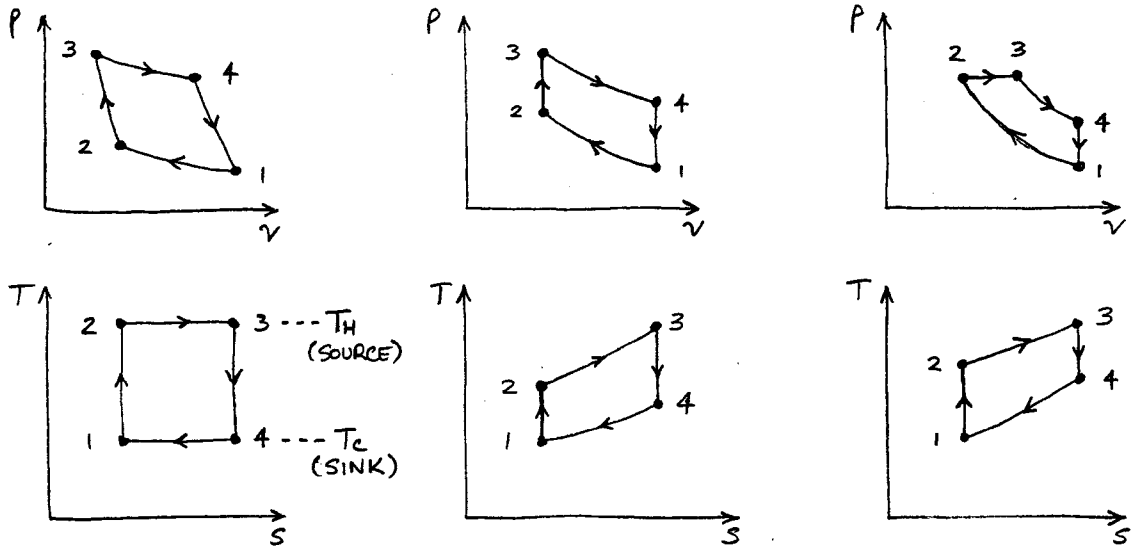
CH. 6 SUMMARY



CARNOT — THEORETICAL MAXIMUM

OTTO, DIESEL — "AIR STANDARD CYCLES"

$$\eta_{CARNOT} = 1 - \frac{T_C}{T_H} = \frac{W_{NET}(MAX)}{q_S}$$

$$\downarrow$$

$$\eta_{CARNOT} = \eta_{TH}(MAX)$$

$$\boxed{\eta_{TH} = \frac{W_{NET}}{q_S} = \frac{q_{NET}}{q_S}}$$

OTTO

$$\eta_{TH} = \frac{W_{12} + W_{34}}{q_{23}}$$

OR

$$\eta_{TH} = \frac{q_{23} + q_{41}}{q_{23}}$$

DIESEL

$$\eta_{TH} = \frac{W_{12} + (W_{23} + W_{34})}{q_{23}}$$

OR

$$\eta_{TH} = \frac{q_{23} + q_{41}}{q_{23}}$$

PROCESS	CARNOT	OTTO (SPARK IGNITION)	DIESEL (COMPRESSION IGNITION)
C: 1 → 2	ISENTROPIC	ISENTROPIC	ISENTROPIC
A: 2 → 3	ISOTHERMAL	ISOMETRIC	ISOBARIC
E: 3 → 4	ISENTROPIC	ISENTROPIC	ISENTROPIC
R: 4 → 1	ISOTHERMAL	ISOMETRIC	ISOMETRIC

"CAER":

- C OMPRESSION → W_{IN}
- A DD HEAT → q_S (NOTE: DIESEL ONLY HAS q_S AND W_{OUT})
- E XPANSION → W_{OUT}
- R EJECT HEAT → q_R

COMPRESSION RATIO: $r_v = \frac{v_1}{v_2}$

TEMPERATURES: ① ALWAYS USE °R ② $T_{MAX} = T_3$ ③ $T_{ATM} = T_1$