

Exam.Code:0943
Sub. Code: 7064

1129
B.E. (Mechanical Engineering)
Seventh Semester
MEC-701: Refrigeration and Air Conditioning

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit.

x-x-x

- I. Attempt the following:-
- Define a TON of refrigeration
 - What is desired property for refrigerant and absorber for vapour absorption system?
 - List disadvantages of wet compression.
 - Define GSHF and Bypass factor.
 - Define the dew point temperature. (2x5)

UNIT - I

- II. In a 15 TR ammonia refrigeration plant, the condensing temperature is 25°C and evaporating temperature is -10°C. Refrigerant is sub-cooled by 5°C before passing to expansion device. The vapour leaving the evaporator is 0.97 dry. Find COP and power required. (10)
- III. Compare vapour absorption system with vapour compression system. (10)
- IV. An air refrigeration used for food storage provides 25 TR. The temperature of air entering the compressor is 7°C and the temperature at the exit of cooler is 27°C. Find COP, power required if the air circulated is 3000 kg/hr. The compression and expansion follows the law $pv^{1.3} = C$. (10)

UNIT - II

- V. The moist air at 30°C DBT and 75% RH enters a cooling coil at a rate of 200 m³/min. The coil dew point is 14°C and by-pass factor is 0.1. Determine temperature of air leaving the coil, cooling capacity, amount of water vapour removed per minute, sensible heat factor for the process. (10)

P.T.O.

(2)

VI. The following data were collected to design an air-conditioning system for a restaurant: inside design conditions 24°C DBT & 50% RH, outdoor conditions 34°C DBT & 28°C WBT, solar heat gain through walls, roof and floor 16160 kJ/hr, solar heat gain through glass 15200 kJ/hr, number of occupants 25, sensible heat gain per person 300 kJ/hr, latent heat gain per person 360 kJ/hr, internal lighting load 15 lamps of 100w & 10 fluorescent tubes of SOW, sensible heat gain from other sources 40000 kJ/hr, by-pass factor of the coil 0.35. if 40% fresh air and 60% re-circulated air is mixed & passed through the conditioner coil determine: total air required in m^3/hr , DPT of the coil, condition of the supply air to the room & the capacity of the conditioning-plantain tons. (10)

- VII. a) What is the necessity of a cooling tower in an air conditioning system? Sketch and explain working of forced and induced draft cooling towers.
- b) What are different types of evaporators used in air conditioning? Sketch and explain flooded evaporator and dry expansion evaporator its application. (2x5)

x-x-x