

Section-D

8. Explain the different types of expansion device in detail. 20
9. Explain the different types of condensers with sketch. 20

B.Tech. 7th Semester (M.E.)
Examination, December-2015

REFRIGERATION AND AIR CONDITIONING
Paper-ME-403-F

Time allowed : 3 hours] [Maximum marks : 100

Note: Attempt any five questions. Question No. 1 is compulsory and one question must be attempted from each section.

1. (a) What is co-efficient of Performance ?
- (b) Discuss the eco-friendly refrigerant.
- (c) Compare the vapour compression cycle with Air refrigeration cycle.
- (d) What are the application of steam Jet refrigerating system ?
- (e) Explain the source of heating system. $5 \times 4 = 20$

Section-A

2. Define the refrigerants. Explain its classification, nomenclature and desirable properties of good refrigerant. 20

3. A reversed Carnot cycle is used for treating and cooling purpose. If the work supplied is 9.5 kW and C.O.P is 3.6 for cooling, find :

$$(i) \frac{T_2}{T_1}$$

- (ii) The refrigerating effect in tonnes of refrigeration

- (iii) C.O.P. for heating. 20

Section -B

4. Explain the following terms :
 (i) Limitations of the reversed Carnot Cycle 10,10
 (ii) Electrolux refrigeration.
5. A refrigerating plant works between temp. limits of -5°C and 25°C . The working fluid ammonia has a dryness fraction of 0.62 at entry to compressor.
 If the machine has a relative efficiency of 55%, calculate the amount of ice formed during a period of 24 hours. The ice is to be formed at 0°C from water at 15°C and 6.4 kg of ammonia is circulated per minute. Specific heat of water is 4.187 kJ/kg and latent heat of ice is 335 kJ/kg. Properties of NH_3 (datum -40°C) 20

Temp $^{\circ}\text{C}$	Liquid Heat kJ/kg	Latent Heat kJ/kg	Entropy of liquid kJ/kg K
25	298.9	1167.1	1.124
-5	158.2	1280.8	0.630

Section -C

6. Explain the following term :
 (a) Gibbs Dalton Law
 (b) Properties of Moist Air
 (c) Dew Point Temp.
 (d) Relative Humidity
 (e) Degree of Saturation. $5 \times 4 = 20$
7. An office for seating 30 occupants is to be maintained at 22°C DBT and 55% RH. The outdoor conditions are 36°C DBT and 27°C WBT. The various loads in the office are
 Solar Heat gain 8500 W.
 Sensible Heat gain per occupant 83 W.
 Latent Heat gain per occupant 100 W.
 Lighting load 2500 W
 Sensible Heat load from other sources 12000 W.
 Infiltration load 15 m^3/min .
 Assuming 40 percent fresh air and 60 percent of recirculated air passing through the evaporator coil and the by pass factor of 0.12, determine
 (i) Dew Point Temp. of the coil, and
 (ii) Capacity of the plant. 20