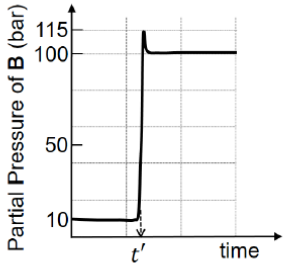
*14. Consider the reaction $A \rightleftharpoons B$ at 1000 K. At time t', the temperature of the system was increased to 2000 K and the system was allowed to reach equilibrium. Throughout this experiment the partial pressure of A was maintained at 1 bar. Given below is the plot of the partial pressure of B with time. What is the ratio of standard Gibbs energy of the reaction at 1000 K to that at 2000 K?



Sol. **0.25**

$$K_1 \text{ at } 1000\ K = \frac{10}{1} = 10$$

$$K_2 \text{ at } 2000\ K = \frac{100}{1} = 100$$

$$\Delta G_1^\circ = -RT_1 \ln 10 = -2.303RT_1$$

$$\Delta G_2^\circ = -2.303RT_2 \log 100 = -2 \times 2.303RT_2$$

$$\frac{\Delta G_1^\circ}{\Delta G_2^\circ} = \frac{1 \times 1000}{2 \times 2000} = \frac{1}{4} = 0.25$$