from saturation table T_{sat} @ $P_1 = 5$ bar is $T_{sat1} = 151.83°C$

T_{sat} @ (3) is $T_{sat3} = 179.88°C$

(II) Process 1→2:

since isovol $W_{12} = 0$

and from SHV table internal energies can be calculated using interpolation

$$u_1 = [(160 - 151.83)°C] \cdot \frac{(2610.1 - 2560.8)\frac{kJ}{kg}}{(180 - 151.83)°C} + 2560.8 \frac{kJ}{kg}$$

$$u_1 = 2575.1 \frac{kJ}{kg}$$

$$\therefore U_1 = (1.0\,kg)u_1 = 2575.1\ kJ$$

also $V_1 = (1.0\,kg)v_1 = v_1 = \left\{[(160 - 151.83)°C] \cdot \frac{(0.40466 - 0.37484)\frac{m^3}{kg}}{(180 - 151.83)°C} + 0.37484 \frac{m^3}{kg}\right\}(1.0\,kg)$

$\cong 0.3835\ m^3$

$V_2 = V_1 \Leftrightarrow v_2 = v_1$

so looking at SHV @ $P_2 = 10$ bar, v_2

$$U_2 = (1.0\,kg)u_2 = (1.0\,kg)\left\{[(0.3835 - 0.37295)\frac{m^3}{kg}] \cdot \frac{(3297.5 - 3193.3)\frac{kJ}{kg}}{(0.38847 - 0.37295)\frac{m^3}{kg}} \cdots + 3193.3 \frac{kJ}{kg}\right\}$$

$\therefore U_2 = 3297.5\ kJ$

$\therefore Q_{12} = \Delta U_{12} = U_2 - U_1 = 3297.5\ kJ - 2575.1\ kJ = 722.4\ kJ$

$W_{12} = 0$

$Q_{12} = 722\ kJ$

(II) process 2→3

first find V_3 (@ $T_3 = 179.88°C$ $P_3 = P_2 = 10$ bar)

from saturation table → $v_3 = 0.19436 \frac{m^3}{kg}$ $\therefore V_3 = 0.19436\ m^3$

then

$$W_{23} = \int_{V_2}^{V_3} P_2\,dV = (10 \times 10^5\ Pa)(0.19436 - 0.3835)\ m^3 = -189.140\ kJ$$

and using saturation table $u_3 = 2582.7 \frac{kJ}{kg}$ → $U_3 = 2582.7\ kJ$

$$\therefore Q_{23} = \Delta U_{23} + W_{23} = (2582.7 - 3297.5)kJ - 189.140\,kJ$$

$$= -900.9\ kJ$$

$W_{23} = -189\ kJ$

$Q_{23} = -901\ kJ$