

90. In a constant-pressure process, the work done is $W = p\Delta V$. Using the ideal gas law (assuming the number of moles is constant) this becomes $W = nR\Delta T$. Therefore,

$$W = (3.00 \text{ mol}) \left(8.31 \frac{\text{J}}{\text{mol} \cdot \text{K}} \right) (-75\text{K}) \approx -1870 \text{ J} .$$

Now, the First Law of Thermodynamics (Eq.19-24) yields

$$\Delta E_{\text{int}} = Q - W = (-4670) - (-1870) = -2800 \text{ J} .$$