Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – II • EXAMINATION – SUMMER • 2013

Subject code: 1721003 **Date: 03-06-2013**

Subject Name: Advanced Air Conditioning

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.**
4. **Use of Calculator , Psychrometric chart –table is permissible**

Q.1 **(a)** List down only the various types of psychrometric Processes. **07**
Explain in detail about cooling and dehumidification Process with representation on schematic Psychrometric diagram for the same.

(b) Define and discuss in brief about the following **07**
1. Bypass factor
2. Apparatus dew point
3. Sensible heat factor

Q.2 **(a)** Draw a neat sketch of Air-washer. Explain in brief about its working principle and construction. **07**

(b) Air at a dry bulb temperature of 15 ºC and 30 % Relative humidity passes through a heating chamber and through a humidifier in such a manner that the final dry bulb temperature becomes 32 ºC and 50 % Relative humidity. Than Determine the following:- **07**
1. Heat and moisture content added to the air.
2. Sensible heat factor of the process.

OR

(b) Define Duct. **07**
Classify the various types of the ducts in detail.
What are the various economic factors influencing duct layout. Discuss in brief.

Q.3 **(a)** List down only the various methods of duct design. **07**
Discuss in detail about step-by-step procedure for design a duct through Equal friction method with necessary sketch.

(b) What are the various factors affecting human comforts? Discuss in detail. **07**
Also discuss in brief about the effect of high and low temperature on human health in brief.

OR

Q.3 **(a)** Classify the various types of outlets in Air-Distribution systems. Discuss in detail about each. **07**

(b) Classify the various types of Air-conditioning systems. **07**
Also discuss in brief about the factors affecting the selection of the Air-conditioning systems.

Q.4 **(a)** Determine the dew point temperature of the cooling coil and capacity of the Air-conditioning Plant for the following data. **07**

No of occupants in office:- 30
Inside Design conditions: - 25 ºC and 50 % Relative humidity.
Outside Design conditions: - 36 ºC and 28 ºC Wet bulb temperature.
Solar heat gain:- 9100 watt
Sensible heat gain per occupants:- 85 watt
Latent heat gain per occupants:- 100 watt
Load due to lighting:- 2250 watt
Sensible heat load from other sources:- 11650 watt
Infiltration load:- 15 m^3/min
Assuming 40 % of fresh air and 60 % of recirculated air passing through the evaporator coil.
Bypass factor of the coil:- 0.16

(b) Define and discuss about the applications of the following in brief:- **07**

1. Noise Rating
2. RC Curve

OR

Q.4 **(a)** What do you mean by Air Handling unit? **07**

List down only the basic components of Air Handling Unit.
Classify the various types of Air Handling units.

(b) Define the following:- **07**

1. Circulating Fan
2. Fan total pressure
3. Fan static pressure
4. Fan Air power
5. Brake power
6. Free delivery or wide open
7. Impeller

Q.5 **(a)** Classify the various types of fans in detail. **07**

Explain brief about the difference between Fan, Blower and compressor.

(b) Short note on Fan testing methodology with neat sketch of Fan testing setup. **07**

OR

Q.5 **(a)** Short note on DX systems with necessary line diagram. **07**

(b) What do you mean by cooling tower? Classify in brief. **07**

Also discuss in brief about Testing of desert coolers as per B.I.S.

****