Code: 9A03604

R09

B.Tech III Year II Semester (R09) Supplementary Examinations May/June 2016
REFRIGERATION & AIR CONDITIONING
(Mechanical Engineering)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
Use of steam tables, P-H charts and Psychrometric charts is permitted in the examination hall
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1 (a) What are the factors considered in selecting the refrigeration system for aero plane
   (b) A refrigerating system operates on the reversed Carnot cycle. The higher temperature of the refrigerant in the system is 35°C and the lower temperature is -15°C. The capacity is to be 12 tonnes. Neglect all losses. Determine: (i) Coefficient of performance. (ii) Heat rejected from the system per hour. (iii) Power required.

2   A Refrigerant 12 vapour compression system operating at a condenser temperature of 40°C and an evaporator temperature of -5°C develops 15 tonnes of refrigeration.
        Using Ph-diagram for R-12 determine:
        (i) The Mass flow rate of the refrigerant circulated.
        (ii) The theoretical piston displacement of the compressor and piston displacement per ton of refrigeration.
        (iii) The heat rejected in the condenser. The Carnot C.O.P. and actual C.O.P. of the cycle.

3 (a) Why ammonia is not used in domestic refrigerator?
   (b) How will you locate leaks in NH_3 and Freon system?
   (c) Why CFC and HCFC refrigerants are to be replaced? Explain.

4 (a) Why purging is required in Li-Br system? With a neat sketch describe purge unit used in Li-Br system?
   (b) What are the four basic components of an absorber machine

5   Explain with the help of a neat sketch, the working of a steam jet refrigeration system.

6 (a) In a cooling application, moist air enters a refrigeration coil at the rate of 100 kg of air 35^{0}C DBT and 50% RH. The apparatus dew point of the coil is 5^{0}C and the bypass factor is 0.15. Determine (i) the outlet state of moist air and (ii) the cooling capacity of coil in TR.
   (b) What is psychrometry? What do you mean by psychrometric properties?

7   Atmospheric air at 35^{0}C and 60% RH is conditioned to 22^{0}C DBT and 55% RH. This is done first by cooling and dehumidifying and then heating. If the quantity of air flow is 60 cu.m per minute find the following: (i) Mass of water drained. (ii) Capacity of cooling coil. (iii) Capacity of heating coil.

8 (a) Explain year-round air conditioning systems with the help of a schematic diagram.
   (b) What are the sources of heating loads in a restaurant? List them.

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