Time : 5 Hour | STD 11 Science chemistry | Total Marks : 400

kd700+ neet target ch-6 equilibrium part -1

* Chemistry [400]

1. In which of the following equilibria, K_p and K_c are NOT equal?
   (A) $H_{2(g)} + I_{2(g)} \rightleftharpoons 2HI_{(g)}$
   (B) $CO_{(g)} + H_2O_{(g)} \rightleftharpoons CO_{2(g)} + H_{2(g)}$
   (C) $2BrCl_{(g)} \rightleftharpoons Br_{2(g)} + Cl_{2(g)}$
   (D) $PCl_{5(g)} \rightleftharpoons PCl_{3(g)} + Cl_{2(g)}$

2. The equilibrium concentrations of the species in the reaction $A + B \rightleftharpoons C + D$ are $2, 3, 10$ and $6\,mol\,L-1$, respectively at $300\,K.\Delta G^\circ$ for the reaction is ($R = 2\,cal/mol\,K$)
   (A) $-13.73\,cal$ (B) $1372.60\,cal$ (C) $-137.26\,cal$ (D) $-1381.80\,cal$

3. For the reversible reaction,
   $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)} +$ heat
   The equilibrium shifts in forward direction
   (A) by increasing the concentration of $NH_{3(g)}$
   (B) by decreasing the pressure
   (C) by decreasing the concentrations of $N_{2(g)}$ and $H_{2(g)}$
   (D) by increasing pressure and decreasing temperature.

4. $KMnO_4$ can be prepared from K_2MnO_4 as per the reaction,
   $3MnO_4^{2-} + 2H_2O \rightleftharpoons 2MnO_4^- + MnO_2 + 4OH^-$
   The reaction can go to completion by removing OH^- ions by adding
   (A) CO_2 (B) SO_2 (C) HCl (D) KOH

5. The rate of forward reaction is two times that of reverse reaction at a given temperature and identical concentration. $K_{equilibrium}$ is
   (A) 2.5 (B) 2 (C) 0.5 (D) 1.5

6. For the reaction : $H_{2(g)} + CO_{2(g)} \rightleftharpoons CO_{(g)} + H_2O_{(g)}$, if the initial concentration of $[H_2] = [CO_2]$ and x moles/litre of hydrogen is consumed at equilibrium, the correct expression of K_p is
   (A) $\frac{x^2}{(1-x)^2}$ (B) $\frac{(1+x)^2}{(1-x)^2}$
   (C) $\frac{x^2}{(2+x)^2}$ (D) $\frac{x^2}{1-x^2}$

7. The equilibrium constant of the reaction $H_{2(g)} + I_{2(g)} \rightleftharpoons 2HI_{(g)}$ is 64. If the volume of the container is reduced to one fourth of its original volume, the value of the

equilibrium constant will be

(A) 16 (B) 32 (C) 64 (D) 128

8. $CaCO_{3(s)} \rightleftharpoons CaO_{(s)} + CO_{2(g)}$ which of the following expression is correct

(A) $K_P = (P_{CaO} + P_{CO_2}/P_{CaCO_3})$

(B) $K_P = P_{CO_2}$

(C) $K_P \times (P_{CaO} \times P_{CO_2}).P_{CaCO_3}$

(D) $\frac{K_p[CaO][CO_2]}{[CaCO_3]}$

9. One mole of a compound AB reacts with one mole of a compound CD according to the equation $AB + CD \rightleftharpoons AD + CB$. When equilibrium had been established it was found that $\frac{3}{4}$mole each of reactant AB and CD had been converted to AD and CB. There is no change in volume. The equilibrium constant for the reaction is

(A) $\frac{9}{16}$ (B) $\frac{1}{9}$ (C) $\frac{16}{9}$ (D) 9

10. One mole of SO_3 was placed in a litre reaction vessel at a certain temperature. The following equilibrium was established $2SO_3 \rightleftharpoons 2SO_2 + O_2$ At equilibrium 0.6 moles of SO_2 were formed. The equilibrium constant of the reaction will be

(A) 0.36 (B) 0.45 (C) 0.54 (D) 0.675

11. Consider the imaginary equilibrium $4A + 5B \rightleftharpoons 4X + 6Y$ The equilibrium constant K_c has the unit

(A) Mole^2 litre^{-2} (B) Litre mole^{-1} (C) Mole litre^{-1} (D) Litre^2 mole^{-2}

12. For the system $2A(g) + B(g) \rightleftharpoons 3C(g)$, the expression for equilibrium constant K is

(A) $\frac{[2A]\times[B]}{[3C]}$ (B) $\frac{[A]^2\times[B]}{[C]^3}$ (C) $\frac{[3C]}{[2A]\times[B]}$ (D) $\frac{[C]^3}{[A]^2\times[B]}$

13. For the reaction

$2NO_2(g) \rightleftharpoons N_2O_4(g)$ at $300\,K$

The value of Kp is $2\,atm^{-1}$. The total pressure at equilibrium is $10\,atm$. If volume of container become two times of its original volume, what will be its equilibrium pressure at $300\,K$ ......atm

(A) 6.4 (B) 4.51 (C) 6 (D) 5.19

14. The equilibrium constants K_{p_1} and K_{p_2} for the reaction

$X \rightleftharpoons 2Y$ and $Z \rightleftharpoons P + Q$,

respectively are in the ratio of $1:4$. If the degree of dissociation of X is 2 times that of Z, then the ratio of total pressure $(P_1 : P_2)$ at these equilibria is : (Assume degree of dissociation for both reactions are very very small)

(A) $1:36$ (B) $1:16$ (C) $1:64$ (D) None of these

15. In a reversible reaction $A \underset{k_2}{\overset{k_1}{\longleftrightarrow}} B$, the initial concentration of A and B are a and b and the equilibrium concentration are $(a-x)$ and $(b+x)$ respectively. Express " x " in terms of k_1, k_2, a and b

(A) $\frac{k_1 a - k_2 b}{k_1 + k_2}$ (B) $\frac{k_1 a - k_2 b}{k_1 - k_2}$ (C) $\frac{k_1 a - k_2 b}{k_1 k_2}$ (D) $\frac{k_1 a + k_2 b}{k_1 + k_2}$

16. In a system $A(s) \rightleftharpoons 2B(g) + 3C(g)$, if the concentration of C at equilibrium is increased by a factor of 2, it will cause the equilibrium concentration of B to change to

(A) two times the original value (B) one half of its original value

(C) $2\sqrt{2}$ times to the original value (D) $\frac{1}{2\sqrt{2}}$ times the original value

17. Find the value of $\frac{P}{k_p}$ for reaction at a certain temperature is :-
$2NOBr(g) \rightleftharpoons 2NO(g) + Br_2(g)$, where P is the total pressure of gases at equilibrium and $P_{Br_2} = \frac{P}{9}$

(A) 9 (B) 81 (C) 27 (D) 3

18. 40% of a mixture of $0.2\,mol$ of N_2 and $0.6\,mol$ of H_2 reacts to give NH_3 according to the equation.
$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3\,(g)$
at constant temperature and pressure. Then the ratio of the final volume to the initial volume of gases are.

(A) $4:5$ (B) $5:4$ (C) $7:10$ (D) $8:5$

19. In reaction $A + 2B \rightleftharpoons 2C + D$, initial concentration of B was 1.5 times of $[A]$, but at equilibrium the concentrations of A and B became equal. The equilibrium constant for the reaction is

(A) 4 (B) 6 (C) 12 (D) 8

20. The reaction $A(g) + 2B(g) \longrightarrow C(g) + D(g)$ is an elementary process. In an experiment, the initial partial pressure of A and B are 0.6 and $0.8\,atm$, respectively. When partial pressure of C is $0.2\,atm$, the rate of reaction relative to the initial rate is

(A) $1/48$ (B) $1/24$ (C) $9/16$ (D) $1/6$

21. Eight moles of a gas AB_3 attained equilibrium in a closed container of volume $1\,dm^3$ is. $2AB_{3(g)} \rightleftharpoons A_{2(g)} + 3B_{2(g)}$ If at equilibrium $2\,moles$ of A_2 are present then equilibrium constant is......$mol^2\,L^{-2}$

(A) 72 (B) 36 (C) 3 (D) 27

22. If equilibrium constant of a reaction is 20.0, at equilibrium, rate constant of forward reaction is 10.0, then rate constant for backward reaction is

(A) 0.5 (B) 2 (C) 10 (D) 200

23. In a chemical equilibrium $A+B \rightleftharpoons C+D$ when $1\,mole$ each of two reactants are mixed, $0.5\,mol$ each of the products are formed. The equilibrium constant is

(A) 5 (B) 1 (C) 1.5 (D) None

24. For the reaction $2NOBr(g) \rightleftharpoons 2NO(g)+Br_2(g)$, if $P_{Br_2}=\frac{P}{9}$ at equilibrium and P is total presssure, then find $\frac{K_P}{P}$?

(A) $\frac{1}{9}$ (B) $\frac{1}{81}$ (C) $\frac{1}{27}$ (D) $\frac{1}{3}$

25. For the reaction
$SnO_2(s)+2H_2(g) \rightleftharpoons 2H_2O(g)+Sn(l)$
At equilibrium, the mixture of steam and hydrogen contains 40% H_2 by volume then find K_p for the reaction

(A) $\frac{9}{4}$ (B) $\frac{3}{2}$ (C) $\frac{6}{4}$ (D) None of these

26. A mixture of SO_2 and O_2 at $5\,atm$ pressure reacts 30% till equilibrium. Determine the pressure of equilibrium mixture ......atm
$2SO_2(g)+O_2(g) \rightleftharpoons 2SO_3$

(A) 5 (B) 2.5 (C) 4.5 (D) 9

27. For the reaction,
$C(s) + CO_2(g) \rightleftharpoons 2CO(g)$,
the partial pressure of CO_2 and CO are 2.0 and $4.0\,atm$, respectively, at equilibrium. The k_p of the reaction is

(A) 0.5 (B) 4 (C) 32 (D) 8

28. Equivalent amounts of H_2 and I_2 are heated in a closed vessel till equilibrium is obtained. If 80% of the hydrogen is converted to HI, the K_c at this temperature is

(A) 64 (B) 16 (C) 0.25 (D) 14

29. If the equilibrium constant of the reaction $2HI \rightleftharpoons H_2+I_2$ is 0.25, then the equilibrium constant of the reaction $H_2+I_2 \rightleftharpoons 2HI$ would be

(A) 1 (B) 2 (C) 3 (D) 4

30. In which of the following reaction $K_p > K_c$

(A) $N_2+3H_2 \rightleftharpoons 2NH_3$ (B) $H_2+I_2 \rightleftharpoons 2HI$

(C) $PCl_3+Cl_2 \rightleftharpoons PCl_5$ (D) $2SO_3 \rightleftharpoons O_2+2SO_2$

31. For the reaction $PCl_{5(g)} \rightleftharpoons PCl_{3(g)}+Cl_{2(g)}$

(A) $K_p=K_c$ (B) $K_p=K_c(RT)^{-1}$ (C) $K_p=K_c(RT)$ (D) $K_p=K_c(RT)^2$

32. For the following gaseous reaction $H_2+I_2 \rightleftharpoons 2HI$, the equilibrium constant

(A) $K_p > K_c$ (B) $K_p < K_c$ (C) $K_p=K_c$ (D) $K_p=1/K_c$

33. For which one of the following reactions $K_p=K_c$

(A) $N_2+3H_2 \rightleftharpoons 2NH_3$ (B) $N_2+O_2 \rightleftharpoons 2NO$

(C) $PCl_5 \rightleftharpoons PCl_3 + Cl_2$ (D) $2SO_3 \rightleftharpoons 2SO_2 + O_2$

34. The equilibrium constant for the reversible reaction, $N_2 + 3H_2 \rightleftharpoons 2NH_3$ is K and for the reaction $\frac{1}{2}N_2 + \frac{3}{2}H_2 \rightleftharpoons NH_3$ the equilibrium constant is K'. K and K' will be related as

(A) $K = K'$ (B) $K' = \sqrt{K}$ (C) $K = \sqrt{K'}$ (D) $K \times K' = 1$

35. The equilibrium constant for the reaction $PCl_{5(g)} \rightarrow PCl_{3(g)} + Cl_{2(g)}$ is 16. If the volume of the container is reduced to one half its original volume, the value of K_p for the reaction at the same temperature will be

(A) 32 (B) 64 (C) 16 (D) 4

36. For $N_2 + 3H_2 \rightleftharpoons 2NH_3$ equilibrium constant is k then equilibrium constant for $2N_2 + 6H_2 \rightleftharpoons 4NH_3$ is

(A) $\sqrt{k}$ (B) k^2 (C) $k/2$ (D) $\sqrt{k+1}$

37. If equilibrium constant for reaction $2AB \rightleftharpoons A_2 + B_2$, is 49, then the equilibrium constant for reaction $AB \rightleftharpoons \frac{1}{2}A_2 + \frac{1}{2}B_2$, will be

(A) 7 (B) 20 (C) 49 (D) 21

38. For reaction, $2A_{(g)} \rightleftharpoons 3C_{(g)} + D_{(g)}$, the value of K_c will be equal to

(A) $K_p(RT)$ (B) K_p/RT (C) $= K_p$ (D) None of these

39. If equilibrium constants of reaction, $N_2 + O_2 \rightleftharpoons 2NO$ is K_1 and $\frac{1}{2}N_2 + \frac{1}{2}O_2 \rightleftharpoons NO$ is K_2 then

(A) $K_1 = K_2$ (B) $K_2 = \sqrt{K_1}$ (C) $K_1 = 2K_2$ (D) $K_1 = \frac{1}{2}K_2$

40. For the following reaction in gaseous phase $CO + \frac{1}{2}O_2 \rightarrow CO_2$; K_p/K_c is

(A) $(RT)^{1/2}$ (B) $(RT)^{-1/2}$ (C) (RT) (D) $(RT)^{-1}$

41. At $700\,K$, the equilibrium constant K_p for the reaction $2SO_{3(g)} \rightleftharpoons 2SO_{2(g)} + O_{2(g)}$ is 1.80×10^{-3} and kP_a is 14, ($R = 8.314\,Jk^{-1}\,mol^{-1}$). The numerical value in moles per litre of K_c for this reaction at the same temperature will be

(A) $3.09 \times 10^{-7}\ mol - litre$

(B) $5.07 \times 10^{-8}\ mol - litre$

(C) $8.18 \times 10^{-9}\ mol - litre$

(D) $9.24 \times 10^{-10}\ mol - litre$

42. $xA_{(s)} \rightleftharpoons yB_{(g)} + zC_{(g)}$ If $\frac{k_c}{k_p} = (RT)^{-2}$, then which is correct

(A) $y + z - x = -2$ (B) $y + z - x = 2$ (C) $y + z = -2$ (D) $y + z = 2$

43. $xA_{(s)} \rightleftharpoons yB_{(g)} + zC_{(g)}$ If $\frac{k_c}{k_p} = (RT)^{-2}$, then which is correct

(A) $y + z - x = -2$ (B) $y + z - x = 2$ (C) $y + z = -2$ (D) $y + z = 2$

44. What is the unit of K_p for the reaction ?

$CS_2(g) + 4H_2(g) \rightarrow CH_4(g) + 2H_2S(g)$

(A) atm (B) atm^{+2} (C) atm^{-2} (D) atm^{-1}

45. For the complex ML_2, stepwise formation constants

$$M + L \rightleftharpoons ML$$
$$ML + L \rightleftharpoons ML_2$$

are 4 and 3. Hence, overall stability constant for

$M + 2L \rightleftharpoons ML_2$ is

(A) 12 (B) 7 (C) 1.33 (D) 0.75

46. For the equilibrium

$SO_2Cl_2(g) \rightleftharpoons SO_2(g) + Cl_2(g)$, what is the temperature at which $\frac{K_p(atm)}{K_c(M)} = \frac{1}{3}$? ...... K

(A) 0.027 (B) 0.36 (C) 36.54 (D) 4.06

47. Two gaseous equilibrium $\mathrm{SO_2(g) + \frac{1}{2}O_2(g) \rightleftharpoons SO_{3(g)}}$ and $\mathrm{2SO_{3(g)} \rightleftharpoons 2SO_{2(g)} + O_2(g)}$ have equilibrium constant K_1 and K_2 respectively at $298\,K$. Which of the following relationship between K_1 and K_2 is correct ?

(A) $K_1 = K_2$ (B) $K_2 = (K_1)^2$ (C) $K_2 = (\frac{1}{K_1})^2$ (D) $K_2 = \frac{1}{K_1}$

48. For a gaseous reaction $pA + qB \rightleftharpoons qC + pD$, Which of the following relationship is true

(A) $K_P = K_C(RT)^{p+q}$

(B) $K_P = K_C$

(C) $K_P = K_C(RT)^{p-q}$

(D) $K_P = K_C(RT)^{\left(\frac{1}{p+q}\right)}$

49. The overall complex dissociation equilibrium constant for the complex $[Cu(NH_3)_4]^{2+}$ ion will be (β_4 for this complex is 2.1×10^{13}) $\beta_4 =$ association constant

(A) 4.7×10^{-14} (B) 2.1×10^{13} (C) 11.9×10^{-2} (D) 2.1×10^{-13}

50. Which of the following expression is true regarding formation of $PCl_{5(g)}$.

$PCl_{3(g)} + Cl_2(g) \rightleftharpoons PCl_{5(g)}$

(A) $\frac{Kp}{Kc} < 1$ (B) $\frac{Kp}{Kc} = 1$ (C) $\frac{Kp}{Kc} > 1$ (D) None

51. The equilibrium $PCl_{5(g)} \rightleftharpoons PCl_{3(g)} + Cl_{2(g)}$ shows that $K_P\,(atm)$ is double to the value of K_C $(mol/litre)$ at a particular temperature T, then T is ......K

(A) 300 (B) 48.72 (C) 12.18 (D) 24.36

52. For the reactions

$A \rightleftharpoons B$ $K_C = 2$

$B \rightleftharpoons C$ $K_C = 3$

$C \rightleftharpoons D+E \qquad K_C = 5$

K_C for the reaction $A \rightleftharpoons D+E$ is

(A) $2+3+5$ (B) $\frac{2\times3}{5}$ (C) $\frac{5\times3}{2}$ (D) $2\times3\times5$

53. For the reactions

$2NO + O_2 \rightleftharpoons 2NO_2\,;\, K_1$

$4NO + 2Cl_2 \rightleftharpoons 4NOCl\,;\, K_2$

$NO_2 + \frac{1}{2}Cl_2 \rightleftharpoons NOCl + \frac{1}{2}O_2\,;\, K_3$

where K_1, K_2, K_3 are equilibrium constants then K_3^2 equal to

(A) $\sqrt{K_2/K_1}$ (B) $\sqrt{K_1K_2}$ (C) $\sqrt{K_2}/K_1$ (D) $\frac{1}{K_1K_2}$

54. From the given data of equilibrium constant of following reactions

$CO_{2(s)} + H_{2(g)} \rightleftharpoons CO_{(s)} + H_2O(g)\,;\, K_1$

$CO_{2(s)} + CO(g) \rightleftharpoons CO_{(s)} + CO_2(g)\,;\, K_2$

Calculate the equilibrium for the reaction

$CO_{2(s)} + H_2(g) \rightleftharpoons CO(g) + H_2O(g)$

(A) $\frac{K_1}{K_2}$ (B) $K_1.K_2$ (C) $\frac{K_2}{K_1}$ (D) K_1+K_2

55. For the reaction

$N_2O_4(g) \rightleftharpoons 2NO_2(g),\ \frac{K_c}{K_p}$ is

(A) $(RT)^2$ (B) $(RT)^{-2}$ (C) $(RT)^1$ (D) $(RT)^{-1}$

56. Find out the value of K_C for the following reaction from the value of K_P

$2NOCl(g) \rightleftharpoons 2NO(g) + Cl_2(g)$

[Given : $K_P = 8\times10^{12}\,atm$ at $500\,K$ use $R = 0.08\,L\,atm\,mol^{-1}\,K^{-1}$]

(A) $32\times10^{13}\,mol\,L^{-1}$ (B) $8\times10^{12}\,mol\,L^{-1}$ (C) $2\times10^{11}\,mol\,L^{-1}$ (D) None of these

57. $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g); K_1$

$NH_3(g) \rightleftharpoons \frac{1}{2}N_2(g) + \frac{3}{2}H_2(g)\,;\, K_2$

$\frac{1}{2}N_2(g) + \frac{3}{2}H_2(g) \rightleftharpoons NH_3(g); K_3$

$2NH_3(g) \rightleftharpoons N_2(g) + 3H_2(g); K_4$

If $K_1 = K_2^x = K_3^y = K_4^z$ then correct values of x, y and z are respectively

(A) $2, 1, -2$ (B) $-1, 2, -2$ (C) $-2, 2, 1$ (D) $-2, 2, -1$

58. In which of the following K_p is less than K_c ?

(A) $N_2O_4 \rightleftharpoons 2NO_2$ (B) $2HI \rightleftharpoons H_2 + I_2$

(C) $2SO_2 + O_2 \rightleftharpoons 2SO_3$ (D) $N_2 + O_2 \rightleftharpoons 2NO$

59. process $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)} + heat$

(A) $K_p = K_c$ (B) $K_p = K_c\,(RT)^{-1}$ (C) $K_p = K_c\,(RT)^{-2}$ (D) $K_p = K_c\,(RT)$

60. At a certain temperature the equilibrium constant K_c is 0.25 for the reaction

$A_2(g) + B_2(g) \rightleftharpoons C_2(g) + D_2(g)$

If we take 1 mole of each of the four gases in a 10 litre container, what would be equilibrium concentration of $A_2(g)$?

(A) $0.331\,M$ (B) $0.033\,M$ (C) $0.133\,M$ (D) $1.33\,M$

61. The equilibrium constant K and reaction quotient Q are in ratio $0.33:1$. It means that

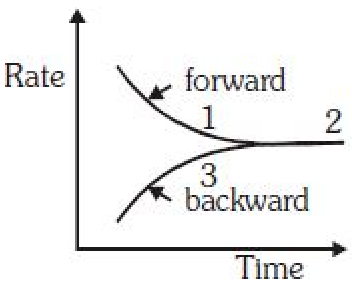
(A) The reaction mixture will equilibrate to form more reactant species

(B) The reaction mixture will equilibrate to form more product species

(C) The equilibrium ratio of reactant to product concentrations will be 3

(D) The equilibrium ratio of reactant to product concentrations will be 0.33

62. In the reaction $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$ a graph in plotted to show the variation of rate of forward and backward reactions against time. Which of the following is correct ?



(A) $Q > K_{eq} \to 3, Q = K_{eq} \to 2, Q < K_{eq} \to 1$

(B) $Q > K_{eq} \to 1, Q = K_{eq} \to 2, Q < K_{eq} \to 3$

(C) $Q > K_{eq} \to 2, Q = K_{eq} \to 3, Q < K_{eq} \to 1$

(D) $Q > K_{eq} \to 2, Q = K_{eq} \to 1, Q < K_{eq} \to 3$

63. If in the reaction $N_2O_4 = 2NO_2$, α is that part of N_2O_4 which dissociates, then the number of moles at equilibrium will be

(A) 3 (B) 1 (C) $(1-\alpha)^2$ (D) $(1+\alpha)$

64. At a certain temp. $2HI \rightleftharpoons H_2 + I_2$ Only 50% HI is dissociated at equilibrium. The equilibrium constant is

(A) 0.25 (B) 1 (C) 3 (D) 0.5

65. In the reaction, $H_2 + I_2 \rightleftharpoons 2HI$. In a 2 litre flask 0.4 moles of each H_2 and I_2 are taken. At equilibrium 0.5 moles of HI are formed. What will be the value of equilibrium constant, K_c

(A) 20.2 (B) 25.4 (C) 0.284 (D) 11.1

66. The vapour density of completely dissociated NH_4Cl would be

(A) Slight less than half that of NH_4Cl

(B) Half that of NH_4Cl

(C) Double that of NH_4Cl

(D) Determined by the amount of solid NH_4Cl in the experiment

67. If dissociation for reaction, $PCl_5 \rightleftharpoons PCl_3 + Cl_2$ is 20% at $1\ atm.$ pressure. Calculate K_c

(A) 0.04 (B) 0.05 (C) 0.07 (D) 0.06

68. $2SO_3 \rightleftharpoons 2SO_2 + O_2$. If $K_c = 100$, $\alpha = 1$, half of the reaction is completed, the concentration of SO_3 and SO_2 are equal, the concentration of O_2 is

(A) $0.001\,M$ (B) $\frac{1}{2}\,SO_2$ (C) 2 times of SO_2 (D) Data incomplete

69. For the reaction ,$N_2 + O_2 \rightleftharpoons 2NO$ equilibrium constant $K_c = 2$. Degree of dissociation of N_2 and O_2 are (Both have same initial moles)

(A) $\frac{1}{1+\sqrt{2}}, \frac{1}{1-\sqrt{2}}$ (B) $\frac{1}{1-\sqrt{2}}, \frac{1}{1+\sqrt{2}}$ (C) Both are $\frac{1}{1+\sqrt{2}}$ (D) Both are $\frac{1}{1-\sqrt{2}}$

70. $AB_3(g)$ is dissociates as ;
$AB_3(g) \rightleftharpoons AB_2(g) + \frac{1}{2}B_2(g)$, when the initial pressure of AB_3 is $800\,torr$ and the total pressure developed at equilibrium is $900\,torr$. What percentage of $AB_3(g)$ is dissociated?

(A) 10 (B) 20 (C) 25 (D) 30

71. For the dissociation reaction $N_2O_4\,(g) \rightleftharpoons 2NO_2(g)$, the degree of dissociation (α) in terms of K_p and total equilibrium pressure P is

(A) $\alpha = \sqrt{\frac{4P+K_p}{K_p}}$ (B) $\alpha = \sqrt{\frac{K_p}{4P+K_p}}$ (C) $\alpha = \sqrt{\frac{K_p}{4P}}$ (D) $\alpha = \sqrt{\frac{K_p}{2P}}$

72. In a saturated solution of $Mg(OH)_2$, the degree of dissociation of $Mg(OH)_2$ is α, find concentration (C) of $Mg(OH)_2$ if concentration of $[OH^-]$, is 2

(A) α (B) 2α (C) $1/\alpha$ (D) $1/2\alpha$

73. $2NOBr_{(g)} \rightleftharpoons 2NO_{(g)} + Br_{2(g)}$ If $NOBr$ is 40% discociated at certain temp. and a total pressure of $0.30\,atm.$ K_p for the reaction $2NO_{(g)} + Br_{2(g)} \rightleftharpoons 2NOBr_{(g)}$ is

(A) 45 (B) 25 (C) 0.022 (D) 0.25

74. The vapour density of a mixture containing NO_2 and N_2O_4 is 27.6 . The mole fraction of N_2O_4 in the mixture is

(A) 0.1 (B) 0.2 (C) 0.5 (D) 0.8

75. For the following equilibrium $N_2O_4 \rightleftharpoons 2NO_2$ in gaseous phase, NO_2 is 50% of the total volume when equilibrium is set up. Hence percentage of dissociation of N_2O_4 is.......$\%$

(A) 50 (B) 25 (C) 66.66 (D) 33.33

76. For the reaction $N_2\,(g) + O_2\,(g) \rightleftharpoons 2NO\,(g)$; $K_C = 2$ then degree of dissociation of O_2 is

(A) $\frac{1}{1-\sqrt{2}}$ (B) $\frac{1}{1+\sqrt{2}}$ (C) $\frac{\sqrt{2}}{1+\sqrt{2}}$ (D) $\frac{\sqrt{2}}{\sqrt{2}-1}$

77. In a saturated solution of $Mg(OH)_2$, the degree of dissociation of $Mg(OH)_2$ is α, find concentration (C) of $Mg(OH)_2$ if concentration of $[OH^-]$, is 2

(A) α (B) 2α (C) $1/\alpha$ (D) $1/2\alpha$

78. Which of the following reactions proceed at low pressure

(A) $N_2 + 3H_2 \rightleftharpoons 2NH_3$
(B) $H_2 + I_2 \rightleftharpoons 2HI$
(C) $PCl_5 \rightleftharpoons PCl_3 + Cl_2$
(D) $N_2 + O_2 \rightleftharpoons 2NO$

79. In the reaction $A_{(g)} + 2B_{(g)} \rightleftharpoons C_{(g)} + Q\,kJ$, greater product will be obtained or the forward reaction is favoured by

(A) At high temperature and high pressure
(B) At high temperature and low pressure
(C) At low temperature and high pressure
(D) At low temperature and low pressure

80. Reaction in which yield of product will increase with increase in pressure is

(A) $H_{2(g)} + I_{2(g)} \rightleftharpoons 2HI_{(g)}$
(B) $H_2O_{(g)} + CO_{(g)} \rightleftharpoons CO_{2(g)} + H_{2(g)}$
(C) $H_2O_{(g)} + C_{(s)} \rightleftharpoons CO_{(g)} + H_{2(g)}$
(D) $CO_{(g)} + 3H_{2(g)} \rightleftharpoons CH_{4(g)} + H_2O_{(g)}$

81. The equilibrium which remains uneffected by change in pressure of the reactants is

(A) $N_{2(g)} + O_{2(g)} \rightleftharpoons 2NO_{(g)}$
(B) $2SO_{2(g)} + O_{2(g)} \rightleftharpoons 2SO_{3(g)}$
(C) $2O_{3(g)} \rightleftharpoons 3O_{2(g)}$
(D) $2NO_{2(g)} \rightleftharpoons N_2O_{4(g)}$

82. In which of the following equilibrium reactions, the equilibrium would shift to the right, if total pressure is increased

(A) $N_2 + 3H_2 \rightleftharpoons 2NH_3$
(B) $H_2 + I_2 \rightleftharpoons 2HI$
(C) $H_2 + Cl_2 \rightleftharpoons 2HCl$
(D) $N_2O_4 \rightleftharpoons 2NO$

83. In which of the following gaseous equilibrium an increase in pressure will increase the yield of the products

(A) $2HI \rightleftharpoons H_2 + I_2$
(B) $2SO_2 + O_2 \rightleftharpoons 2SO_3$
(C) $H_2 + Br_2 \rightleftharpoons 2HBr$
(D) $H_2O + CO \rightleftharpoons H_2 + CO_2$

84. Which of the following conditions is favourable for the production of ammonia by Haber's process

(A) High concentration of reactants

(B) Low temperature and high pressure

(C) Continuous removal of ammonia

(D) All of these

85. What would happen to a reversible reaction at equilibrium when an inert gas is added while the pressure remains unchanged

(A) More of the product will be formed

(B) Less of the product will be formed

(C) More of the reactants will be formed

(D) It remains unaffected

86. On addition of an inert gas at constant volume to the reaction $N_2 + 3H_2 \rightleftharpoons 2NH_3$ at equilibrium

(A) The reaction remains unaffected

(B) Forward reaction is favoured

(C) The reaction halts

(D) Backward reaction is favoured

87. Le-Chatelier principle is not applicable to

(A) $H_{2(g)} + I_{2(g)} \rightleftharpoons 2HI_{(g)}$

(B) $Fe_{(S)} + S_{(S)} \rightleftharpoons FeS_{(S)}$

(C) $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$

(D) $N_{2(g)} + O_{2(g)} \rightleftharpoons 2NO_{(g)}$

88. The dissociation of phosgene, which occurs according to the reaction
$COCl_2\,(g) \rightleftharpoons CO\,(g) + Cl_2$
is an endothermic process. Which of the following will increase the degree of dissociation of $COCl_2$

(A) Adding Cl_2 to the system

(B) Adding He to the system at constant pressure

(C) Decreasing the temperature of the sytem

(D) Increasing the total pressure of the system

89. Consider given endothermic reaction at equilibrium, $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$
A graph is plotted between concentration and time as shown. Effect-1 & Effect-2 are due to respectively

(A) P increase, T increase

(B) P increase, T decrease

(C) Inert gas added at constant pressure, T increase

(D) P decrease, T decrease

90. Which of the following statement is incorrect regarding catalyst ?

(A) Does not alter, gibbs energy (ΔG) of a reaction

(B) The equilibrium position does not change in presence of a catalyst

(C) It increases speed of both forward and backward reaction

(D) Activation energy of reaction remain unaltered.

91. On heating a mixture of SO_2Cl_2 and CO , two equilibria are simultaneously established

$SO_2Cl_2(g) \rightleftharpoons SO_2(g) + Cl_2(g)$

$CO(g) + Cl_2(g) \rightleftharpoons COCl_2(g)$

On adding more SO_2 at equilibrium what will happen ?

(A) Amount of CO will decrease

(B) Amount of SO_2Cl_2 and $COCl_2$ will increase

(C) Amount of CO will remain unaffected

(D) Amount of SO_2Cl_2 and CO will increase

92. For which of the following reaction, product formation is favoured at low pressure and low temperature ?

(A) $CO_2(g) + C(s) \rightleftharpoons 2CO(g)$; $\Delta H^o = 172.5\ \mathrm{kJ}$

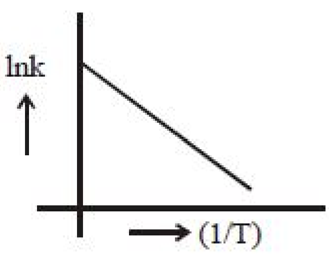
(B) $CO(g) + 2H_2(g) \rightleftharpoons CH_3OH(g)$; $\Delta H^o = -21.7\ kJ$

(C) $2O_3(g) \rightleftharpoons 3O_2(g)$; $\Delta H^o = -285\ kJ$

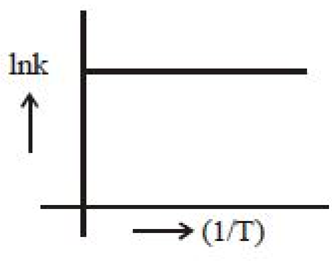
(D) $H_2(g) + F_2(g) \rightleftharpoons 2HF(g)$; $\Delta H^o = -541\ kJ$

93. An equilibrium shift towards reactants at higher temperatures. Find the correct graph

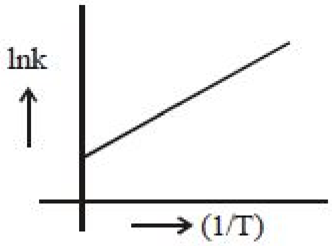
(A)



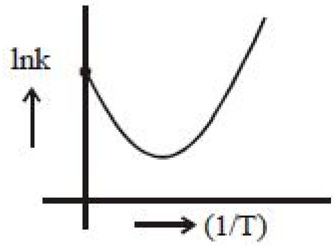
(B)



(C)



(D)



94. The equation for the reaction in the figure below is: $H_2(g) + I_2(g) - heat \rightleftharpoons 2HI(g)$
At the instant 3 min, what change was imposed into the equilibrium ?

(A) Pressure was increased
(B) Temperature was decreased
(C) Temperature was increased
(D) Hydrogen was added

95. Which of the following equilibrium is not affected by pressure ?
(A) $CaCO_{3(s)} \rightleftharpoons CaO_{(s)} + CO_{2(g)}$
(B) $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$
(C) $N_{2(g)} + O_{2(g)} \rightleftharpoons 2NO_{(g)}$
(D) $2SO_{2(g)} + O_{2(g)} \rightleftharpoons 2SO_{3(g)}$

96. Which among the following reactions is favoured in forward direction by increase of temperature?
(A) $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g) + 22.9\,kcal$
(B) $N_2(g) + O_2(g) \rightleftharpoons 2NO(g) - 42.8\,kcal$
(C) $2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g) + 45.3\,kcal$
(D) $H_2(g) + Cl_2(g) - 44\,kcal \rightleftharpoons 2HCl(g)$

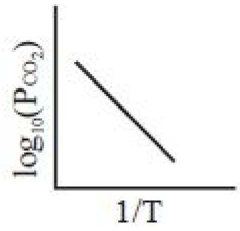
97. In which of the following equilibrium, change in volume of the system does not alter the number of moles ?
(A) $N_{2\,(g)} + O_{2\,(g)} \rightleftharpoons 2NO_{(g)}$
(B) $PCl_{5\,(g)} \rightleftharpoons PCl_{3\,(g)} + Cl_{2\,(g)}$
(C) $N_{2\,(g)} + 3H_{2\,(g)} \rightleftharpoons 2NH_{3\,(g)}$
(D) $SO_2Cl_{2\,(g)} \rightleftharpoons SO_{2\,(g)} + Cl_{2\,(g)}$

98. For the reaction; $PCl_{5(g)} \rightleftharpoons PCl_{3(g)} + Cl_{2(g)}$ the forward reaction at constant temperature is not favoured by
(A) Introducing chlorine gas at constant volume
(B) Introducing an inert gas at constant pressure
(C) Introducing PCl_5 at constant volume
(D) Increasing the volume of the container

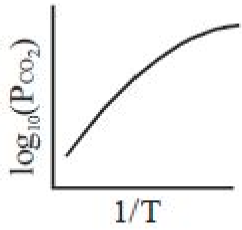
99. For the chemical reaction

$CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g)$ ΔH^o of reaction can be determined from which one of the following plots ?

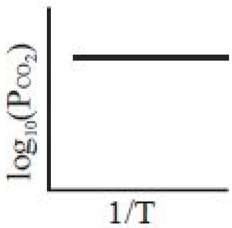
(A)



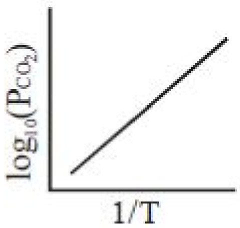
(B)



(C)



(D)



100. On heating a mixture of SO_2Cl_2 and CO two equilibria are simultaneously established

$SO_2Cl_2(g) \rightleftharpoons SO_2(g) + Cl_2(g)$

$CO(g) + Cl_2(g) \rightleftharpoons COCl_2(g)$

on adding more SO_2 at equilibrium what will happen?

(A) Amount of CO will decrease

(B) Amount of SO_2Cl_2 and $COCl_2$ will increase

(C) Amount of CO will remain unaffected

(D) Amount of SO_2Cl_2 and CO will increase

----- उद्यमेन हि सिध्यन्ति कार्याणि न मनोरथैः। न हि सुप्तस्य सिंहस्य प्रविशन्ति मुखे मृगाः।।-जीवन में सफलता पाने के लिए मेहनत और प्रयास जरूरी हैं। केवल इच्छा करने या कल्पना करने से काम नहीं बनते -----