

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VIII EXAMINATION – SUMMER 2016****Subject Code:181901****Date:10/05/2016****Subject Name:Refrigeration And Air-conditioning****Time:10:30 AM to 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 steam and refrigeration table and charts are permitted.

- Q.1** (a) Describe a simple vapour compression cycle giving clearly its flow and T-s diagram **07**
- (b) Give the full name of the following refrigerants **07**  
R-12, R717, R-22, R-134a, R-600, R-150, R-123
- Q.2** (a) Sketch bootstrap air cycle refrigeration cycle and derive an expression for its COP **07**
- (b) Compare between water cooled and air cooled condensers. Explain evaporative condenser. **07**
- OR**
- (b) What are the advantages and disadvantages of steam jet refrigeration system over other type of system? Explain its working principle. **07**
- Q.3** (a) Write note on : **07**  
(a) Shell and tube condenser  
(b) Screw compressor
- (b) With a diagram explain Li-BR Vapor absorption refrigeration system and write its application. **07**
- OR**
- Q.3** (a) Explain the following terms:1.Dry bulb temperature 2.specific humidity 3.Relative humidity 4.Thermodynamic wet bulb temperature 5.Dew point temperature 6.Degree of saturation 7.Adiabatic saturation Temperature **07**
- (b) The pressure and temperature of mixture of dry air and water vapor are 736mm of Hg and 21 C.The dew point temperature of the mixture is 15 C. Determine the following using steam table:1)partial pressure of water vapor in the mixture2)Relative humidity3)Specific humidity4)Enthalpy of mixture per Kg of dry air(5) specific volume of mixture per kg of dry air. **07**

- Q.4 (a)** Explain infiltration of air. What point should be considered while making heat load calculation? **07**
- (b)** An office for seating 30 occupants is to be maintained at 22 C DBT and 55% RH. The outdoor conditions are 36 C DBT and 27 C WBT. The various loads in the office are **07**
- 1) solar heat gain: 8500W
  - 2) sensible heat gain per occupants: 83 W
  - 3) Latent heat gain per occupant: 100W
  - 4) Lighting load : 2500W
  - 5) Sensible heat load from other sources: 12000W
  - 6) Infiltration load: 15m<sup>3</sup>/min
- Assuming 40% fresh air and 60% of re circulated air passing through the evaporator coil and the bypass factor of 0.12 Determine: 1) Dew point temperature of the coil (2) Capacity of the plant

**OR**

- Q.4 (a)** Write a brief note on Human comfort and briefly explain factors governing effective temperature **07**
- (b)** What is central air conditioning system? Write advantages and limitations of central air conditioning system. **07**
- Q.5 (a)** Explain Equal friction method of duct designing. Under which situation it is recommended. Write its limitations. **07**
- (b)** Draw a neat sketch of Automatic Expansion valve and write its advantage and disadvantages. **07**

**OR**

- Q.5 (a)** Explain Ice making plant with a suitable diagram. **07**
- (b)** Write classifications of Fans. Explain selection of the Fan using fan characteristic curve **07**

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