Registration No:

M.TECH 1ST SEMESTER REGULAR EXAMINATIONS, DECEMBER 2017
ADVANCED REFRIGERATION ENGINEERING
Branch: TE, Subject Code:MTEPC1030
Time: 3 Hours
Max Marks : 70
The figures in the right hand margin indicate marks.

PART-A   (2X10=20 MARKS)

1. Answer the following questions .
   a) How does the body attempt to compensate for a warm environment approaching body temperature?
   b) What do you understand by evaporative cooling?
   c) What do you mean by green refrigerants? Name two of this kind.
   d) Define approach and range of a cooling tower.
   e) Name four refrigerants that are suitable for ice plants.
   f) List out the fields of applications of vortex tube.
   g) What do you meant by DART?
   h) Why capillary tube is preferred to other throttling devices in household refrigerators?
   i) Explain the importance of Joule Thomson coefficient.
   j) Differentiate between wet bulb temperature and thermodynamics wet bulb temperature.

PART-B   (5 X 10=50 MARKS)
Answer any five questions from the following.

2. a) What is the function of the following components in the absorption system: **5**
      i) Absorber   ii) Rectifier iii) Analyser
   b) Draw a neat diagram of an Ejector refrigeration system and explain its working.   **5**

3. a) Derive an expression for optimal inter stage pressure of a two stage compression refrigeration system.   **5**
   b) Discuss the method of producing liquid nitrogen?   **5**

4. a) A vapour compression refrigeration system using R-12, the evaporator pressure is 1.4 bar and the condenser pressure is 8 bar. The refrigerant leaves the condenser sub cooled to 30^0C.The vapour leaving the evaporator is dry and saturated. The compression process is isentropic. The amount of heat rejected in the condenser is 13.42MJ/min. Determine: i)Refrigerating effect (ii)refrigerating load in TR (iii) Compressor input in KW (iv) COP   **8**
   b) Write about Secondary refrigerant.   **2**

5. a) A mixture of dry air and water vapour is at a temperature of 21^0C and total pressure of 746 mm of Hg. The dew point temperature is 16^0C.Find the partial pressure of water vapour, relative humidity, specific enthalpy of water vapour, specific volume of air.   **6**
   b) One kg of air at 40^0C dry bulb temperature and 50% relative humidity is mixed with 2 kg of air at 20^0C dry bulb temperature and 20^0C dew point temperature. Calculate temperature and specific humidity of the mixture.   **4**

6. Write short answer on :

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a) Refrigerant compressors

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b) Multistage evaporator the refrigeration system

7. a) Describe magnetic refrigeration system.

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b) Explain thermostatic expansion valve with neat sketch.

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8. a) A cooling tower is to be designed to take the heat load of 200 tons refrigerating plant using R-12 as refrigerant. The heat rejection ratio of the system is 1.2. The rise in the temperature allowed in the condenser is 5^0C.The atmospheric air condition is 35^0C DBT and 25^0C WBT. The air leaves the tower at 30^0c and 90% relative humidity. Neglecting the heat losses in the system and carry over loss through the cooling tower, find

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    i.   Quantity of air required to pass through the cooling tower per minute

    ii.   Quantity of make-up water

        The temperature water coming out of tower is 30^0c

b) Write down the properties of an ideal refrigerant.

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