CHL121- Chemical Engineering Thermodynamics
Quiz – 2 (29th September, 2008) : Open Book

Max. Marks : 20
(to be scaled down to 10)

Make assumption if required, and state those clearly.

Q1. It has been suggested that water may be used as a refrigerant for the following situation.

Evaporation temp.	=	4 °C
Condensation temp.	=	34 °C
Compressor Efficiency	=	0.76
Refrigeration rate	=	1200 kW

Determine the circulation rate of the refrigerant, heat transfer rate in the condenser, the power requirements, the coefficient of performance of the cycle, and the coefficient of performance of a Carnot refrigeration cycle operating between the same temperature levels.

Useful data

	P^{sat}	H^l	H^v	S^l	S^v
4 °C	0.813	16.8	2509	0.0611	9.0526
34 °C	5.318	142.4	2563	0.4913	8.3740

Specific heat of water vapour = 2.0 kJ $kg^{-1}K^{-1}$

Parameter	**Units**
H	kJ kg^{-1}
S	kJ $kg^{-1}K^{-1}$
P	kPa

(5 x 3 = 15)

2. Superheated steam is flowing through a valve. Temperature, pressure and enthalpy conditions are given below:

: before the valve P = 4000 kPa T = 500 °C H = 3445 kJ
after the vale P = 2900 kPa

What are the conditions of stream leaving the valve. (5)