

GUJARAT TECHNOLOGICAL UNIVERSITY
B.E. - SEMESTER – VIII EXAMINATION – OCTOBER 2012

Subject code: 181901**Date: 27/10/2012****Subject Name: Refrigeration and Air-conditioning****Time: 02.30pm - 05.00pm****Total Marks: 70****Instructions:**

1. Attempt any five questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Q.1 (a) Explain standard vapour compression refrigeration cycle with T-S and P-H diagram. **07**

What is the effect of sub-cooling on the performance of vapour compression refrigeration system?

(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 of the system. **07**

Q.2 (a) Explain Boot-strap air refrigeration system with neat diagram. **07**

(b) Explain Steam jet refrigeration system with neat system diagram and T-S or P-H diagram. **07**

OR

(b) Explain working of Li-Br vapour absorption refrigeration system with neat sketch. **07**

Q.3 (a) Explain compound compression with flash chamber but without intercooler with system diagram and P-H diagram. **07**

(b) Explain multiple evaporator at different temperature with individual expansion valve with neat sketch and P-H diagram. **07**

OR

Q.3 (a) Explain construction, working, advantages and disadvantages of Thermostatic Expansion valve with neat sketch. **07**

(b) (i) Explain Flooded type evaporator with neat sketch. **05**
(ii) State different types of compressors used in refrigerators. **02**

Q.4 (a) Explain Adiabatic saturation process with neat sketch. **07**

(b) Following data is available for an air conditioning system comprising of filter, cooling coil, fan and distribution system using only fresh air for the purpose of maintaining comfort conditions in summer. RSH = 11.63 KW, RLH = 2.33 KW. Outside design condition: 28°C DBT, 20°C WBT. Inside design condition: 21°C DBT, 50% RH. Temperature of air entering the room = 11°C . Calculate (i) RSHF (ii) Coil bypass factor (iii) rate of flow of air kg/hr. (iv) Load on cooling coil (v) Coil ADP **07**

OR

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

- labeled diagram.
- Q.4 (b)** Explain the procedure for calculating cooling load due to infiltration air. **07**
- Q.5 (a)** Explain Velocity reduction method of duct design. State its advantages and disadvantages. **07**
- (b)** Define Effective Temperature. Explain various factors governing effective temperature. **07**
- OR**
- Q.5 (a)** Explain with neat sketch various terms used in air distribution. **07**
- (b)** Attempt any TWO **07**
- (i) State desirable properties of ideal refrigerant.
- (ii) Explain All water air conditioning system with neat diagram.
- (iii) Explain Fan laws. State its significance.
