**8.*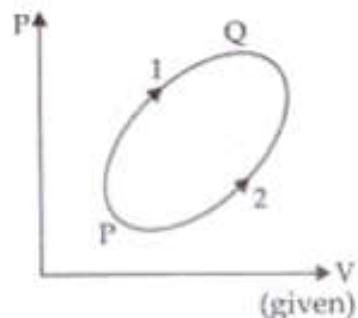* A system goes from P to Q by two different paths in the P-V diagram as shown in Figure. Heat given to the system in path 1 is 1000 J. The work done by the system along path 1 is more than path 2 by 100 J. What is the heat exchanged by the system in path 2?

(given)

Sol. For path (1) $Q_1 = + 1000$ J

$W.D = W_1 - W_2 = 100$

$W_1 = W D$ through path 1

$W_2 = WD$ through path 2

$\therefore W_2 = W_1 - 100$

As change in internal energy by path 1 and 2 are same

$\Delta U = Q_1 - W_1 = Q_2 - W_2$

$1000 - W_1 = Q_2 - (W_1 - 100)$

$1000 = Q_2 + 100$

$Q_2 = 900$ J.