BSC I - PAPER-2

La-chatelier principle:

If a system is in equilibrium and factor effecting chemical equilibrium like temperature pressure or concentration is changed, the equilibrium shifts in such a direction that it tends to reduce the effect.

For example Let us consider the reaction

(i) $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$ $\Delta H = -93$ KJ

(2) $N_2O_4(g) \rightleftharpoons 2NO_2(g)$ $\Delta H = +59.0$ KJ

(iii) $H_2 + I_2 \rightleftharpoons 2HI + Q$

Effect of pressure:- When pressure increases, the formation of NH_3 increases as sum of moles of left is 4 while moles of right is 2. But decomposition of formation of N_2O_4 i.e backward reaction will increases because number of moles in left side is less than the moles of right sides.

There is no effect in the equilibrium of (iii) reaction because

number of mole of left side (1+1=2) is equal to right side (2).

Temperature effect:- ~~Reaction of~~

First reaction of formation of NH_3 is endothermic reaction and hence increase of temperature will favour formation of NH_3 i.e chemical equilibrium shift ~~toward left~~ toward right.

Second and third reaction in example is exothermic reaction and hence increase in temperature tends the equilibrium to shift toward left i.e formation of N_2O_4 in reaction (ii) and formation of H_2 and I_2 will be increased.

Effect of concentration:- Increase in concentration of H_2 or N_2 will increase the formation of NH_3 i.e chemical equilibrium shift toward right. Similarly increase in concentration of N_2O_4 in reaction (i) will increases the formation of NO_2 and increase in concentration of H_2 or I_2 will increase the formation of HI so that it reduce the effect.