

[JEE (Main)-2016]

262a. For the reaction,

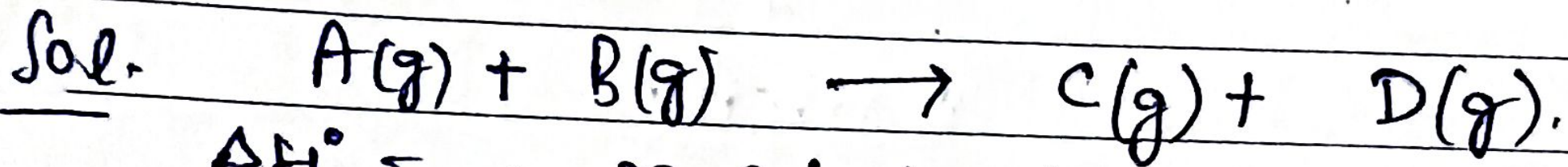
$A(g) + B(g) \rightarrow C(g) + D(g)$, ΔH° and ΔS° are, respectively, $-29.8 \text{ kJ mol}^{-1}$ and $-0.100 \text{ kJ K}^{-1} \text{ mol}^{-1}$ at 298 K. The equilibrium constant for the reaction at 298 K is

(1) 1.0×10^{-10}

(2) 1.0×10^{10}

(3) 10

(4) 1



$$\Delta H^\circ = -29.8 \text{ kJ/mol}$$

$$\Delta S^\circ = -0.100 \text{ kJ/mol}$$

We know, $\Delta G^\circ = \Delta H^\circ - T\Delta S^\circ$

$$\therefore \Delta G^\circ = -29.8 + 298 \times 0.1$$

$$\Delta G^\circ = 0$$

Also, $\Delta G^\circ = -RT \ln K_{eq}$

$$\therefore \ln K_{eq} = 0$$

$$\Rightarrow \boxed{K_{eq} = 1}$$