U.S.N.										

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

Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

Programme: B.E. **Semester: VI**
Branch: Mechanical Engineering **Duration: 3 hrs.**
Course Code: 23ME6PEHVA/ 22ME6PEHVA **Max Marks: 100**
Course: HVAC Industrial Applications

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.
3. Use of psychrometric chart and steam table is permitted.
4. Marking on psychrometric chart is permitted.

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)	What is the Boot Strap type aircraft cooling system**?** Explain its working principle with the help of *T–s* diagram**.**	*CO1*	*PO1*	**10**
	b)	Explain the significance of following thermodynamic properties of the refrigerants: i) Suction vapour volume. ii) Critical temperature and critical pressure. iii) Boiling point.	*CO1*	*PO1*	**10**
		OR			
2	a)	Explain the importance of aircraft cabin cooling and also highlight the advantages of air cycle refrigeration for cabin cooling.	*CO1*	*PO1*	**10**
	b)	With the help of neat sketches explain the working of actual vapour absorption system.	*CO1*	*PO1*	**10**
		UNIT - II			
3	a)	Draw the specific volume curves for air at the dry bulb temperature of 22°C.	*CO1*	*PO2*	**10**
	b)	What is dew point temperature**?** Explain the same with the help of *T-s* diagram**.**	*CO1*	*PO1*	**10**
		OR			
4	a)	Explain the different cooling load factors considered while designing the Air conditioning system.	*CO1*	*PO1*	**10**
	b)	Plot 80% relative humidity lines corresponding to dry bulb temperatures of 16°C, 20°C, 24°C, 28°C, 32°C, and 36°C**.**	*CO1*	*PO2*	**10**

			UNIT - III			
	5	a)	Explain the working of an Air-water fan coil system and an induction-type unit used in HVAC setups.	*CO2*	*PO1*	**10**
		b)	Using suitable diagrams, explain the working principle of Air-to-water heat pump system.	*CO2*	*PO1*	**10**
			OR			
	6	a)	What is multizone type of HVAC System? Explain with the help of neat sketch.	*CO2*	*PO1*	**10**
		b)	Classify heat pumps and explain the working of heat recovery type of HVAC System with the help of suitable neat diagram.	*CO2*	*PO1*	**10**
			UNIT-IV			
	7	a)	Define the terms drop**,** spread**,** and entrainment ratio in the context of air distribution pattern.	*CO3*	*PO1*	**10**
		b)	Explain how the airflow distribution differ between cooling and heating processes in floor registers for the following cases: i) Vertical discharge. ii) Spread.	*CO3*	*PO1*	**10**
			OR			
	8	a)	Explain the mechanism of flow through outlet of duct with the help of neat sketch and suitable equation.	*CO3*	*PO1*	**06**
		b)	Explain the distribution patterns for the outlet in HVAC.	*CO3*	*PO1*	**04**
		c)	How do you consider the location and selection of HVAC outlets?	*CO3*	*PO1*	**10**
			UNIT - V			
	9	a)	List and explain the various types of pressure losses that occur in duct systems. Also, highlight the guidelines to be followed while designing ducts.	*CO4*	*PO1*	**10**
		b)	What is meant by index run in design of duct? Explain with help of schematic sketch.	*CO4*	*PO1*	**10**
			OR			
	10	a)	Discuss the causes of dynamic pressure losses in duct bends and elbows. Suggest effective ways to reduce these losses.	*CO4*	*PO1*	**10**
		b)	With the of suitable neat sketches, explain how fans operate when installed in series and in parallel within a duct system.	*CO4*	*PO1*	**10**

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