Registration No: | | | | | | | | | | | **M.TECH**

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M.TECH 1ST SEMESTER SUPPLE EXAMINATIONS, DECEMBER 2018
ADVANCED REFRIGERATION ENGINEERING
Branch: TE, Subject Code:MTEPC1030
(Regulations 2017)

Time: 3 Hours   **Max Marks : 70**   **Question Code: SD18002053**

PART-A (10 X 2=20 Marks)

1. Answer the following questions.

   a. Name a refrigerant which works as Primary, Secondary as well as tertiary refrigerant.
   b. What is the use of air washer?
   c. Explain why sudden expansion causes cooling.
   d. A heat pump working on a reversed Carnot cycle has a COP of 5. It works as a refrigerator taking 1 kW of work input. What will be its Refrigerating effect?
   e. Define Thompson effect of current while passing through the semiconductors.
   f. Why Capillary tube is used for a low capacity refrigeration system?
   g. What is the objective of under cooling?
   h. Why is the C.O.P of a gas cycle refrigeration is low?
   i. What do you understand by evaporative cooling?
   j. What defrosting capacity control in refrigeration system low?

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

2. a) Write the working principle of a thermostatic expansion valve.   [5]
   b) Discuss the balancing point of compressor and capillary tube.   [5]

3. a) Explain the lubrication system in refrigeration plant?   [5]
   b) Explain all methods dehumidification processes of air conditioning system?   [5]

4. a) The amount of air supplied to an air conditioned hall is 300m^3/min. The atmospheric [5] conditions are 35°C DBT and 55% RH. The required conditions are 20°C DBT and 60% RH. Find out the sensible heat and latent heat removed from the air per minute. Also find sensible heat factor for the system.

   b) A mixture of dry air and water vapor is at a temperature of 21°C under a total pressure of [5] 736 mm Hg. The dew point temperature is 15°C. Find:

   (i) Partial pressure of water vapor
   (ii) Relative humidity
   (iii) Degree of saturation
   (iv) Specific humidity

5. A building has the following calculated cooling loads.
   RSH gain = 310 kw
   RLH gain=100 kw
   The space is maintains at DBT=27^{0}C and RH =60%.The outside air is at 35^{0}C and 80^{0}C RH.10% by mass of supplied to the building is outdoor air. If the air supplied to the space is not be at a temperature lower than 18^{0}C, find: [5]
   a) Minimum amount of air supplied to the space in m^3/s.   [5]
   b) Capacity, ADP, BPF and SHF of the cooling coil.

6. 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]

7. a) A 100 tonne refrigerating plant using R-12 has a condensing temperature of 35^0C and an evaporating temperature of 5^0C. Calculate the power requirement of the compressor in KW, the volume rate of the compressor and the compressor displacement volume if the volumetric efficiency is 75% and mechanical efficiency is 80%. [5+5]

   If a liquid suction heat exchanger is installed in the above plant, which subcools the condensed refrigerant to 30^0C, what would be the refrigeration capacity of the plant and power required by the compressor?.

8. Write short notes on
   a) Magnetic Refrigeration Principle [5]
   b) Flow Control devices [5]

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