Total No. of Questions :8] *[Total No. of Printed Pages :2*

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MMTP-203

M.E./M.Tech., II Semester

Examination, December 2016

Advance Refrigeration Systems

Time : Three Hours

Maximum Marks : 70

Note : Attempt any five questions. All questions carry equal marks. Draw neat diagrams wherever required.

1. a) State the various methods for producing refrigeration effect. Sketch T-S diagram for regenerative evaporative cooling system.
   b) Draw a schematic diagram for a simple saturation cycle with sub cooling of liquid refrigerant by liquid refrigerant.

2. a) Explain with the help of a neat sketch, the working of a refrigerating system having three evaporators at different temperatures with individual compressors and multiple expansion valves.
   b) What is sub-cooling and super heating? Explain with the help of diagram why is super heating considered to be good in certain cases?

3. a) What is Hermetically shield compressor? Give the classification of the compressors.
   b) With the help of a neat sketch explain the working of automatic expansion valve.

4. a) Discuss thermal design considerations of screw compressor.
   b) Explain the function and constructional details of a throttling device.

5. A refrigeration system (using R-12 as a refrigerant) consists of three evaporators of capacity 20 TR at - 15°C, 30 TR at 5°C, and 10 TR at 15°C. The vapours leaving the three evaporators are dry and saturated. The system is provided with individual compressors and multiple expansion valves. The condenser temperature is 38°C and the liquid refrigerant leaving the condenser is sub-cooled to 30°C. Assuming isentropic compression in each compressor, determine :
   i) The mass of refrigerant flowing through each evaporator
   ii) The COP of the system
   iii) The power required to drive the system

6. a) Classify types of condensers used in advanced refrigeration systems. Explain any one with neat sketch.
   b) Discuss Solar powered refrigeration. State its limitations.

7. a) State working of Liquid Line Strainer and its properties.
   b) Draw a neat diagram of three fluid system of refrigeration (Electrolux Refrigeration System) and explain its working.

8. Write short note on following (any two) :
   a) Liquid receiver
   b) Pure and mixed refrigerants
   c) Oil separators

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