Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – WINTER 2012

Subject code: 711107N Date: 16-01-2013

Subject Name: Automobile Refrigeration and A/C

Time: 02.30 pm – 05.00 pm Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Briefly explain vapuor absorption cycle with figure	**07**
	(b)	Explain designation system for refrigerants. Also explain Azeotrope refrigerants in brief.	**07**
Q.2	**(a)**	Write short note on car air conditioning system.	**07**
	(b)	Give important properties of R-134a and R-152a with its chemical name and formula.	**07**
		OR	
	(b)	Explain vapour compression refrigeration cycle with wet vapour after compression using T-s and p-h diagram.	**07**
Q.3	**(a)**	Define the following psychrometric terms (i) Specific humidity (ii) Wet bulb temperature (iii) wet bulb depression (iv) adiabatic saturation temp.	**07**
	(b)	An air-water vapour mixture enters an adiabatic saturator at 28^{o}C and leaves at 18^{o}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.	**07**
		OR	
Q.3	**(a)**	Give classification of air conditioning systems and explain central system.	**07**
	(b)	In an air conditioning plant, an air handling unit supplies a total of 4000m3/min of dry air which comprises by mass 20% of fresh air at 39^{o}C DBT and 26^{o}C WBT and 80% recirculated air at 24^{o}C DBT and 50% RH. The air leaves the cooling coil at 12^{o}C saturated. Calculate the following, (i) Total cooling load ; and (ii) Room heat gain.	**07**
Q.4	**(a)**	Explain human comfort chart with fig.	**07**
	(b)	Explain eco-friendly refrigerants with its necessity.	**07**
		OR	
Q.4	**(a)**	Explain the refrigerant circuit and ventilation circuit in automobile air conditioning system	**07**
Q.4	**(b)**	Write short note on air conditioning controls.	**07**
Q.5	**(a)**	Enlist various methods of duct design and explain any one in detail.	**07**
	(b)	Explain charging of refrigerant through the suction valve.	**07**
		OR	
Q.5	**(a)**	Enlist various tools needed for air conditioning system service. Explain working of compound gauge manifold.	**07**
	(b)	Write short note on refrigerated trucks.	**07**

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