**COLLEGE OF ENGINEERING PUNE**
DEPARTMENT OF MECHANICAL ENGINEERING

Refrigeration and Air conditioning ME-14002
**END Semester Examination**

Programme: B. Tech | Branch: Mechanical
Duration: 3:00 Hrs 2pm-5pm | Date: 26 NOV 2014 | Max. Marks: 60

Instructions: **1. All Questions are compulsory.** 2. Illustrate your answer with neat sketches wherever necessary. 3 Figures to the right indicate full marks.

| No. | Questions | Marks |
|---|---|---|
| Q. 1 | a) Explain the working principal of Air craft air refrigeration system with the help of block diagram and T-S diagram. Give advantages and disadvantages of such a system. | 5 |
| | b) Explain the principle of working of Condenser and explain the various types of Condensers with neat sketches. | 5 |
| | c) Explain the working of Automatic Expansion Valve with the help a suitable sketch. Give the advantages over other capillary tube. | 5 |
| Q. 2 | a) With the help of psychrometric chart explain the following processes<br>1) Cooling and humidification by water injection<br>2) heating and humidification by steam injection | 6 |
| | b) A restaurant with capacity of 150 persons is to be air-conditioned with the following conditions<br>Outside conditions : $30^0$C DBT and 70% RH<br>Desired inside conditions : $23^0$C DBT and 55% RH<br>Quantity of air supplied : 0.5 $m^3$/min/person<br>The desired conditions are achieved by cooling, dehumidifying and then heating. Determine<br>1) Capacity of cooling coil<br>2) Capacity of heating coil<br>3) Amount of heat removed by Dehumidifier<br>4) By pass factor of heating coil if its surface is $35^0$C. | 9 |
| Q. 3 | Write a short note on any four of the following<br>1) Winter Air conditioning system.<br>2) Explain the methods of Defrosting<br>3) Hermetically sealed Compressor<br>4) Flooded Evaporator<br>5) Global Warming , ozone depletion and greenhouse effect due to CFC and HCFC refrigerants | 20 |
| Q.4 | A two stage ammonia food freezing plant with a desired capacity 528000kj/h at $-40^0$C evaporating temperature and $35^0$C condensing temperature has a flash intercooling system with a liquid subcooler. The vapour leaving the evaporator is at $-30^0$C and entering the first stage compressor at $-15^0$C. The vapour leaving the flash chamber is superheated by $10^0$C in the suction line to the second stage compressor. Water intercooling is done to cool the vapour to $45^0$C. Adiabatic effectiveness of both compressors are 0.75 respectively. Find the piston displacement, discharge temperatures and power requirements of the two compressors. | 10 |