Engineering Thermodynamics Exam 1 Cheat Sheet

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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=Qnet-Wnet

Open

> U=Qnet-Wnet+ m(ein-eout)

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*2*pi*number of turns

Devices

Thermal devices

> n=Q/mfuel*HV (burner, water heater)

Mechanical devices (Turbine)

> n=Wout/Efluid

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