Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – SUMMER 2024

Subject Code: 3171918 Date:20-05-2024

Subject Name: Refrigeration and Air conditioning

Time:02:30 PM TO 05:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Enlist different types of refrigeration systems.	**03**
	(b)	Enlist desirable properties of refrigerant and discuss anyone in detail.	**04**
	(c)	Explain working of Bootstrap air refrigeration with neat sketch.	**07**
Q.2	**(a)**	Enlist different types of air conditioning systems.	**03**
	(b)	Discuss about future industrial refrigerants.	**04**
	(c)	Write short note on cascade refrigeration system.	**07**
		OR	
	(c)	Write short note on practical H_2O- NH_3 cycle.	**07**
Q.3	**(a)**	Enlist types of compressors and explain any one of them.	**03**
	(b)	Explain evacuation and charging of refrigerants.	**04**
	(c)	Explain layout of LiBr-H_2O systems and its working.	**07**
		OR	
Q.3	**(a)**	Write different expansion devices in VCR and explain any one of them.	**03**
	(b)	Write short note on properties and classification of thermal insulation.	**04**
	(c)	A refrigeration cylce uses Freon-12 as the working fluid. The temperature of the refrigerant in the evaporator is –10°C. The condensing temperature is 40°C. The cooling load is 150 W and the volumetric efficiency of the compressor is 80%. The speed of the compressor is 720 rpm. Calculate the mass flow rate of the refrigerant and the displacement volume of the compressor. Properties of Freon-12 below table.	**07**

Temp. (°C)	Sat. Pressure (MPa)	Enthalpy (kJ/kg)		Sp. Volume (m^3/kg) Sat. Vapour
-10	0.22	26.8	183.0	0.08
40	0.96	74.5	203.1	0.02

Q.4	**(a)**	Enlist different factors governing effective temperature.	**03**
	(b)	Discuss about selection of inside design conditions.	**04**
	(c)	Write short note on load calculations for automobiles.	**07**
		OR	
Q.4	**(a)**	State different sensible heat load of buildings (any three)	**03**
	(b)	Discuss effect of wall construction on cooling load.	**04**
	(c)	Discuss flywheel effect of building material and its use in design.	**07**
Q.5	**(a)**	State different factors affecting thermal comfort.	**03**
	(b)	Explain economic factors influencing duct layout.	**04**
	(c)	Write short note on requirements of air distribution system.	**07**
		OR	
Q.5	**(a)**	Explain difference between summer and winter air conditioning.	**03**
	(b)	Explain split air conditioning system with neat sketch.	**04**
	(c)	Write short note on packaged air conditioning plant.	**07**

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