**Thermodynamics Equation Sheet: Test 1 & 2**

Thermal Expansion Volume Expansion where =3

Thermal Conductivity

First law of thermodynamics U=Q+Wsys

U=U(T)

Heat Capacitance: Q = CT Q=mcT Q=nCPT Q=nCVT

Latent Heat Q = m L

Calorimetry: Q = 0

Entropy, S:

Ideal Gas Equation: P V = n R T

Kinetic Theory of Gases: where f is the degrees of freedom.

CP - CV = R and

 Average KE per molecule

 Average KE per mole

Reversible cycle: Scycle = Ucycle = 0

Sackur-Tetrode Equation

k = 1.381 x 10-23 J/K = 8.617 x 10-5 eV/K

h = 6.626 x 10-34 J.s = 4.136 x 10-15 eV.s

1 a.m.u = 1.67 x 10-27 kg

R = 8.314 J/mol.K

NA = 6.022 x 1023

Einstein solid multiplicity formula:

Thermodynamic identity: dU = T dS – P dV + dN

This relation can be manipulated to get relations between various quantities e.g. with V and U fixed

Specific heat capacity of water: 4186 J/kg

Latent heat of fusion of water: 334 kJ/kg

1 atm = 1.01 x 105 Pa