Simple terms

Thermodynamic System (TS)

any object or system of objects

Types of TS

Isolated (no interaction with surroundings), **Closed** (no mass exchange), **open** (mass exchange)

State Postulate

Defines a number of properties required to fix a state

Intensive properties

(mass ind.) if the property is the same

Extensive properties

(mass dep.) if the property is doubled

Energys

macroscopic energys

(Work) kinetic, potential

microscopic energys

(Heat transfer) thermal, chemical, nuclear, etc

1LT

Closed

$U=Q_{net}-W_{net}$

Open

$U=Q_{net}-W_{net}+ m(e_{in}-e_{out})$

adiabatic

no heat transfer

isothermal

T is constant

isobaric

P is constant

isochoric

V is constant

Equations

Specific _____

$x=X/m$

kinetic energy

$ke=v^2/2$

potential energy

$pe=gh$

specific total energy

$e=ke+pe+u$

total energy

$E=mv^2/2 +mgh+u$

electric power

$W=Voltage*current$

steady electric power

$W=Voltage*current*time$

boundary work

$W=P*V$

shaft work

$W= T*2pi*number\ of\ turns$

Devices

Thermal devices

$n=Q/m_{fuel}*HV$ (burner, water heater)

Mechanical devices (Turbine)

$n=W_{out}/E_{fluid}$