Code No. 6179 / O

FACULTY OF ENGINEERING

B. E. 3/4 (Mech. / Prod.) II - Semester **(Old)** Examination, December 2009

Subject : **Refrigeration and Air Conditioning**

Time : 3 Hours} {Max. Marks: 75

Note: Answer **all** questions of Part - A and any **five** from Part-B.
Use of Psychrometric charts, Ammonia charts permitted

PART – A
(Marks : 25)

1	List out the applications of refrigeration ?	1
2	What is hermetically sealed compressor ?	1
3	Determine COP of a refrigeration system, which operates on reversed carnot cycle. Temperatures of the refrigerant in the system is 35^0C(higher) and -15^0C(lower). Neglect the losses.	2
4	Define tonne of refrigeration ?	2
5	List few applications of low temperature refrigeration ?	2
6	What are advantages of Vortex tube over other refrigeration systems?	2
7	List out merits and demerits of air refrigeration system ?	3
8	Write advantages of cascade systems ?	3
9	List out the properties of Ideal refrigerant ?	3
10	Explain briefly about the following:	
	i) Solenoid valve	2
	ii) Air distribution	2
	iii) System heat gains.	2

PART – B
(Marks : 5 X 10 = 50)

11	A dense air refrigeration cycle operates between 5 bar and 20 bar. The air temperature after heat rejection to surroundings is 37^0C and air temperature at exit of refrigerator is 7^0C. The isentropic efficiencies of compressor and turbine are 0.84 and 0.82 respectively. Determine a) Compressor and turbine work per ton of refrigeration b) Coefficient of performance c) Power per ton of refrigeration	10

12a. List out the advantages and dis/advantages of vapour refrigeration over air refrigeration system. 4

b. Derive the expression for COP of Bell coleman cycle in terms of pressure ratio. 6

13. Explain the working of vapour compression refrigeration cycle with a neat sketch. 10

14. Explain briefly about the following non-convectional refrigeration systems.
   a) Pulse tube refrigeration system. 5
   b) Thermo electric refrigeration system. 5

15. A classroom of 60 seating capacity is air-conditioned. The out door conditions are 32^0C DBT and 22^0C WBT and required comfort conditions are 22^0C DBT and 55% RH. The quantity of out door air supplied is $0.5m^3$/min/student. Comfort conditions are achieved first by dehumidifying the air and then cooling by cooling coil. 10
Find the following
   a) DBT of air leaving dehumidifier.
   b) Capacity of dehumidifier.
   c) Capacity of cooling coil in tons of refrigeration.
   d) Surface temperature of cooling coil if bypass factor is 0.3.

16a. List out the various methods of food preservation. 4

b. Draw the layout of an Ice plant and explain. 6

17a. How the leakage is detected in refrigeration system, explain. 4

b. Explain the following:
   i) Designation of refrigerants 3
   ii) Nomenclature of refrigerants. 3

—X—