Date Planned : __ / __ / __	Daily Tutorial Sheet-1	Expected Duration : 90 Min
Actual Date of Attempt : __ / __ / __	JEE Advanced (Archive)	Exact Duration :________

1. If equilibrium constant for the reaction, $A_2 + B_2 \rightleftharpoons 2AB$, is K, then for the backward reaction $AB \rightleftharpoons \frac{1}{2}A_2 + \frac{1}{2}B_2$, the equilibrium constant is $\frac{1}{K}$. (True/False) **(1984)**

2. One mole of nitrogen is mixed with three moles of hydrogen in a four litre container. If 0.25 per cent of nitrogen is converted to ammonia by the following reaction $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$, then calculate the equilibrium constant, K_c in concentration units. What will be the value of K_c for the following equilibrium? **(1984)**

$$\frac{1}{2}N_2(g) + \frac{3}{2}H_2(g) \rightleftharpoons NH_3(g)$$

3. When a liquid and its vapour are at equilibrium and the pressure is suddenly decreased, cooling occurs. (True/False) **(1984)**

***4.** For the gas phase reaction, $C_2H_4 \rightleftharpoons C_2H_6 \quad (\Delta H = -32.7 \text{ kcal})$ **(1984)**

Carried out in a vessel, the equilibrium concentration of C_2H_4 can be increased by :

(A) increasing the temperature **(B)** decreasing the pressure

(C) removing some H_2 **(D)** adding some C_2H_6

5. The equilibrium constant of the reaction $A_2(g) + B_2(g) \rightleftharpoons 2AB(g)$ at $100°C$ is 50. If a one litre flask containing one mole of A_2 is connected to a two litre flask containing two moles of B_2, how many moles of AB will be formed at 373 K? **(1985)**

***6.** When $NaNO_3$ is heated in a closed vessel, oxygen is liberated and $NaNO_2$ is left behind. At equilibrium, **(1986)**

(A) adding of $NaNO_2$ favours reverse reaction

(B) adding of $NaNO_3$ favours forward reaction

(C) increasing temperature favours forward reaction

(D) increasing pressure favours reverse reaction

7. Catalyst makes a reaction more exothermic. **(1987)**

8. At a certain temperature, equilibrium constant (K_c) is 16 for the reaction; **(1987)**

$$SO_2(g) + NO_2(g) \rightleftharpoons SO_3(g) + NO(g)$$

If we take one mole each of all the four gases in a one litre container, what would be the equilibrium concentrations of NO and NO_2?

9. N_2O_4 is 25% dissociated at $37°C$ and one atmosphere pressure. Calculate (i) K_p and (ii) the percentage dissociation at 0.1 atm and $37°C$. **(1988)**

10. The equilibrium constant K_p of the reaction, $2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$ is 900 atm at 800 K. A mixture containing SO_3 and O_2 having initial pressure of 1 and 2 atm respectively is heated at constant volume to equilibrate. Calculate the partial pressure of each gas at 800K. **(1989)**

11. For the reaction, $CO(g) + 2H_2 \rightleftharpoons CH_3OH(g)$ hydrogen gas is introduced into a five litre flast at 327°C,s containing 0.2 mole of CO(g) and a catalyst, until the pressure is 4.92 atm. At this point 0.1 mole of $CH_3OH(g)$ is formed. Calculate the equilibrium constant, K_p and K_c. **(1990)**

***12.** For the reaction, $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$ the forward reaction at constant temperature is favoured by: **(1991)**

(A) introducing an inert gas at constant volume

(B) introducing chlorine gas at constant volume

(C) increasing the volume of the container

(D) introducing PCl_5 at constant volume

13. The rate of an exothermic reaction increase with increasing temperature. (True/False) **(1993)**

14. 0.15 mole of CO taken in a 2.5L flask is maintained at 752 K along with a catalyst so that the following reaction can take place: **(1993)**

$$CO(g) + H_2 \rightleftharpoons CH_3OH(g)$$

Hydrogen is introduced until the total pressure of the system is 8.5 atm at equilibrium and 0.08 mole of methanol is formed. Calculate (i) K_p and K_c and (ii) the final pressure is the same amount of CO and H_2 as before are used, but with no catalyst so that the reaction does not take place.

15. A ten-fold increase in pressure on the reaction, $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$ at equilibrium, results in............in K_p. **(1996)**