



Department of Food Technology
School of Interdisciplinary Sciences and Technology
Jamia Hamdard, New Delhi-110062
End Semester Examination, December, 2025 B.Tech Vth Sem)
Paper Title: FM-II; Paper Code: BFTC -503

Roll No.....

B.Tech.
5th Sem.
12.12.25.

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	What is TEL?	Co1Po3
Q2	What is the unit of loss of head and pressure head?	Co2Po2
Q3	Which types of losses are produced in pipe flow due to friction.	Co2Po3
Q4	Write down the expression of shear velocity?	Co1Po2
Q5	What do you understand by Mach number ?	Co1Po3

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

Q6	An aeroplane is flying at an height of 15 km where the temperature is -50 °C. The speed of the plane is corresponding to $M=2$. Assuming $k=1.4$ and $R=287 \text{ J/kg-K}$, find the speed of the plane	Co1Po3
Q7	What do you understand by equivalent pipes. Derive the expression for loss of head when pipes connected in parallel.	Co2Po2
Q8	An oil of viscosity 0.1 N-s/m^2 flows between two large parallel plates which are 40 mm apart. If the drop of pressure in a length of 2 m is 0.5 kPa, find the rate of flow of oil if the width of the plate is 30 cm.	Co2Po3
Q9	Find the loss of head when a pipe of diameter 200 mm is suddenly enlarged to a diameter of 400 mm. The rate of flow of water through the pipe is 250 litre/s.	Co2Po2
Q10	What do you understand continuity equation? Derive the expression for the continuity equation in compressible flow in differential form.	Co2Po3
Q11	What is eddy viscosity? Write down the expression for turbulent shear stress	Co2Po2
Q12	Calculate the Mach number at a point on a jet propelled air craft, which is flying at 1100 km/hr at sea level where air temperature is 20 °C. Take $k=1.4$, $R=287 \text{ J/kg-K}$.	Co2Po2

Section C (Attempt any 2) (12.5 Marks Each)

Q13	What do you understand by laminar flow in circular pipes. Show that the ratio of maximum velocity to average velocity is $3/2$ when fluid flows between plates.	Co3Po4
Q14	A gas with a velocity of 300 m/s is flowing through a horizontal pipe at a section where pressure is $6 \times 10^4 \text{ N/m}^2$ (abs) and temperature 40 °C. The pipe changes in diameter and at this section the pressure is $9 \times 10^4 \text{ N/m}^2$. Find the velocity of gas at this section if the flow of the gas is adiabatic.	Co4Po4
Q15	Derive the expression for Bernoulli's equation for adiabatic compressible flow.	Co3Po4
Q16	Calculate the stagnation pressure, temperature and density at the stagnation point on the nose of a plane, which is flying at 800 km/hr through still air having a pressure 8 N/cm ² and temperature -10 °C	Co3Po4