Total No. of Questions : 09

Total No. of Pages : 02

B.Tech.(ME) (2018 Batch)   (Sem.–3)
# FLUID MECHANICS
Subject Code : BTME-301-18
M.Code : 76417

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.

SECTION-A

1. Write briefly :

    (a) Define Bulk Modulus. How it is related to compressibility?

    (b) What is metacentric height?

    (c) What is meant by intensity of pressure? How it varies with depth of fluid?

    (d) What is hydrostatic paradox?

    (e) Write the four properties of stream function.

    (f) What is the significance of dimensional less numbers?

    (g) What is the stability criteria of submerged body?

    (h) Define Stream line, path line and streak line.

    (i) Define Froude's number.

    (j) What are the various flow measurement devices?

SECTION-B

2. Derive an expression to find Metacentric height analytically.

3. The velocity potential function for a two dimensional flow is given by $x(2y - 1)$, calculate the velocity at the point (4,5). Find the stream function at this point also.

4. Derive continuity equation in cylindrical coordinates.

5. Derive Euler's equation of motion.

6. Discuss free and forced vortex motions.

SECTION-C

7. The resisting force F of a plane during flight can be considered as dependent upon the length of aircraft, velocity, air viscosity, air density and bulk modulus of air. Express the functionality relationship between these variables and the resisting force using dimensional analysis. (10)

8. (a) A Rectangular channel 2 m wide has a discharge of 250 litres/s, which is measured by a right angled V-notch weir. Find the position of apex of the notch from the bed of the channel if maximum depth of water is not to exceed 1.3m. Take Cd = .62. (6)

   (b) State advantages of triangular notch over rectangular notch. (4)

9. Show that energy correction factor for laminar flow through a circular pipe is 2. (10)

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.

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