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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Mechanical Engineering)(Sem.-6)
REFRIGERATION AND AIR CONDITIONING

Subject Code : BTME601-18

M.Code : 79650

Date of Examination : 30-04-2025

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) Why is the Carnot cycle not practical for refrigeration?
- b) What is a flash chamber and why is it used?
- c) How is the vapour compression refrigeration system cycle represented on a P-V diagram?
- d) What are the main classifications of refrigerants?
- e) Name two common methods of leak detection in refrigeration systems.
- f) What is the function of an expansion device?
- g) What are the advantages of a vapour absorption system over VCRS?
- h) Define dry air and moist air.
- i) What is heating with dehumidification?
- j) What are the sources of heat load in an air-conditioned space?

SECTION - B

2. Explain the compound compression system with a single evaporator and its advantages over a single-stage system.
3. What are eco-friendly refrigerants and what is the action plan to reduce ecological hazards?
4. Explain the working principles of an expansion device used in refrigeration systems.
5. A room has an air supply at 25°C DBT and 50% RH. Find the specific humidity and enthalpy using a psychometric chart.
6. Define and explain the terms: By-pass factor, Contact factor, Sensible heat factor, Room sensible heat factor and Grand sensible heat factor.

SECTION - C

7. A Freon 22 condensing unit is specified to give 40 TR capacities for air conditioning under standard operating conditions of 40°C condensing and 5°C evaporating temperatures. What would be its capacity in TR for food freezing for which the evaporator temperature is -35°C ?
8. **A building has the following calculated cooling loads :**
RSH gain = 310 kW
RLH gain = 100 kW
The space is maintained at the following conditions :
Room DBT = 24°C
Room RH = 50%
Outdoor air is at 28°C and 50% RH, and 10% by mass of air supplied to the building is outdoor air. If the air supplied to the space is not to be at a temperature lower than 18°C , find:
 - a) Minimum amount of air supplied to space in m^3/s .
 - b) Volume flow rates of return (recirculated) air exhaust air and outdoor air
 - c) State and volume flow rate of air entering the cooling coil.
9. **Write short notes on the following :**
 - a) Aqua - ammonia vapour absorption refrigeration system.
 - b) Azeotropes and zeotropes.

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.

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