

**April 2019**

Time – Three hours  
(Maximum Marks: 75)

- [N.B: (1) Q.No. 8 in PART – A and Q.No. 16 in PART – B are compulsory. Answer any FOUR questions from the remaining in each PART – A and PART – B  
(2) Answer division (a) or division (b) of each question in PART – C.  
(3) Each question carries 2 marks in PART – A, 3 marks in Part – B and 10 marks in PART – C.  
(4) Approved R&AC tables and Charts are permitted.]

PART – A

1. State Fourier's law of heat conduction.
2. What are the classifications of condenser?
3. How will you classify cryogenic refrigerators?
4. What is the use of flash chamber in refrigeration? Where is it located?
5. Name any two types of freezing methods.
6. What is comfort chart?
7. Name any three basic media used in thermal storage.
8. What do you know about heat reclaim?

PART – B

9. What is the function of a refrigeration compressor?
10. Compare open and closed loop air system of refrigeration.
11. What are the effects of super heating?
12. How will you select a refrigerant? Explain.
13. What is dairy refrigeration?
14. List out the desirable properties of an ideal insulator.
15. Discuss energy conservation through design criteria.
16. Draw the p-V, T-s diagram and p-h diagram for a vapour compression system with details.

PART – C

17. (a) A refrigerator storage is supplied with 10,000 kg of fish at a temperature of  $20^{\circ}\text{C}$ . The fish has to be cooled to  $-10^{\circ}\text{C}$  for preserving it for a long period without deterioration. The cooling takes place in 10 hours. The specific heat of fish is  $2.933 \text{ kJ/kgK}$  above freezing point and  $1.257 \text{ kJ/KgK}$  below freezing point which is  $-3^{\circ}\text{C}$ . The latent heat of freezing is  $232.545 \text{ kJ/kg}$ . Find the refrigerating capacity of the plant in TR.  
(Or)
- (b) Describe about forced convection evaporator with the help of a neat sketch.
18. (a) Find the theoretical C.O.P for a  $\text{CO}_2$  machine working between the temperatures of  $25^{\circ}\text{C}$  and  $-4^{\circ}\text{C}$ . The dryness fraction of  $\text{CO}_2$  gas during the suction stroke is 0.6.  
(Or)
- (b) Explain with neat sketch, the working of solar absorption refrigeration system.
19. (a) Explain the working principle of thermostatic expansion valve with the help of a neat sketch.  
(Or)
- (b) Write short notes on the following (i)Ice cream cabinets (ii)Frost free refrigeration.
20. (a) In a cooling application, moist air enters a refrigeration coil at the rate of 100kg of dry air per minute at  $35^{\circ}\text{C}$  and 50% R.H. The apparatus dew point of coils is  $5^{\circ}\text{C}$  and by-pass factor is 0.15. Determine the outlet condition of moist air and cooling capacity of coil in TR.  
(Or)
- (b) List out the factors governing optimum and effective temperature in comfort air conditioning.
21. (a) Discuss about the various loads to be considered in cooling load calculations.  
(Or)
- (b) Write short notes on the following (i)Chilled water systems (ii)Variable refrigerant flow.
-