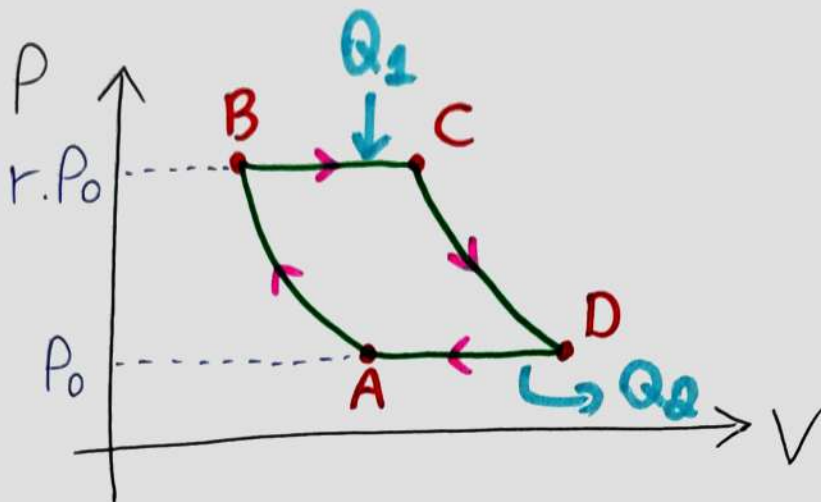


# CICLO JOULE



$$\eta(r, \gamma) = ?$$

$$\eta = \frac{W}{Q_1} = \frac{Q_1 - Q_2}{Q_1}$$

$$\therefore \boxed{\eta = 1 - \frac{Q_2}{Q_1}}$$

B  $\rightarrow$  C: ISOBÁRICO

$$Q_1 = + C_p \cdot (T_c - T_B)$$

D  $\rightarrow$  A: ISOBÁRICO

$$-Q_2 = + C_p \cdot (T_A - T_D)$$

$$\eta = 1 - \frac{Q_2}{Q_1} = \boxed{1 - \frac{T_D - T_A}{T_c - T_B}} = 1 - \frac{P_D V_D - P_A V_A}{P_c V_c - P_B V_B} =$$

$$= 1 - \frac{P_0 V_D - P_0 V_A}{r P_0 V_c - r P_0 V_B} = 1 - \frac{1}{r} \cdot \frac{V_D - V_A}{V_c - V_B} \quad (1)$$

JOULE 01

$$\text{MAS } P_c \cdot V_c^\gamma = P_D \cdot V_D^\gamma \Rightarrow P_c^{1/\gamma} \cdot V_c = P_D^{1/\gamma} \cdot V_D \Rightarrow$$

$$\Rightarrow \frac{V_D}{V_c} = r^{1/\gamma} \quad (2)$$

E

$$P_A \cdot V_A^\gamma = P_B \cdot V_B^\gamma \Rightarrow P_A^{1/\gamma} \cdot V_A = P_B^{1/\gamma} \cdot V_B \Rightarrow$$

$$\Rightarrow \frac{V_A}{V_B} = r^{1/\gamma} \quad (3).$$

(3) E (2) EM (1):

$$\eta = 1 - \frac{1}{r} \cdot \frac{V_D - V_A}{V_c - V_B} = 1 - \frac{1}{r} \cdot \frac{r^{1/\gamma} \cdot V_c - r^{1/\gamma} \cdot V_B}{V_c - V_B}$$

$$\therefore \boxed{\eta = 1 - r^{-\frac{1-\gamma}{\gamma}}}$$