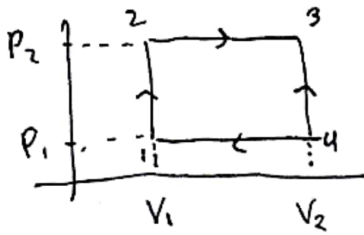


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21/480179/TK/52981

Quiz #2



A

$$\begin{aligned} \bullet T_1 &= \frac{P_1 \cdot V_1}{nR} & \bullet T_3 &= \frac{P_2 V_2}{nR} \\ \bullet T_2 &= \frac{P_2 V_1}{nR} & \bullet T_4 &= \frac{P_1 \cdot V_2}{nR} \end{aligned}$$

B

$$\begin{aligned} \bullet \Delta E_{th12} &= \overbrace{n \cdot C_v \cdot \Delta T}^Q + \overbrace{0}^W \text{ (isokhork)} \\ &= n \cdot C_v \cdot (T_2 - T_1) \\ &= n \cdot C_v \frac{P_2 V_1 - P_1 V_1}{nR} \\ &= n \cdot C_v \frac{V_1 (P_2 - P_1)}{nR} \\ &= C_v \cdot \frac{V_1 (P_2 - P_1)}{R} \end{aligned}$$

$$\begin{aligned} \bullet \Delta E_{th23} &= Q + W = n \cdot C_v \Delta T + P \Delta V \text{ (isobar)} \\ &= n C_v (T_3 - T_2) + P_2 (V_2 - V_1) \\ &= n C_v \left(\frac{P_2 V_2 - P_2 V_1}{nR} \right) + P_2 (V_2 - V_1) \\ &= \frac{n C_v P_2 (V_2 - V_1)}{nR} + P_2 (V_2 - V_1) \\ &= P_2 (V_2 - V_1) \left[\frac{C_v}{R} + 1 \right] \end{aligned}$$

$$\begin{aligned} \bullet \Delta E_{th34} &= Q + W \\ &= n C_v \Delta T + 0 \text{ (isokhork)} \\ &= n C_v (T_4 - T_3) \\ &= n C_v \left(\frac{P_1 V_2 - P_2 V_2}{nR} \right) \\ &= n C_v \frac{V_2 (P_1 - P_2)}{nR} \\ &= \frac{C_v \cdot V_2 (P_1 - P_2)}{R} \end{aligned}$$

$$\begin{aligned} \bullet \Delta E_{th41} &= Q + W \text{ (isobarik)} \\ &= n C_v \Delta T + P \Delta V \\ &= n C_v (T_1 - T_4) + P_1 (V_1 - V_2) \\ &= n C_v \frac{P_1 V_1 - P_1 V_2}{nR} + P_1 (V_1 - V_2) \\ &= \frac{C_v P_1 (V_1 - V_2)}{R} + P_1 (V_1 - V_2) \\ &= P_1 (V_1 - V_2) \left[\frac{C_v}{R} + 1 \right] \end{aligned}$$

$$\boxed{c} \quad W_{12} \rightarrow \text{isokhorik} \quad W = 0$$

$$W_{23} \rightarrow \text{isobarik} \quad W = P \Delta V = P_2 (V_2 - V_1)$$

$$W_{34} \rightarrow \text{isokhorik} \quad W = 0$$

$$W_{41} \rightarrow \text{isobarik} \quad W = P \Delta V = P_1 (V_1 - V_2)$$

$$\begin{aligned} \boxed{d} \quad Q_{12} &= n C_v \Delta T \\ &= \cancel{n} C_v \frac{P_2 V_1 - P_1 V_1}{\cancel{n} R} \\ &= \frac{C_v V_1 (P_2 - P_1)}{R} \end{aligned}$$

$$\begin{aligned} Q_{34} &= n C_v \Delta T \\ &= \cancel{n} C_v \frac{V_2 (P_1 - P_2)}{\cancel{n} R} \\ &= \frac{C_v V_2 (P_1 - P_2)}{R} \end{aligned}$$

$$\begin{aligned} Q_{23} &= n C_v \Delta T \\ &= \cancel{n} C_v \frac{P_2 V_2 - P_2 V_1}{\cancel{n} R} \\ &= \frac{C_v}{R} P_2 (V_2 - V_1) \end{aligned}$$

$$\begin{aligned} Q_{41} &= n C_v \Delta T \\ &= \cancel{n} C_v \frac{P_1 V_1 - P_1 V_2}{\cancel{n} R} \\ &= \frac{C_v}{R} P_1 (V_1 - V_2) \end{aligned}$$