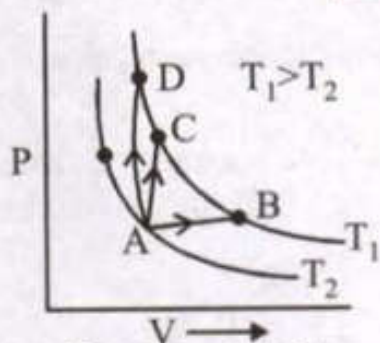


4. Three different processes that can occur in an ideal monoatomic gas are shown in the P vs V diagram. The paths are labelled as $A \rightarrow B$, $A \rightarrow C$ and $A \rightarrow D$. The change in internal energies during these process are taken as E_{AB} , E_{AC} and E_{AD} and the workdone as W_{AB} , W_{AC} and W_{AD} . The correct relation between these parameters are :

[Main 5 Sep. 2020 (I)]



- (a) $E_{AB} = E_{AC} < E_{AD}$, $W_{AB} > 0$, $W_{AC} = 0$, $W_{AD} < 0$
 (b) $E_{AB} = E_{AC} = E_{AD}$, $W_{AB} > 0$, $W_{AC} = 0$, $W_{AD} > 0$
 (c) $E_{AB} < E_{AC} < E_{AD}$, $W_{AB} > 0$, $W_{AC} > W_{AD}$
 (d) $E_{AB} > E_{AC} > E_{AD}$, $W_{AB} < W_{AC} < W_{AD}$

ans (b) Temperature change ΔT is same for all three processes

$A \rightarrow B$; $A \rightarrow C$ and $A \rightarrow D$

$$\Delta U = nC_v \Delta T = \text{same}$$

$$E_{AB} = E_{AC} = E_{AD}$$

Work done, $W = P \times \Delta V$

$AB \rightarrow$ volume is increasing $\Rightarrow W_{AB} > 0$

$AD \rightarrow$ volume is decreasing $\Rightarrow W_{AD} < 0$

$AC \rightarrow$ volume is constant $\Rightarrow W_{AC} = 0$