DIPLOMA VIEP MECHANICAL ENGINEERING (DMEVI)

00207

Term-End Examination

June, 2013

BIMEE-032 : REFRIGERATION SYSTEM

Time : 2 hours *Maximum Marks : 70*

Note: *Attempt **any five** questions, use of refrigeration table is **permitted**.*

1. Explain Boot Strap air refrigeration system. **14**

2. (a) Differentiate between wet and dry compression. Discuss harmful effects of wet compression. **7**

    (b) Describe the working of cascade refrigeration system. **7**

3. A two cylinder 'R - 134 Q' compressor has a bore and stroke equal to 7 cm and 6.5 cm respectively. The speed of compressor is 1450 rpm. and volumetric efficiency is 100%. The condenser temperature is 40°C and the evaporator temperature is − 20°C. The refrigerant gets superheated by 20°C in the evaporator and under **14**

cooled as liquid in the condenser to 30°C. Assume isentropic compression. Determine the mass of the refrigerant circulated and the theoretical refrigerating capacity of the compressor. How will the results get modified if the clearance volumetric efficiency is considered with clearance factor of 3%.

Solve the problem with the help of p-h charts of R-134 a.

4. (a) Discuss the function of absorber in vapour   7
         absorption refrigeration system.

    (b) Explain the function of capillary tube in a   7
         vapour compression refrigeration system.

5. The following data apply to the Absorber of an   **14**
    Aqua-Ammonia Absorption Refrigeration
    System :

    Evaporator pressure   = 2bar

    Exit temperature of NH_3

    from evaporator   = -12°C

    Entering temperature of NH_3

    to absorber   = -10°C

    Absorber pressure   = 2bar

    Entering temperature of weak

    aqua-ammonia solution to

    absorber   = 50°C

Entering mass-concentration of

weak solution $\qquad = 0.2$

Exit temperature of strong aqua

ammonia solution from absorber $= 30°C$

Exit mass-concentration of strong

aqua-ammonia $\qquad = 0.35$

Anhydrous-ammonia circulated

in the system $\qquad = 10\text{kg/min}$

Assume specific heat of aquaammonia

solution. $\qquad = 4.5\text{kJ/kg}°C$

and liquid enthalpy as 200 kJ/kg

at $-50°C$

Determine the heat rejected from the absorber.

6. (a) What is the importance of hydrogen in   7
    electrolux refrigerator ? Explain.

   (b) What is the function of flash inter cooler   7
    provided in a compound vapour
    compression refrigeration system ? Explain.

7. Write short note on the following :   3.5x4=14

   (a) Thermostatic expansion value

   (b) Ozone depletion potential

   (c) Total equivalent warming impact

   (d) Secondary Refrigerants