



Roll No.....

**Department of Food Technology**  
**School of Interdisciplinary Sciences and Technology**  
**Jamia Hamdard, New Delhi-110062**  
End Semester Examination (July 2024, B.Tech IV<sup>th</sup> SEM)  
Paper Title: Fluid Mechanics; Paper Code: BFTC-401

2024  
B.Tech.  
4<sup>th</sup> Sem.

**Time Allotted: 3Hrs.****Max Marks: 60****Note: Write to the point. Before answering make sure you have mentioned the Question No.****Section-A (2 Marks each, Attempt All)**

|    |                                                                                                    |        |
|----|----------------------------------------------------------------------------------------------------|--------|
| Q1 | Define fluid. Also write down the difference between the incompressible and compressible fluid.    | Co1Po3 |
| Q2 | What do you understand by specific gravity?                                                        | Co1Po2 |
| Q3 | What do you understand by bulk modulus?                                                            | Co1Po3 |
| Q4 | What is the relation between the slope of equipotential line and line of constant stream function? | Co1Po2 |
| Q5 | Explain piezometer with neat diagram.                                                              | Co1Po1 |

**Section-B (5 Marks Each, Attempt any 5)**

|     |                                                                                                                               |        |
|-----|-------------------------------------------------------------------------------------------------------------------------------|--------|
| Q6  | What do you understand by surface tension? Derive the expression for surface tension of a liquid droplet                      | Co1Po3 |
| Q7  | What is ideal gas equation? Derive the relation between R and $\bar{R}$ (R bar).                                              | Co2Po2 |
| Q8  | Find the surface tension in the soap bubble whose diameter is 40mm and the inside pressure is $2.5 \text{ N/m}^2$ ?           | Co2Po3 |
| Q9  | Given $V = 4x^3i - 10x^2yj + 2tk$ . Find the velocity and acceleration of a fluid particle at (2,1,3) and at time $t=1$ .     | Co2Po2 |
| Q10 | What is equipotential line. Derive the relation between the slope of equipotential line and line of constant stream function? | Co2Po3 |
| Q11 | What is U tube manometer. Derive the equation for the intensity of pressure of the U tube manometer?                          | Co2Po2 |
| Q12 | Derive the expression for the rotational components.                                                                          | Co2Po2 |

**Section-C (12.5 Marks Each, Attempt any 2)**

|     |                                                                                                                                                              |        |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Q13 | What is mass flow rate? Derive the expression for the continuity equation for cartesian coordinates?                                                         | Co3Po4 |
| Q14 | Write short notes on<br>a. Velocity potential<br>b. Stream function                                                                                          | Co2Po3 |
| Q15 | A gas weighs $16 \text{ N/m}^3$ at $25^\circ \text{C}$ and at an absolute pressure of $0.25 \text{ N/mm}^2$ . Calculate the gas constant and density of gas? | Co2Po3 |
| Q16 | What is dynamics of fluid. Derive the expression for Bernoulli's theorem.                                                                                    | Co3Po3 |