R20 Regulation *Subject code:3E6CC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech VI Semester Supplementary Examinations, May 2025

REFRIGERATION & AIR CONDITIONING

(ME)

Maximum Marks: 70 Date: 23.06.2025 Duration: 3 hours

Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X2M=20 Marks)		Marks	CO	BTL
1	Define the refrigeration.	2M	1	L1
2	List out the various processes in Vapor compression refrigeration cycle	2M	1	L1
3	What is the purpose of a compressor in Vapor compression refrigeration cycle?	2M	2	L1
4	Mention the various functions of an expansion device.	2M	2	L1
5	What is the function of an absorber in vapor absorption refrigeration system?	2M	3	L1
6	What are the main advantages of vapor absorption system over vapor compression refrigeration system?	2M	3	L1
7	Define dry bulb temperature and wet bulb temperature.	2M	4	L1
8	What is meant by Sensible cooling?	2M	4	L1
9	What are the methods of obtaining humidification and dehumidification?	2M	5	L1
10	What is meant by dehumidification?	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	a) With the help of neat sketches, differentiate between heat engine, refrigerator and heat pump. b) With the help of T-S and P-h diagrams explain the effect of sub-cooling in vapor compression refrigeration cycle.	5M 5M	1	L2
	OR			
12	1.5 KW per tonne of refrigeration is required to maintain the temperature of -40^0C in the refrigerator. If the refrigeration cycle works on Carnot cycle determine i) COP of the cycle ii) Temperature of the sink iii) Heat rejected to the sink per tonne of refrigeration iv) Heat supplied and EPR if the cycle is used as a heat pump.	10M	1	L2
13	With the help of neat sketches explain the working principle of a Bell-Coleman air refrigeration cycle.	10M	2	L2

	OR			
14	a) What are the factors that affect the heat transfer capacity of an evaporator? b) With the help of a neat sketch describe the working of a thermostatic expansion valve.	5M 5M	2	L2
15	a) Write down the various advantages of Vapour absorption refrigeration system over Vapour compression refrigeration system? b) With the help of a neat sketch explain the working of Ammonia-Hydrogen refrigerator.	5M 5M	3	L2
	OR			
16	Draw a neat diagram of lithium bromide water absorption system and explain its working.	10M	3	L2
17	a) Define the following Psychrometric terms: i) Dry air ii) Moist air iii) Saturated air iv) Degree of saturation and v) Humidity b) Explain room sensible heat factor.	5M 5M	4	L2
	OR			
18	a) Explain the following with respect to Psychrometric chart: i) Dry bulb temperature lines ii) Specific humidity or moisture content lines iii) Dew point temperature lines and Wet bulb temperature lines b) Explain the humidification and dehumidification.	5M 5M	4	L2
19	a) Explain the following: i)Comfort air-conditioning system ii) Industrial air-conditioning system b) Explain the various various types of axial flow fans.	5M 5M	5	L2
	OR			
20	a) What is a function of fan in air conditioning system? b) Define specific speed for a centrifugal fan. Derive its expression.	5M 5M	5	L2