Reg No.:_____ **00000AU309121903** Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fifth semester B.Tech degree examinations (S) September 2020

Course Code: AU 309

Course Name: Heating Ventilating and Air Conditioning

(Refrigeration table and psychrometric chart are permitted)

Max. Marks: 100 Duration: 3 Hours

PART A

Answer any 3 questions, each carries 10 marks.

1	a	List the common problems of warm air heating system.	(5)
	b	List the needs of ventilation.	(5)
2	a	With a sketch explain two pipe water heating systems.	(5)
	b	Identify the basic difference between gravity heating system and forced heating system.	(5)
3	a	With a sketch explain the working of heat pump.	(5)
	b	Differentiate between “back to back ventilation” and “cross ventilation”.	(5)
4	a	What do you mean by air change in air conditioning?	(5)
	b	Describe the effect of humidity and microbial growth.	(5)

PART B

Answer any three questions, each carries 10 marks.

5	a)	5000 Kg of water at 20^0C is converted into ice at -30^0C in 12 hours. Determine the heat removal rate in kW and in Ton of Refrigeration (TR). Latent heat of fusion of ice is 335 kJ /kg.	(7)
	b)	List the advantages of mixed refrigerants	(3)
6	a)	Atmospheric air at 760 mm of mercury barometric pressure has 25^0C dry bulb temperature and 15^0C wet bulb temperature. Determine using Psychrometric chart 1. Relative humidity 2. Specific humidity 3. Dew point temperature 4 Enthalpy 5. Specific Volume	(7)
	b)	Illustrate the Psychrometric process “Sensible heating”.	(3)
7	a)	Explain required thermodynamic properties of refrigerants.	(7)
	b)	Describe the significant of GWP of refrigerants.	(3)

8	a)	100 m^3 of air per minute at 20^0C and 75% relative humidity is heated until it's temperature becomes 30^0C. Calculate i) Final RH ii) Heat added in kW. During the process moisture content is constant.	(7)
	b)	Define saturated air and relative humidity.	(3)

PART C

Answer any four questions, each carries 10 marks.

9	a)	Explain the vapour compression refrigeration system and represent the system in P-H and T-S plots.	(7)
	b)	Describe the need of flash chamber in vapour compression system.	(3)
10	a)	Explain a) Diaphragm pressure sensor b) Bimetallic temperature sensor	(7)
	b)	Explain with line diagram the closed loop control system.	(3)
11	a)	Explain the Winter air conditioning system with diagram.	(7)
	b)	Discuss the effects of sub cooling of refrigerant on the performance of vapour compression system.	(3)
12	a)	Describe heat produced in human body and its dissipation.	(5)
	b)	Explain the factors affecting human comfort and comfort chart.	(5)
13	a)	Compare vapour compression refrigeration system and vapour absorption refrigeration system.	(5)
	b)	Explain with line diagram the temperature control system in automobiles.	(5)
14	a)	Describe the factors to be considered in the design of comfort air conditioning.	(5)
	b)	Describe the temperature control system of an air conditioning system.	(5)