GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–VIII (Old) EXAMINATION – WINTER 2019

Subject Code: 181901   **Date: 27/11/2019**

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.**
4. **Use of refrigerant table/chart and psychrometric chart is permissible.**

Q.1	**(a)**	Explain Boot strap air refrigeration system with neat sketch.	**07**
	(b)	Discuss the desirable properties of an ideal refrigerant.	**07**
Q.2	**(a)**	Explain working of Li-Br vapour absorption refrigeration system with neat sketch.	**07**
	(b)	A R-12 vapour compression system has saturated suction temperature of -5°C and saturated discharge temperature of 40°C, The refrigerant vapour is dry-saturated at the suction of compressor and becomes superheated after compression. For one ton of refrigeration capacity, Calculate (i) Refrigerating effect (ii) mass flow rate (iii) power and (iv) COP system.	**07**

OR

	(b)	Explain steam jet refrigeration system and mention its applications.	**07**
Q.3	**(a)**	Explain the effect of change of suction pressure and delivery pressure on performance of vapour compression refrigeration using P-H and T-S diagram.	**07**
	(b)	A Two stage ammonia refrigeration system operates between overall pressure limits of 15 bar and 2 bar respectively. The liquid is sub-cooled to 30°C. The temperature of de-superheated vapour leaving the water intercooler is also 30°C. The flash chamber separates the dry vapour at 5 bar pressure. The liquid refrigerant then expands to 2 bar, the evaporator pressure. The load on the evaporator is 50 kW. Calculate 1. Mass flow rate in different lines 2. Power required 3. COP	**07**

OR

Q.3	**(a)**	Define following terms: (i) Saturated air (ii) Specific humidity (iii) Relative humidity (iv) Absolute humidity (v) Dry bulb temperature (vi) Dew point temperature (vii) Wet bulb depression	**07**
	(b)	40 m^3 of air at 35°C DBT and 50% R.H. is cooled to 25°C DBT maintaining its specific humidity constant. Determine: (i) Relative humidity of cooled air; (ii) Heat removed from air.	**07**
Q.4	**(a)**	Explain construction, working, advantages and disadvantages of Thermostatic Expansion valve with neat sketch.	**07**
	(b)	Explain the procedure for calculating cooling load due to infiltration air.	**07**

OR

Q.4	**(a)**	Explain flywheel effect as applied to cooling load calculation with neat labeled diagram.	**07**
	(b)	Write brief note on Hermetically sealed compressor.	**07**

Q.5 **(a)** Explain Equal friction method of duct designing. Under which situation it is recommended. Write its limitations. **07**

(b) Classify air conditioning systems. Explain Central air conditioning system with a neat sketch. **07**

OR

Q.5 **(a)** With neat sketch explain working of an Ice Plant. **07**

(b) Explain in brief the following : **07**
(**1**) Filters
(**2**) Humidifiers used in air conditioning systems

****