Roll No. [| | | | | | | | | | |] **Total No. of Pages : 02**

Total No. of Questions : 09

B.Tech. (CE-2011 Batch) (Sem.–4th)

FLUID MECHANICS-II

Subject Code : BTCE-404

Paper ID : [A1174]

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 short notes on :**

   a) In a uniform laminar flow through a pipe what will be the ratio of maximum velocity to average velocity?

   b) Define momentum thickness.

   c) Draw the velocity diagram for the laminar flow in a pipe.

   d) Define sequent depth.

   e) Write the equation for velocity distribution in a rough pipe having turbulent flow.

   f) Define Froude number.

   g) Under what condition a channel section is considered to be the most economical section?

   h) Define specific energy.

   i) Classify the hydraulic jump based on the Froude number.

   j) Draw a neat sketch of S_2 type of profile.

SECTION

2. Using the basic differential equation o
   dy/dx is positive for M_3 and S_3 profile

3. Water flows at a uniform depth of 2 m
   bottom width of 6 m and side slop
   discharge of 65 m^3/sec, calculate the b
   Use Manning's $n = 0.025$.

4. How will you classify hydrodynamic
   pipe?

5. Water flows at a steady mean veloc
   diameter pipe sloping upwards at 4
   some distance downstream of the in
   section 2, 30 m further from the secti
   762 kPa. Determine the average shear

6. What are the causes which result in se

SECTION

7 (a) A 3.0 m wide rectangular channel
   velocity of 0.8 m/sec. If a sudden
   upstream end of the channel caus
   determine the absolute velocity of t
   the new flow rate.

   (b) A hydraulic jump in a rectangular
   the beginning of the jump $F_1 = 5.$
   the end of the jump.

8. State and discuss the assumption mad
   for gradually varied flow. Also derive
   gradually varied flow.

9. Determine the displacement thicknes
   velocity profile given by :

$$\frac{u}{u_0} = \sin(\pi\delta/2)$$

where u_0 is the free stream velocity.