

**FACULTY OF ENGINEERING**  
**B.E. 3/4 (AE) II – Semester (Main) Examination, June 2014**

**Subject: Automotive Air-Conditioning**

Time: 3 Hours

Max.Marks: 75

**Note: Answer all questions from Part A. Answer any five questions from Part B.**

**PART – A (25 Marks)**

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|----|---|---|
| 1  | Define relative humidity and specific humidity.                               | 2 |
| 2  | What is a psychrometer? List out different types of psychrometers.            | 3 |
| 3  | What factors affects the air-conditioning load?                               | 2 |
| 4  | What are the sources of internal heat gain?                                   | 3 |
| 5  | List the basic components of vapour compression refrigeration system.         | 2 |
| 6  | Explain the operation of a capillary tube in a refrigeration system.          | 3 |
| 7  | Write short notes on R-12 and R-22 as a refrigerant.                          | 2 |
| 8  | What are the factors to be considered for selection of ideal refrigerants?    | 3 |
| 9  | Why ducts are used in an air-conditioning system.                             | 2 |
| 10 | List out the four possible causes for compressors hums and trips on overload. | 3 |

**PART – B (50 Marks)**

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|----|--|----|
| 11 | The humidity ratio of atmospheric air at 28°C DBT and 760 mm of mercury is 0.016 kg/kg of dry air. Determine (1) Partial pressure of water vapour (2) relative humidity; (3) dew point temperature; (4) specific humidity and (5) vapour density.  | 10 |
| 12 | A hall is to be maintained at 24°C DBT and 60% RH under the following conditions.<br>Outdoor condition = 38°C DBT and 28°C WBT<br>Sensible heat load in room = 46.6 kW<br>Latent heat load in room = 11.6 kW<br>Total infiltrated air = 1200 m <sup>3</sup> /hr<br>Determine (a) Mass flow rate of infiltrated air<br>(b) Room sensible heat factor. | 10 |
| 13 | Explain the working of thermostatic expansion valve with help of neat diagram.   | 10 |
| 14 | Describe the classification of refrigerant stating two examples in each group.   | 10 |
| 15 | What are the various types of temperature control systems in automobile air-conditioning.  | 10 |
| 16 | Discuss briefly the different types of heat loads which have to be taken into account in air conditioning system.  | 10 |
| 17 | Explain the following with help of psychrometric chart.<br>a) Gross sensible heat factor (GSHF)<br>b) Room sensible heat factor (RSHF).  | 10 |

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