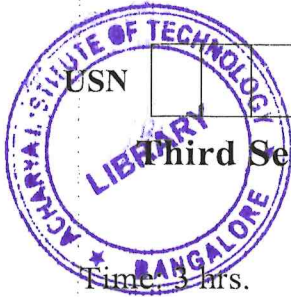


CBCS SCHEME



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BBT302

Third Semester B.E./B.Tech. Degree Examination, June/July 2026

Unit Operations + Lab

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.

2. M : Marks , L: Bloom's level , C: Course outcomes.

Module – 1			M	L	C
Q.1	a.	Explain in brief Reynold's experiment with a neat sketch.	10	L2	CO1
	b.	Define and explain the Hydrostatic law of equilibrium. Derive the expression of pressure at a certain depth in a liquid at rest.	10	L3	CO1
OR					
Q.2	a.	Define and explain Newtonian and Non-Newtonian fluids with suitable examples. Plot the graph to show the relationship between shear stress and shear rate for both types of fluids.	10	L2	CO1
	b.	State Pascal's law and prove the pressure at all directions are equal.	10	L3	CO1
Module – 2					
Q.3	a.	With a neat sketch, derive an expression for coefficient of discharge of orifice metre.	10	L3	CO2
	b.	Explain the working principle of filtration and write types of filtration.	10	L2	CO2
OR					
Q.4	a.	A horizontal venturimeter is fitted to a pipe of diameter 200 mm. The throat diameter is 100 mm. The differential manometer reads 5 meters of water. Take $C_d = 0.98$. Calculate the discharge in the pipe.	10	L3	CO2
	b.	An Orifice meter is installed in a 150 mm diameter pipe and the orifice diameter is 75 mm. The manometer shows a pressure difference of 3 meters of water. Take $C_d = 0.2$. Calculate the discharge of water flowing through the pipe.	10	L3	CO2
Module – 3					
Q.5	a.	Obtain the expression for heat transfer by conducting through composite plane wall.	10	L3	CO3
	b.	Derive the expression $Q = UA\Delta T_m$	10	L3	CO3
OR					
Q.6	a.	In a counterflow heat exchanger, hot water enters at 130°C and leaves at 90°C. Cold water enters at 40°C and leaves at 80°C. The overall heat transfer coefficient is 600 W/m ² .K and the surface area is 8 m ² . Find the rate of heat transfer.	10	L3	CO3