

Now the Gibbs energy differences between the beginning of each section and the highest activated state are considered.

In the figure, these are

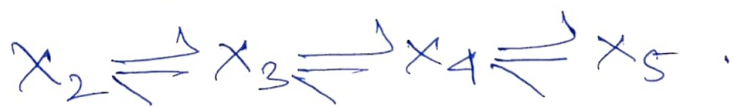
$$\Delta G_A^\ddagger = G_{\ddagger_2}^\ddagger - G_A^\ddagger$$

$$\Delta G_B^\ddagger = G_{\ddagger_4}^\ddagger - G_{X_2}^\ddagger$$

$$\Delta G_C^\ddagger = G_{\ddagger_6}^\ddagger - G_{X_5}^\ddagger$$

See the figure

The figure shows that  $\Delta G_B^\ddagger$  is the largest one. Therefore section B will control the overall reaction rate. However, the section B is not  $X_2 \rightleftharpoons X_5$ , it is originally,



Among three steps we have to find out which one is the rate determining step. We know that the rate is controlled by the highest activated complex in the sequence. In the section B, it is  $\ddagger_4$ , therefore the rate determining step that controls the overall rate is  $X_3 \rightarrow X_4$