm at sections 1 and 2 respectively. The rate of flow through the pipe is 40 l/s . The section 1 is 6m above datum and section 2 is 4m above datum. If the pressure at section 1 is 400 kN/m^2 . Find the intensity of pressure at section 2.

P.T.O

- 6 Types of Venturimeter and its specific usage.
- 7 Three pipes of lengths 800 m, 500 m and 400 m and of diameters 500 mm, 400 mm and 300 mm respectively are connected in series. These pipes are to be replaced by a single pipe of length 1700 m. Find the diameter of the single pipe.

IV Answer any ONE of the following

(1x10=10)

- 1 Flow net construction
- 2 Application of Dimensional analysis
