

28 A system expands by 0.75m^3 at a constant pressure of 125 kPa . Find the heat that flows into or out of the system if its internal energy

(1) increases by 65 J

(2) decreases by 1850 J

(1) Solution

Isobaric Process

$$\Delta V = 0.75\text{m}^3$$

$$P = 125\text{ kPa} = 125 \times 10^3 \text{ Pa}$$

$$W = -P\Delta V = (125 \times 10^3 \text{ Pa})(0.75\text{m}^3) = -9.375 \times 10^4 \text{ J}$$

$$\Delta U = 65\text{ J}$$

2

$$\Delta U = \Delta Q + W$$

$$\Delta Q = \Delta U - W$$

$$= 65\text{J} - (-9.375 \times 10^4\text{J})$$

$$= \boxed{9.3815 \times 10^4\text{J}}$$

(2)

$$W = -9.375 \times 10^4\text{J}$$

$$\Delta U = -1850\text{J}$$

$$\Delta U = \Delta Q + W$$

$$\Delta Q = \Delta U - W$$

$$= -1850\text{J} - (-9.375 \times 10^4\text{J})$$

$$= \boxed{9.19 \times 10^4\text{J}}$$