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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(CE) (2011 Onwards) (Sem.-3)

FLUID MECHANICS-I

Subject Code : BTCE-301

Paper ID : [A1113]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.
4. Assume any data suitably.

SECTION-A**1. Write briefly :**

- a. Describe in brief Laminar and Turbulent Flows.
 - b. Describe the different sub groups of non-Newtonian fluid, giving example of each.
 - c. Explain Pascal's Law.
 - d. Differentiate between Stream Line and Streak Line.
 - e. Write Euler's Equation.
 - f. What is Metacentric Height?
 - g. Derive the equation of stream function.
 - h. What is the function of pitot tube?
 - i. What do you understand by Dynamic Similarity?
 - j. How the discharge in a venturimeter will change if its orientation changes?
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SECTION-B

2. Explain the three conditions of equilibrium developed when a floating body is given a slight angular displacement.
3. How can you describe the flow patterns and give the individual description of each pattern.
4. Derive the equation of stream function and velocity potential for a uniform stream of velocity v in a two dimensional field, the velocity v being inclined to the x-axis at a positive angle α .
5. Derive Borda - Carnot equation of head loss.
6. Derive an expression for 'total pressure' and 'position of centre of pressure' for an inclined plane surface immersed in liquid.

SECTION-C

7. Derive the equation for actual discharge in an orifice meter.
8. A pitot tube is mounted on an airplane to indicate the relative speed of the plane. What differential pressure intensity will the instrument register when the plane is travelling at a speed of 200 km/hr in a wind blowing at 60 km/hr. against the direction of motion of the plane? Take sp. wt. of air as 11.9 N/m^3 . Assume $C_v = 0.98$.
9. Explain the Buckingham's Pi Method of Dimensional Analysis with a suitable example.