R19

Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
M.Tech I Year I Semester Regular Examinations Jan 2020
AIR CONDITIONING SYSTEM DESIGN
(Thermal Engineering)

Time: 3 hours   Max. Marks: 60

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1 Classify the psychometric processes. Explain any four processes with the help of neat sketches.   **12M**

OR

2 a What is effective temperature? Write short notes on the factors affecting the effective temperature?   **6M**

  b For a sample of air having 22^0C DBT, relative humidity 30% at barometric pressure of 760mm Hg. Calculate i)Vapour pressure, ii) Humidity ratio iii)Vapour density iv) Enthalpy using theoretical formulas.   **6M**

UNIT-II

3 a Explain the following   **6M**
     (i). Duct heat gain and   (ii).Fan load

  b With neat sketch, explain the principle of working of summer.   **6M**

OR

4 An air conditioning plant is to be designed for a small office for winter conditions with the following data: Outdoor conditions = 10°C DBT and 8°C WBT, Required indoor conditions = 20°C DBT and 60% RH, Amount of air circulations = 0.3 m3/min/person, Seating capacity of the office =50 persons. The required condition is achieved first by heating and then by adiabatic humidifying. Find 1. Heating capacity of the coil in kW and the surface temperature, if the by-pass factor of the coil is 0.32; and 2.capacity of the humidifier.   **12M**

UNIT-III

5 a Discuss about the recirculate air with reheat coil.   **6M**

  b An air-conditioned space is maintained at 26^0C DBT 50% RH when the outdoor conditions are 35^0C DBT and 28^0C WBT. The space has a sensible heat gain of 17.6kW and the air to the space is supplied at a condition of 8^0C saturated. Determine i) The mass and volume flow rate of the air supplied. ii) Latent heat in the room iii) The cooling load of the refrigerator plant is 15% of total mass of air supplied to the space is fresh air and the remaining air is re circulated.   **6M**

OR

6 A conference room for seating 100 persons is to be maintained at 220C DBT and 60% relative humidity. The outdoor conditions are 400C DBT and 270C WBT. The various loads in the auditorium are as follows: Sensible and latent heat loads per person, 80W and 50W respectively: lights and fans, 15000W: sensible heat gain through glass, walls, ceiling, etc., 15000W. The air infiltration is 20m3/min and fresh air supply is 100m3/min. Two-Third of re circulated room air and one-third of fresh air are mixed before entering the cooling coil. The by-pass factor of the coil is 0.1.   Determine Apparatus Dew Point, the Grand Total Heat Load and Effective Room Sensible Heat Factor.   **12M**

UNIT-IV

7	a	What are the advantages of steam humidifiers?	6M
	b	Explain the process of humidification by Air- washing method.	6M

OR

8	Explain in detail about the Lithium bromide absorption system with neat sketch.	12M

UNIT-V

9	Explain the following with neat sketches	12M

    i.   Upward flow system
    ii.   Downward flow system

OR

10	a	The general noise level in a factory is measured as 10^{-11} watts per cm^2. (i) Calculate the level in db. (ii) If a new machine is installed and resulting sound level is 55db, what would be ts level at the same distance from the machine in a quiet background?	6M
	b	A fan which has a noise level of 43 db is operating in a room having originally a noise level of 35 db. Find the combined noise level in the room.	6M

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