2006-PUNJAB UNIVERSITY

B.TECH DEGREE EXAMINATION

REFRIGERATION AND AIR CONDITIONING

TIME-3HOUR
MARKS-100

PART A[10*2=20 MARKS]

1. Write any five applications of refrigeration.
2. Differentiate between Heat engine and Heat pump.

3. Compare open cycle and closed cycle refrigeration systems.
4. What is the effect of subcooling and superheating on refrigeration work in VCR systems?

5. Draw a sketch of Electolux refrigeration system.
6. Write applications of steam jet refrigeration and mention its limitations.

7. Define RSHF and Bypass factor.
8. Differentiate between Ventilation load and Infiltration load.

9. Differentiate between split A/C system and window A/C system.
10. Write the advantages of cooling towers used in refrigeration industry..

PART B[10*8=80 MARKS]

2A Bell-Coleman cycle works between 1 bar and 6 bar pressure limits. The compression and expansion indices are 1.25 and 1.3 respectively. Obtain COP and tonnage of the unit for an air flow rate of 0.5 kg/sec. Neglect clearance volume and take temperatures at the beginning of compression and expansion to be 7 oC and 37 oC respectively.

3 A 5 ton Freon-12 refrigeration plant has saturated suction temperature of -5 oC. The condensation takes place at 30 oC and there is no undercooling of refrigerant liquid. Assuming isentropic compression find (i) COP (ii) Mass flow rate of refrigerant (iii) power required to drive the compressor in kW. Take the following properties of Freon-12 and Cpv= 0.615 kJ/kgK.

P (bar)	T (oC)	hf (kJ/kgK)	hg (kJ/kgK)	sg (kJ/kg)
8	30	130	265	1.55
3	-5	--	250	1.57

4 Draw a neat sketch of Linde and Claude cycles and compare both cycles in their construction.

5 Explain with a neat sketch the working of thermostatic expansion valve.

6 What are the various leak detection systems used in refrigeration industry and explain any one.

7(a) Compare VAR system with VCR system.

(b) Explain with a neat sketch the working of NH3-H2O VAR system. Write its applications.

8 Write the Detailed procedure foe estimating the cooling load of a computer centre with 100 capacity.

9 (a) Explain the importance o comfort chart.

(b) Distinguish between water inter cooling and Flash inter cooling of a compound compression system.