

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VIII (OLD) EXAMINATION – SUMMER 2019****Subject Code: 181901****Date: 15/05/2019****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.

- Q.1 (a) Discuss the effect of following on the performance of a vapour compression system 07
- i. Effect of suction pressure
 - ii. Effect of delivery pressure
 - iii. Effect of superheating
 - iv. Effect of sub-cooling of liquid.
- (b) An air refrigeration system operating on Bell-Coleman cycle, takes in air from a room at -6°C and compresses it from 1.04 bar to 6.2 bar. The index of compression being 1.26. The compressed air is cooled to 25°C . The ambient temperature is 18°C . Air expands in an expander where index of compression is 1.36. Determine 07
- i. C.O.P of the system
 - ii. Quantity of air circulated per minute for production of 1500 kg of ice per day at 0°C from water at 15°C .
 - iii. Capacity of the plant.
- Q.2 (a) Enumerate desirable properties of an ideal refrigerant. 07
- (b) Explain Lithium-Bromide vapour absorption system with neat sketch. 07
- OR**
- (b) Explain Boot strap air refrigeration system with neat sketch. 07
- Q.3 (a) State the principle of steam jet refrigeration system. Write at least three advantages and three disadvantages of steam jet refrigeration over other systems 07
- (b) Give detailed classification of compressors used in refrigeration and explain any one rotary compressor. 07
- OR**
- Q.3 (a) Enlist various types of expansion valves used in refrigeration and explain any one with neat sketch. 07
- (b) Explain compound compression with multiple expansion valves and flash intercooling system. 07
- Q.4 (a) Define following term related to psychrometry 07
- i. Saturated air
 - ii. Dry bulb temperature
 - iii. Relative humidity
 - iv. Specific humidity
 - v. Dew point temperature
 - vi. Sensible heat factor
 - vii. By-pass factor.
- (b) Enumerate and explain the components of cooling load estimate. 07
- OR**
- Q.4 (a) Discuss the factors affecting human comfort. 07
- (b) Atmospheric air at 15°C DBT and 30% RH passes through a furnace and through a humidifier, in such a way that the final DBT is 32°C and 40% RH. Determine 07

- i. Heat and moisture added to the air.
 - ii. Sensible heat factor of the process.
- Q.5 (a) Enumerate various methods of air-conditioning duct design and explain in detail the “Equal friction method”. 07
- (b) With neat sketch explain working of an Ice Plant. 07
- OR**
- Q.5 (a) Explain following terms with respect to fan 07
 - i. Static fan pressure
 - ii. Dynamic fan pressure
 - iii. Specific speed
 - iv. Static fan efficiency
- (b) Classify air conditioning systems. Explain Central air conditioning system with a neat sketch 07
