Roll No. ☐☐☐☐☐☐☐☐☐☐☐ Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Mechanical Engg.)   (Sem.–6)
REFRIGERATION AND AIR CONDITIONING
Subject Code : BTME601-18
M.Code : 79650
Date of Examination : 02-07-22

Time : 3 Hrs.   Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :
1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. **Write briefly :**

   a) Explain how a refrigerant produces a cooling effect.

   b) What are the advantages of using a flash chamber in parallel with evaporator?

   c) Suggest some measures to improve the working of a vapor compression refrigeration system.

   d) What are various methods of leak detection in refrigeration system?

   e) What do you understand by the performance characteristics of refrigerant compressor?

   f) What is the basic principle of vapor absorption refrigeration system?

   g) What are human requirements of comforts?

   h) Atmospheric air temperature is 20°C and specific humidity is 9.5 gm/kg of dry air. Find the partial pressure of water vapour and specific humidity.

   i) Why wet compression is avoided?

   j) What is the importance of dielectric strength in selecting a proper refrigerant?

SECTION - B

2. A vapor compression refrigeration machine with R – 12 as refrigerant has a capacity of 20 T of refrigeration operating between -28°C and 26°C. The refrigerant is subcooled by 4°C before the throttle value and superheated by 5°C before leaving the evaporator. Calculate the theoretical COP and power required.

3. "*Compound compression with intercooling is effective method of operation*". Discuss.

4. Explain with a neat sketch, the working principle of thermostatic expansion valve. Discuss the factors that affect the capacity of the valve.

5. What are secondary refrigerants? Where these are used? Explain its importance in the context of big ice manufacturing plants.

6. Draw a neat diagram of the Lithium Bromide Water Absorption refrigeration system and explain its working.

SECTION – C

7. Air flowing at the rate of 90m^3/min at 45°C DBT and 60% RH is mixed with another stream flowing at the rate of 20m^3/min at 25°C DBT and 40% RH. The mixture flows over a cooling coil whose ADP temperature is 12°C and bypass factor is 0.22. Find DBT and RH of air leaving the coil. If this air is supplied to an air conditioned room where DBT of 25°C and RH of 40% are maintained, estimate Room Sensible Heat Factor (SHR) and Cooling coil capacity in tons of refrigeration.

8. What are the thermodynamic advantages of sub-cooling the liquid refrigerant in the condenser? State different methods of sub-cooling and explain their relative merits and demerits.

9. Explain the following :

    a) Two phased Carnot cycle and its limitations

    b) Eco-friendly refrigerants

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.