BRAINWARE UNIVERSITY

Term End Examination 2023-2024
Programme – Dip.ME-2021
Course Name – Refrigeration & Air Conditioning
Course Code - DME605A
(Semester VI)

Full Marks : 60 **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Choose the correct ideal cycle for vapour compression refrigerator system.

a) Reversed Carnot
b) Carnot
c) Reversed Rankine
d) Rankine

(ii) Choose the correct refrigerant that used in absorption system normally.

a) Freon-11
b) CO2
c) Ammonia
d) Freon-22

(iii) Select the correct option. In a domestic vapour compression refrigerator, the refrigerant commonly used is.

a) CO_2
b) Ammonia
c) R-12
d) All of these

(iv) Select the appropriate procedure typically used during winter air conditioning to heat and humidify the air.

a) Humidification
b) Cooling and dehumidification
c) Dehumidification
d) Heating and humidification

(v) The coefficient of performance of "Heat Pump" is always _____ one.

a) Equal
b) Less than
c) Greater than
d) None of these

(vi) Identify the pressure at the outlet of a refrigerant compressor.

a) Suction pressure
b) Discharge pressure
c) Critical pressure
d) Back pressure

(vii) Tell the reason for using of compressor in VCR.

a) Raise the pressure of the refrigerant
b) Raise the temperature of the refrigerant
c) Circulate the refrigerant through the refrigerating system
d) All of these

(viii) In domestic refrigerator the capillary tubes are usually made of which material?

a) Steel
b) Copper

c) Zinc
d) Iron

(ix) Identify the correct reason for maximum ozone depletion potential in the stratosphere.

a) Ammonia
b) Sulpher dioxide
c) carbon dioxide
d) Fluorine

(x) The refrigerant used for absorption refrigerators working on heat from solar collectors is a mixture of water and other substance. Identify that substance.

a) Carbon dioxide
b) Sulphur dioxide
c) Lithium bromide
d) R-12

(xi) Identify a closed system from the following.

a) Mass does not cross boundaries of the system, through energy may do so
b) Neither mass nor energy crosses the boundsries of the system
c) Both energy and mass cross the boundaries of the system
d) Mass crosses the boundary but not the energy

(xii) Identify the component of vapour compression refrigeration system, where the enthalpy remains constant.

a) Evaporator
b) Compressor
c) Throttle valve
d) None

(xiii) Identify the fuction of an Accumulator in VCR.

a) Exchange of heat
b) storing of un vaporized liquid
c) condensing gas
d) Storing of liquid refrigerant

(xiv) Choose the correct process in winter air conditioning.

a) Dehumidification
b) Heating and humidification
c) Humidification
d) Cooling and dehumidification

(xv) Choose the correct process of adding moisture to the air, without change in its dry bulb temperature.

a) humidification
b) dehumidification
c) heating
d) none of these

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Explain the term "tonne of refrigeration". (3)
3. Explain the working of hermetically sealed compressor. (3)
4. Discuss the properties of ideal refrigerant. (3)
5. Discuss the function of absorber in vapor absorption refrigeration system. (3)
6. The coefficient of performance of a refrigerator working on a reversed Carnot cycle is 4. Estimate the ratio of the highest absolute temperature to the lowest absolute temperature. (3)

OR

A refrigerating machine working on reversed Carnot cycle takes out 2 kW of heat from the system at 200 K while working between temperature limits of 300 K and 200 K. Estimate the C.O.P. and power consumed by the cycle. (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Explain winter air conditioning system with neat sketch. (5)

8. Evalute an expression for the by-pass factor of the cooling coil. (5)

9. Describe the advantages and disadvantages of air cooled condenser. (5)

10. Draw the line diagram and explain the working of practical vapour absorption system. (5)

11. Draw a neat line diagram of Electrolux refrigerator and explain its working principles. (5)

12. The values of enthalpy at the beginning of compression, at the end of compression and at the end of condensation are 185 kJ/kg, 210 kJ/kg and 85 kJ/kg respectively.Determine the value of the COP of the vapour compression refrigeration system? (5)

OR

For simple vapour compression cycle, enthalpy at suction = 1600 kJ/kg, enthalpy at discharge from the compressor = 1800 kJ/kg, enthalpy at exit from condenser = 600 kJ/kg. Determine the COP for this refrigeration cycle. (5)

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