

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. Sem. – IInd - Examination – June/July- 2011

Subject code: 1722103

Subject Name: Advance air conditioning

Date: 27/06/2011

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.

- Q.1:** a) Classify the air conditioning system and Explain central air conditioning system (7)
b) Explain RSHF, GSHF, ESHF, By pass factor (7)

- Q.2:** a) The following data is given for the space to be conditioned (10)
- | | |
|------------------------------------|----------------------------|
| Inside design condition | 25 deg C DBT 50 % RH |
| Outside design conditions | 43 deg C DBT, 27 deg C WBT |
| Room sensible heat gain | 40 KW |
| Room latent heat gain | 10 KW |
| By pass factor of the cooling coil | 0.2 |
- The return air is mixed with outside air before entering to the cooling coil in the ratio of 4:1
Determine
- (i) ADP of cooling coil
 - (ii) Entry and exit conditions of air for cooling coil
 - (iii) Dehumidified air quantity
 - (iv) Refrigeration load on cooling coil

- b) Explain flywheel effect for cooling load calculation (4)

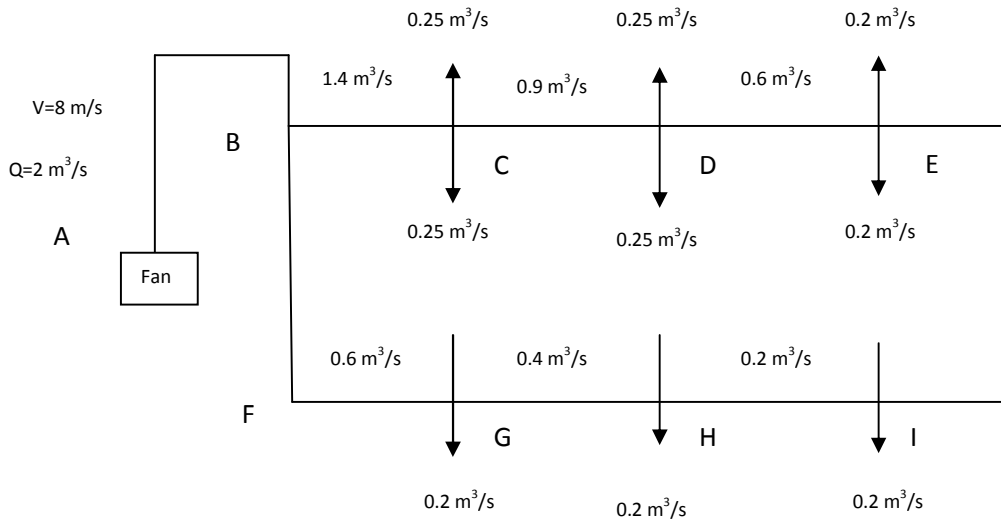
OR

- b) Explain factors affecting the performance of cooling tower (4)

- Q-3** a) Prove that the diameter of circular duct from rectangular duct is given by (4)

$$D_e = 1.265 [a^3 b^3 / (a+b)]^{1/5}$$

- b) Given figure shows the duct layout, find the sizes of various ducts using equal friction method. (10)



OR

- Q-3 a)** Explain equal friction method for duct design (7)
- b)** Explain equations for body heat transfer for different mode of heat transfers. (7)
- Q-4 a)** Discuss factors for selection of an air outlet. (7)
- b)** Discuss the procedure for selection of an outlet using nomograph. (7)

OR

- Q-4 a)** Compare the performance of FC,BC,RC fans using characteristic curves (6)
- b)** A centrifugal fan 910 mm in diameter operates at 8 RPS handling air at a temperature of 20 deg C, with a corresponding pressure of 500 N/m², and the shaft power is 2.5 KW. (8)
If the fan is used for heating purpose, and handles the air at a temperature of 50 deg C, Calculate the total pressure developed and power under this new conditions, Further, if it is desired to keep the pressure constant, when air is handled at a temperature of 50 deg C, Calculate fan speed, the air volume handled and fan power given that volume handled at 20 deg C was 5 m³/S, density of air at 16 deg C is 1.22 kg/m³
- Q-5 a)** Explain different methods of noise reduction. (7)
- b)** Explain evaporative condenser and compare it with cooling tower. (7)

OR

- Q-5 a)** What is clean room condition?, what are its typical applications.? (7)
- b)** Explain various loads to be considered for cooling load calculation., and procedure for cooling load calculation of a building. (7)
