TED(21) – 5022 **REVISION 2021**

MODEL QUESTION PAPER

Refrigeration & Air conditioning

Time :3Hours *Max. Marks :75*

PART A

I Choose the correct answer

1	The relative coefficient of performance is (a) actual COP/theoretical COP (b) theoretical COP/actual COP (c) actual COP x theoretical COP (d) 1-actual COP x theoretical COP	M 1.01	R
2	The value of COP in vapour compression cycle is usually (a) always less than unity (b) always more than unity (c) equal to unity (d) any one of the above	M 2.01	R
3	A vapour absorption refrigerator uses ---------- as a refrigerant (a) water (b) ammonia (c) freon (d) aqua-ammonia	M 2.01	R
4	The lowest temperature during the cycle in a vapour compression system occurs after (a) compression (b) expansion (c) condensation (d) evaporation	M 2.02	R
5	A refrigerant compressor is used to (a) Raise the pressure of the refrigerant (b) Raise the temperature of the refrigerant (c) Circulate the refrigerant through the refrigerating system (d) All of the above	M 3.01	R
6	In a shell and coil condenser ,water flows in the -------and the refrigerant in the ----------	M 3.02	R
7	The refrigeration effect in a dry evaporator compared to flooded evaporator in a similar plant is (a) same (b) more (c) less	M 3.03	R

8	Air refrigeration cycle is used in (a) domestic refrigerators (b) commercial refrigerators (c) air conditioning (d) gas liquefaction	M 3.05	R
9	For unsaturated air ,the dew point temperature is --------wet bulb temperature (a) equal to (b) less than (c) more than	M 4.01	R

(9x1=9 marks)

PART B

IIAnswer any ***eight*** questions from the following .Each question carries 3 marks

1	Define COP of a refrigerator and explain the term "tonne of refrigeration"	M 1.01	U
2	Identify any six properties of ideal refrigerant –absorbent combination in Vapour Absorption system	M 2.01	U
3	Identify the three effects of decrease in suction pressure of Vapour Compression cycle	M 2.02	U
4	List the properties required for a good refrigerant	M 2.04	R
5	Explain the need of substitutes for CFC refrigerants	M 2.04	U
6	Identify any three advantages of hermetic sealed compressor	M 3.01	U
7	Explain the advantages of forced convection evaporators	M 3.03	U
8	Draw the simple diagram of Thermostatic Expansion Valve and identify the parts	M 3.04	U
9	List any six applications of low temperature	M 3.06	R
10	Explain sensible heating with psychrometric chart	M 4.01	U

(8x3=24 marks)

PART C

III Answer **ALL** questions. Each question carries 7 marks

1	Derive the expression for the C O P of ReversedCamot Air Reftigeration Cycle	M 1.02	U
	OR		
2	200 kg of ice at – 10^{o}C is placed in a bunker to cool some vegetables. 24 hours later the ice has melted into water at 50C. Compute the average rate of cooling in kJ/hr and TR provided by the ice? Assume Specific	M 1.04	A

	heat of ice, Cp.i = 1.94 kJ/kg^{o}C Specific heat of water, Cp,w = 4.1868 kJ/kg^{o}C Latent heat of fusion of ice at 0^{o}C, L = 335 kJ/kg.		
3	Explain the advantages of Vapour Absorption Refrigeration system over Vapour Compression Refrigeration system	M 2.01	U
	OR		
4	Explain theoretical VC cycle with dry saturated vapour after compression	M 2.02	U
5	Explain flooded evaporator with diagram	M 3.03	U
	OR		
6	Explain capillary tube with diagram and identify the advantages	M 3.04	U
7	On a particular day, the atmospheric air was found to have a dry bulb temperature of 30°C and a wet bulb temperature of 18°C. The barometric pressure was observed to b 756mm of Hg. Using the tables of psychrometric properties of air, determine the relative humidity, the specific humidity and the dew point temperature	M 4.02	A
	OR		
8	The readings from a sling psychrometer are as follows: dry bulb temperature = 30° C ; Barometer reading 740mm of Hg .Using steam tables, determine : I. Dew point temperature ; 2. Relative humidity ; 3. Specific humidity	M 4.02	A
9	In a cooling application, moist air enters a refrigeration coil at the rate of 100 kg of dry air per minute at 35° C and 50% RH. The apparatus dew point of coil is 5° C and by-pass factoris 0.15. Calculate the outlet state of moist air and cooling capacity of coil in TR	M 4.02	A
	OR		
10	Atmospheric air at a dry bulb temperature of 16° C and 25% relative humidity passes through a furnace and then through a humidifier, in such a way that the final dry bulb temperature is 30°C and 50% relative humidity. Calculate the heat and moisture added to the air. Also computethe sensible heat factor of the-process.	M 4 .02	A
11	Explain year round air conditioning system with schematic arrangement	M 4.05	U
	OR		
12	The amount of air supplied to an air conditioned hall is 300 m^{3}/min. The atmospheric conditions are 35^{o}C DBT and 55% RH. The required conditions are 20^{o}C DBT and 60% RH. Find out the sensible heat and latent heat removed from the air per minute. Also find sensible heat factor for the system	M 4.06	A

(6x7=42 marks)