Register No.: [ ]

2013

October 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 heat pump.
2. State the necessity of compressor in refrigeration system.
3. Draw T-s curve of vapour compression refrigeration system and label the processes.
4. State the advantages of simple vapour absorption refrigeration system.
5. What is meant by cryogenics?
6. Compare slow freezing and quick freezing.
7. Write down the measuring procedure of wet bulb temperature.
8. Define optimum effective temperature.
9. Write down the properties of ideal insulator.
10. List out the various heat loads.

PART – B

11. (a) *Explain the working* principle of open air refrigeration system with *neat sketch. Also* state its advantages and disadvantages.

(Or)

(b) (i) Explain the working of evaporative condenser with simple sketch. (7)

(ii) Explain the working of water cooled condenser with simple sketch. (7)

[Turn over.....

12. (a) An ammonia vapour compression refrigerator has an effective swept volume of 0.288 m^3 per minute. Condensation and evaporation takes place at 32^0C and 25^0C, respectively. There is no under cooling and the gas temperature after compression is 52^0C. Take C_p for the superheated vapour as 2.95 kJ/kg K. Determine
(i) the rate of circulation of ammonia in kg per minute,
(ii) the heat rejected in the condenser per minute,
(iii) the dryness fraction of vapour as it enters the compressor,
(iv) the rate of extraction of heat in kJ/min.

(Or)

(b) Explain the construction and working of vapour compression refrigeration system with simple layout.

13. (a) Explain the working of automatic expansion valve with neat sketch.

(Or)

(b) Explain the following with neat sketches:
(i) Dairy refrigeration, (7)
(ii) Frost free refrigeration (7)

14. (a) Explain the following with neat sketches:
(i) Heating and humidification process, (5)
(ii) Cooling and dehumidification process, (5)
(iii) By-pass factor (4)

(Or)

(b) Explain about comfort chart and its design considerations with neat sketch.

15. (a) (i) Explain the working of centrifugal dust collector with neat sketch. (7)
(ii) Discuss about the service and maintenance of R&AC system. (7)

(Or)

(b) A theatre of 200 seating is to be maintained at 24°C DBT and 64% RH. The outdoor conditions are 35°C and 20°C WBT. The various loads in the hall are as follows.
Sensible heat and latent heat loads per person, 90W and 40W, respectively; the air infiltration is 20 m^3/min and fresh air supply is 100 m^3/min, two third of recirculated room air and one third of fresh air are mixed before entering the cooling coils. The by-pass factor of the coil is 0.1. Determine SHF, apparatus dew point temperature and capacity of air conditioning system in TR.
