

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°C, and compressed to 5 bars. The same is cooled to 25°C 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 $C_p = 1.009$ kJ/kg K.
If the compression and expansion laws followed are $p v^{1.35} = c$ and $p v^{1.3} = c$ 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 Seebeck 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**
