

3E1214

Roll No. _____

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B.Tech. III Sem. (Main) Examination, April/May - 2022
Civil Engineering
3CE4-06 Fluid Mechanics

Time : 2 Hours

Maximum Marks : 70

Instructions to Candidates:

Attempt all ten questions from Part A. All five questions from Part B and three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination (As mentioned in form No.205)

PART - A

(word limit 25)

(10×2=20)

1. Define specific Gravity.
2. State Newton's Law of Viscosity.
3. Name the types of fluid's flow.
4. Define "Pascal's Law"?
5. What is mean by Absolute pressure and Gauge pressure?
6. Define uniform and Non Uniform flow.
7. Write the Bernoulli's equation applied between two sections with losses.
8. What is Hagen Poiseuille's formula?
9. Give the formula for velocity distribution.
10. Give the expression for the coefficient of friction in viscous flow.

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PART - B

(word limit 100)

(5×4=20)

1. Discuss Newtonian and Non - Newtonian fluids with characteristics plots.
2. Derive the equation of capillary rise, stating meaning of terms used with neat sketches.
3. With neat sketch explain gauge pressure and absolute pressure

4. Derive Euler's equation of motion for flow along a stream line.
5. Briefly discuss various types of minor losses in pipe flow.

PART - C

(Any three)

(3×10=30)

1. The rate of flow of water through a horizontal pipe is $0.25 \text{ m}^3/\text{s}$. The diameter of the pipe which is 200 mm is suddenly enlarged to 400 mm. The pressure intensity in the smaller is 11.772 N/cm^2 . Determine.
- Loss of head due to sudden enlargement.
 - Pressure intensity in the large pipe.
 - Power lost due to enlargement.
2. What are the different applications of Bernoulli's equation? Give the expression for rate of flow through venturimeter.
3. Give the classification of notches and weirs. Find the discharge over a triangular notch and stepped notch.
4. Two water tanks are connected by a pipe line of 25 cm diameter and 350 m long. The flow rate is $0.4 \text{ m}^3/\text{s}$. Find the difference in head between the two tanks. Take $f = 0.007$ for the pipe.
5. A 15 cm diameter vertical cylinder rotates concentrically inside another cylinder of diameter 15.10 cm. Both cylinders are 25 cm high. The space between the cylinders is filled with a liquid whose viscosity is unknown. If a torque of 12.0 Nm is required to rotate the inner cylinder at 100 rpm determine the viscosity of the fluid.
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