Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) - EXAMINATION – SUMMER 2018

Subject Code:2161908 Date:14/05/2018

Subject Name:Refrigeration and Air Conditioning

Time:10:30 AM to 01:00 PM Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. kindly permit psychrometric chart and refrigeration chart to students

			MARKS
Q.1	(a)	The sling psychrometer reads 40 °C DBT and 28 °C WBT. Assume atmospheric pressure to be 1.03 bar and partial pressure of vapour to be 0.03038 bar. calculate specific humidity and vapour density.	03
	(b)	draw neat sketch and Temperature –Entropy diagram of boot strape air cooling system.	04
	(c)	The amount of air supplied to an air conditioned hall is 300 m^3/min. the atmoshpheric conditions are 35 °C DBT and 55% RH. The required condition are 20 °C DBT and 60% relative humidity. Find out the sensible heat and latent heat removed from the air per miniut. Also find the sensible heat factor for the system.	07
Q.2	(a)	What is psychrometry? Define sensible heat factor.	03
	(b)	A class room of 60 seating capacity is air conditioned. The out door conditions are 32 °C DBT and 22 °C WBT and required comfort conditions are 22 °C DBT and 55% R.H. The total mass of air supplied is 33 kg/min. the comfort condition is achieved first by chemical dehumidification of air and then cooling by the cooling coil. Calculate: 1. Capacity of the dehumidifier 2. Capacity of the cooling coil in tone of refrigeration.	04
	(c)	A vapour compression system with ammonia as the refrigerant work between the pressure limit of 2 bar and 12 bar with three stage compression. The vapour leaving the water intercoolers at a pressure of 4 bar and 8 bar are at saturated state. If the load is 10 TR, find the power required to drive the three compressors and COP of the system. Assume saturated refrigerant at the end of evaporator.	07
		OR	
	(c)	What is sub cooling and superheating in refrigeration system? Draw p-h diagram for following. 1. Two stage compression with water intercooler, liquid subcooler and liquid flash inter cooler. 2. Draw p-h diagram of two stage compression with water intercooler, liquid subcooler and liquid flash chamber.	07
Q.3	(a)	What is the difference between refrigeration and heat pump? How is effectiveness of a refrigeration system measured ?	03
	(b)	Discuss brief history and need of refrigeration.	04
	(c)	Explain flywheel effect of building material and its use in design.	07

OR

Q.3	**(a)**	Give name of six methods of refrigeration.	**03**
	(b)	How actual vapor compression cycle is differ than theoretical cycle.	**04**
	(c)	State and explain various heat load to be consider for cooling load calculation of typical building.	**07**
Q.4	**(a)**	Explain two physical and two thermodynamic properties of refrigerant.	**03**
	(b)	Explain construction and working of thermostatic expansion valve with neat sketch.	**04**
	(c)	Draw a neat diagram of lithium bromide water absorption system and explain its working.	**07**

OR

Q.4	**(a)**	Discuss briefly secondary refrigerants.	**03**
	(b)	Explain hermitically sealed compressor.	**04**
	(c)	Explain with neat sketch practical vapor absorption system.	**07**
Q.5	**(a)**	When is dehumidification of air necessary? How it is achieved?	**03**
	(b)	Explain ice plant with sketch.	**04**
	(c)	Explain various method used for design of duct.	**07**

OR

Q.5	**(a)**	State the factors which determine the human comfort.	**03**
	(b)	What is relative humidity? Derive its equation in terms of degree of saturation.	**04**
	(c)	Define effective temperature. Discuss various factors governing it.	**07**

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