U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

April 2024 Semester End Main Examinations

Programme: B.E. **Semester: III**
Branch: Biotechnology **Duration: 3 hrs.**
Course Code: 23BT3PCFME / 22BT3PCFME **Max Marks: 100**
Course: Fluid Mechanics

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			UNIT - I	CO	PO	Marks
1	a)		Explain the significance of Reynolds's number and Froude's number used in fluid flow phenomena.	CO2	PO 1	04
	b)		Derive barometric equation for pressure using the principles of hydrostatic equilibrium for compressible and incompressible fluids.	CO2	PO1	10
	c)		With the help of a suitable plot of shear stress versus velocity gradient, distinguish between Newtonian and various types of non-Newtonian fluids.	CO2	PO1	06
			UNIT - II			
2	a)		Derive Bernoulli's Equation for frictionless fluid.	CO2	PO1	10
	b)		Oil with specific gravity at 0.8 flows through a tapered pipeline whose diameter changes from 310mm at section 1 to 620mm at section 2. The pressure at section 1 and 2 are observed to be 1 bar and 0.65 bar respectively. The discharge through the pipe line is 300 L/s and the difference in elevation between two section is 4 m. Determine, (a) Loss of head and (b) Analyze the results and determine the direction of flow.	CO3	PO2	10
			OR			
3	a)		A 25cm diameter pipe carries oil of specific gravity 0.9 at a velocity of 3m/s. At another section the diameter is 20cm. Find the velocity at this section and also the mass flow rate of oil.	CO3	PO2	06
	b)		Derive Hagen Poiseulle equation for laminar flow through a circular pipe.	CO2	PO1	10
	c)		Define stream line and stream tube with respect to fluid flow phenomena.	CO1	-	04
			UNIT - III			
4	a)		Deduce the flow equation for a venturimeter.	CO2	PO1	10
	b)		Explain the constructional details and working of an orifice meter with a neat labeled sketch.	CO2	PO1	10

			OR			
	5	a)	Explain the construction and working principal of a rotameter with a suitable diagram.	***CO2***	***PO1***	**10**
		b)	Draw and analyze the characteristic curves of a centrifugal pump.	***CO2***	***PO1***	**10**
			UNIT - IV			
	6	a)	Explain the process of batch sedimentation with a neat sketch. Distinguish between sedimentation and filtration process.	***CO2***	***PO1***	**10**
		b)	Describe the working of a leaf filter with a neat illustration.	***CO2***	***PO1***	**10**
			UNIT - V			
	7	a)	Explain the types of agitators and different flow patterns with a neat sketch.	***CO2***	***PO1***	**10**
		b)	Describe the working of a ribbon blender with a neat labeled diagram.	***CO2***	***PO1***	**10**

****