

GUJARAT TECHNOLOGICAL UNIVERSITY**M.E. SEM-I Examination January 2010****Subject code: 711107****Subject Name: Automobile Refrigeration & Air-conditioning****Date: 27 / 01 / 2010****Time: 12.00 – 2.30 pm****Total Marks: 60****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Use of properties Chart and tables permissible
5. Draw neat sketches, wherever necessary.

- Q.1** (a) How the air-conditioning of automobile vehicles differ from room air-conditioning? **06**
 (b) Explain the air-conditioning system of a small car. **06**
- Q.2** (a) Explain the numbering system of refrigerants. **06**
 (b) Explain the thermodynamic and physical properties of refrigerants. **06**
- OR**
- (b) Explain ODP of refrigerants. Which are new refrigerants? Which conventional refrigerants they will replace? **06**
- Q.3** (a) The room sensible heat load and latent heat load for an air-conditioned space are 25 kW and 5 kW respectively. The room condition is 26⁰ C dry-bulb temp. & 50 % RH. The outdoor condition is 43⁰ C dry-bulb temp. & 55 % RH. The ventilation requirement is such that on mass flow rate basis 20% of fresh air is introduced and 80% of supply air is recirculated. The bypass factor is 0.12. Determine:
 1. Dehumidified air quantity.
 2. Outside sensible heat load.
 3. GTH
 Attach the psychrometric chart showing the air-conditioning processes. **06**
 (b) Explain comfort zone. **06**
- OR**
- Q.3** (a) Define and Explain the following terms in air-conditioning.
 I. ESHF II. By pass factor III Adiabatic Saturation **06**
 (b) A fan delivers 9000 lit/min of air at standard pressure of 700 Pa and consumes 1300 watts at 450 rpm. Determine speed, input power and static pressure, if the flow rate is increased to 13 000 lit/min. **06**
- Q.4** (a) Explain the construction and working of refrigerated /isolated vehicles. **06**
 (b) Explain the classification of compressors. **06**
- OR**
- Q.4** (a) Compare water cooled condensers with air cooled condensers and give their relative merits and demerits **06**
 (b) What are the controls used in air-conditioning systems? How do they control the system? **06**
- Q.5** (a) Write a short note on Compound gauge manifold. **06**
 (b) Explain the classification of air-conditioning systems. **06**
- OR**
- Q.5** (a) Write a short note on sling psychrometer. **06**
 (b) Explain the construction & working of a cooling tower. **06**
