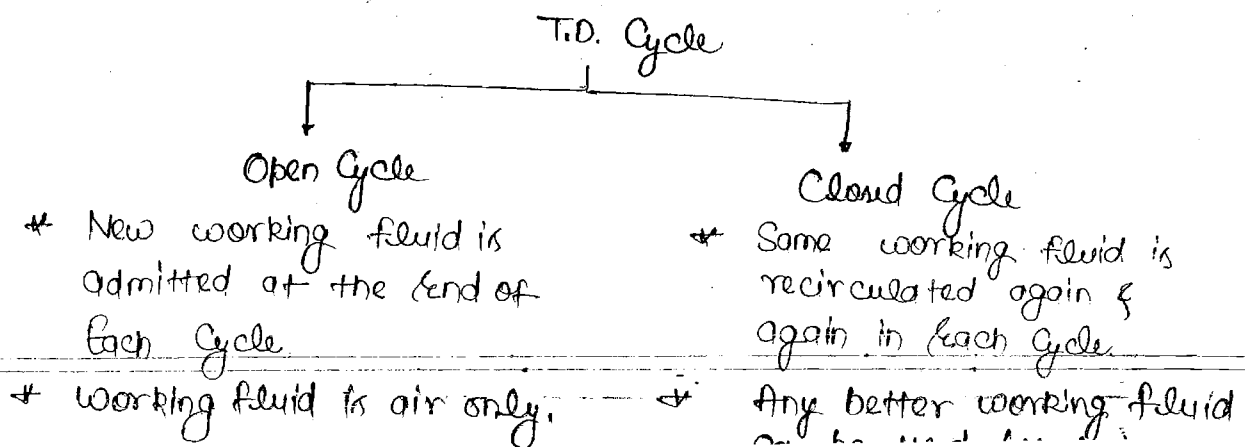
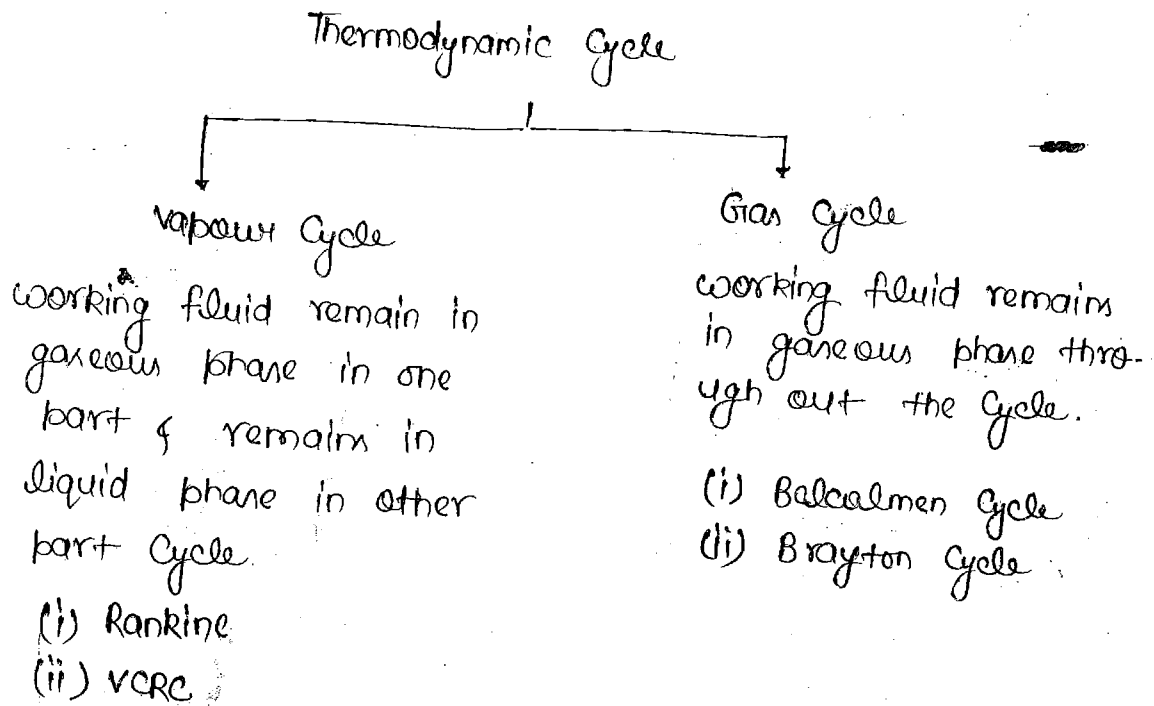
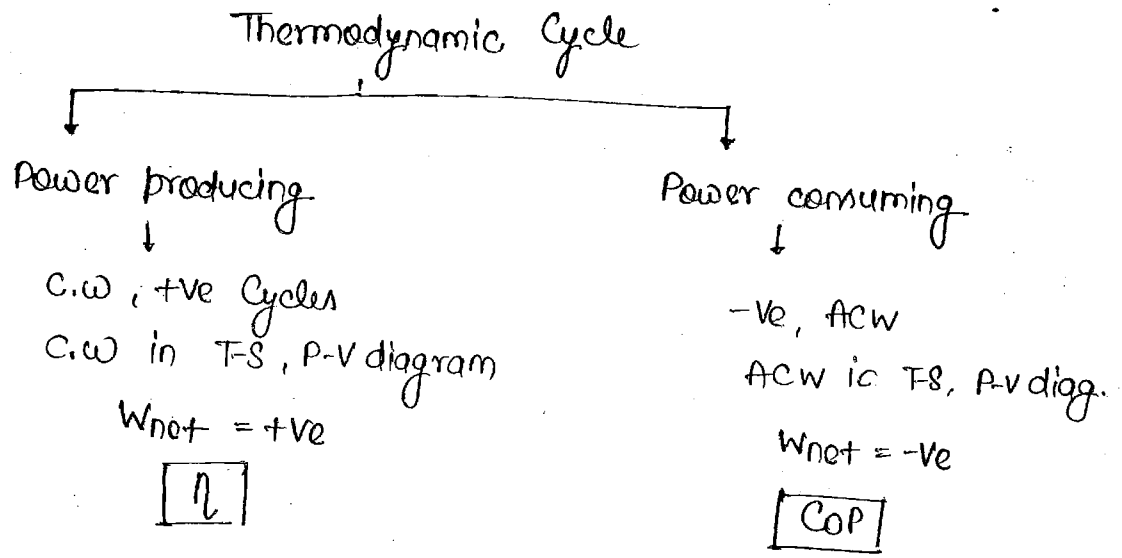


"Power Plant"



* Less Efficient

* There will be a
Internal Combustion

* Better grade of fuel burned

* Blade Erosion is more

* Light weight

→ Combustion

* C_p, C_v values are high, hence

More Efficient.

* There will be an External
Combustion.

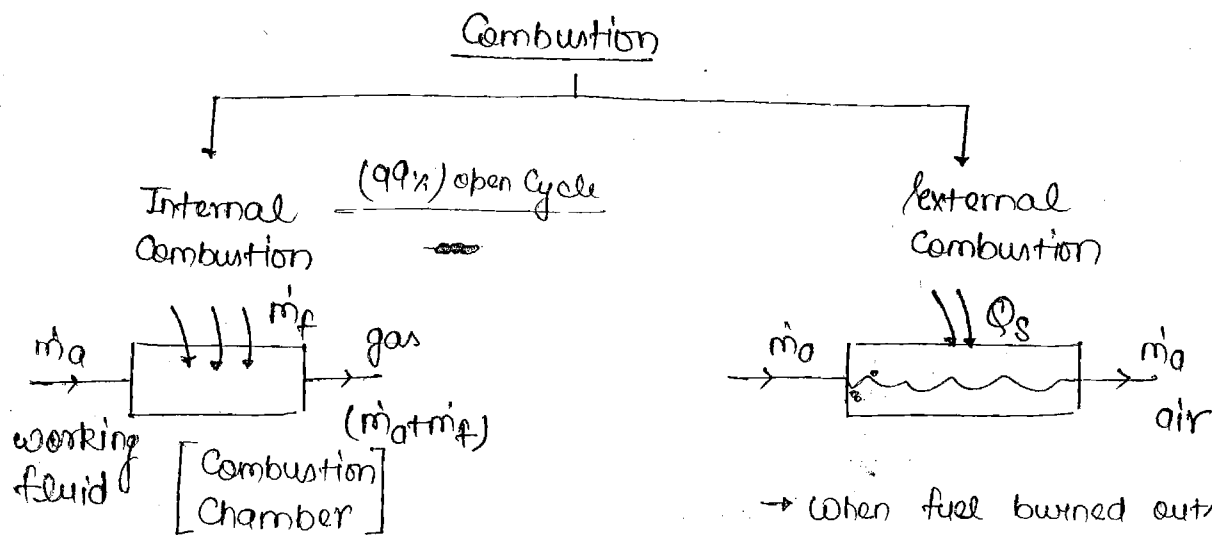
* Any grade of fuel burned.

* Blade Erosion is absent

* Bulky Cycle

The burning of fuel is known as Combustion.

The aim of Combustion is to supply Heat. to the working fluid.



→ When fuel burned inside the system boundary i.e. working fluid & fuel both are mixed and burned together.

→ When fuel burned outside the system boundary i.e. fuel burned separately from the working fluid. Only Heat interaction will take place.

Parameter	Steam P.P.	Gas P.P.	I.C Engine
	60%	10-12%	1-2%
Cycle	Rankine	Brayton or Joule	Diesel, Otto, dual
Fuel	Coal, High Speed diesel	Natural gases Ethane, Methan	Diesel, Petrol
Working fluid	Water, Steam	Air, gas	Air, gas
Max. Temp.	620°C	1300°C	2500°C
Pressure ratio r_p	220-300 bar	15-20 bar	20-25
Weight to power ratio	55 kg/kw	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> 20 kg/kw ↓ Hence used in air-craft </div>	110 kg/kw
Thermal Eff.	max. 35-40%	min. 20-25%	medium 24-27%
Installation period	3-4 Yr for 200 MW	2.5-3 Yr for 200 MW	1-2 month for 10kw
Pollution	Max.	Min.	medium

* Note :

$$\eta_{I.C} > \eta_{gas} \rightarrow \text{eff. is more}$$

$$\eta_{m, gas} > \eta_{m, I.C} \rightarrow \text{Losses are more in I.C engine}$$

For 200 MW Steam → 110 Ton/hr Coal

33% Ash

35 Ton/hr Ash

Fly Ash (80%)

Bottom Ash (20%)

25 Ton/hr

~~To atm~~

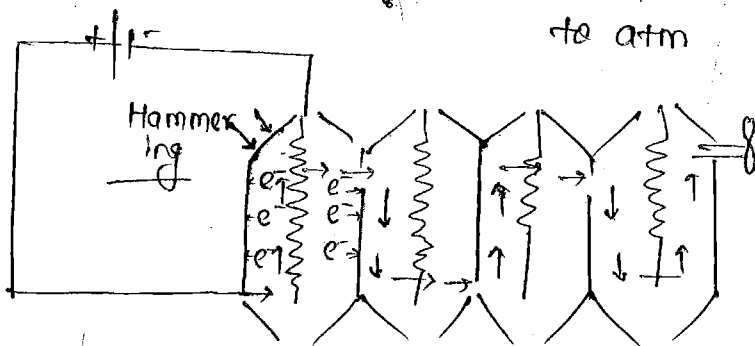
↓ ESP

98-99%

Bottom Ash

↓
0.5 Ton/hr
to atm

ESP - 20-25%
Power
Produced
by P.P.



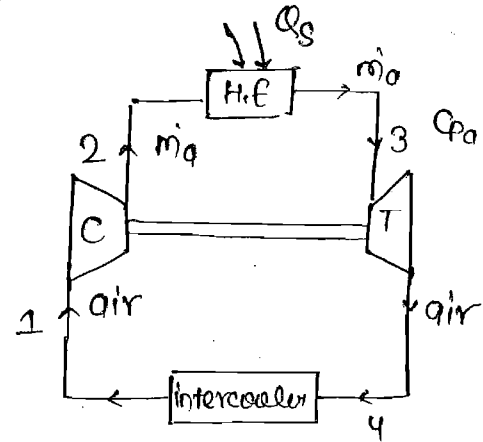
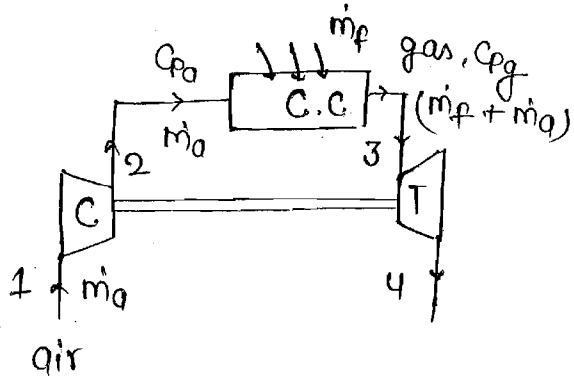
air-ionized

Bottom Ash

Brayton Cycle

Open Brayton Cycle

Close Brayton Cycle



1-2 - isentropic Comp.

2-3 - Const. pressure H.A (C.C or H.E)

3-4 - isentropic Exp.

4-1 - Const. pressure H. Rejection (intercool)

