U.S.N.										

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

Autonomous Institute Affiliated to VTU

January 2024 Semester End Main Examinations

Programme: B.E. **Semester: VII**
Branch: Mechanical Engineering **Duration: 3 hrs.**
Course Code: 21ME7DEBHT **Max Marks: 100**
Course: Fundamentals of Boiling Heat Transfer

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.

				CO	PO	Marks
			UNIT - I			
1	a)		Explain the importance of minimum boiling Azeotropic mixtures.	*CO1*	*PO1*	**05**
	b)		Explain the effect of wettability in boiling heat transfer.	*CO1*	*PO1*	**05**
	c)		What is meant by positive and negative deviation from Raoult's law of mixture? Explain with the help of suitable graphs.	*CO1*	*PO1*	**10**
			OR			
2	a)		What are Zeotropic mixtures? Explain with the help of suitable graphs.	*CO1*	*PO1*	**10**
	b)		Explain the application of heat pipe in space applications and anti-icing in aeroplane wings.	*CO1*	*PO1*	**10**
			UNIT - II			
3	a)		What are the Coolants used in cooling of heat dissipative devices?	*CO2*	*PO1*	**05**
	b)		How to do you classify Boiling heat transfer?	*CO2*	*PO1*	**05**
	c)		What are the different dimensionless numbers used in boiling heat transfer? Also explain their significance.	*CO2*	*PO1*	**10**
			UNIT - III			
4	a)		Explain Boiling regimes in Horizontal flow and corresponding type of heat transfer involved during the flow.	*CO2*	*PO1*	**10**
	b)		Explain Augmentation techniques in flow boiling.	*CO2*	*PO1*	**05**
	c)		Explain Microgravity boiling in flow boiling heat transfer.	*CO2*	*PO1*	**05**
			UNIT - IV			
5	a)		Explain Bubbly flow, Slug flow, Churn flow, Annular and mist flow for vertical orientation.	*CO3*	*PO1*	**10**
	b)		Why do Homogenous and Heterogeneous nucleation happen in flow boiling?	*CO3*	*PO1*	**10**

			OR			
	6	a)	Discuss Nucleation site density, bubble release frequency and bubble departure diameter?	*CO3*	*PO1*	**10**
		b)	Explain the experimental test set up of flow boiling with neat labelled diagrams	*CO3*	*PO1*	**10**
			UNIT - V			
	7	a)	Derive the continuity equation from basic scalar transport equation. What is bubble void fraction in boiling?	*CO4*	*PO1*	**10**
		b)	Derive the energy equation from Reynolds scalar transport equation.	*CO4*	*PO1*	**10**

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