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GUJARAT TECHNOLOGICAL UNIVERSITY M. E. - SEMESTER – I • EXAMINATION – WINTER • 2013

Subject code: 711107N Date: 06-01-2014 Subject Name: Automobile Refrigeration & A/C 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. (a) State & explain the factors affecting the performance of a simple vapour 07 Q.1 compression system. (b) Define and explain the following with fig. (1) Adiabatic dew point temp. (2) 07 Relative humidity (3) Wet bulb temp **Q.2** (a) Explain air conditioning system for isolated vehicle with figure. 07 (b) Explain automobile air distribution system for air conditioning with fig. 07 OR (b) In a simple vapour compression cycle following are the properties of the 07 refrigerant R-12 at various points: Compressor inlet : $h_2 = 183.2 \text{ kJ/kg}$; $v_2 = 0.0767 \text{ m}^3/\text{kg}$ Compressor discharge : $h_3 = 222.6 \text{ kJ/kg}$; $v_3 = 0.00164 \text{ m}^3/\text{kg}$ Condenser exit : $h_{f4} = 84.9 \text{ kJ/kg}$; $v4 = 0.00083 \text{ m}^3/\text{kg}$ The piston displacement volume for compressor is 1.5 litres per stroke and its volumetric efficiency is 80%. The speed of the compressor is 1600 rpm Find (i) Power rating of the compressor (kW) (ii) Refrigerating effect (a) Give important properties of any two automobile A/C refrigerants used now a 0.3 07 days. 40 m³ of air at 35° C DBT and 50% RH is cooled to 25° C DBT maintaining its **07** specific humidity constant. Detrimine (i) Relative humidity of cooled air and (ii) Heat removed from air. (a) What is the need of 'eco-friendly refigerants'. State and explain various eco-0.3 07 friendly refrigerants. (b) Enlist different types of cooling loads. Explain how to calculate cooling load **07** for designing A/C system. **Q.4** (a) Explain designation system for refrigerants. 07 Explain the effect of air conditioning load on engine performance **(b) 07** OR **Q.4** (a) Explain comfort chart with figure. 07 State and explain factors affecting the selection of air conditioning system **(b) 07 Q.5** (a) Explain various safety devices for refrigeration system. **07** (b) Derive equation of equivalent diameter of a circular duct for a rectangular duct **07** for same quantity of air. OR Q.5 (a) Explain trouble shooting of air conditioning system 07 Explain the method of charging refrigerant in refrigeration system. 07 **(b)**
