Code No.: 4183

FACULTY OF ENGINEERING

B.E. III/IV Year (Mech./Prod.) II Semester Examination, April/May 2008

REFRIGERATION AND AIR CONDITIONING

Time : 3 Hours] [Max. Marks : 75

Answer **all** *questions of* Part A.

Answer **five** *questions from* Part B.

Use of Psychrometric Charts, Ammonia Charts is permitted.

Part A – (Marks : 25)

1. Explain briefly an air-refrigerator working on a reversed carnot cycle. Derive an expression for its COP. 3

2. A refrigeration machine working on reversed carnot cycle consumes 5.5 KW for producing refrigerating effect of 940 KJ/min for maintaining a region at -38°C. Determine :
   (a) COP of refrigerating machine.
   (b) Higher temperature machine. 3

3. Write a short note on pressure Enthalpy chart. 2

4. State the functions of a Absorber and Rectifier in an vapour absorption refrigerating system. 3

5. What are the advantages of a pulse tube cooling? 2

6. Define Dew point temperature and relative humidity. 3

7. What points should be considered while making heat load calculations. 2

8. Define an air-conditioning system. Name its basic elements. 3

9. How are ducts classified in air conditioning systems? 2

10. What do you understand by food preservation? 2

Part B – (Marks : 5 × 10 = 50)

11. (a) State the effects and causes of moisture in refrigeration systems. 5
    (b) Why is R^{-12} system susceptible to expansion valve freeze up. 5

12. (a) Explain with a neat sketch a Bootstrap cycle of air refrigeration system. 5
    (b) Differentiate between open and closed air refrigeration systems. 5

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13. A F^{-12} vapour compressor refrigeration system has a condensing temperature of 50°C and evaporating temperature of 0°C. The refrigeration capacity is 7 tonnes. The liquid leeving the condenser is saturated liquid and compression is isentropic. Determine (a) The refrigeration flow rate (b) The heat rejected in the plant (iii) COP of the system. 10

14. (a) What are the advantages of cascading. 5

    (b) What is simple vapour absorption system? State how its efficiency can be improved. 5

15. In a laboratory test, a psychrometer, recorded 36°C DBT and 30°C WBT.

    Calculate (a) Relative humidity (b) Specific humidity (c) Degree of saturation (d) Dew point temperature. 10

16. (a) Explain with a neat diagram the working of a central system of air-conditioning. 5

    (b) Explain the difference between summer air conditioning and winter air conditioning. 5

17. Explain briefly with neat sketch all the year round air-conditioner. 10
