B.Tech Sem – VI (2007 Course) (Mechanical Engg.) : SUMMER - 2019
SUBJECT : REFRIGERATION & AIR – CONDITIONING

Day : Wednesday
Date : 22/05/2019

Time : 02.30 PM TO 05.30 PM
Max. Marks : 80

S-2019-3132

N.B.:

1) **Q.No.1** and **Q.No.5** are **COMPULSORY**. Out of the remaining attempt **ANY TWO** questions from each section.
2) Answer to both the sections should be written in **SAME** Answer book.
3) Use of non-programmable **CALCULATOR** is allowed.
4) Figures to the right indicate **FULL** marks.
5) Assume suitable data if necessary.

SECTION – I

Q.1 **a)** Give the classification of refrigerants. **[05]**
b) Explain heat engine and refrigerator with block diagram. **[05]**
c) Explain Electrolux refrigeration system. **[04]**

Q.2 Explain with P-V and T-S diagram 3-stage, multi evaporator refrigeration system. **[13]**

Q.3 Give the classification of air refrigeration system. Explain with neat sketch Boot strap air refrigeration system. **[13]**

Q.4 A small refrigerating plant using CO_2 as refrigerant is used for the production. The cycle operates between 26^0C and -6^0C. The condition of CO_2 at the entry of the compressor is 0.9 dry. The quantity of CO_2 circulated through the cycle is 5kg/sec. Find the ice formed per hour assuming relative efficiency of the cycle is 50%. The water is supplied at 10^0C and ice is formed at -4^0C. Use the following properties of CO_2. **[13]**

Sat. Temp^{0}C	hf kJ/kg	hfg kJ/kg	Sf kJ/kg
26	81	121	0.25
−6	−7	246	−0.04

SECTION – II

Q.5 Write short notes on: **[14]**
a) Central air conditioning plant
b) Mobile refrigeration system
c) Thermostatic expansion valve
d) Summer air conditioning system

Q.6 **a)** Define the following terms: **[06]**
i) Dew point temperature **ii)** Relative humidity **iii)** Degree of saturation
b) Explain all round air conditioning system. **[07]**

Q.7 Give the classification of compressors. Explain and discuss the working of hermetically sealed compressor. **[13]**

Q.8 A duct of 18 m length passes air at the rate of $70m^3$/min. Assuming the friction factor of 0.005, calculate the pressure drop in the duct in mm of water when : **[13]**
a) The duct is circular of diameter 0.32 m.
b) The duct is of 0.3 m square cross section.
And also explain the mobile air conditioning system.

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