



GUJARAT UNIVERSITY

B.E. Sem VIII (Mech.) (New) Examination
Airconditioning Engineering (E.P. II)

Thursday, 19th June, 2008]

[Time : 3 Hours
Max. Marks : 100

- Instructions :** (1) Attempt all questions.
 (2) Answer to the two sections must be written in **separate** answer books.
 (3) Figures to the right indicate **full** marks.
 (4) Assume suitable data if necessary.
 (5) Use of charts, tables, calculator is permitted.



SECTION I

- 1 (a) Define RSHP, GSHP and SHP of air and how to findout ADP of a cooling Coil ? 16
 (b) What do you mean by psychrometric processes ? Plot them on psychrometric chart and name them.
 (c) Air at 32°C DBT and 20°C WBT is passed through a cooling coil maintained at 5°C. The heat extracted by the cooling coil is 15 kW and air flow rate is 45 m³/min. Determine DBT and WBT of the air leaving the coil and coil by pass factor.
- OR**
- 1 (a) State and explain the factors which affect body comfort. 16
 (b) What is an effective temperature? Explain briefly "Effective temperature chart" and "Comfort chart".
 (c) Sketch comfort chart and show on it the "Comfort zones".
- 2 (a) Discuss briefly the following : 16
 Attic fans, Remote units (split units), self contained units, unit Aircooler, Induction unit, AHU, FCU etc.
 (b) Explain the difference between summer airconditioning and winter air conditioning.
 (c) Explain with neat diagram the working of central air conditioning system.
- OR**
- 2 (a) Which factors are to be considered while making heat load calculations ? 16
 (b) Write down the procedure for calculating heat gain through building structure.
 (c) What do you mean by the term "Infiltration" ? Explain briefly how air leakag through window and door cracks can be estimated.
- 3 Write short note any **three** : 18
 (a) Humidity measuring instruments
 (b) Adiabatic chemical dehumidification
 (c) Effective sensible heat factor.
 (d) Flywheel effect on building materials
 (e) Solair temperature.

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SECTION II

- 4 (a) Which type of fan is generally used in A/C system, Why? confirm it from fan characteristic curves ? 16
(b) What do you understand by a geometrically similar fan ?
(c) A fan delivers 600 m³/min of air against 400 pa. SP with an outlet velocity of 600 m/min and a static efficiency of 80% Calculate (i) Total head (ii) Air power (iii) Brake power and (v) Mechanical efficiency.

OR

- 4 (a) What is a clean Room ? How it is classified ? 16
(b) List the different components required for clean room ?
(c) What is HEPA filters ? Where it is used in practice ? Why ?
- 5 (a) Explain the term "Aspect ratio and Attic Air" . 16
(b) Describe equal-friction method of duct design. State its limitations ?
(c) What do you understand by the dynamic losses in duct design?
(d) Derive the following equation for the diameter of the equivalent round duct.

$$d_e = 1.3 \frac{(a \times b)^{0.625}}{(a + b)^{0.25}} \text{ with usual notations.}$$

OR

- 5 (a) What is an Air washer ? Describe the construction and working of an Air washer plant. 16
(b) What is desert cooler ? Where it is used ? What is the main difference between desert cooler and Air washer ?
(c) How water is cooled in a cooling tower ? Explain construction and working of an induced draft cooling tower used in air conditioning plant.
- 6 Write short note any three : 18
(a) Velocity reduction method for duct design
(b) Applications of clean Rooms.
(c) Pitot static tube for measurement of velocity
(d) Packaged Air conditioning plant.
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