Answer on Question #75208, Physics / Molecular Physics | Thermodynamics

A gas in a close container is heated with $Q = 10$ joules of energy causing the lid of the container to rise $h = 2$ meters with $F = 3$ newton net force. What is the total change in energy of the system?

Solution:

The first law of thermodynamics states

$$Q = \Delta U + W$$

The work done

$$W = F \times h = 3 \times 2 = 6\,\text{J}$$

So, the total change in energy of the gas

$$\Delta U = Q - W = 10 - 6 = 4\,\text{J}$$

Answer: 4 J