

(1)
 $A \rightarrow B, C \rightarrow D$ は定積変化
 なのて

$$W_{AB} = 0, W_{CD} = 0$$

$\langle B \rightarrow C \rangle$

$$\boxed{Q = \Delta U + W} \text{ のよ}$$

$$0 = \Delta U_{BC} + W_{BC}$$

\therefore

$$\begin{aligned} \Delta U_{BC} &= n \cdot C_v \cdot \Delta T_{BC} \\ &= 1 \cdot C_v \cdot (T_C - T_B) \end{aligned}$$

\therefore

$$\begin{aligned} W_{BC} &= -\Delta U_{BC} \\ &= C_v (T_B - T_C) \dots \textcircled{1} \end{aligned}$$

$\langle D \rightarrow A \rangle$

$$0 = \Delta U_{DA} + W_{DA}$$

\therefore

$$\begin{aligned} \Delta U_{DA} &= n \cdot C_v \cdot \Delta T_{DA} \\ &= 1 \cdot C_v \cdot (T_A - T_D) \end{aligned}$$

\therefore

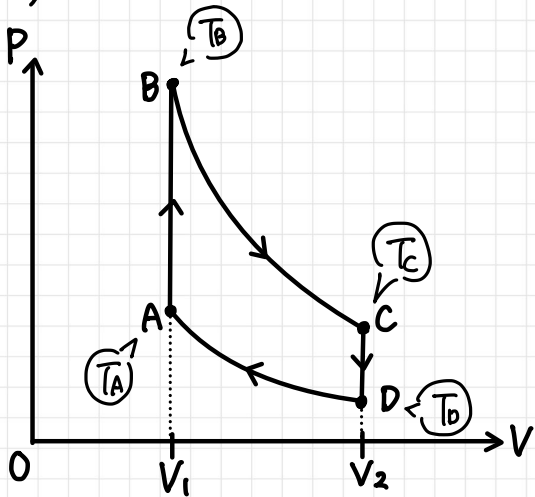
$$\begin{aligned} W_{DA} &= -\Delta U_{DA} \\ &= C_v (T_D - T_A) \dots \textcircled{2} \end{aligned}$$

ゆえに1サイクルでの仕事Wは

$\textcircled{1} \textcircled{2}$ のよ

$$\begin{aligned} W &= W_{BC} + W_{DA} \\ &= \underline{C_v (-T_A + T_B - T_C + T_D)} \end{aligned}$$

(2)



$\langle A \rightarrow B \rangle$

$$\boxed{Q = \Delta U + W} \quad (1)$$

$$Q_{AB} = 1 \cdot C_v \cdot (T_B - T_A) + 0$$

$$\therefore Q_{AB} = \underline{C_v (T_B - T_A)}$$

$\langle C \rightarrow D \rangle$

$$Q_{CD} = 1 \cdot C_v \cdot (T_D - T_C) + 0$$

$$\therefore Q_{CD} = \underline{C_v (T_D - T_C)}$$