07.11.23 4020632 R&AC

Register No.: [ ]

557

October 2023

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 COP.
2. What are the types of cooling tower?
3. Define the term refrigeration effect.
4. What is the difference between vapour absorption and vapour compression refrigeration system?
5. What is capillary tube?
6. Define freeze drying.
7. Define - dry air, moist air and water vapour.
8. What is by pass factor?
9. Differentiate between fan and blower.
10. What is meant by occupants load?

PART – B

11. (a) Explain the principle of working of open and closed air system of refrigeration. Also list out its advantages and disadvantages.

(Or)

(b) Explain the construction and working principle of shell and tube type water cooled condenser with a neat sketch.

12. (a) An ammonia vapour compression refrigerator has an effective swept volume of 0.327 m^3 per minute. Condensation and evaporation takes place at 30^0C respectively. There is no under cooling and the gas temperature after compression is 60^0C taking C_p for the superheated vapour as 2.95 kJ/kgK. Determine
(i) The dryness fraction of the vapour as it enters the compressor.
(ii) The rate of circulation of ammonia in kg per minute.
(iii) The rate of extraction of heat in kJ/min.
(iv) The heat rejected in the condenser per minute.

(Or)

[Turn over.....

(b) Explain simple vapour absorption refrigeration system with a neat sketch.

13. (a) Explain the construction and working of thermostatic expansion valve with a neat sketch.

(Or)

(b) Explain the following:
(i) Water cooler (3)
(ii) Frost free refrigeration (3)
(iii) Ice cream cabinets (4)
(iv) Dairy refrigeration (4).

14. (a) Explain the following psychrometric processes:
(i) sensible heating (3)
(ii) sensible cooling (3)
(iii) humidifying and heating (4)
(iv) dehumidifying and cooling (4).

(Or)

(b) The air at 80% RH and 35^0C DBT enters a cooling coil at the rate of 100 m^3/min. The coil dew point temperature is 10^0C and its BPF is 0.15.
Find:
(i) Temperature of air leaving the cooling coil.
(ii) Amount of water vapour removed per minute.
(iii) Capacity of the cooling coil in TR and kW.
(iv) Sensible heat factor of the process.

15. (a) Explain the working of window type air conditioner with a neat sketch.

(Or)

(b) An air – conditioned room is maintained at 25^0C DBT and 55% RH when ambient conditions are 32^0C DBT and 25^0C WBT. The room sensible heat gain is 10 kW. The air enters the conditioned hall at 10^0C DBT and saturated. Find,
(i) Volume of moist air supplied to the space in m^3/min.
(ii) Latent heat gain in the room in kW.
(iii) Cooling load of the air washer in kW if 20% of the air supplied to the room is fresh air and remaining 80% is recirculated.
