

IV B.Tech I Semester Regular Examinations, November 2005
REFRIGERATION & AIR CONDITIONING
(Mechanical Engineering)

Time: 3 hours**Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

1. The cockpit of a jet plane is maintained at 25°C using air cycle refrigeration system. The ambient air temperature and pressure are -15°C and 0.4 bar respectively. The pressure ratio of the jet compressor is 3. The plane moves at a speed of 1500 km/hr. The air passes through a heat exchanger after compression and cooled to its original condition entering into the air jet. The pressure loss in the heat exchanger is 0.1 bar. The pressure of the air leaving the cooling turbine is 1.06 bar and the air pressure in the cabin is 1.013 bar. The cooling load in the cockpit is 70 kW. Determine the following,
 - (a) Stagnation temperature and pressure
 - (b) Mass flow rate of the air circulated through the cabin
 - (c) Volume handled by the compressor and the expander
 - (d) COP of the system [16]
2.
 - (a) What is the effect of super heating and sub cooling of refrigerants? [6]
 - (b) What are the parameters that effect the vapour compression refrigeration system and how? [10]
3.
 - (a) Explain the working of a rotary screw compressor. [10]
 - (b) How the capacity control is achieved in refrigerant compressor? [6]
4.
 - (a) What are the advantages of evaporative condensers over water cooled condensers. [6]
 - (b) Describe the working of any two types of water cooled condensers. [10]
5.
 - (a) Derive the expression for COP of absorption system. [6]
 - (b) What is the effect of inert gas in three fluid refrigeration system. [4]
 - (c) Explain how the pressure and temp of refrigerant is increased in vapour absorption system. [6]
6.
 - (a) Name the applications of steam jet refrigeration system. [4]
 - (b) What are the limitations of thermoelectric Refrigerator over conventional absorption system? Explain how thermoelectric refrigerator works. [12]
7.
 - (a) Describe a suitable air conditioning system for hot and dry outdoor conditions [8]
 - (b) Explain the following psychrometric process

- i. mixing of two air streams
 - ii. Humidification by steam injection [8]
8. Explain how the Desalination of sea water is carried out by the heat pump system with a suitable sketch. [16]

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