

Register No.:

617

April 2024

Time – Three hours
(Maximum Marks: 100)

- [N.B. 1. Answer all questions under Part-A. Each question carries 3 marks.
2. Answer all the questions either (A) or (B) in Part-B. Each question carries 14 marks.]

PART – A

1. Define relative humidity.
2. Write any three differences between sensible heat and latent heat.
3. Draw the sensible heating process in psychrometry chart.
4. Write the formula used to find By pass factor of cooling coil and its efficiency.
5. What are the physiological hazards resulting from heat?
6. How does clothing and duration of stay affect optimum effective temperature?
7. State the effect when fresh air is only used for cooling.
8. What is meant by heat load in air conditioning system?
9. State the advantages of Unitary AC System over Central AC.
10. Draw the sketch of year around air conditioning system.

PART – B

11. (a) (i) The Atmospheric conditions are 25°C dry bulb temperature and specific humidity of 10gm/kg of air. Atmospheric pressure= 1 bar. Determine the following: (7)
- (1) Partial pressure of water vapour
 - (2) Relative humidity
 - (3) Dew point Temperature
- (ii) Describe the construction and working of laboratory psychrometer with a neat sketch. (7)
- (Or)
- (b) (i) Explain the construction and working of Aspirating Psychrometer with neat sketch. (7)
- (ii) Explain the following properties of air: (7)
- (1) Wet bulb temperature (WBT)
 - (2) Humidity ratio
 - (3) Degree of saturation
12. (a) (i) Explain humidification Process and dehumidification process with help of Psychrometric chart. (7)
- (ii) Derive an expression to find latent heat transfer during the above two processes. (7)
- (Or)
- (b) The atmospheric air at 30°C dry bulb temperature and 75% RH enters a cooling coil at the rate of 200m³/min. The coil dew point temperature is 14°C and the by pass factor of the coil is 0.1. Determine
- (1) temperature of air leaving the coil
 - (2) capacity of the coil in tonnes of refrigeration
 - (3) amount of water vapour removed per minute
 - (4) Sensible heat factor for the process
13. (a) Explain how the human body is compared to a thermal machine with neat sketch.
- (Or)
- (b) Explain about the comfort chart with its salient features with neat sketch.

14. (a) Discuss the different types of heat loads which have to be taken into consideration while designing air conditioning system for a household application. (Consider Hall and kitchen utilization).
- (Or)
- (b) The following data relates the office air conditioning plant having maximum seating capacity of 25 occupants.
- Outside design conditions : 34°C DBT and 28°C WBT
- Inside design conditions : 24°C DBT and 50%RH
- Solar heat gain: 9120 W
- Latent heat gain per occupant: 105 W
- Sensible heat gain per occupant: 90 W
- Lightening load : 2300 W
- Sensible heat load from other occupants : 11630 W
- Infiltration load: 14m³ / min
- Assume 40% fresh air and 60% of recirculated air passing through the evaporator coil. By pass factor is 0.15.
- Determine
- (1) Dew point temperature of the coil
 - (2) Capacity of the plant.
15. (a) Explain the following air conditioning system with neat sketch:
- (i) Remote air conditioning unit
 - (ii) Self contained air conditioning unit
- (Or)
- (b) Explain summer air conditioning system with air washer. Explain the process involved and represent in a Psychrometric chart.
