

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VIII (old) - EXAMINATION – SUMMER 2017****Subject Code:181901****Date:04/05/2017****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.
1. Figures to the right indicate full marks.
2. Use of Refrigerants table and Psychrometric chart is permitted.

- Q.1** (a) Explain standard vapour compression refrigeration cycle with T-S and P-H diagram. **07**
- (b) Explain with neat sketch wet and dry compression. Enlist advantages and disadvantages of both. **07**
- Q.2** (a) Discuss the effect of suction pressure and sub-cooling on the performance of a vapour compression system. **07**
- (b) Explain Boot strap air refrigeration system with neat diagram. **07**

OR

- (b) An NH_3 refrigerator produces 30 tonnes of ice from and at 0°C . The temperature range in the compressor is from 26°C to -14°C . the vapour is dry saturated at the end of the compression. Actual C.O.P. is 60 % of the theoretical. Calculate the power required for the compressor. The latent heat of ice = 335 kJ/kg. Use following table. **07**

Temp., $^\circ\text{C}$	Enthalpy kJ/kg, Vapour	Enthalpy kJ/kg, Liquid	Entropy kJ/kg K, S_L	Entropy kJ/kg K, S_v
26	1483.72	322.73	1.4257	5.3066
-14	1445.47	135.82	0.7599	4.8137

- Q.3** (a) Explain construction, working, advantages and disadvantages of Thermostatic Expansion valve with neat sketch. **07**
- (b) State the principle of Steam jet refrigeration system. Explain the working of Steam jet refrigeration system. **07**

OR

- Q.3** (a) Mention the limitations of Simple vapour compression refrigeration cycle. Briefly explain the working of Two stage compression with water intercooler and liquid sub-cooler employed for vapour compression system. **07**
- (b) Explain working of Li-Br vapour absorption refrigeration system with neat sketch. **07**
- Q.4** (a) Explain Adiabatic saturation process with neat sketch. **07**
- (b) 100 m^3/min of air at 27°C DBT and 20°C WBT flows through a cooling coil and **07**

leaves the coil at 12° C DBT and 8 gms/kg of moisture content. Determine:

(i) Apparatus dew point (ii) Contact factor (iii) Cooling load.

OR

Q.4 (a) Explain flywheel effect as applied to cooling load calculation with neat labeled diagram. **07**

(b) Explain velocity reduction method for duct design. **07**

Q.5 (a) Classify air conditioning systems. Explain Air-Water air conditioning system with a neat sketch. **07**

(b) Discuss the factors affecting human comfort. **07**

OR

Q.5 (a) Write short note on : (a) Humidifiers used in air conditioning systems (b) Sources of Heat load **07**

(b) Discuss the desirable properties of an ideal refrigerant. **07**
