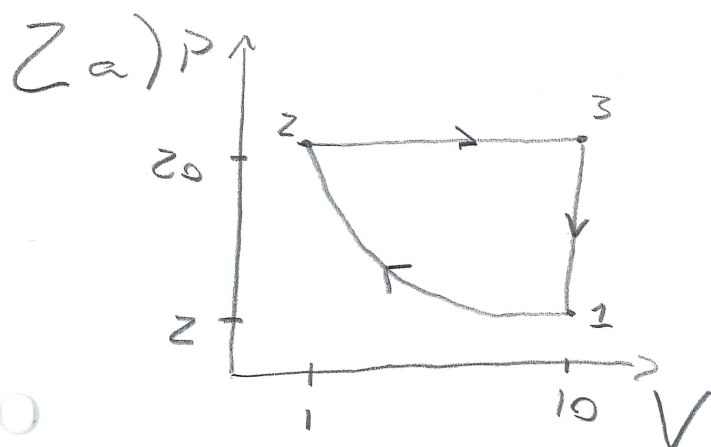


Termo, Øving 1, Vegard G. Jervell

- 1.1) Lukket = ingen utveksling av masse
Åpent = utveksling av masse og varme
Isoleret = ingen utveksling av masse eller varme
Isokor: $V = \text{konstant}$
Isobar: $p = \text{konst.}$
Isoterm: $T = \text{konst.}$
Adiabatisk: $S = \text{konst.}$

1.2) $H = U + p \Delta V$



2b) $T_1 = \frac{P_1 V_1}{nR} = 240 \text{ K} \quad (p_{\text{atm}} \approx 10^5 \text{ Pa})$

$T_2 = 2405 \text{ K}$

2c) $\Delta U_1 = 0$ (Fordi isoterm)

$\Delta U_2 = C_p \Delta T_1 + p \Delta V = 27 \text{ kJ}$

$\Delta U_3 = C_v \Delta T_2 = -27 \text{ kJ}$

$$\underline{\Delta H_1 = 0 \text{ (fordi } \Delta T = 0)}$$

$$\Delta H_2 = \Delta U_2 + p \Delta V$$

$$\underline{\Delta H_2 = 45 \text{ kJ} + 18 \text{ kJ} = 45 \text{ kJ}}$$

$$\Delta H_3 = \Delta U_3 + p \Delta V$$

$$\underline{\Delta H_3 = -45 \text{ kJ}}$$

$$q_1 = -w_1 = -nRT \int_{V_1}^{V_2} \frac{1}{V} dV$$

$$\underline{q_1 = 4,6 \text{ kJ}}$$

$$\underline{q_2 = \Delta U_2 - p \Delta V_2 = 45 \text{ kJ}}$$

$$\underline{q_3 = \Delta U_3 - p \Delta V_3 = -27 \text{ kJ}}$$

$$\underline{w_1 = nRT \int_{V_1}^{V_2} \frac{1}{V} dV = 4,6 \text{ kJ}}$$

$$\underline{w_2 = -p \Delta V_2 = -18 \text{ kJ}}$$

$$\underline{w_3 = -p \Delta V_3 = 0 \text{ kJ}}$$

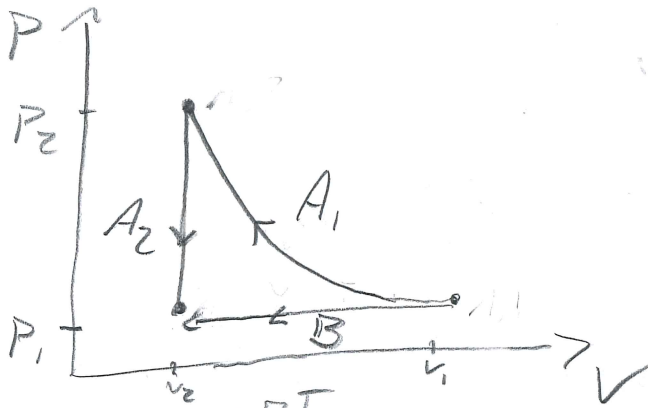
Hele prosessen

$$\underline{\Delta U = \Delta H = 0 \text{ (Tilstandsfunksjoner)}}$$

$$\underline{q_T = \sum q_i = 13 \text{ kJ}}$$

$$\underline{w_T = \sum w_i = -13 \text{ kJ}}$$

3a)



$$3b) \quad P_1 = \frac{nRT_1}{V_1} = 4,96 \text{ bar}$$

$$P_2 = \frac{nRT_2}{V_2} = 9,9 \text{ bar}$$

$$T_2 = \frac{P_2 V_2}{nR} = 150 \text{ K}$$

$$3c) \quad q_1 = -w_1 = \int_{V_1}^{V_2} p \, dV$$

$$q_1 = nRT \ln\left(\frac{V_2}{V_1}\right)$$

$$q_1 = -1,7 \text{ kJ}$$

$$w_1 = -q_1 = 1,7 \text{ kJ} \quad (\text{For } \Delta U_1 = 0)$$

$$\Delta H_1 = 0 \quad \text{For } \Delta T_1 = 0$$

$$q_2 = C_V \Delta T_2 = -1,8 \text{ kJ}$$

$$w_2 = 0$$

$$\Delta U_2 = -1,8 \text{ kJ}$$

$$\Delta H_2 = \Delta U_2 + \Delta(pV) = -3 \text{ kJ}$$

3d)

$$W_B = P \Delta V = 1,25 \text{ kJ}$$

$$\Delta U_B = \Delta U_A = -1,8 \text{ kJ}$$

$$Q_B = \Delta U_B - W_B = -3 \text{ kJ}$$

$$\Delta H_B = \Delta H_A = -3 \text{ kJ}$$