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Brainware University
398, Ramkrishnapur Road, Barasat
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BRAINWARE UNIVERSITY

Term End Examination 2025-2026

Programme – Dip.ME-2024

Course Name – Refrigeration and Air-conditioning

Course Code - DME40201A

(Semester IV)

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) Select the component of a refrigeration system that is responsible for compressing the refrigerant.
 - a) Evaporator
 - b) Condenser
 - c) Compressor
 - d) Expansion valve
- (ii) Identify the function of the evaporator in a refrigeration system.
 - a) To transfer heat to the surroundings
 - b) To transfer heat from the space being cooled
 - c) To compress the refrigerant
 - d) To expand the refrigerant
- (iii) Select the role that the expansion valve does play in the refrigeration cycle.
 - a) Increasing pressure
 - b) Decreasing pressure
 - c) Increasing temperature
 - d) Decreasing temperature
- (iv) Choose the option that happens to the refrigerant as it passes through the expansion valve.
 - a) Its pressure decreases
 - b) Its pressure increases
 - c) Its temperature decreases
 - d) Its temperature increases
- (v) Choose the state of refrigerant exists at the outlet of the evaporator in a vapor compression refrigeration system.
 - a) Saturated liquid
 - b) Saturated vapor
 - c) Superheated liquid
 - d) Superheated vapor
- (vi) Choose the correct from the following that is commonly used as the absorbent in vapor absorption refrigeration systems.
 - a) Water
 - b) Carbon dioxide
 - c) Ammonia
 - d) Hydrochlorofluorocarbon (HCFC)
- (vii) Choose the term refers to the process of removing moisture from the air in an air conditioning system.

- a) Humidification b) Dehumidification
c) Ventilation d) Filtration
- (viii) Select the term for the temperature to which air must be cooled to reach saturation, assuming constant pressure and moisture content.
a) Wet bulb temperature b) Dew point temperature
c) Dry bulb temperature d) Adiabatic saturation temperature
- (ix) Choose the term for amount of moisture present in the air, expressed as a percentage of the maximum moisture it can hold at a given temperature.
a) Dew point b) Relative humidity
c) Saturation pressure d) Wet bulb temperature
- (x) Choose the component that is responsible for the removal of moisture in a refrigerant.
a) Evaporator b) Driers
c) Dehumidifier d) Safety relief valve
- (xi) Identify the wrong statement for a refrigerant property.
a) Low specific heat of liquid b) High latent heat of vaporization
c) High boiling point d) Higher critical temperature
- (xii) Select the function of oil separator in vapour compressor refrigerator.
a) Lubricate compressor b) Reduce the heat transfer efficiency
c) Prevent the oil being carried to condenser d) None of these
- (xiii) Select the correct type of refrigerant flow control device that uses a temperature-sensitive bulb and a diaphragm to control refrigerant flow.
a) Capillary tube b) Thermostatic expansion valve
c) Float valve d) Orifice plate
- (xiv) Identify the principle that uses a electronic expansion valve to control the flow of refrigerant in a system.
a) By sensing temperature changes in the refrigerant b) By adjusting the size of the orifice based on pressure readings
c) By manually adjusting a valve mechanism d) By using a float to regulate refrigerant flow
- (xv) Select a material that is commonly used to make capillary tubes.
a) Copper b) Aluminum
c) Stainless steel d) Plastic

Group-B

(Short Answer Type Questions)

3 x 5=15

2. Explain the concept of "Latent heat of vaporization" in refrigeration. (3)
3. Describe about any three suitable physical property of refrigerant. (3)
4. Draw a neat labelled sketch of a Practical Vapour Absorption refrigeration cycle. (3)
5. Discuss the advantages of vapour absorption refrigeration system over vapour compression refrigeration system. (3)
6. Explain the working of Hermetically sealed compressor. (3)

OR

Explain the function of a capillary tube in a refrigeration system. (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

7. Explain the following psychometric terms:- i) Dew point temperature ii) Relative humidity. (5)
8. A refrigerating machine having coefficient of performance equal to 2 is used to remove heat at the rate of 1200 kJ/min. Estimate the power required for this machine. (5)

9. The humidity ratio of atmospheric air at 28 degree C dbt and 760 mm of Hg is 0.016 kgv/kg- (5)
da. Determine the partial pressure of water vapour.
10. Moist air exists at a pressure of 1.01 bar. The partial pressure and saturation pressure of water (5)
vapour are 0.01 bar and 0.02 bar respectively. Determine the relative humidity and humidity
ratio of the moist air.
11. Explain the sensible heating and sensible cooling processes with the help of a psychrometric (5)
chart.
12. In an ideal vapour compression refrigeration cycle, the enthalpy of the refrigerant at exit from (5)
the condenser, compressor and evaporator is 80 kJ/kg, 200 kJ/kg and 180 kJ/kg respectively.
Estimate the coefficient of performance of the cycle.

OR

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

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