

$$10) \quad \Delta U = -\Delta L = C_V (T_f - T_i) = 623 \text{ J}$$

$$a) \quad h = \frac{\Delta L}{\rho g} = 318 \text{ m}$$

$$b) \quad V_0 = RT_0/p_0 = 41 \text{ l} \quad ; \quad V_f = V_0 + h S = 50 \text{ l}$$

c) Espansione nel vuoto di un gas: irreversibile

$$\Delta S = \int_{T_0}^{T_f} C_V \frac{dT}{T} + \int_{V_0}^{V_f} \frac{R dV}{V} = \frac{3}{2} R \ln \frac{T_f}{T_i} + R \ln \frac{V_f}{V_i} = 0,336 \text{ J/K}$$

$$20) \quad C dT = C_V dT + p dV = C_V dT + \frac{RT dV}{V}$$

$$\frac{(C_V - C)/R}{T} \quad V = v_0 T \quad \alpha = \frac{C_V - C}{R} = 95$$

$$T_f = \frac{T_0}{2} \quad T_f = 740 \text{ K}$$

$$\Delta U = \frac{3}{2} R (T_f - T_i) = -2735 \text{ J}$$

$$\Delta S = \int_{T_0}^{T_f} \frac{dQ}{T} = C \int_{T_0}^{T_f} \frac{dT}{T} = R \ln \frac{T_f}{T_i} = -11,4 \text{ J/K}$$