Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E –IIst SEMESTER–EXAMINATION – JULY- 2012

Subject code: 1722103 **Date: 10/07/2012**

Subject Name: Major Elective II - Advanced Air conditioning

Time: 10:30 am – 13:00 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) Describe 'By-Pass Factor' and explain its importance in designing of an air conditioning system. **07**

(b) Discuss factors which affecting the air conditioning system selection. **07**

Q.2 (a) An air conditioning system comprising of filter, cooling coil, fan and distribution system uses only fresh air for the purpose of maintaining comfort conditions in summer. The following data is available: RSH=11.63kW, RLH=2.33 kW. **07**

Outside design condition: 28^0 C DBT, 20^0 C WBT, inside design condition: 21^0 C DBT, 50% RH. Temperature of air entering the room = 11^0 C.

Calculate (1) RSHF (2) Coil ADP (3) Room ADP

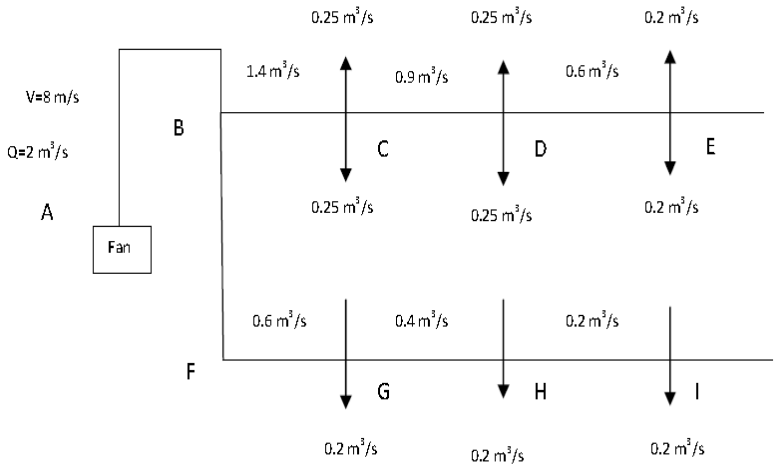
(b) Discuss factors affecting the performance of cooling tower **07**

OR

(b) Write short note "Central Air Conditioning System". **07**

Q.3 (a) Discuss factor for selection of air outlet. **07**

(b) Given figure shows the duct layout, find the sizes of various duct using equal friction method. **07**



OR

Q.3 (a) Explain equal friction method for duct design. **07**

(b) Compare the performance of FC, BC, RC fans using characteristic curves. **07**

Q.4 (a) Discuss the procedure for selection of an outlet using nomograph. **07**

(b) Explain general rule & procedure in duct design. **07**

OR

Q.4 (a) Prove that the diameter of circular duct from rectangular duct is given by **07**

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

Q.4 (b) A centrifugal fan has a circular inlet duct 450 mm diameter and a rectangular duct of 450 mm × 375 mm. The static pressure at the fan inlet is 125 Pa and the static pressure at the fan outlet is 250 mm when the fan delivers 110 m^3/min and absorbs 1 kW power. Assume standard air, calculate (1) total pressure at fan inlet and outlet, (2) fan total pressure and fan static pressure, and (3) fan total efficiency and fan static efficiency. **07**

Q.5 (a) Explain test methods to measure efficiencies for air filters. **07**

(b) Explain testing of desert cooler as per BIS. **07**

OR

Q.5 (a) What is clean room condition? What are its typical applications? **07**

(b) Explain different methods of noise reduction. **07**

****