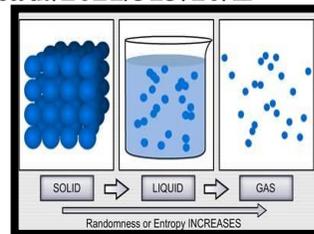


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1. Give reason for the following:
 - (a) Neither q nor w is a state function but $q + w$ is a state function.
 - (b) A real crystal has more entropy than an ideal crystal.
2. The equilibrium constant for a reaction is one or more if ΔG° for it is less than zero. Explain.
3. Many thermodynamically feasible reactions do not occur under ordinary conditions. Why?
4. Predict in which of the following, entropy increases/decreases.
 - (i) A liquid crystallizes into a solid
 - (ii) Temperature of a crystallize solid is raised from 0 K to 115 K
 - (iii) $2\text{NaHCO}_3 (\text{s}) \longrightarrow \text{Na}_2\text{CO}_3 (\text{s}) + \text{CO}_2 (\text{g}) + \text{H}_2\text{O} (\text{g})$
 - (iv) $\text{H}_2(\text{g}) \longrightarrow 2\text{H}(\text{g})$
5. 1. When liquid benzene is oxidized at constant pressure at 300 K, the change in enthalpy is -3728 kJ. What is the change in internal energy at the same temperature?
6. For an isolated system $\Delta U = 0$; what will be ΔS ?
7. What will be the work done on an ideal gas enclosed in a cylinder, when it is compressed by a constant external pressure, p_{ext} in a single step as shown in Fig. 1.1. Explain graphically.

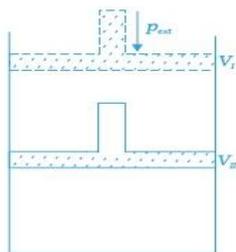
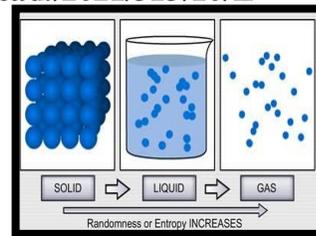
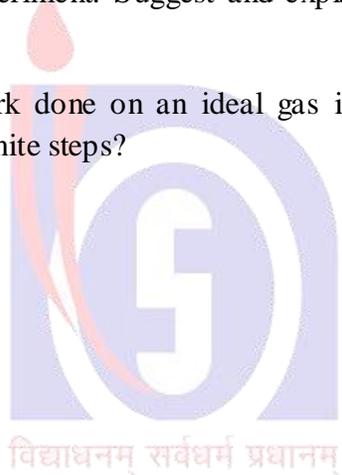


Fig-1.1

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8. Graphically show the total work done in an expansion when the state of an ideal gas is changed reversibly and isothermally from (P_i, V_i) to (P_f, V_f) . With the help of a P_V plot compare the work done in the above case with that carried out against a constant external pressure P_f .
9. The lattice enthalpy of an ionic compound is the enthalpy when one mole of an ionic compound present in its gaseous state, dissociates into its ions. It is impossible to determine it directly by experiment. Suggest and explain an indirect method to measure lattice enthalpy of NaCl(s) .
10. How will you calculate work done on an ideal gas in a compression, when change in pressure is carried out in infinite steps?



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