Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E –Ist SEMESTER–EXAMINATION – JULY- 2012

Subject code: 712102N **Date: 07/07/2012**

Subject Name: Advanced Refrigeration

Time: 2:30 pm – 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.**

Q.1 **(a)** Explain in detail the balancing of vapor compression refrigeration system. **07**

(b) Discuss the advantages and disadvantages of thermoelectric system for refrigeration **07**

Q.2 **(a)** Explain the difference between compound vapor compression system with flash cooling and flash intercooling. **07**

(b) In a Bell-Coleman refrigeration plant, the air is drawn from cold chamber at 1 bar and 10^0C, and compressed to 5 bars. The same is cooled to 25^0C in the cooler before expanding in the expansion cylinder to cold chamber pressure of 1 bar. **07**

Determine the theoretical COP of the plant and the theoretical net refrigeration effect per kg of air. The compression and expansion be assumed isentropic. Assume $\gamma = 1.41$ and Cp = 1.009 kJ/kg K.

If the compression and expansion laws followed are $pv^{1.35} = c$ and $pv^{1.3} = c$ respectively how will the result be modified.

OR

(b) What are the limitations of vapor compression refrigeration system for low temperature production? Explain in brief the cascade refrigeration system. **07**

Q.3 **(a)** Explain the various components of steam jet refrigeration system and discuss the function of each component. Also compare the system with vapor compression refrigeration system. **07**

(b) Discuss the simple analysis of aqua-ammonia vapor absorption refrigeration cycle with h-c chart assuming degasification factor for generator-rectifier-dephlegmator. **07**

OR

Q.3 **(a)** How is vapor absorption refrigeration system different from vapor compression refrigeration system? Under what situation it is preferred to vapor compression refrigeration system. **07**

(b) Explain the enthalpy concentration diagram **07**

Q.4 **(a)** Explain with the help of flow diagram and on p-h and T-s diagram the refrigerating system with two evaporators at different temperatures with compound compression, individual expansion valves and flash intercoolers. **07**

(b) Under what situation is steam jet refrigeration system recommended. What are the limitations? Can it be used for obtaining sub-zero temperatures? **07**

OR

Q.4 **(a)** Discuss the reversible cycle heat pump. **07**

Q.4	**(b)**	What is binary mixture? Explain the elementary steady flow process with binary mixtures.	**07**
Q.5	**(a)**	Explain with the help of flow diagram and on p-h and T-s diagram the compound vapor compression refrigeration system with flash cooler and single evaporator.	**07**
	(b)	Discuss the Seeback effect, Peltier effect, Thomson effect and the relation between the coefficients in thermoelectric refrigeration system.	**07**

OR

Q.5	**(a)**	Discuss the food preservation by use of refrigeration.	**07**
	(b)	Discuss the eco-friendly refrigerants.	**07**

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