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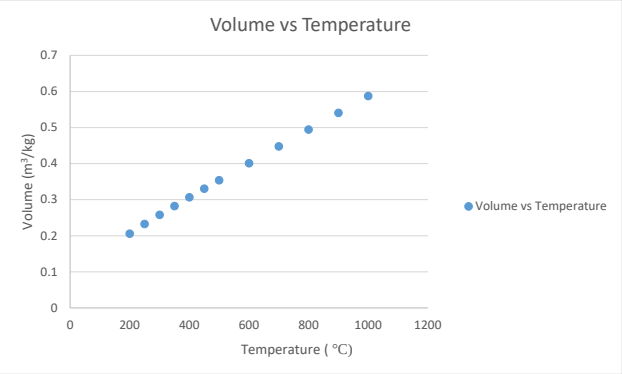
ENGR-127
Section 5

Homework Assignment 2

P = 800 kPa (Tsat = 170.4 C)				
T	volume	energy	enthalpy	entropy
oC	v(m3/kg)	u(kJ/kg)	h(kJ/kg)	s(kJ/kg-K)
sat.	0.2403	2576	2768.3	6.662
200	0.2609	2631	2839.7	6.818
250	0.2932	2715.9	2950.4	7.04
300	0.3242	2797.5	3056.9	7.235
350	0.3544	2878.6	3162.2	7.411
400	0.3843	2960.2	3267.6	7.573
450	0.4139	3042.8	3373.9	7.726
500	0.4433	3126.6	3481.3	7.869
600	0.5019	3298.7	3700.1	8.135
700	0.5601	3477.2	3925.3	8.379
800	0.6182	3662.4	4157	8.606
900	0.6762	3854.5	4395.5	8.819
1000	0.7341	4053.2	4640.5	9.019

P = 1000 kPa (Tsat = 179.9 C)				
T	volume	energy	enthalpy	entropy
oC	v(m3/kg)	u(kJ/kg)	h(kJ/kg)	s(kJ/kg-K)
sat.	0.1944	2582.7	2777.1	6.585
200	0.206	2622.2	2828.3	6.696
250	0.2328	2710.4	2943.1	6.927
300	0.258	2793.6	3051.6	7.125
350	0.2825	2875.7	3158.2	7.303
400	0.3066	2957.9	3264.5	7.467
450	0.3305	3040.9	3371.3	7.62
500	0.3541	3125	3479.1	7.764
600	0.4011	3297.5	3698.6	8.031
700	0.4478	3476.2	3924.1	8.276
800	0.4944	3661.7	4156.1	8.502
900	0.5408	3853.9	4394.8	8.715
1000	0.5872	4052.7	4639.9	8.916

a) graph of Volume vs Temperature for P= 1000 Kpa



b) temperature of a superheated vapor at P=1000 kPa and v=0.275 m^3/Kg

Equation using graph y = 0.0005x + 0.1156

given y, find x
y= 0.275
x= 318.8

c) use ideal gas equation PV= RT

p 1000 Kpa
V 0.275 m^3/kg
R 0.4615 KJ/Kg-K

T= pv/R

T= 595.883 Kelvin (K)

Conversion of temperature from kelvin to celsius

T :Temperature (K) - 273.15

T= 322.733 °C

I think that the value of temperature using the ideal gas equation should be be more accurate than the value of the temperature using the equation of the graph the reason for that is because : the graph equation give us an estimation of the temperature by taking in consideration some lost of temperature however for the ideal gas equation, does not since it consider the gas as an ideal gas which means it does not lost energy

d) Pressure of Superheated vapor at T = 400°C and V= 0.35m^3/kg

T= 400 °C
V= 0.35 m^3/kg

p= RT/V

P= 527.4286 Kpa

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