

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E –Ist SEMESTER–EXAMINATION – JULY- 2012

Subject code: 711107N

Date: 11/07/2012

Subject Name: Automobile Refrigeration & A/C

Time: 2:30 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) Explain designation system for refrigerants. **07**
(b) Give the important properties of following refrigerants (i) R-134a (ii) R-152a **07**

- Q.2** (a) Explain winter air conditioning on psychrometric process chart. **07**
(b) In an auditorium which is to be maintained at a temperature not exceeding 24⁰ C and a relative humidity not more than 60%, a sensible heat load of 132 kW and 54 kg/h of moisture has to be removed. Air is supplied to the auditorium at 15⁰ C. (a) How many kg of air per hour must be supplied? (b) What is the dew point temp. of supply air and what is its relative humidity? **07**

OR

- (b) Write short note on alternative refrigerants. **07**

- Q.3** (a) Draw and explain human comfort chart. **07**
(b) Atmospheric air at a dry bulb temperature of 16⁰ 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 30⁰ C and 50% relative humidity. Find the heat and moisture added to the air. Also determine the sensible heat factor of the process. **07**

OR

- Q.3** (a) Give various sources of heat load that contribute to the vehicle cooling load. **07**
(b) A rectangular duct 0.15m X 0.12m is 20m long and carries standard air at the rate of 0.3 m³/s. Calculate the total pressure required at the inlet to the duct in order to maintain this flow and the air power. Assume that for the duct, the friction factor $f = 0.005$. **07**

- Q.4** (a) Explain various methods of duct design in nutshell. **07**
(b) Explain construction and working of any unitary air conditioning system. **07**

OR

- Q.4** (a) Draw layout of automatic car air conditioning system and give functions of each component. **07**
(b) Explain step by step refrigerant gas leak detecting method using halide torch. **07**

- Q.5** (a) Explain with figure the refrigerant charging method for a refrigeration system. **07**
(b) Explain servicing of air conditioning compressor. **07**

OR

- Q.5** (a) Write short note on refrigerated trucks. **07**
(b) Explain briefly the trouble shooting method of automobile air conditioning system. **07**
