Qu 5 (cont.)

	Q	W	ΔU	ΔS	
1→2	−2·485	+2·485	ϕ		isothermal
2→3	3·619	−1·034	2·585		isobaric
3→	ϕ	−2·585	−2·585	ϕ	adiabatic
Σ	1·134	−1·134	ϕ	ϕ	(all reversible)

To complete the table we need to find either ΔS_{12} or ΔS_{23}

* From Q4 for a reversible isothermal process

$$\Delta S = mR \ln\left(\frac{p_1}{p_2}\right)$$

$$= \frac{p_1 V_1}{T_1} \ln\left(\frac{p_1}{p_2}\right)$$

$$\therefore \Delta S_{12} = \frac{100\times10^3 \times 0.01}{289} \ln\left(\frac{100}{1200}\right)$$

$$= -8.6 \text{ J/kg}$$

$$= -0.0086 \text{ kJ/kg}. \quad (c)$$

$$\therefore \Delta S_{23} = +0.0086 \text{ kJ/kg} \quad (g).$$

* Alternatively $\Delta S_{23} = \frac{Q_{23}}{T_1} = -\frac{2.485}{289} = -0.0086 \text{ kJ/kg}.$