Roll No. Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CE) (Sem.–3rd)

FLUID MECHANICS-I

Subject Code : CE-203

Paper ID : [A0602]

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

I. Answer briefly :

(a) Define Newtonian Fluid.

(b) Calculate specific gravity of one litre of a liquid which weighs 7N.

(c) What do you mean by Total Pressure ?

(d) Define Flow Net.

(e) Define Archimedes Principle of Buoyancy.

(f) What is kinetic energy correction factor ?

(g) Give units of Modulus of Elasticity. Also write its dimensional formula in terms of M, L & T.

(h) What is the advantage of Cippoletti Weir?

(i) Define Reynold Number.

(j) What is Coefficient of Discharge ?

SECTION-B

2. Determine the minimum size of glass tube that can be used to measure water level if the capillary rise in the tube is to be restricted to 2 mm. Consider surface tension of water in contact with air = 0.073575 N/m. (5)

3. A rectangular plane surface 2 m wide and 3 m deep lies in water in such a way that its plane makes an angle of 30° with the free surface of water. Determine the total pressure and centre of pressure when the upper edge is 1.5 m below the free water surface. (5)

4. How would you determine experimentally the metacentric height of a body? Explain with neat sketch. (5)

5. Prove that in the case of Forced Vertex, the rise of liquid level at the ends is equal to fall of liquid level at the axis of rotation. (5)

6. (a) A rectangular channel 2.0 m wide has a discharge of 250 lps, which is measured by a right angled V-notch. Find position of apex of the notch from the bed of channel, if maximum depth of water is not to exceed 1.3 m. Take coefficient of discharge = 0.62. (3)

   (b) Give advantages of Triangular notch over rectangular notch. (2)

SECTION-C

7. What are the methods of Dimensional Analysis ? Describe Rayleigh's method for Dimensional Analysis.

8. State Bernoulli Theorem. Mention the assumptions made. How is it modified while applying in practice? Give some application of Bernoulli Theorem.

9. Two pipes one of Diameter D_1 and other of diameter D_2, having equal length have a constant value of pipe coefficient. If the pipes are arranged in parallel, the loss of head is H_1 and when pipes are arranged in series, loss of head is H_2 for the same quantity of flow. If $D_2 = \frac{D_1}{2}$, find the ratio of $\frac{H_2}{H_1}$ neglecting secondary lossess.