Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. IST Semester–Remedial Examination – July- 2011

Subject code: 711107N

Subject Name: Automobile Refrigeration & A/C

Date:12/07/2011 **Time: 10:30 am – 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. **Use of properties table is permitted.**

Q.1 **(a)** Differentiate between vapour compression and vapour absorption refrigeration system. **07**

(b) Give the important properties of following refrigerants with their chemical name and formulas. **07**
(i) R-22 (ii) R-152a

Q.2 **(a)** Define the following Psychrometric terms. **07**
Wet bulb temperature
Dew point temperature
Relative humidity
Degree of saturation
Wet bulb depression

(b) In a standard vapour compression refrigeration cycle operating between an evaporator temperature of -10^0 C and a condenser temperature of 40^0 C. The enthalpy of the refrigerant R-134a at the end of compression is 225 kJ/kg. Show the cycle on T-s diagram and calculate (i) C.O.P. (ii) Refrigerating capacity and (iii) Compressor work if the refrigerant mass flow rate is 1 kg/min. **07**

OR

(b) Define Thermodynamic Comfort. Also describe various factors affecting comfort. **07**

Q.3 **(a)** Explain summer air conditioning psychrometric process of dehumidification with cooling with neat sketch. **07**

(b) 120 m^3 of air per minute at 35^0 C DBT and 50% RH is cooled to 20^0 C by passing through a cooling coil. Determine the following: **07**
RH of outlet air and its WBT
Capacity of cooling coil in TR
Amount of water vapour removed per hour.

OR

Q.3 **(a)** Describe various cooling loads to be considered for sizing the air conditioning system for passenger car. **07**

(b) In a cooling application moist air enters a refrigeration coil at the rate of 100 kg/min at 35^0 C and 50 % RH. The apparatus dew point of coil is 5^0 C and by-pass factor is 0.15. Determine: (i) Outlet state of the air (ii) Cooling capacity of the coil in TR. **07**

Q.4	**(a)**	Draw the diagram illustrating the location of various components of a typical car air conditioning system.	**07**
	(b)	Give detailed classification of air conditioning systems.	**07**
		OR	
Q.4	**(a)**	Describe briefly various methods of refrigeration used in refrigerated trucks.	**07**
	(b)	Explain briefly the trouble shooting method of automobile air conditioning system.	**07**
Q.5	**(a)**	Explain with neat sketch the working of a Central Air Conditioning System.	**07**
	(b)	Explain with figure the refrigerant charging method for a refrigeration system.	**07**
		OR	
Q.5	**(a)**	Describe about sources of noise in an automobile air conditioning system.	**07**
	(b)	Explain construction and working of Thermostat control of an automobile air conditioning system.	**07**

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