



R18 Regulation

Subject code: 2P7CA

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VII Semester Supplementary Examinations, November 2025

REFRIGERATION & AIR CONDITIONING

(ME)

Maximum Marks: 70

Date: 24.11.2025

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 process.	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 dewpoint temperature in psychometric chart.	2M	4	L1
8	What is meant by Sensible heating?	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°C 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	a) With the help of P-V and T-S diagrams derive an expression for the work done by a reciprocating compressor during polytropic compression.	5M	2	L2

	b) Differentiate between the air cooled and water-cooled condensers.	5M		
	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) What are the various factors affecting the comfort air conditioning.	5M 5M	4	L2
	OR			
18	a) What are the different factors considered in load estimation sheet for comfort application. b) What is a fog? Show on psychometric chart when two air stream yield fogged state of air.	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