a) $PV = mRT \Leftrightarrow P = \frac{mRT}{V} = 6 \times 10^5\ Pa$

$V_q = \sqrt{\frac{3K_BT}{m_0}} \Leftrightarrow T = \frac{V_q^2 m_0}{3K_B} = 288.7\ K$

B //

b 1) isobárico $\Rightarrow \Delta P = 0 \rightarrow P_f = P_i$

$PV = mRT$

$\frac{T_i}{T_f} = \frac{\frac{PV_i}{mR}}{\frac{PV_f}{mR}} = \frac{V_i}{V_f} = 0{,}8 \rightarrow A$ //

b 2) $W = -\int P\,dV$

Isobárica : $W = -P(V_f - V_i)$

Isotérmica : $W = -\int \frac{mRT}{V} dV = -mRT \ln\left(\frac{V_f}{V_i}\right)$

$\rightarrow C$ //

b 3) $T_i = 290\ K$

Isotérmico $\rightarrow \Delta T = 0 \Rightarrow \Delta U = 0$

$\Delta U = W + Q \rightarrow \Delta U = 0 \rightarrow W + Q = 0 \rightarrow Q = -W = mT_i \ln\left(\frac{V_f}{V_i}\right) R = 6{,}5R \rightarrow A$ //

b 4) $\Delta U = m c_v \Delta T \rightarrow D$ //

c) Monoatómico $\rightarrow$ 3 graus de liberdade $c_v = \frac{3}{2}R \rightarrow c_p = c_v + R = 2.5R \rightarrow A$ //