JEE previous year questions:

Chemical Thermodynamics-VIII

1. The incorrect expression among the following is :

    A $\frac{\Delta G_{System}}{\Delta S_{Total}} = -T$ (at constant P)

    B $K = \frac{\Delta H^\circ - T\Delta S^\circ}{RT}$

    C $K = e^{-\Delta G^\circ / RT}$

    D For isothermal process $w_{reversible} = -nRT \ln \frac{V_f}{V_i}$
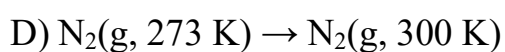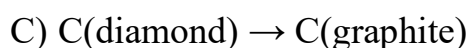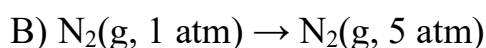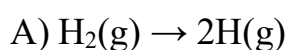
(Mains'21)

Ans: B)

Explanation:

$\Delta G^0 = -RTlnK$

$\Delta H^0 - T\Delta S^0 = -RTlnK$

$lnK = -[\Delta H^0 - T\Delta S^0]/RT$

2. For which of the following processes, ΔS is negative?
    A) $H_2(g) \rightarrow 2H(g)$
    B) $N_2(g, 1 \text{ atm}) \rightarrow N_2(g, 5 \text{ atm})$
    C) $C(\text{diamond}) \rightarrow C(\text{graphite})$
    D) $N_2(g, 273 \text{ K}) \rightarrow N_2(g, 300 \text{ K})$

(Mains'18)

Ans: **B)**

Explanation:

$N_2(g, 1 \text{ atom}) \rightarrow N_2(g, 5 \text{ atom})$
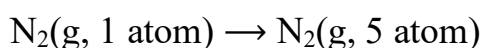
Here pressure increases. When pressure increases, the molecules will come closer and intermoleculer distance decreases, so entropy will also decrease and $\Delta S < 0$.