Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER– II (Old course)• REMEDIAL EXAMINATION – SUMMER 2015

Subject Code: 1721003 **Date:14/05/2015**

Subject Name: Advanced Air Conditioning

Time: 02:30 pm to 5:00 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)** What is flywheel effect as applied to load calculation? How it is useful? **07**

(b) The following data is available for air conditioning of a room: **07**

Outside design condition: 38°C DBT, 27°C WBT
Inside design condition : 27°C DBT, 21°C WBT
Room sensible heat load = 46.5 KW
Room latent heat load = 23.3 KW
Coil ADP = 15°C
Recirculated air from the room = 70% of the total air required.
The recirculated air is mixed with the conditioned air after the cooling coil.
Calculate:

(i) Condition of air before mixing with recirculated air.
(ii) Condition of air entering the room
(iii) Coil bypass factor
(iv) RSHF
(v) Coil capacity

Q.2 **(a)** Explain comfort chart, comfort zone and its usefulness with the sketch of a skeleton chart. **07**

(b) Calculate infiltration and ventilation air load from the following data: **07**

Room size: 30 m × 15 m × 4 m height
Outside design condition: 42°C DBT, 27°C WBT
Inside design condition: 27°C DBT, 50% RH
Number of air changes/hr = 2
Door infiltration = 20 m^3/ min

OR

(b) What is TETD? Why and what are the corrections applied to TETD? Explain the term Sol-air temperature. **07**

Q.3 **(a)** (i) What is by-pass factor? Explain factors governing by-pass factor. What is its usual value in air-conditioning? **04**

(ii) Explain briefly Apparatus Dew point. **03**

	(b)	A large window is placed in east direction in an air conditioned restaurant at Ahmedabad. The total glass area is 5 m^2. Calculate the cooling load for June 21 at 2 pm through this window. Make suitable assumptions about inside/outside conditions, shading factor, overall heat transfer coefficient.	**07**
		OR	
Q.3	**(a)**	(i) State fan laws.	**03**
		(ii)Explain non-overloading characteristics of the backward curve fan.	**04**
	(b)	A fan delivers 120 m^3/ min of air under a static pressure of 245 Pa. The fan discharge area is 0.2 m^2. Find (i) Total pressure (ii) Static air power (iii) how much shaft power is required if the static fan efficiency is 60 % at this load. Take density of air = 1.2 kg/m^3.	**07**
Q.4	**(a)**	(i) Name important materials used for ducts.	**02**
		(ii) Explain various duct losses.	**05**
	(b)	Find the rectangular sizes of various ducts in the system shown in fig.(1).Use equal friction method. Assume your own data if required.	**07**
		OR	
Q.4	**(a)**	Explain different air-washer processes with neat sketches.	**07**
	(b)	Explain the significance of (i) Sensible heat factor (ii) Mixing of two air streams.	**07**
Q.5	**(a)**	What is FCU? How it is different from AHU? Compare.	**07**
	(b)	What is air-water system? Explain how it differs from DX system.	**07**
		OR	
Q.5	**(a)**	(i) Explain Grill, Diffuser and Register.	**04**
		(ii) Define following terms used in cooling tower. (a) Range (b) Approach (c) Effectiveness	**03**
	(b)	Explain ADPI. Explain design procedure for outlet selection with the help of ADPI.	**07**

****

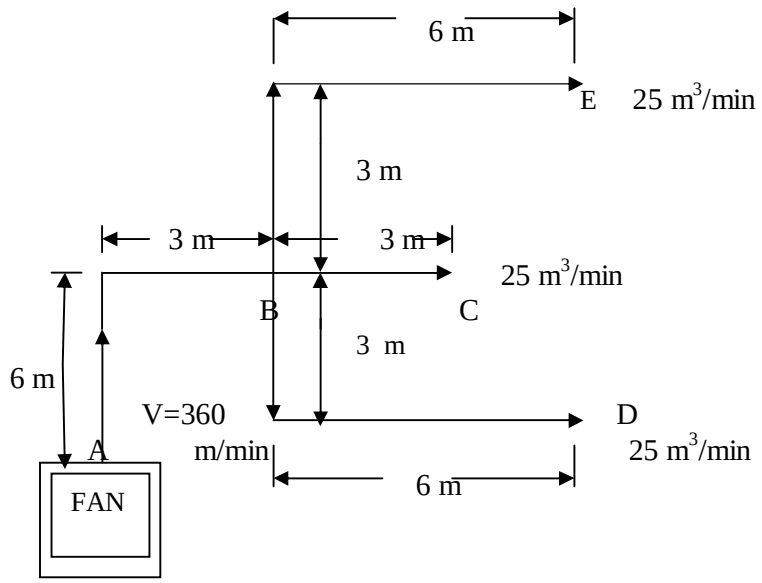
6 m
E
25 m3/min
3 m
3 m
3 m
25 m3/min
B
C
3 m
6 m
V=360
m/min
D
25 m3/min
A
6 m
FAN

Fig.(1) Q-4(b)