

SECTION-B

2. How a Carnot cycle is used as a refrigeration cycle, and what is the value of C.O.P. of a Carnot refrigeration cycle in terms of higher and lower temperatures? A scientist claims to have developed a refrigerator which maintains a freezer temperature of -15°C in a room whose temperature is 35°C and have a C.O.P. of 6.5. Justify, whether "his" claim is True or False.
3. A R-12 vapour compression systems has saturated suction temperature of -5°C and saturated discharge temperature of 40°C . The refrigerant vapour is dry-saturated at the suction of compressor and becomes superheated after compression. For one ton of refrigeration capacity, calculate Refrigerating effect; mass flow rate; Power and COP of the system.
4. Draw a neat diagram of three-fluid system of refrigeration (Electrolux refrigeration system) and explain its working.
5. Explain Ozone depleting potential and global warming potential. How these are affected by refrigerants? Suggest substitutes for CFC Refrigerants from the point of Ozone Depletion and Global Warming.
6. 50 cu. m. of air per minute at 30°C DBT and 60% R.H. is cooled to 22°C DBT. Determine from first principles and using psychometric chart: sensible heat removed from air per minute, R.H. of cooled air. Assume air pressure as 1.033 bar.

SECTION-C

7. A single compressor using R-12 as refrigerant has three evaporators of capacity 30TR; 20TR and 10TR. The temperature in the three evaporators is to be maintained at -10°C , 5°C and 10°C respectively. The condenser pressure is 9.609 bars. The liquid refrigerant leaving the condenser is sub-cooled to 30°C . The vapour leaving the evaporators is dry and saturated. Assuming isentropic compression, calculate : the mass of refrigerant flowing through each evaporator; the power required to drive the compressor; and C.O.P. of the system.
8.
 - a) What are desirable characteristics of ideal refrigerant? Explain how refrigerants are designated?
 - b) Explain construction, working, advantages and disadvantages of Thermostatic Expansion, valve, with neat sketch.

9. a) Define Effective Temperature. Explain various factors governing effective temperature.
- b) A small office hall of 25 persons capacity is provided with summer air conditioning system with the following data :

Outside conditions = 34°C DBT and 28°C WBT

Inside conditions = 24°C DBT and 50 % RH

Volume of air supplied = $0.4\text{ m}^3/\text{min}/\text{person}$

Sensible heat load in room = 125600 kJ/h

Latent heat load in the room = 42000 kJ/h . Find the sensible heat factor of the plant.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.