P #G

Ch 12 Worksheet

a) $W = -P \cdot \Delta V$

$= -(4 \times 10^5 \text{ Pa})(5 \times 10^{-3} - 2 \times 10^{-3} \text{ m}^3)$

$\boxed{W_{AB} = -1200 \text{ J}}$

b) $\Delta KE = \frac{3}{2} \cdot k_B \cdot \Delta T$ OR $\Delta U = \frac{3}{2} \cdot n \cdot R \cdot \Delta T$

$\Delta U = \frac{3}{2} \cdot (.48 \text{ mol})(8.31 \text{ J/mol} \cdot \text{K})(500 \text{ K} - 200 \text{ K})$

$\boxed{\Delta U_{AB} = +1800 \text{ J}}$

c) $\Delta U = W + Q$

$+1800 \text{ J} = (-1200 \text{ J}) + Q$

$\boxed{Q_{AB} = +3000 \text{ J}}$

d) $\boxed{W_{BC} = 0 \text{ J}}$ $(\Delta V = 0)$

e) $\Delta U = \frac{3}{2} \cdot n \cdot R \cdot \Delta T = \frac{3}{2} \cdot (.48 \text{ mol})(8.31 \text{ J/mol K})(250 \text{ K} - 500 \text{ K})$

$\boxed{\Delta U_{BC} = -1500 \text{ J}}$

f) $\Delta U = W + Q$

$-1500 \text{ J} = 0 + Q$ $\boxed{Q_{BC} = -1500 \text{ J}}$