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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE, APRIL - 2025

REFRIGERATION AND AIR CONDITIONING

[*Note: -*   1. Steam tables, psychrometric tables & charts are permitted.
2. Missing data if any can be suitable assumed.]

[Maximum Marks: **100**]   [Time: **3** Hours]

PART-A
[Maximum Marks: **10**]

I.   (Answer *all* questions in one or two sentences. Each question carries *2* marks)

1. List two modes of heat transfer.

2. State the uses of flash chamber used in simple vapour compression refrigeration system.

3. Uses of capillary tube used in commercial refrigeration and air conditioning system.

4. Define Dalton's law of partial pressure.

5. Define the term HVAC.   (5 x 2 = 10)

PART-B
[Maximum Marks: **30**]

II.   (Answer *any five* of the following questions.   Each question carries *6* marks)

1. Define: **(a)** Sensible heat   **(b)** Latent heat   **(c)** Saturation temperature

2. Compare between open and closed cycle air refrigeration systems.

3. Explain with simple sketch the working of a reciprocating refrigerant compressor.

4. Illustrate the working of domestic refrigerator with suitable diagram.

5. Explain and represent psychrometric process such as sensible heating and sensible cooling.

6. List advantages and applications of Cryogenics refrigeration.

7. Explain winter air conditioning system with suitable figures.   (5 x 6 = 30)

PART-C
[Maximum Marks: **60**]
(Answer *one* full question from each Unit. Each full question carries **15** marks)

UNIT – I

III.   a. List various methods of refrigerations. And draw a neat sketch of ice refrigeration.   (9)

b. A refrigeration system operates on the reversed carnot cycle. The highest temperature of the refrigerant in the system is 32°C and the lower temperature is -12°C. The capacity is 12 Ton of refrigeration. Neglect all losses. Determine

    (i) COP   **(ii)** Heat rejected from the system per hour   **(iii)** Power required.   (6)

OR

IV.   a. Explain with a sketch the working of a Bell-coleman cycle. And indicate the cycle in P-V and T-S diagrams.   (9)

b. Explain the working of simple vapour compression refrigeration system with schematic diagram.   (6)

UNIT – II

V.   a. Compare vapour compression system with vapour absorption system.   (9)

b. Distinguish between hermetically sealed and semi hermetically sealed compressor.   (6)

OR

VI.   a. Outline the desirable properties of an ideal refrigerant.   (9)

b. Explain the working of ice plant with a layout.   (6)

UNIT- III

VII.   a. List commonly used psychrometric process and also represent cooling and dehumidifying process on psychrometric charts.   (9)

b. What is a psychrometers? List different types of psychrometers and it's uses.   (6)

OR

VIII.   a. Draw and explain the working of Cascade refrigeration.   (9)

b. Explain liquefaction of hydrogen with figure.   (6)

UNIT - IV

IX.   a. Explain the construction and working of summer air conditioning system with suitable sketches.   (9)

b. For a room of dimensions 20 x 10 x 5 meters, obtain infiltration load when the ambient and inside temperatures are 42°C and 22°C respectively. Take number of air changes per hour as 0.5. Take C_p for air = 1 KJ/kgK and R for air = 0.287 KJ/KgK.   (6)

OR

X.   a. Explain the working of central air conditioning system with suitable sketch.   (9)

b. List the factors affecting human comfort.   (6)

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