

$$\Delta Q_{AB} = (30 - 0) + 60 = 90 \text{ J}$$

$$(iii) \quad \Delta W_{CA} = \text{area under the line CA}.$$

$$= \left(\frac{30 + 90}{2} \right) \times 2 = -120 \text{ J}$$

$$\Delta Q_{CA} = \Delta U_{CA} + \Delta W_{CA}$$

$$\Delta Q_{CA} = (U_A - U_C) + \Delta W_{CA}.$$

$$= (0 - 80) + (-120)$$

$$\Delta Q_{CA} = -200 \text{ J} \Rightarrow \text{heat is given away by the system or.}$$

heat is taken from the system.

$$(iv) \quad \Delta W_{ABCA} = - \text{area of } \triangle abc$$

$$= - \frac{1}{2} \times 2 \times 60 = -60 \text{ J}$$