Characteristics of Equilibrium constant

* equilibrium constant for a particular reaction is always constant
* depending only upon the temperature of the reaction and independent of the concentration of the reactants and products.
* If the reaction (having k_{eq}) is reversed then

$$A \rightarrow B \Rightarrow k$$
$$B \rightarrow A \Rightarrow \boxed{k' = 1/k}$$

* If the reaction (having k_{eq}) is divided by 2 then

$$\boxed{k' = \sqrt{k}}$$

* If the reaction (having k_{eq}) is multiplied by 2 then,

$$\boxed{k' = k^2}$$

* If the reaction (having k_{eq}) is written in two steps (having k_1 & k_2) then

$$\boxed{k' = k_1 \times k_2}$$

* The value of the equilibrium constant is not affected by the addition of a catalyst to the Reaction

3. $CaCO_{3(s)} \rightleftharpoons CaO_{(s)} + CO_{2(g)}$

Most of dissociation reaction are favoures at low pressure because dissociation normally results change in volume of system.

4. $CO_{2(g)} \rightleftharpoons CO_{2(aq)}$

Solubility of any gas in any liquid is favoures at high pressure.

5. $M_{(s)} + X_{(g)} \rightleftharpoons M-X_{(s)}$

The extent of absorption of any gas over any solid surface increses on the pressure.

Effect of change in ~~Pressure~~ Temperature

(i) Endo thermic Process

$A + B \rightleftharpoons C + D$ (ΔH = +ve)

$T\uparrow \Rightarrow$ The Rxn will proceed in forward direction

$T\downarrow \Rightarrow$ Rxn move backward direction

(ii) exo thermic Process

$A + B \rightleftharpoons C + D$ (ΔH = -ve)

$T\downarrow \Rightarrow$ forward Rxn

$T\uparrow \Rightarrow$ backward Rxn

Application

1. $N_2 + O_2 \rightleftharpoons 2NO$ (ΔH = +ve)

For higher yield of NO, temperature should be high.