

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

**GUJARAT TECHNOLOGICAL UNIVERSITY**

**M. E. - SEMESTER – II • EXAMINATION – SUMMER • 2014**

**Subject code: 1722103**

**Date: 20-06-2014**

**Subject Name: Advanced Air Conditioning**

**Time: 02:30 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.
4. Use Refrigerant and Psychrometry charts/tables where required.

- Q.1** (a) Explain terms RSHP, GSHP, ESHF and By pass factor **07**  
(b) Explain requirements of comfort air conditioning **07**

- Q.2** (a) Explain different governing equations for Heat loss from Human Body **07**  
(b) Using skeleton psychrometric chart, explain cooling and dehumidification process with ventilation air and cooling coil with bypass factor. On the same chart clearly show Room ADP and Coil ADP **07**

**OR**

- (b) A hall is to be air conditioned for Sensible Heat Load = 58.5 kW and Latent Heat Load = 15 kW. The outdoor conditions = 40 °C DBT and 27 °C WBT and indoor conditions = 25 °C DBT and 50% Relative Humidity. 70m<sup>3</sup>/min of fresh air is supplied to the hall. Find (a) The ventilation load (b) Total load to be taken by the plant (c) Effective SHF (d) Apparatus DPT (e) Dehumidified air quantity **07**

- Q.3** (a) Enlist different methods of Duct Design. Explain velocity reduction method for duct design. **07**  
(b) Explain factors affecting performance of cooling tower. **07**

**OR**

- Q.3** (a) Compare the characteristics of forward, backward and radial bladed fans. **07**  
(b) Explain the procedure for selection of an outlet using nomographs. **07**

- Q.4** (a) A circular duct of 36 cm in diameter is selected to carry air in air conditioned space at a velocity of 420 m/min. If this duct is to be replaced by a rectangular duct of aspect ratio = 1.4 find the size of rectangular duct for equal friction method, when (a) The velocity of air in both the ducts is same (b) The discharge rate of air in both the ducts is same. Given  $f = 0.015$ , find the pressure loss per 100 m length of the duct. Take density of air = 1.12 kg/m<sup>3</sup> **07**  
(b) Discuss factors affecting selection of an outlet. **07**

**OR**

- Q.4** (a) Enlist and discuss importance of different heat sources for cooling load calculations. **07**  
(b) Classify air conditioning systems. Explain Constant volume ó Variable temperature System with help of Air Reheat Control. **07**

- Q.5** (a) Explain with neat sketch Temperature and Humidity control device used in air conditioning system. **07**

- (b) Discuss sources of Noise and Methods of noise control in Air Conditioning System **07**

**OR**

- Q.5** (a) Explain clean room concept. What are its typical applications? **07**  
(b) Explain importance of filter in Air Conditioning system and explain different filters used in Air Conditioning System. **07**

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