

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER- VII EXAMINATION – SUMMER 2026****Subject Code:3171918****Date:26-05-2026****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) Explain in brief about need of refrigeration.	03
	(b) Discuss about different industrial applications of refrigeration and air conditioning.	04
	(c) What is cascade refrigeration? Explain cascade refrigeration with neat sketch.	07
Q.2	(a) Explain need of air craft refrigeration.	03
	(b) Write desirable properties of refrigerants. Explain any one in detail.	04
	(c) Write short note on regenerative air refrigeration system.	07
	OR	
	(c) Write short note on future industrial refrigerants.	07
Q.3	(a) Define throttling.	03
	(b) Discuss merits and limitations of absorption refrigeration system.	04
	(c) A simple air cooled system is used for an aero-plane having a load of 10 tones. The atmospheric pressure and temperature are 0.9 bar and 10°C respectively. The pressure increases to 1.013 bar due to ramming. The temperature of the air is reduced by 50°C in the heat exchanger. The pressure in the cabin is 1.01 bar and the temperature of air leaving the cabin is 25°C. Determine: 1. Power required to take the load of cooling in the cabin; and 2. C.O.P. of the system. Assume that all the expansions and compressions are isentropic. The pressure of the compressed air is 3.5 bar.	07
	OR	
Q.3	(a) Enlist different properties of thermal insulation.	03
	(b) Explain function of flash intercooler in compound compression VCR system.	04
	(c) Explain construction of thermostatic expansion valve with neat sketch.	07
Q.4	(a) Enlist different types of condensers used in refrigeration system.	03
	(b) Discuss in brief about selection of compressors used in refrigeration systems.	04
	(c) Enlist and explain in detail about different factors governing thermal comfort.	07
	OR	
Q.4	(a) State heat balance equation for human being.	03
	(b) Explain in brief different methods of reduction of solar heat gain through glass.	04
	(c) Explain in detail about various latent heat load sources in residential buildings.	07
Q.5	(a) Explain in brief about function of duct in air conditioning systems.	03
	(b) Explain in brief about use of room air conditioner.	04
	(c) Write short note on split air conditioning system.	07
	OR	
Q.5	(a) Explain difference between summer and winter air conditioning.	03
	(b) Discuss about use of friction chart in duct design.	04
	(c) A small office hall of 25 person capacity is provided with summer air conditioning system with the following data: Outside conditions = 34°C DBT and 28°C WBT Inside conditions = 24°C DBT and 50% RH. Volume of air supplied = 0.4 m ³ / min / person Sensible heat load in room = 1,25,600 kJ/h. While Latent heat load in the room = 42,000 kJ/h Find the sensible heat factor of the plant.	07
