

CBCS SCHEME

USN

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

BBT302

Third Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025

Unit Operations

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.	Define fluids. Explain the classification of fluids with a note on the rheological behavior of fluids.	8	L2	CO1
	b.	Describe the significance of Reynolds experiment in chemical engineering.	8	L2	CO1
	c.	Differentiate free settling and hindered settling.	4	L2	CO1
OR					
Q.2	a.	Derive Bernoulli equation.	10	L3	CO1
	b.	Narrate batch sedimentation experiment.	7	L2	CO1
	c.	Define Newton's law of viscosity. Write its mathematical equation.	3	L1	CO1
Module – 2					
Q.3	a.	Explain the construction and working of venturimeter with a neat sketch.	10	L2	CO2
	b.	Derive the equation for the effectiveness of a screen.	10	L3	CO2
OR					
Q.4	a.	Derive the flow equation for an orifice meter.	10	L3	CO2
	b.	Explain the construction and working of a centrifugal pump.	10	L2	CO2
Module – 3					
Q.5	a.	Derive the equation for heat transfer through multilayer wall.	10	L3	CO3
	b.	What is condensation? Describe different types of condensation.	6	L2	CO3
	c.	Explain the significance of LMTD in heat transfer studies.	4	L2	CO3
OR					
Q.6	a.	What are the modes of heat transfer? Explain with types.	7	L2	CO3
	b.	Analyze and derive the relationship between individual and overall heat transfer coefficient.	10	L3	CO3
	c.	Define Fourier law of conduction. Write its mathematical equation.	3	L1	CO3

Module – 4

Q.7	a.	Derive the equation for steady state equimolar counter diffusion in gases.	10	L3	CO4
	b.	Prove that $D_{AB} = D_{BA}$.	10	L3	CO4

OR

Q.3	a.	Explain the molecular diffusion in liquids and solids.	10	L2	CO4
	b.	Prove that $N_A = J_A + X_A (N_A + N_B)$	10	L3	CO4

Module – 5

Q.9	a.	Detail the process of distillation of binary mixtures using McCabe Thiele method.	10	L2	CO5
	b.	Illustrate the construction and working of a continuous dryer with a neat sketch.	10	L2	CO5

OR

Q.10	a.	Explain the process of liquid extraction.	10	L2	CO5
	b.	What are stage type extractors? Explain with any two extractors.	10	L2	CO5
