1510230088

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/
MANAGEMENT/COMMERCIAL PRACTICE, APRIL – 2024**

REFRIGERATION & AIR CONDITIONING

[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. Define Sublimation.

2. Compare vapour compression system and vapour absorption system.

3. Define the term Cryogenics.

4. State Dalton's law of partial pressure.

5. Describe the concept of effective temperature.   (5 x 2 = 10)

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

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

1. Explain open and closed cycle air refrigeration system.

2. State the purpose of strainer, drier and muffler in a refrigeration system.

3. Define:

   (i) Dry bulb temperature (ii) Wet bulb temperature (iii) Dew point temperature

4. Explain the concept of sensible heat factor

5. List Advantages and applications of cryogenic refrigeration.

6. Classify air conditioning systems based on function, season of the year and equipment

    arrangement.

7. Explain the sources of heat gain or loss in air conditioning system.   (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. Derive the COP of Bell-Coleman Cycle.   (8)

b. A refrigerating machine working on reversed Carnot cycle consumes 5.5 kW for producing a refrigerating effect of 940 kJ/min for maintaining a region at - 38°C. Determine:

    (i) C.O.P of refrigerating machine.

    ii) Higher temperature of cycle.

    iii) Amount of heat delivered in kJ/min when this device used as a heat pump.   (7)

OR

IV.   a. Explain the use of Flash chamber and accumulator in vapour compression system with the help of line diagram.   (7)

    b. Define saturation temperature, critical pressure, critical temperature and entropy.   (8)

UNIT – II

V.   a. Explain the working of dry expansion type evaporator.   (8)

    b. Mention the characteristics of following refrigerants R123, R134a, R125.   (7)

OR

VI.   a. Explain the working of thermostatic expansion valve.   (8)

    b. Explain with sketch the working of vane type compressors.   (7)

UNIT- III

VII.   a. Define: (i) specific humidity (ii) relative humidity (iii) absolute humidity (iv) degree of saturation.   (8)

    b. With the help of psychrometric chart explain sensible cooling.   (7)

OR

VIII.   a. Humid air at 30°C DBT and 21°C WBT is cooled to 20°C without removal moisture. Find the RH and DPT in final state. What is the change in enthalpy?   (7)

    b. With the help of schematic diagram explain cascade refrigeration system.   (8)

UNIT - IV

IX.   a. Explain the working of Summer Air Conditioning with line sketch.   (8)

    b. Define cooling load. Explain the components of cooling load.   (7)

OR

X.   a. Explain the working of window type air conditioner with sketch.   (8)

    b. List the factors affecting human comfort.   (7)

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