

**ANURAG Engineering College**

(An Autonomous Institution)

II B.Tech I Semester Supplementary Examinations, Jan/Feb-2024

**FLUID MECHANICS  
(CIVIL ENGINEERING)****Time: 3 Hours****Max. Marks: 75****Section – A (Short Answer type questions)****(25 Marks)****Answer All Questions**

	<b>Course Outcome</b>	<b>B.T Level</b>	<b>Marks</b>
1. Define density and weight density.	CO1	L1	2M
2. What is surface tension?	CO1	L1	3M
3. Define centre of pressure.	CO2	L1	2M
4. Tell about total pressure.	CO2	L1	3M
5. Mention one difference between streamline and path line.	CO3	L1	2M
6. Define uniform and non-uniform flows.	CO3	L1	3M
7. Define Magnus effect.	CO4	L1	2M
8. Distinguish lift and drag.	CO4	L1	3M
9. What is total energy line?	CO5	L1	2M
10. Give Expression for loss of energy due to friction.	CO5	L1	3M

**Section B (Essay Questions)****Answer all questions, each question carries equal marks.****(5 X 10M = 50M)**

11. A) Define the properties of fluid, i) Mass density ii) Weight density iii) Specific volume iv) Specific gravity.	CO1	L2	10M
<b>OR</b>			
B) Explain the phenomenon of capillarity. Obtain an expression for capillarity rise of a fluid.	CO1	L2	10M
12. A) Derive an expression for the depth of centre of pressure from free surface of liquid of an inclined plane surface sub-merged in the liquid.	CO2	L3	10M
<b>OR</b>			
B) A rectangular plane surface is 2m wide and 3m deep. It lies in vertical plane in water. Determine the total pressure and position of centre of pressure on the plane surface when its upper edge is horizontal and i) Coincides with water surface, ii) 2.5m below the free water surface.	CO2	L3	10M
13. A) State Bernoulli's theorem for steady flow of an incompressible fluid. Derive an expression for Bernoulli's equation from first principle and state the assumptions made for such a derivation.	CO3	L3	10M
<b>OR</b>			
B) Define Steady flow and Unsteady flow, Uniform and non-uniform, Compressible and non-compressible, ideal and non-ideal fluids.	CO3	L2	10M
14. A) The velocity distribution in the turbulent boundary layer over a flat plate is given as $(u/U_\infty) = (y/\delta)^{1/5}$ . Obtain the expression for the displacement thickness and momentum thickness.	CO4	L3	10M
<b>OR</b>			
B) What is boundary layer control and explain with diagrams.	CO4	L2	10M

15. A) Derive the equation for head loss in pipes due to friction Darcy-Weisbach equation. CO5 L3 10M
- OR**
- B) Explain the principle of venturimeter with a neat sketch. Derive the expression rate of flow of fluid through it. CO5 L3 10M