Formula Sheet

$R^* = 8.3144$ J/°K mol, 1 bar = 1 atm = 10^5 Pa, 1 atm = 1.013×10^5 Pa, 1 Pa= 1 N m^{-2},
1 N = 1 J/m, Molar mass of Air = 29 x 10^{-3} kg mol^{-1}, L_{lv} = 2.47x10^6 J kg^{-1}

$g = -\frac{1}{\rho}\frac{\partial p}{\partial z}$, where ρ is density.

$dw = -pdv$

$du = dq + dw$

For an ideal gas:

$du = c_v\, dT$

$dh = c_p\, dT$

$c_p - c_v = R$

1 cm^3 = 0.1 J/bar

R^* = 8.3144 J/K mol

1 atm = 10^5 Pa

1 bar = 1 atm.

1 Pa = N/m^2

1 N = J/m

g = 9.81 m/s^2

Molar mass of Air = 29 x 10^{-3} kg/mol

K = °C + 273.15

$pv = RT$, R is the specific gas constant = R^*/M, where M is the molar mass of the gas.

For an ideal gas: $du = c_v\, dT$, $dh = c_p\, dT$, $c_p - c_v = R$

Combined 1st+2nd law: $du = dq - pdv = Tds - pdv$

$h = u + pv$; $g = u + pv - sT$

Gibbs Free Energy $dg = -sdT + vdP$

Gibbs Phase Rule: F = C - P + 2

Carnot Heat Engine is $\eta = 1 - \frac{T_{cold}}{T_{hot}}$.