

ANURAG Engineering College

(An Autonomous Institution)

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

**FLUID MECHANICS
(CIVIL ENGINEERING)****Time: 3 Hours****Max. Marks: 60****Section – A (Short Answer type questions)****(10 Marks)****Answer All Questions**

	Course Outcome	B.T Level	Marks
1. Define Newtonian fluid.	CO1	BL1	1M
2. Name the different manometers used for pressure measurement?	CO1	BL1	1M
3. What is a uniform and non uniform flow?	CO2	BL2	1M
4. What is Bernoulli's equation?	CO2	BL2	1M
5. What is the difference between notch and weir?	CO3	BL2	1M
6. Name the various types of notches.	CO3	BL1	1M
7. What for Reynolds number used?	CO4	BL2	1M
8. Define branching in pipes?	CO4	BL1	1M
9. What is drag boundary layer?	CO5	BL2	1M
10. Define laminar boundary layer.	CO5	BL1	1M

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

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|---|-----|----------|----------|
| 11. A) i) Discuss variation of viscosity with respect to temperature.
ii) calculate specific weight, density and specific gravity of one lit of a liquid which weights 7N. | CO1 | L2
L3 | 4M
6M |
| OR | | | |
| B) i) Derive expressions for inverted U tube differential manometer.
ii) A plate 0.025mm distant from a fixed plate, moves at 60cm/sec and requires a force of 2N per unit area to maintain the fluid viscosity between the plates. | CO1 | L3
L3 | 5M
5M |
| 12. A) i) Derive momentum equation with neat sketch.
ii) Define stream line, streak line and stream tube. | CO2 | L3
L1 | 6M
4M |
| OR | | | |
| B) Derive continuity equation for three dimensional flows for Cartesian system. | CO2 | L3 | 10M |
| 13. A) Derive expression for rate of flow through orifice meter. | CO3 | L3 | 10M |
| OR | | | |
| B) i) Derive expression for discharge over a triangular notch.
ii) What do you understand by broad crested weir. | CO3 | L3
L2 | 7M
3M |
| 14. A) Derive Darcy-Wiesbatch equation. | CO4 | L3 | 10M |
| OR | | | |
| B) A main pipe divides into two parallel pipes which again forms one pipe. The length and diameter for the first parallel pipe are 2000m and 1m respectively, while the length and diameter of the second parallel pipe are 2000m and 0.8m. Find the rate of flow in each parallel pipe, if total flow in the main is 3.0 m ³ /sec. The coefficient of friction for each pipe is same and equal to 0.005 | CO4 | L3 | 10M |

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|--------|--|-----|----|----|
| 15. A) | i) Derive expression for momentum thickness. | CO5 | L3 | 5M |
| | ii) Discuss turbulent boundary layer with sketch | | L3 | 5M |
| | OR | | | |
| B) | i) Define laminar boundary layer, turbulent boundary layer, laminar sub layer. | CO5 | L2 | 6M |
| | ii) Define drag and lift. | | L1 | 4M |