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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.704 : REFRIGERATION AND AIR CONDITIONING (M)

Time : 3 Hours Max. Marks : 100

*Instructions : 1) Use of **Psychrometric Chart** and **Refrigeration properties tables** are **permitted**.*

*2) Answer **all** questions from Part **A** and **one full** question from **each** Module of Part – **B**.*

PART – A

1. Define coefficient of performance. What is the unit of refrigerating effect ?
2. Using T-s and P-h diagram explain a simple vapour compression system.
3. Write the factors considered for the selection of a refrigerant in a refrigeration system.
4. What are the methods of improving COP of a simple vapour compression cycle ?
5. Discuss the function of a evaporator in a refrigeration system.
6. Explain how leak could be detected in R_{22} refrigeration system.
7. Explain a two-stage compression system with liquid inter cooler.
8. Define the term sensible heat factor. Draw Grand Sensible heat factor line on psychrometric chart.
9. State the factors that determine human comfort. Sketch the comfort chart.
10. Describe the different methods of air-conditioning duct design. **(10×4=40 Marks)**

P.T.O.

PART – B

Module – I

11. a) Explain with diagram the working of regenerative air cooling system. Draw its T-s diagram. **10**

    b) An ammonia refrigerating machine has working temperature of 35° C in the condenser and –15° C in the evaporator. Assume two cases :

    a) dry compression and

    b) wet compression

    Calculate for each the following :

    i) the theoretical piston displacement per T.R.

    ii) the theoretical horse power per T.R. and

    iii) the coefficient of performance. **10**

12. a) Discuss the arrangement used for producing low temperature by Adiabatic demagnetisation of a paramagnetic salt. **10**

    b) A two stage vapour compression refrigeration system using R_{12} working between pressure limits of 9.6 bar and 1.6 bar for saturation temperature 35° C and – 10° C. For a mass flow of 0.2 kg/sec. Obtain the COP and the capacity. The intermediate pressure is 4.2 bar. **10**

Module – 2

13. a) Draw a neat diagram of Electrolux refrigeration system and explain its working.

    b) What are the different methods used for food preservation ? Explain them.

14. a) What is the function of a condenser in a refrigeration system ? Describe with diagram the working of an evaporative condenser. **10**

    b) Discuss about different methods for leak detection in refrigeration system. **10**

Module – 3

15. a) Distinguish between summer and winter air-conditioning. Explain with diagram a year round air-conditioning system. **10**

    b) Define by-pass factor for a cooling coil. Obtain an expression for by-pass factor of cooling coil. **10**

16. The following data relates to office air-conditioning plant having maximum seating capacity 25 occupants. Outside design conditions = 34°C DBT, 28°C WBT, inside design conditions = 24°C DBT, 50%RH, Solar heat gain = 9120 W, latent heat gain per occupant = 105 W, sensible heat gain per occupant = 90 W, Lightening load = 2300 W, sensible heat from other sources = 11630 W, infiltration load is 14 m^3/min. Assuming 40% fresh air and 60% of recirculated air passing through the evaporator coil and the by-pass factor of 0.15, find the dew point temperature of the coil and capacity of the plant. **20**
