Question. The volume of $1\ kg$ of water at $100°C$ is $10^{-3}\ m^3$ and the volume of $1\ kg$ of steam at normal pressure is $1.671\ m^3$ latent heat of steam is $2.3\ \cdot 10^6\ joule\ per\ kg$ and the normal pressure is $10^5\ N/m^2$ How much work will be done in converting $5\ kg$ of water at hundred degree Celsius into steam at the same pressure and temperature.

Solution.

The work done is equal

$$W = \int dW = \int_{V_i}^{V_f} pdV = p(V_f - V_i) = 10^5 \cdot (5 \cdot 1.671 - 5 \cdot 10^{-3}) = 8.35 \cdot 10^5\ J.$$

Answer. $W = 8.35 \cdot 10^5\ J.$