

**Oct-B.E.-Insem.-14**  
**B.E. (Mechanical) (Semester - I)**  
**REFRIGERATION AND AIR CONDITIONING**  
**(2012 Pattern)**

*Time : 1 Hour]*

*[Max. Marks : 30*

*Instructions to the candidates:*

- 1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right side indicate full marks.*
- 4) *Use of Refrigerant property tables, steam table, Mollier charts are allowed.*
- 5) *Assume suitable data, if necessary.*

**Unit - I**

- Q1)** a) With neat diagram explain evaporative cooling. **[5]**  
b) Draw the schematic of refrigeration system used in cold storage. Explain the design features of cold storage. **[5]**

OR

- Q2)** a) What is need of refrigeration in dairy plant? **[5]**  
b) What type of air conditioning system is required for multiplex? Explain its working in details. **[5]**

**Unit - II**

- Q3)** a) Explain the thermo-physical properties of refrigerants. **[5]**  
b) Explain refrigerant recovery, recycle and reclaim. **[5]**

OR

- Q4)** A vapour compression system using methyl chloride operates between pressure limits of 12 bar and 5.7 bar. Refrigerant is 0.96 dry at suction and its temperature at the end of compression is 55 °C. There is no undercooling. If refrigerant flow is 1.8 kg/min, determine. **[10]**

- i) COP
- ii) Rise in temperature of coolant if its flow rate is 16kg/h
- iii) The ice produced at 0 °C from water at 15 °C.
- iv) Condenser heat rejected

**P.T.O.**

Compare its COP when refrigerant at compressor inlet is fully saturated.

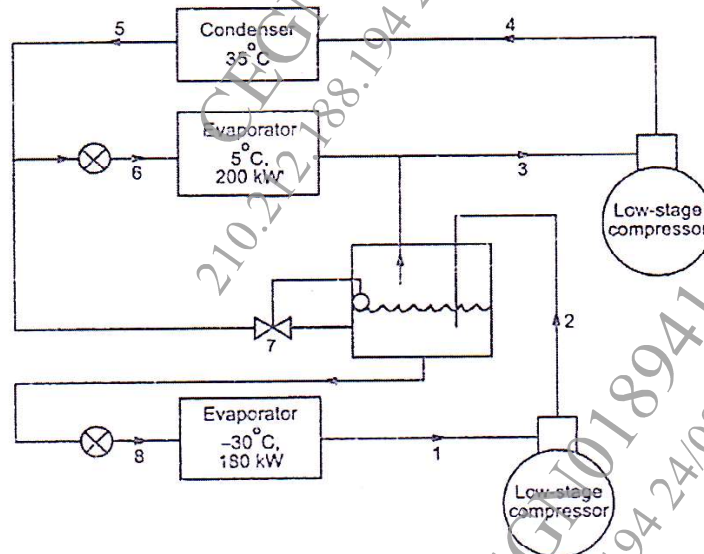
Pressure (bar)	$t_{sat}$ (°C)	Enthalpy		Entropy	
		$h_f$	$h_g$	$S_f$	$S_g$
5.7	-20	30.1	455.2	0.124	1.803
12.0	+25	100.5	476.8	0.379	1.642

### Unit-III

- Q5) a)** Discuss the desirable properties of refrigerant-absorbent mixture in VARS. [4]
- b)** Why multi-evaporator systems are used in industry? Draw neat schematic of two evaporator, single compressor and multiple expansion valve system. Write expression for i) mass calculation of refrigerant through each evaporator, and ii) COP of this system. [6]

OR

- Q6)** An ammonia system as shown in figure is used in certain application. The condensing temperature is 35 °C. Calculate power required by compressor and COP of the system. [10]



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