Today: Wrap up Chapter 2

Monday: Exam 1: Chapters 1, 2 and 20 (20.1-20.4)

Notes and Sample exam have been posted. I will be in the office today until 2:30 except for lunch and several across campus errands that I need to complete. If you have questions about the sample test please stop by...

Quiz 2 : Avg 75

σ 14.1

Prove that V is a state function assuming ideal gas behavior...

$$V = \frac{nRT}{P}$$

$V(T, P, n)$

n not a variable in a closed system

$V(T, P)$

$$\left(\frac{\partial}{\partial P}\left(\frac{\partial V}{\partial T}\right)_P\right)_T \stackrel{?}{=} \left(\frac{\partial}{\partial T}\left(\frac{\partial V}{\partial P}\right)_T\right)_P$$

$$\left(\frac{\partial V}{\partial T}\right)_P = \frac{nR}{P} \qquad \left(\frac{\partial V}{\partial P}\right)_T = \frac{-nRT}{P^2}$$

$$\left(\frac{\partial}{\partial P}\left(\frac{\partial V}{\partial T}\right)_P\right)_T = -\frac{nR}{P^2} \qquad \left(\frac{\partial}{\partial T}\left(\frac{\partial V}{\partial P}\right)_T\right)_P = -\frac{nR}{P^2}$$

Isothermal compressibility

$$\kappa_T = -\frac{1}{V}\left(\frac{\partial V}{\partial p}\right)_T$$

expansion coefficient

$$\alpha = \frac{1}{V}\left(\frac{\partial V}{\partial T}\right)_p$$

Determine a value for the expansion coefficient of an ideal gas at SATP

$$\alpha = \frac{1}{V}\left(\frac{\partial V}{\partial T}\right)_P$$

$$PV = nR\bar{T}$$

$$V = \frac{nRT}{P}$$

$$\alpha = \frac{1}{V}\left(\frac{nR}{P}\right)$$

$$\alpha = \frac{P}{nRT}\left(\frac{nR}{P}\right) = \frac{1}{T}$$

Joule Thompson coefficient

How does the T of a gas change with p

$$\left(\frac{\partial T}{\partial p}\right)_H$$

4 Fundamental Eqns.

$$U(V,T)$$

$$dU = \left(\frac{\partial U}{\partial V}\right)_T dV + \left(\frac{\partial U}{\partial T}\right)_V dT$$