[Total No. of Questions - 9] [Total No. of Printed Pages - 3]
(2125)

15280

B. Tech 7th Semester Examination

Refrigeration & Air Conditioning (NS)

ME-414

Time : 3 Hours **Max. Marks : 100**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : (i) Attempt five questions in all selecting one question from each section A, B, C and D. Section E is compulsory.

(ii) Use of Refrigeration table, Psychrometric chart & calculator is allowed.

SECTION - A

1. List different methods of refrigeration and explain any one method in detail. (20)

2. With neat diagram explain the working of Boot strap air refrigeration system. Also make analysis for the performance of the system for the given capacity. (20)

SECTION - B

3. A 15 TR Freon 22 vapour compression system operates between a condenser temperature of 40°C and an evaporator temperature of 5ºC. Assuming dry saturated cycle determine (a) Compressor discharge temperature (b) theoretical piston displacement and power consumption of the compressor per TR (c) Show the cycle on P-H & T-S diagram. (20)

[P.T.O.]

4. Derive the expression for COP of a refrigeration system consisting of two evaporators at different temperatures & of different capacities with individual compressors and individual expansion valve. Sketch the flow diagram and P-H diagram. (20)

SECTION - C

5. With neat diagram explain the working of any heat operated refrigeration system. What is the criterion of selecting the refrigerant absorbent pair for such systems? (20)

6. Moist air at a temperature of 21ºC and a total pressure of 736 mm of Hg. DPI is 15ºC. Find: (a) Partial pressure of water vapour in the air (b) Relative humidity (e) Specific humidity (d) specific enthalpy of water vapour (e) Enthalpy of air per kg of dry air (f) Specific volume of air per kg of dry air. (20)

SECTION - D

7. (a) List different types of internal and external sensible, latent and mixed heat loads on an airconditioned space. (10)

   (b) How are the summer air conditioning systems are designed? (10)

8. List different types of expansion devices. Explain with neat diagram the working of thermostatic expansion valve. (20)

SECTION - E

9. (a) Define unit of refrigeration.

   (b) Difference between refrigeration and air conditioning

   (c) Why air refrigeration is not used in domestic refrigerating and AC machines?

(d) Establish relation between COP of Heat pump and COP of refrigerator working between same source and sink.

(e) Why pressure drop is less in condenser than in evaporator?

(f) What are the advantages of using compound compression system?

(g) Designate the refrigerant CCl_3F and $CHClF_2$.

(h) Differentiate WBT and thermodynamic WBT.

(i) Define ADP of cooling. Is it different than surface temperature of a cooling coil? How?

(j) What is hermetically sealed compressor? Write few advantages. (10×2=20)