Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
M.Tech I Year I Semester Regular & Supplementary Examinations May/June-2022
AIR CONDITIONING SYSTEM DESIGN
(Thermal Engineering)
Use of Steam Table & Refrigeration Table Permitted
Time: 3 hours   Max. Marks: 60

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

UNIT-I

1. Write the various psychometric processes? Explain any four processes with neat sketches. **L1** **12M**

OR

2. a. Write about the factors affecting optimum effective temperature. **L1** **6M**
   b. Sketch comfort chart and show on it the comfort zone. **L3** **6M**

UNIT-II

3. a. Define the i) Latent heat   ii) Sensible heat   iii) Sensible heat factor **L4** **6M**
   b. The amount of air supplied to an air conditioned hall is 300 m3/min. The atmospheric conditions are 35°C DBT and 55% RH. The required conditions are 20°C DBT and 60% RH. Find out the sensible heat and latent heat removed from the air per minute. Also find sensible heat factor for the system. **L1** **6M**

OR

4. Discuss briefly the different types of heat loads which have to be taken into account while designing air conditioning system. **L6** **12M**

UNIT-III

5. In air conditioning system, the inside and outside conditions are dry bulb temperature 25°C, relative humidity 50% and dry bulb temperature 40°C, wet bulb temperature 27°C respectively. The room sensible heat factor is 0.85. 50% of the room air is rejected to atmosphere and an equal quantity of fresh air added before air enters the air conditioning apparatus. If the fresh air added is 100m3/min, determine: a. Room sensible and latent heat load b. Sensible and latent heat load due to the fresh air c. Apparatus dew point d. Humidity ratio and dry bulb temperature of air entering air conditioning apparatus. Assume by pass factor as zero, density of air as 1.2 kg/m3 at a total pressure of 1.01325 bar. **L3** **12M**

OR

6   a   Draw the psychometric chart representing the condition for all fresh air used and   L1   6M
recirculated air.

     b   An air conditioned auditorium is to be maintained at 27°C dry bulb temperature and   L3   6M
60% relative humidity. The ambient condition is 40°C dry bulb temperature and
30°C wet bulb temperature. The total sensible heat load is 100000 KJ/h and the total
latent heat load is 40000 KJ/h. 60% of the return air is re circulated and mixed with
40% of make-up air after the cooling coil. The condition of air leaving the cooling
coil is at 18°C. Determine 1. Room sensible heat factor 2. The condition of air
entering the auditorium 3. The amount of make-up air 4. Apparatus dew point.

UNIT-IV

7   a   What is meant by a grill? How to design a grill?   L1   6M

     b   What is meant by a register? What are the factors affecting grill performance?   L1   6M

OR

8   a   What is humidification and the necessity of it? What are the common methods of   L1   6M
humidification.

     b   Advantages and disadvantages of humidifying.   L4   6M

UNIT-V

9   a   Explain about duct design and its recommended velocities.   L2   6M

     b   Explain about Pressure drop.   L2   6M

OR

10   a   Explain about the static regain method.   L2   6M

     b   Explain about velocity reduction method.   L2   6M

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