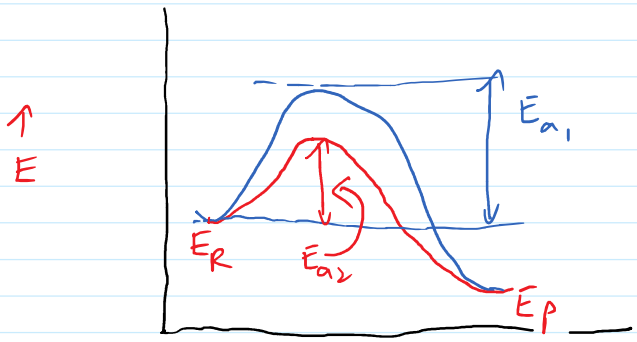
Effect of catalyst on rate constant k

i) A catalyst is a substance which increases the rate of a reaction without itself undergoing any permanent chemical change.

ii) The catalyst provides an alternate pathway or reaction mechanism by reducing the activation energy between reactants and products



Reaction coordinates →

Positive catalyst

Reaction coordinates

Negative catalyst

$$k = A\left(e^{-E_a/RT}\right)$$

It is clear from Arrhenius equation that lower the value of activation energy, faster will be the rate of a reaction.

iii) A small amount of the catalyst can catalyse a large amount of reactants.

iv) $$k_{eq} = \frac{k_f}{k_b}$$

A catalyst does not alter Gibbs energy, ΔG of a reaction. It catalyses the spontaneous reactions but does

not catalyse non spontaneous reactions.

D) A catalyst does not change the equilibrium constant of a reaction, rather it helps in attaining the equilibrium faster, that is, it catalyses the forward as well as the backward reactions to the same extent so that the equilibrium state remains same but is reached earlier.