Code No.: ME701PC	R20	H.T.No.			8	R						

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
IV–B.TECH–I–Semester End Examinations (Supply) - April- 2025
REFRIGERATION AND AIR CONDITIONING
(MECH)

[Time: 3 Hours] **[Max. Marks: 70]**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 20 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A **(20 Marks)**

1.	a)	What are the applications of refrigerators?	[2M]
	b)	Differentiate between the open air and dense air refrigeration systems.	[2M]
	c)	Explain the importance of superheating vapors before suction to compressor.	[2M]
	d)	What are the differences between ideal and actual VCRS?	[2M]
	e)	How do you nomenclature to a refrigerant?	[2M]
	f)	What are the reasons for the Ozone depletion?	[2M]
	g)	Under what situation, the vapor absorption system of refrigeration is preferred to vapor compression system of refrigeration?	[2M]
	h)	Describe the working principle of three fluid VARS.	[2M]
	i)	State the factors that determine human comfort.	[2M]
	j)	What is the role played by deodorants in an air-conditioning system?	[2M]

PART-B **(50 Marks)**

2.		A refrigerating machine of 6 TR capacity working on Bell-Coleman cycle has an upper limit of pressure of 5.2 bar. The pressure and temperature at the start of compression are 1 bar and 16^0C respectively. The compressed air is cooled at constant pressure to a temperature of 41^0C, enters the expansion cylinder. Assuming both expansion and compression processes to be isentropic with Υ=1.4. Calculate: (i) Coefficient of Performance; (ii) Quantity of air in circulation per minute; (iii) Piston displacement of compressor and expander; (iv) Bore of compressor and expansion cylinders. The unit runs at 240 rpm and is double acting. Stroke length is 200 mm; and (v) Power required to drive the unit. For air, take Cp= 1.005 kJ/kg K.	[10M]
		OR	
3.		Draw p-V and T-s diagrams of actual air refrigeration system and discuss the salient points.	[10M]
4.		Explain the important components required for the operation of simple vapour compression refrigeration system.	[10M]
		OR	
5.		A simple vapor compression cycle using F-12 is designed to take a load of 10 TR. Ambient is at 30^0C and refrigerator is at 0^0C. A minimum temperature of -5^0C is required in evaporator. Find the mass flow rate through the system, power required in kW, cylinder dimensions assuming L/D=1.2 for a single cylinder single acting compressor running at 300 rpm if volumetric efficiency= 90%.	[10M]

6. What is hermetically sealed compressor? Explain its features and advantages over ordinary compressors. [10M]

OR

7. Explain the desirable physical and chemical properties of better refrigerant used for the operation of vapour compression refrigeration system. [10M]

8. With proper representation on T-s and h-s diagrams, explain the working of Steam-Jet Refrigeration System. [10M]

OR

9. Derive the equation for the estimation of max COP of vapour absorption refrigeration system and how does it affect with the generator temperature? [10M]

10. What is the need of ventilation air in the air conditioning system? Discuss the method to supply the ventilation air. [10M]

11. Eighteen grams of moisture per kg of dry air is removed from atmospheric air when it is passed through an air-conditioning system and its temperature becomes 26^0 C. The atmospheric conditions are 42^0 C DBT and 70% R.H. Find (i) Relative humidity, (ii) wet-bulb temperature and (iii) dew-point temperature. Take atmospheric air pressure as 1.01325 bar. [10M]

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