GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–VIII (OLD) EXAMINATION – WINTER 2018

Subject Code: 181901   **Date: 26/11/2018**
Subject Name: Refrigeration And Air-Conditioning
Time: 02:30 PM TO 05:00 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)**	Explain steam jet refrigeration system with neat sketch.	**07**
	(b)	Explain Boot strap air refrigeration system with neat sketch.	**07**
Q.2	**(a)**	Explain the following terms.	**07**

       1) Refrigeration effect   2) Dew point temperature
       3) Comfort air conditioning   4) Cooling and Dehumidification
       5) Wet bulb temperature   6) Psychrometry
       7) Relative humidity.

	(b)	The pressure and temperature of mixture of dry air and water vapour are 740 mm of mercury and 20 ºC. The dew point temperature is 14 ºC. Calculate (1) Partial pressure of water vapour in the mixture, (2) Relative humidity (3) Specific humidity (4) Specific volume of mixture per kg of dry air and (5) Enthalpy of mixture per kg of dry air.	**07**

OR

	(b)	Explain working of Li-Br vapour absorption refrigeration system with neat sketch.	**07**
Q.3	**(a)**	State and explain various heat loads to be considered for cooling load calculations of a typical building.	**07**
	(b)	What are the different methods are used for a design of the duct and explain advantages of each other.	**07**

OR

Q.3	**(a)**	Explain with neat sketch various terms used in air distribution.	**07**
	(b)	A comfort air conditioning system is to be design for following information :	**07**

      Outside air condition   30 ºC DBT, 24ºC WBT
      Inside air condition   20 ºC DBT, 50% RH
      Air required in room   50 m³/min

The comfort condition are achieved first by dehumidification and then cooling the air. Determine: (i) mass of water condensed and (ii) capacity of cooling coil.

Q.4	**(a)**	State main application of refrigeration and explain Ice making plant with suitable diagram.	**07**
	(b)	Write short note on: 1) Shell and tube condenser and 2) Screw compressor.	**07**

OR

Q.4	**(a)**	Explain multistage refrigeration system with intercooling between stages.	**07**
	(b)	A refrigerator working on bell-Coleman cycle takes air in to compressor at 1 bar and -5 ºC. It is compress in compressor to a 5 bar and cooled to 25 ºC at the same pressure. It is further expanded in the expander to 1 bar discharged to take cooling	**07**

load. The isentropic efficiency of the compressor = 85% and the isentropic efficiency of expander = 90%. Find the following.

  1. Refrigerating capacity of system if air circulation is 40 kg/min.
  2. KW capacity of motor required to run the compressor.
  3. COP of system.

Q.5 **(a)** Explain construction and working of simple vapour compression refrigeration system with P-V, T-S and P-H diagram. **07**

  (b) Explain with neat sketch year round air conditioning system. **07**

OR

Q.5 **(a)** What are the desirable properties of ideal refrigerant? Explain how refrigerant are designed. **07**

  (b) Explain with neat sketch Electrolux refrigerator. **07**

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