Final Notes Thermo 1 Revised

Tuesday, December 8, 2015   9:10 PM

Laws

① $\Delta M = M_{in} - M_{out}$ & $\Delta E = E_{in} - E_{out}$

② $S_{gen} \geq \emptyset$ (Closed Sys. $S \geq 0$)

③ Perf. Crystal $S = \emptyset$ @ 0k

⓪ if $T_a = T_b$ & $T_b = T_c$, then $T_a = T_c$

Isothermal: $T = $ Const.

Isobar: $P = $ Const.

Isochoric: $V = $ Const.

Adiabat: $Q = 0$

Polytropic: $PV^n = $ Const.

Isotropic: $S = $ Const.

Steady: $\dot{m}_{sys} = \dot{E}_{sys} = \emptyset$

Intensive: Independent of Mass

$$dU = \delta Q - \delta W$$

State   Path Variable

Work $W = \int_1^2 P_{out} \, dV$

Kelvin-Planck Statement

It is impossible for any device that operates on a cycle to receive heat from a single reservoir & produce a net amount of work

Clausius Statement

It is impossible to construct a device that operates in a cycle & produces no effect other than the transfer of heat from a lower temp body to a higher temp body.

PMM 1 & 2

Carnot Cycle

① Isotherm Exp.

② Adiabatic Exp.

③ Isotherm Comp.

④ Adiabatic Comp.

Assumptions

- Steady
- Ignore ΔKE & ΔPE
- Ideal