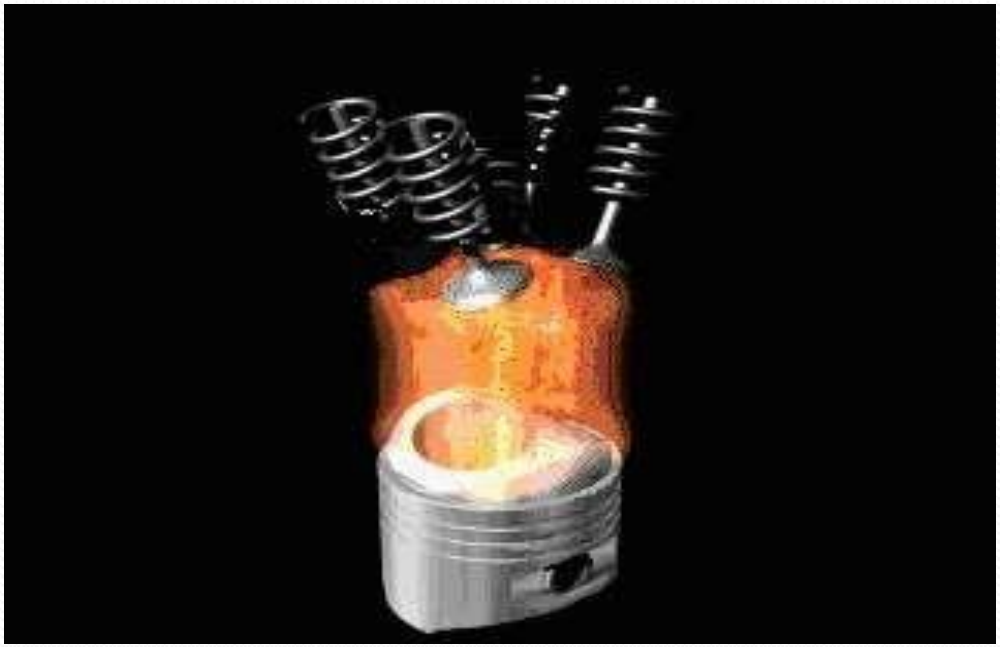
THERMODYNAMIC S CYCLES



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Flow Of Presentation

- Introduction
- Relation b/w Carnot and Ideal Cycle
- Carnot Cycle
- Stirling Cycle
- Diesel Cycle
- Rankine Cycle
- Reheat Cycle
- Q/A session

Thermodynamic cycle

Introduction

- **STATEMENT**

”Thermodynamic processes that involve the ***transference*** of ***heat*** and ***work*** into and out of the system by varying ***pressure***, ***temperature***, and other state variables within the system”

Thermodynamics cycle

Ideal Cycle

A cycle that resembles the actual cycle closely but is made up totally of internally reversible processes is called an Ideal cycle.

Carnot Cycle : Infect , it is a type of an ideal Cycle because carnot cycle has maximum efficiency closer to ideal cycle.

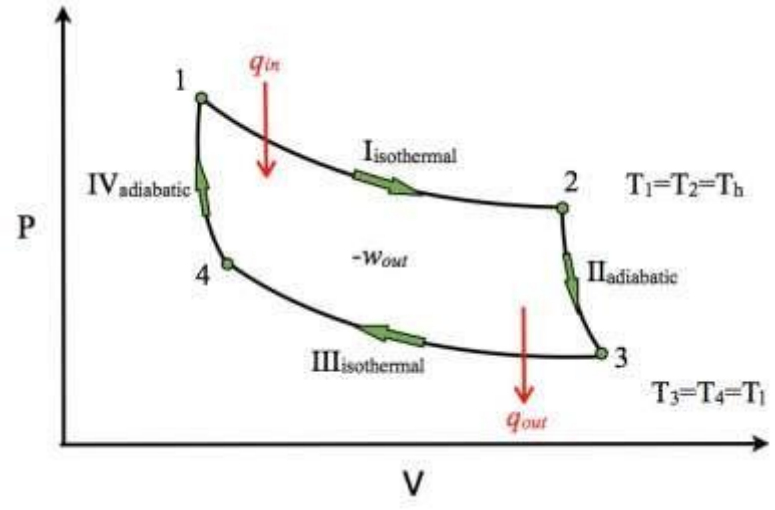
Thermodynamics cycle

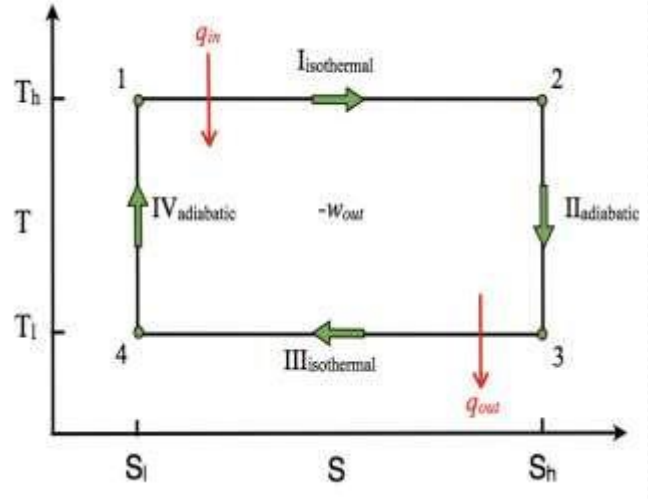
Carnot Cycle

1-2 Reversible Isothermal Expansion (Heat Addition) 2-3 Reversible Adiabatic expansion

3-4 Reversible Isothermal compression (Heat Rejection)

4-1 Reversible Adiabatic Compression





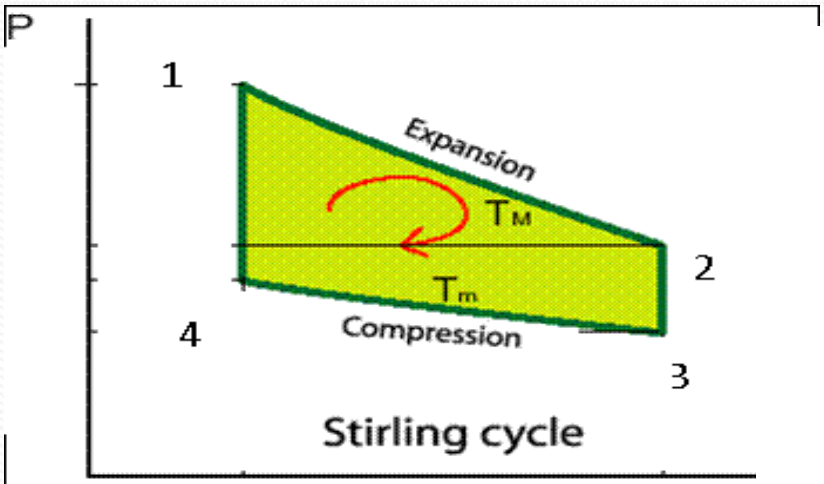
Thermodynamics cycle

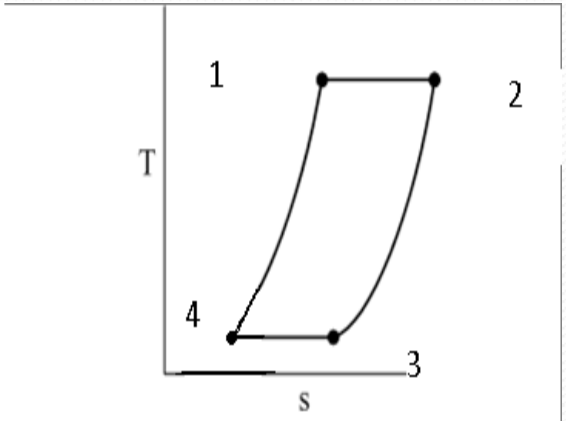
Stirling cycle

1-2 Reversible Isothermal Expansion (Heat Addition) 2-3 Reversible Adiabatic expansion

3-4 Reversible Isothermal compression (Heat Rejection)

4-1 Reversible Adiabatic Compression





Thermodynamics cycle

Stirling cycle

(Efficiency)

- Highest theoretical efficiency
- Expensive to make
- Not competitive with other types for normal commercial use

Thermodynamics cycle

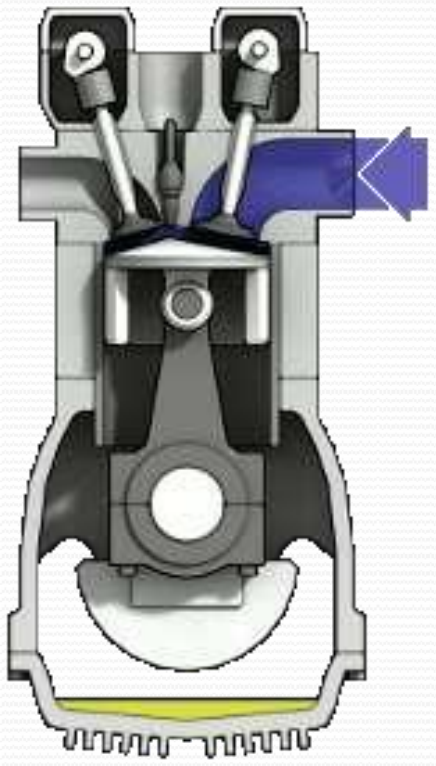
Diesel Cycle (Figure Representation)

1-2 Isentropic compression

2-3 Constant-Pressure heating

3-4 Isentropic expansion

4-1 Constant-volume heat rejection



Thermodynamics cycle

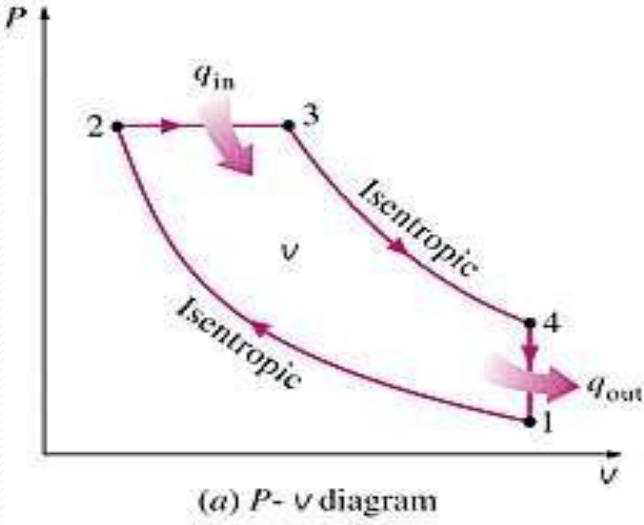
Diesel Cycle (Diagram Representation)

1-2 Isentropic compression

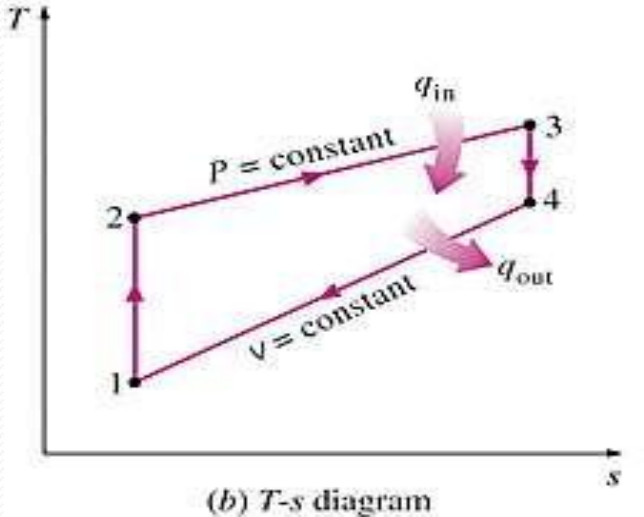
2-3 Constant-Pressure heating

3-4 Isentropic expansion

4-1 Constant-volume heat rejection



(a) P- v diagram



(b) T-s diagram

Thermodynamics cycle

Diesel Cycle

(Efficiency)

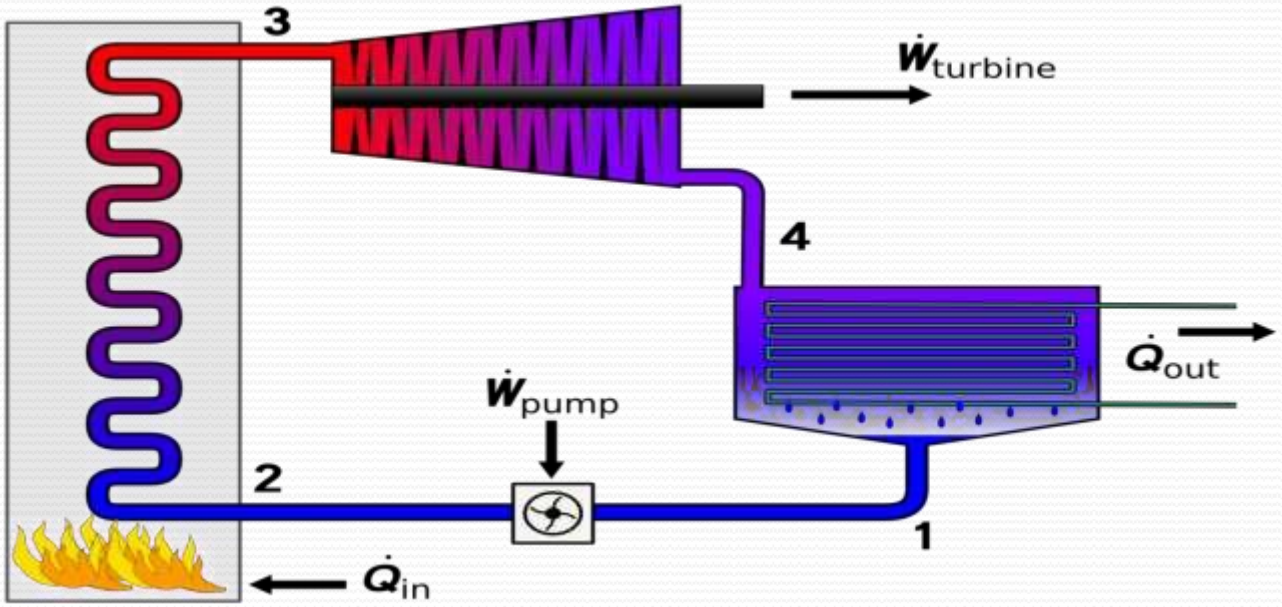
- Diesels Engines, efficiency of about 40%
- Turbo charged has efficiency of 50%

Thermodynamics cycle

Rankine Cycle

Thermodynamics cycle

Rankine Cycle



Thermodynamics cycle

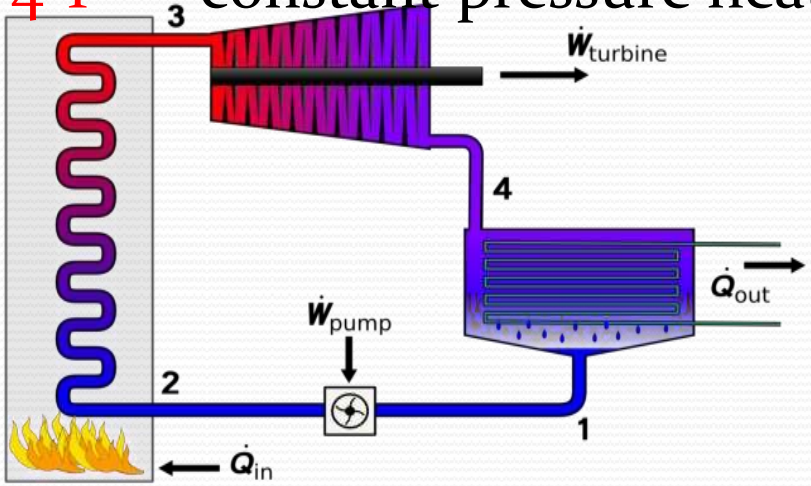
ꕥRankine Cycle (steam engine)

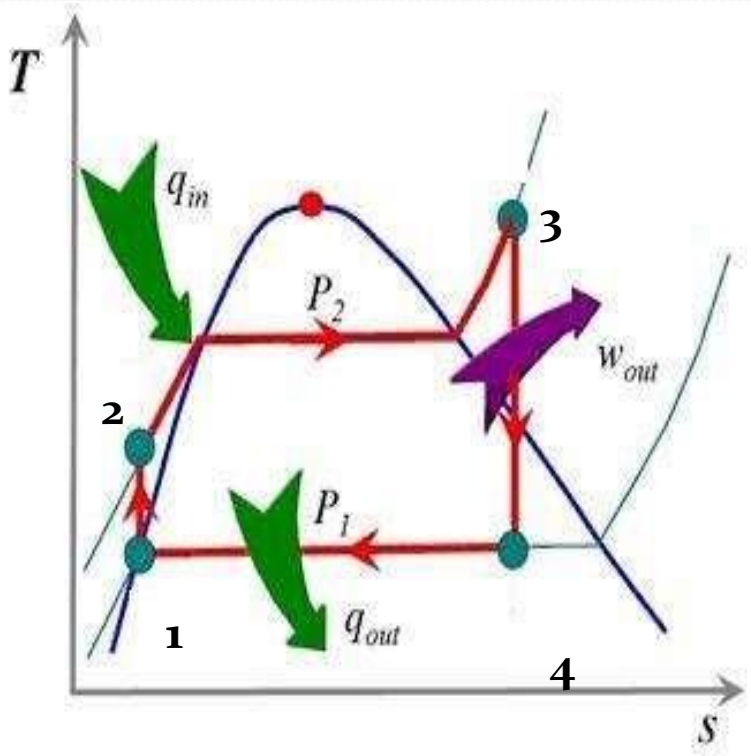
1-2 isentropic pump

2-3 constant pressure heat additi

isentropic turbine

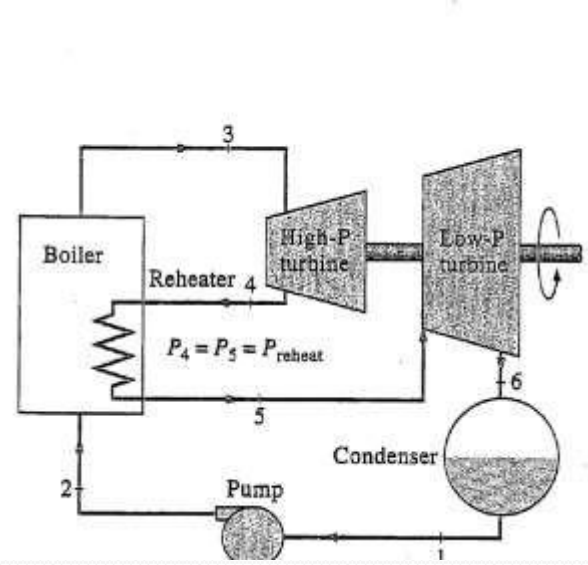
4-1 constant pressure heat reject

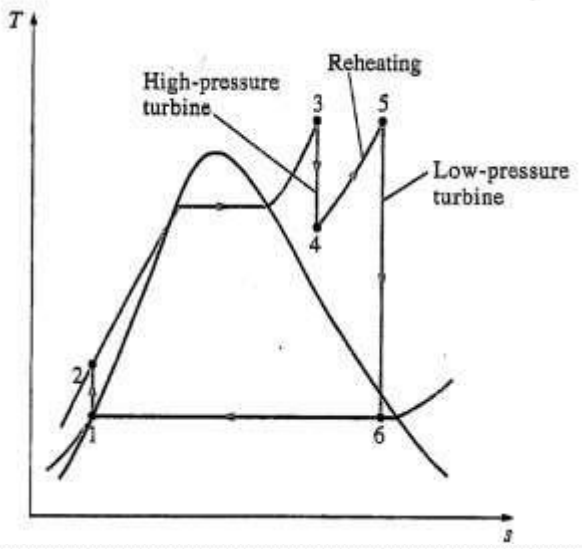




Thermodynamics cycle

Reheat Cycle





Thermodynamics cycle

Rankine Cycle

(Efficiency)

Rankine cycle which has a maximum Carnot efficiency of **63%**

Thermodynamics cycle

Question/Answering