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Total No. of Questions : 09

B.Tech. (CE) (Sem.–3rd) (2011 Batch)

# FLUID MECHANICS-I

Subject Code : BTCE-301

Paper ID : [A1113]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION 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 has to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.

## SECTION-A

1. **Write briefly :**

   a. Describe in brief compressibility and viscosity.

   b. Describe the different sub groups of non-newtonian fluid, giving example of each.

   c. Explain Pascal's Law.

   d. Differentiate between Drag and Lift.

   e. Write Euler's Equation.

   f. What is Metacentric Height?

   g. Derive the equation of stream function.

   h. Derive the equation for actual discharge in an office meter.

   i. What do you understand by Kinematic Similarity?

   j. How the discharge in a venturimeter will change if its orientation changes?

## SECTION-B

2. Explain the three conditions of equilibrium body is given a sight angular displacement.

3. How can you describe the flow patterns and g of each pattern?

4. Derive the equation of stream function and ve stream of velocity $v$ in a two dimensional inclined to the $x$-axis at a positive angle $a$.

5. Derive Borda-Carnot equation of head loss.

6. A 15 Kw pump with 80% efficiency is discha 0.85 to the overhead tank. If losses in the v flowing fluid, find the discharge. The diffe overhead tank oil level and lower tank oil leve

## SECTION-C

7. A rectangular plate 1 m wide and 1.5 m dee so that its upper horizontal edge is 1.25 m b the total water pressure on one face of the p pressure.

8. A pitot tube is mounted on an airplane to in the plane. What differential pressure intensity when the plane is travelling at a speed of 200 60 km/hr. against the direction of motion of air as 11.9 N/m$^2$. Assume Cv = 0.98.

9. A plate of 1m × 1m moves through air 36 km/hr. Determine the drag force, lift forc $Cd$ = 0.18 and $Cl$ = 0.70.





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