

M-505 REFRIGERATION AND AIRCONDITIONING
Model Blue Print of Question Paper

Sl. No	Chapter Name	Periods Allocated	Weightage Allocated	Question Wise Distribution of Weightage			Marks Wise Distribution of Weightage		
				R	U	Ap	R	U	Ap
1	Fundamentals of Refrigeration	10	21	1	1	1 ½	3	3	15
2	Vapour Compression & Vapour Absorption Refrigeration Systems	14	26	1	1	2	3	3	20
3	Refrigeration Equipment & Applications of Refrigeration.	12	21	1	1	1 ½	3	3	15
4	Air Conditioning & Psychrometry	12	21	1	1	1 ½	3	3	15
5	Air Conditioning Equipment & Applications of Air Conditioning.	12	21	1	1	1 ½	3	3	15
TOTAL		60	110	5	5	08	15	15	80

R-Remembering. U-Understanding. Ap-Appling

Unit Test – 1

Q.No	Question from the Chapter	Bloom's category	Marks allocated	CO addressed
Part - A (16 marks)				

1	Fundamentals of Refrigeration, Vapour compression & Vapour absorption Refrigeration Systems, Refrigeration equipment	R,U	4	CO1,CO2, CO3
2	Fundamentals of Refrigeration	U	3	CO1
3	Vapour compression & Vapour absorption Refrigeration Systems	U	3	CO2
4	Vapour Compression & Vapour absorption Refrigeration Systems	U	3	CO2
5	Refrigeration equipment & Applications of Refrigeration	U	3	CO3
Part - B (24 marks)				
6	Fundamentals of Refrigeration	Ap	8	CO1
7	Vapour compression & Vapour absorption Refrigeration Systems	Ap	8	CO2
8	Refrigeration equipment & Applications of Refrigeration	Ap	8	CO3

Unit Test – 2

Q.No	Question from the Chapter	Bloom's category	Marks allocated	CO addressed
Part - A (16 marks)				
1	Refrigeration equipment & Applications of Refrigeration. Air Conditioning and Psychrometry , Air Conditioning Equipment & Applications of Air Conditioning	R,U	4	CO3, CO4, CO5
2	Refrigeration equipment & Applications of Refrigeration.	U	3	CO3
3	Air Conditioning and Psychrometry	U	3	CO4
4	Air Conditioning Equipment & Applications of Air Conditioning	U	3	CO5
5	Air Conditioning Equipment & Applications of Air Conditioning	U	3	CO5
Part - B (24 marks)				
6	Refrigeration equipment & Applications of Refrigeration	Ap	8	CO3
7	Air Conditioning and Psychrometry	Ap	8	CO4
8	Air Conditioning Equipment & Applications of Air Conditioning	Ap	8	CO5

R-Remembering; U-Understanding; Ap-Appling; An- Analysing

MODEL PAPER
Unit Test - I
REFRIGERATION & AIR CONDITIONING (M-505)

Time : 90 Minutes

Total Marks: **40**

PART – A

Instructions: *1st Question having 4 one mark questions, and remaining 4 Questions carry 3 marks each*

1. (a) One ton of refrigeration is _____ kJ/s.
(b) If the condenser pressure increases the power consumption of compressor increases. (True/False)
(c) What are the three fluids used in the vapour absorption refrigeration system?
(d) Write the chemical name of R-22.
2. List the refrigeration methods.
3. Why the wet compression is not desirable in the vapour compression refrigeration system?
4. An absorption type of refrigeration system heating, cooling and refrigeration takes place at the temperature of 100 °C, 20 °C and -10°C. Find the theoretical COP of the system.
5. Write any three requirements of the refrigerants.

PART – B

Instructions: *Part B consists of 3 Units. Answer any one full question from each unit. Each question carries 8 marks and may have sub questions.*

6. A cold storage is supplied with 4000 kg of fish at 22°C. The fish has to be cooled to -10°C. Freezing point of the fish is -2°C. If the capacity of the plant is 10 tons, how long will it take to cool the fish? Specific heats of the fish above and below the freezing point are 3 kJ/kg K and 1.25 kJ/kg K respectively. Latent heat of freezing = 220 kJ/kg.

(OR)

Explain Closed air refrigeration system with a neat sketch

7. A simple vapour compression refrigeration plant produces 5 tons of refrigeration. The enthalpy values at inlet to compressor, at exit of compressor and at exit from the condenser are 183.19, 209.41 and 74.59 kJ/kg respectively. Estimate (i) The refrigeration flow rate (ii) The COP (iii) The power required to drive the compressor (iv) The rate of heat rejection to the condenser.

(OR)

Explain the actual vapour absorption refrigeration system with neat sketch.

8. Explain the working of hermitically sealed compressor with a neat sketch.

(OR)

Explain the working of air cooled condenser with a neat sketch.

MODEL PAPER

Unit Test - II

REFRIGERATION & AIR CONDITIONING (M-505)

Time : 90 Minutes

Total Marks: 40

PART – A

Instructions: *1st Question having 4 one mark questions, and remaining 4 Questions carry 3 marks each*

1. (a) Give two examples of desiccant material used in the drier.
(b) Effective temperature for human comfort in the summer is 19°C. (True/False)
(c) the ratio of actual mass of moisture in a given volume of air to the mass of moisture when the same volume is saturated at the same temperature is known as
(a) Relative humidity (b) Humidity ratio (c) Degree of saturation (d) none of the above
(d) Constant dew point temperature lines are _____ lines in the psychrometric chart.
2. List three applications of refrigeration.
3. Classify the air conditioning systems based on any three criteria.
4. The air supplied to a room of a building in winter is to be at 17°C and have a percentage of relative humidity of 60%. If the barometric pressure is 1.01326 bar, calculate the specific humidity.
5. Write any three advantages of unitary air conditioning systems.

PART – B

Instructions: *Part B consists of 3 Units. Answer any one full question from each unit. Each question carries 8 marks and may have sub questions.*

6. Explain the working of thermostatic expansion valve with a neat sketch.
(OR)
Explain the working of cold storage plant with a neat sketch.
7. Explain the Factors governing effective temperature conditions that affect body heat.
(OR)
Explain four psychrometric processes with the help of psychrometric chart.
8. Write the requirements of air distribution and list out the duct systems in the air conditioning.
(OR)
Explain the summer air conditioning system for a hot and dry conditions with a neat sketch.

MODEL PAPER
DME - FIFTH SEMESTER END EXAMINATION
REFRIGERATION & AIR CONDITIONING (M-505)

Time: 3 hours]

[Total Marks: 80

PART – A

3 x 10 = 30

Instructions: (1) Answer **all** questions.
(2) Each question carries **Three** marks.

1. Define Refrigeration. Mention three methods of refrigeration.
2. Draw the line diagram of open air refrigeration system and label the parts.
3. What are the advantages and disadvantages of vapour compression refrigeration system?
4. State any six desirable thermodynamic properties of refrigerants.
5. What is a hermetic Compressor? State its applications.
6. State the function of capillary tube. What are its advantages and limitations?
7. State the modern applications of air conditioning.
8. Define the following terms
 - (i) Dry bulb temperature
 - (ii) Specific Humidity
9. Why the filter used in air conditioning system? List different types of filters.
10. What is the cooling tower? State the need of a cooling tower.

PART – B

5 x 10 = 50

Instructions: (1) Answer any **Five** questions.
(2) Each question carries **Ten** marks.

11. A cold storage is supplied with 4000 kg of fish at 22°C. The fish has to be cooled to -10°C. Freezing point of the fish is -2°C. If the capacity of the plant is 10 tons, how long will it take to cool the fish? Specific heats of the fish above and below the freezing point are 3 kJ/kg K and 1.25 kJ/kg K respectively. Latent heat of freezing = 220 kJ/kg.
12. A simple vapour compression refrigeration plant produces 5 tons of refrigeration. The enthalpy values at inlet to compressor, at exit of compressor and at exit from the condenser are 183.19, 209.41 and 74.59 kJ/kg respectively. Estimate (i) The refrigeration flow rate (ii) The COP (iii) The power required to drive the compressor (iv) The rate of heat rejection to the condenser.
13. Explain the working of an Electrolux refrigerator with a neat sketch.

14. Explain the working of an ice plant with the help of a neat sketch.
15. (a) Explain Closed air refrigeration system with a neat sketch
(b)) Explain the working of flooded type evaporator with a sketch.
16. Explain various psychrometric processes with the help of Psychrometric chart.
17. Explain working of Window air conditioner with the help of a sketch.
18. (a) Explain the Factors governing effective temperature conditions that affect body heat.
(b) Explain different types of Dust Collectors used in air conditioning systems.