1845

Reg. No. : ....

Name : ....

TRIVANDRUM-11

Seventh Semester B.Tech. Degree Examination, May 2014
(2008 Scheme)
ME 08 704 : REFRIGERATION AND AIR CONDITIONING (M)

Time : 3 Hours

Max. Marks : 100

*Instructions : **Use** of Psychometric chart and refrigeration tables are **permitted**.*
*Answer **all** questions from Part **A** and **one full** question from **each** Module of Part **B**.*

PART – A

1. What are the main characteristic feature of an air refrigeration system ?

2. Explain the effect of operating temperatures on Carnot COP.

3. Show simple vapour compression cycle on P-h diagram and explain briefly each process.

4. Discuss briefly the draw backs of simple vapour absorption cycle.

5. Discuss on open and hermetic compressors.

6. Explain effect of inter cooling, on the performance of reciprocating compressors.

7. Explain briefly the application of thermoelectric refrigeration.

8. List the limitations of evaporative cooling.

9. Enumerate the desirable properties of ideal refrigerant.

10. What are the components of cooling load for air conditioning ?   **(10×4=40 Marks)**

PART – B

Module – I

11. In a standard vapour compression cycle using refrigerant 22, the evaporating temperature is – 5°C and the condensing temperature is 30°C. Sketch the cycle, in pressure enthalpy coordinates and calculate :

    1) The work of compression

    2) Refrigerating effect

    3) Heat rejected in the condenser, all in Kilo Jules per/Kg and

    4) The coefficient of performance.

P.T.O.

12. Explain with a neat diagram, following air cycles for Air Craft Refrigeration

   1) Boot strap system

   2) Reduced ambient system.

Module – II

13. Sketch and explain Lithium Bromide – water vapour absorption system.

14. a) Explain the effect of valve pressure drop in the performance of a refrigerant compressor.

   b) 1 m³ of gas is adiabatically compressed ($Y = 1.4$) from 1 bar to 6 bar in a reciprocating compressor with 8% clearance. The exponent of re expansion curve is 1.1 instead of 1.4, find the percentage increase in the work of compression.

Module – III

15. A winter air conditioning system adds for humidification 0.0025 Kg/s of saturated steam at 101 Kpa pressure to an air flow of 0.36 Kg/S. The air is initially at a temperature of 15°C and relative humidity 20%. What is the dry and wet bulb temperature of air leaving the humidifier ?

16. a) Discuss the conditions of comfort, you would prescribe for office building in a city like Chennai which has hot and humid climate.

   b) 100 cm³ of air per second at 30°C DBT and 60% RH is cooled to 20°C DBT by passing through a cooling coil. Find :

   1) Capacity of cooling coil in tons of refrigeration.

   2) RH of the air coming out of the cooling coil and its WBT.

(3×20=60 Marks)