R18 Regulation *Subject code:* 2P7CA

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VII Semester Regular/Supplementary Examinations, November 2022

REFRIGERATION AND AIR CONDITIONING

(Mechanical Engineering)

Maximum Marks: 70 Date:01.12.2022 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 which carries 10M.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Allow steam tables and RAC tables for the examination

Part-A

All the following questions carry equal marks (10x2M=20 Marks)

1 Define Unit of refrigeration?
2 Define the phenomenon of sub cooling in vapour compression refrigeration system.
3 Classify compressors.
4 List the types of expansion devices.
5 Sketch P-V and T-S graph of air refrigeration system and mention the processes.
6 What is the function of absorber and generator in vapour absorption system.
7 Define sensible and latent heat.
8 What is apparatus dew point (ADP).
9 Give the function of ducting system in air conditioning.
10 What are the applications of heat pumps.

Part-B

Answer All the following questions. (10MX 5=50Marks)

11 Explain the working of vapour compression refrigeration system with the help of P-H and T-S diagram. Also derive COP of the system. 10M

OR

12 The temperature limits of an ammonia refrigerating system are 25°C and -10 °C, if the gas is dry at the end of compression, calculate the COP of the cycle assuming no under cooling of the liquid ammonia. Use the following table for properties of ammonia. 10M

Temp °C	Liquid Heat kJ/kg	Latent Heat kJ/kg	Liquid Entropy kJ/kg K
25	298.9	1166.94	1.1242
-10	135.37	1297.68	0.5443

13 What is the function of condenser in refrigeration system. List types of condensers and explain any one in detail. 10M

OR

14 What is the function of evaporator in refrigeration system. Compare flooded and dry expansion types of evaporators. 10M

15 Explain the working of three fluid vapour absorption system with a neat sketch and state its limitations. 10M

OR

16 Explain the working of steam jet refrigeration system with a neat sketch and mention its applications. 10M

17 Define i) Relative humidity ii) Dew point temperature iii) Wet bulb temperature iv) Humidity ratio. 10M

OR

18 An air-water vapour mixture enters an adiabatic saturator at 28°C and leaves at 18°C, which is the adiabatic saturation temperature. The pressure remains constant at 1.0 bar. Determine the relative humidity and humidity ratio of the inlet mixture. 10M

19 What are the equipment used in air conditioning systems for humidification and dehumidification and explain their working. 10M

OR

20 What is the purpose of filters used in air conditioning system. Explain the working of Pad filters, HEPA Filters and ULPA filters. 10M