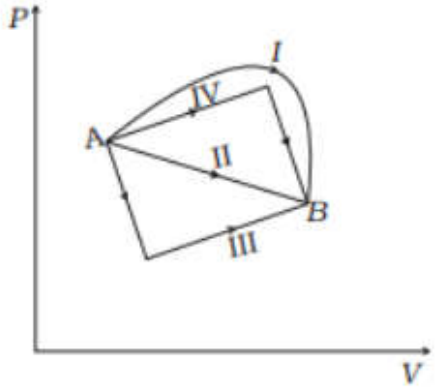
**5.** Figure shows the P-V diagram of an ideal gas undergoing a change of state from A to B. Four different parts I, II, III and IV as shown in the figure may lead to the same change of state.




a. Change in internal energy is same in IV and III cases, but not in I and II.
b. Change in internal energy is same in all the four cases.
c. Work done is maximum in case I
d. Work done is minimum in case II.

**Sol.** We know that internal energy of a system is equal to sum of all kinetic and potential energies of the particles inside it.
Total internal energy, $U = U_k + U_p$
Also, change in internal energy does not depend on the path it depends on initial and final states.
$\therefore$ internal energy is same for all the four paths.
Now,
work done is equal to the area under P-V curve
$\therefore$ work done is maximum for path 1.
option (b, c) is correct.