

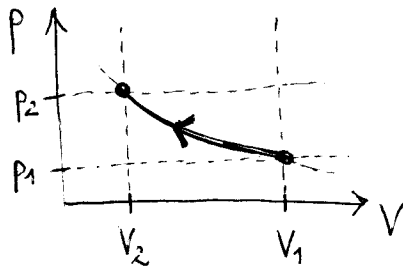
27.)  $V_1 = 10 \text{ dm}^3$   $p_1 = 0,1 \text{ MPa}$   $T = \text{all}$   $Q = -3,14 \text{ kJ}$   
 $p_2 = ?$

$$E_b = \frac{f}{2} nRT = \frac{f}{2} pV$$

$$\Delta E_b = Q + W$$

$$\delta W = -p dV$$

$$pV = nRT$$



$$\Delta T = 0$$

$$\Delta E_b = 0 \rightarrow Q + W = 0 \rightarrow W = 3140 \text{ J}$$

$$pV = nRT$$

$$p_1 V_1 = p_2 V_2$$

$$p = \frac{nRT}{V} = \frac{p_1 V_1}{V}$$

$$\bullet \frac{p_1}{p_2} = \frac{V_2}{V_1}$$

$$\delta W = -p dV = -\frac{p_1 V_1}{V} dV$$

$$W = - \int_{V_1}^{V_2} \frac{p_1 V_1}{V} dV = -p_1 V_1 \int_{V_1}^{V_2} \frac{dV}{V} = -p_1 V_1 [\ln V]_{V_1}^{V_2} = -p_1 V_1 (\ln V_2 - \ln V_1)$$

$$W = p_1 V_1 \ln \frac{V_1}{V_2} = p_1 V_1 \ln \frac{p_2}{p_1}$$

$$\frac{W}{p_1 V_1} = \ln \frac{p_2}{p_1}$$

$$e^{\frac{W}{p_1 V_1}} = \frac{p_2}{p_1}$$

$$p_2 = p_1 e^{\frac{W}{p_1 V_1}} = 0,1 \text{ MPa} \cdot e^{\frac{3140 \text{ J}}{10^5 \text{ Pa} \cdot 0,01 \text{ m}^3}} = \underline{\underline{2,31 \text{ MPa}}}$$