NEET : CHAPTER WISE TEST-6

SUBJECT :- CHEMISTRY **DATE.....**

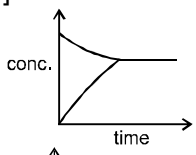
CLASS :- 11th **NAME.....**

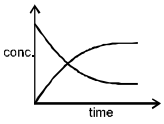
CHAPTER :- CHEMICAL EQUILIBRIUM **SECTION.....**

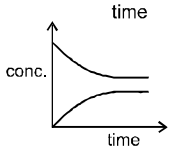
(SECTION-A)

1. Which of the following statement is incorrect :
(A) At equilibrium, concentration of reactants must be equal to concentration of products.
(B) Equilibrium can be attained in both homogenous and heterogenous reaction.
(C) Approach to the equilibrium is fast in initial state but gradually it decreases.
(D) Equilibrium is dynamic in nature

2. Rate of reaction curve for equilibrium can be like : [r_f = forward rate , r_b = backward rate]

(A) 

(B) 

(C) 

(D) All of these

3. At equilibrium rate of forward reaction is proportional to active mass's of reactants with the power of their stoichiometric coefficient. This statement is known as :
(A) Law of mass action
(B) Le-chatelie principle
(C) Faraday law of electrolysis
(D) Law of constant proportion

4. Active mass concentration of 96 g of $O_2(g)$ contained in a 2 L vessel is -
(A) 16 mol/L (B) 1.5 mol/L
(C) 4 mol/L (D) 24 mol/L

5. In a reaction $A(g) + B(g) \rightleftharpoons C(g) + D(g)$ the rate constant of forward & backward reactions are k_1 and k_2 respectively then the equilibrium constant (K) for reaction is expressed as –
(A) $K = \frac{k_2}{k_1}$ (B) $K = \frac{k_1}{k_2}$
(C) $K = k_1 \times k_2$ (D) $K = k_1 + k_2$

6. The equilibrium constant for the reaction $2X(g) + 2Y(g) \longrightarrow 2Z(g)$ is given as :
(A) $\frac{[2X]\ [2Y]}{[2Z]}$ (B) $\frac{[X]\ [Y]}{[Z]}$
(C) $\frac{[Z]^2}{[X]^2\ [Y]^2}$ (D) $\frac{[Z]^2}{[X]\ [Y]}$

7. $N_2 + O_2 \rightleftharpoons 2NO$. For this reaction K_p = 100, then K_p for reaction, $2NO \rightleftharpoons N_2 + O_2$ will be :
(A) 0.01 (B) 0.1
(C) 10 (D) 100

8. Consider the two gaseous equilibrium involving SO_2 and the corresponding equilibrium constant at 299 K $SO_2(g) + 1/2O_2(g) \rightleftharpoons SO_3(g)$; K_1
$4SO_3(g) \rightleftharpoons 4SO_2(g) + 2O_2(g)$; K_2
The value of the equilibrium constant are related by :
(A) $K_2 = \frac{1}{(K_1)^4}$ (B) $K_2 = K_1^4$
(C) $K_2 = \left(\frac{1}{K_1}\right)^{1/4}$ (D) $K_2 = \frac{1}{K_1}$

9. For a reaction $N_2 + 3H_2 \rightleftharpoons 2NH_3$, the value of K_C depends upon :
(A) Initial concentration of the reactants
(B) Pressure
(C) Temperature
(D) catalyst

10. For the following gases equilibrium, $N_2O_4(g) \rightleftharpoons 2NO_2(g)$, K_p is found to be equal to K_c. This is attained when :
(A) 0°C (B) 273 K
(C) 1 K (D) 12.19 K

11. For which reaction is $K_p = K_C$:
(A) $2\,NOCl(g) \rightleftharpoons 2NO(g) + Cl_2(g)$
(B) $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$
(C) $H_2(g) + Cl_2(g) \rightleftharpoons 2HCl(g)$
(D) $2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$

12. For hypothetical equilibrium, $4A(g) + 5B(g) \rightleftharpoons 4X(g) + 6Y(g)$
The unit of K_C will be :
(A) litre mole^{-1} (B) mole litre^{-1}
(C) litre mole^{-2} (D) mole^2 litre^{-2}

13. $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$
In above reaction, at equilibrium condition mole fraction of PCl_5 is 0.4 and mole fraction of Cl_2 is 0.3. Then find out mole fraction of PCl_3
$PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$
(A) 0.3 (B) 0.7
(C) 0.4 (D) 0.6

14. 4 moles of A are mixed with 4 moles of B, when 2 moles of C are formed at equilibrium, according to the reaction, A + B $\rightleftharpoons$ C + D. The equilibrium constant is :
(A) 4 (B) 1
(C) 8 (D) 12

15. In the reaction $2P(g) + Q(g) \rightleftharpoons 3R(g) + S(g)$. If 2 moles each of P and Q taken initially in a 1 litre flask. At equilibrium which is true :
(A) [P] < [Q] (B) [P] = [Q]
(C) [Q] = [R] (D) None of these

16. $K_c = 9$ for the reaction, A + B $\rightleftharpoons$ C + D, If A and B are taken in equal amounts, then ratio of C to A at equilibrium is :
(A) 1 (B) 0.25
(C) 0.75 (D) None of these

17. 1 mole of N_2 and 2 moles of H_2 are allowed to react in a 1 dm^3 vessel. At equilibrium, 0.8 mole of NH_3 is formed. The concentration of H_2 in the vessel is :
(A) 0.6 mol/L (B) 0.8 mol/L
(C) 0.2 mol/L (D) 0.4 mol/L

18. $PCl_5 \rightleftharpoons PCl_3 + Cl_2$ in the reversible reaction the moles of PCl_5, PCl_3 and Cl_2 are a, b and c at equilibrium respectively and total pressure is P then value of K_p is :
(A) $\frac{bc}{a}.RT$ (B) $\frac{b}{(a+b+c)}.P$
(C) $\frac{bc.P}{a\ (a+b+c)}$ (D) $\frac{c}{(a+b+c)}.P$

19. For the reaction
$A_2(g) + 3B_2 \rightleftharpoons 2C_2(g)$
the partial pressure of A_2, B_2 at equilibrium are 0.80 atm and 0.40 atm respectively. The pressure of the system is 2.80 atm. The equilibrium constant K_p will be
(A) 50 (B) 5.0 (C) 0.02 (D) 0.2

20. When two reactants, A & B are mixed to give products C & D, the reaction quotient Q, at the initial stages of the reaction :
(A) is zero
(B) decrease with time
(C) is independent of time
(D) increases with time

21. The reaction quotient Q for
$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$
is given by $Q = \frac{[NH_3]^2}{[N_2][H_2]^3}$. The reaction will proceed in backward direction, when
(A) $Q = K_C$ (B) $Q < K_C$
(C) $Q > K_C$ (D) A = 0

22. A reaction mixture containing H_2, N_2 and NH_3 has partial pressure 2 atm, 1 atm and 3 atm respectively at 725 K. If the value of K_P for the reaction, $N_2 + 3H_2 \rightleftharpoons 2NH_3$ is 4.28×10^{-5} atm^{-2} at 725 K, in which direction the net reaction will go :
(A) Forward
(B) Backward
(C) No net reaction
(D) Direction of reaction cannot be predicted

23. For the reaction,
$2A + B \rightleftharpoons 3C$ at 298 K, $K_C = 49$
A 3L vessel contains 2, 1 and 3 moles of A, B and C respectively. The reaction at the same temperature
(A) must proceed in forward direction
(B) must proceed in backward direction
(C) must be equilibrium
(D) can not be predicted

24. The dissociation of CO_2 can be expressed as $2CO_2 \rightleftharpoons 2CO + O_2$. If the 2 moles of CO_2 is taken initially and 40% of the CO_2 is dissociated equilibrium then total number of moles at equilibrium :
(A) 2.4 (B) 2.0 (C) 1.2 (D) 5

25. In a 0.25 litre tube dissociation of 4 moles of NO is take place. If its degree of dissociation is 10%. The value of K_p for reaction $2NO \rightleftharpoons N_2 + O_2$ is :
(A) $\frac{1}{(18)^2}$ (B) $\frac{1}{(8)^2}$
(C) $\frac{1}{16}$ (D) $\frac{1}{32}$

26. What will be the amount of dissociation, if the volume is increased 16 times of initial volume in the reaction $PCl_5 \rightleftharpoons PCl_3 + Cl_2$? (Assume dissociation is negligible)

(A) 4 times (B) $\frac{1}{4}$ times

(C) 2 times (D) $\frac{1}{5}$ times

27. For $NH_4HS(s) \rightleftharpoons NH_3(g) + H_2S(g)$ reaction started only with $NH_4HS(s)$, the observed pressure for reaction mixture in equilibrium is 1.2 atm at 106°C. What is the value of K_P for the reaction ?

(A) 1.44 atm^2 (B) 0.36 atm^2

(C) 0.16 atm^2 (D) 3.6 atm^2

28. The correct relationship between free energy change in a reaction and the corresponding equilibrium constant K is :

(A) $-\Delta G^o = RT \ln K$ (B) $\Delta G = RT \ln K$

(C) $-\Delta G = RT \ln K$ (D) $\Delta G^o = RT \ln K$

29. In an equilibrium reaction for which $\Delta G° = 0$, the value of equilibrium constant K = is

(A) 0 (B) 1

(C) 2 (D) 10

30. The effect of temperature on equilibrium constant is expressed as $(T_2 > T_1)$ $\log K_2 / \log K_1 = \frac{\Delta H}{2.303R}\left[\frac{1}{T_1} - \frac{1}{T_2}\right]$. For endothermic reaction false statement is

(A) $\left[\frac{1}{T_2} - \frac{1}{T_1}\right]$ = positive

(B) ΔH = positive

(C) $\log K_2 > \log K_1$

(D) $K_2 > K_1$

31. The equilibrium constant for the reaction $Br_2 \rightleftharpoons 2Br$ at 500 K and 700 K are 1×10^{-10} and 1×10^{-5} respectively. The reaction is :

(A) Endothermic (B) Exothermic

(C) Fast (D) Slow

32. For the reaction $CO(g) + H_2O(g) \rightleftharpoons CO_2(g) + H_2(g)$ at a given temperature the equilibrium amount of CO_2 (g) can be increased by :

(A) adding a suitable catalyst

(B) adding an inert gas

(C) decreasing the volume of container

(D) increasing the amount of CO(g)

33. Given the following reaction at equilibrium $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$. Some inert gas at constant pressure is added to the system. Predict which of the following facts will be affected.

(A) More $NH_3(g)$ is produced

(B) Less $NH_3(g)$ is produced

(C) No affect on the equilibrium

(D) K_p of the reaction is decreased

34. Introduction of inert gas (at the same temperature) will affect the equilibrium if :

(A) volume is constant and $\Delta n_g \neq 0$

(B) pressure is constant and $\Delta n_g \neq 0$

(C) volume is constant and $\Delta n_g = 0$

(D) pressure is constant and $\Delta n_g = 0$

35. Consider the reactions

(i) $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$

(ii) $N_2O_4(g) \rightleftharpoons 2NO_2(g)$

The addition of an inert gas at constant volume

(A) will increase the dissociation of PCl_5 as well as N_2O_4

(B) will reduce the dissociation of PCl_5 as well as N_2O_4

(C) will increase the dissociation of PCl_5 and step up the formation of NO_2

(D) will not disturb the equilibrium of the reactions

(SECTION-B)

36. Vapour density of equilibrium $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$ is decreased by

(A) increasing temperature

(B) decreasing volume

(C) increasing pressure

(D) decreasing temperature

37. For the reaction : $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$

The backward reaction at constant temperature is favoured by

(A) introducing chlorine gas at constant volume

(B) introducing an inert gas at constant pressure

(C) increasing the volume of the container

(D) introducing PCl_5 at constant volume

38. For the reaction, $\frac{1}{2}N_2(g) + \frac{1}{2}O_2(g) \rightleftharpoons NO(g)$

If pressure is increased by reducing the volume of the container then :

(A) Degree of dissociation at equilibrium will change.

(B) Concentration of all the component at equilibrium will change.

(C) Concentration of all the component at equilibrium will remain same

(D) Equilibrium will shift in the forward direction

39. When hydrogen molecules decomposed into its atoms which conditions give maximum yield of hydrogen atoms ?

(A) High temperature and low pressure

(B) Low temperature and high pressure

(C) High temperature and high pressure

(D) Low temperature and low pressure

40. A gas 'X' when dissolved in water heat is evolved. Then solublity of 'X' will increase :

(A) Low pressure, high temperature

(B) Low pressure, low temperature

(C) high pressure, high temperature

(D) high pressure, low temperature

41. For an equilibrium $H_2O(s) \rightleftharpoons H_2O(\ell)$ which of the following statements is true.

(A) The pressure changes do not affect the equilibrium

(B) More of ice melts if pressure on the system is increased

(C) More of liquid freezes if pressure on the system is increased

(D) The degree of advancement of the reaction do not depend on pressure.

42. For $N_2 + 3H_2 \rightleftharpoons 2NH_3$ equilibrium constant is K then equilibrium constant for $2N_2 + 6H_2 \rightleftharpoons 4NH_3$:

(A) $\sqrt{K}$ (B) K^2

(C) $\frac{K}{2}$ (D) $\sqrt{\frac{1}{K}} + 1$

43. Equilibrium constant for following reactions respectively K_1, K_2 and K_3

$N_2 + 3H_2 \underset{K_1}{\rightleftharpoons} 2NH_3$

$N_2 + O_2 \underset{K_2}{\rightleftharpoons} 2NO$

$H_2 + \frac{1}{2}O_2 \underset{K_3}{\rightleftharpoons} H_2O$

$2NH_3 + \frac{5}{2}O_2 \underset{K_4}{\rightleftharpoons} 2NO + 3H_2O$

Which of the following relation is incorrect.

(A) $K_1 = \frac{K_2 \times (K_3)^3}{K_4}$

(B) $K_4 = K_1 \times K_2/(K_3)^3$

(C) $K_2 = \frac{K_4 \times K_1}{(K_3)^3}$

(D) $K_4 = \frac{K_2 \times (K_3)^3}{K_1}$

44. For the reaction

$CuSO_4.5H_2O(s) \rightleftharpoons CuSO_4.3H_2O(s) + 2H_2O(g)$

Which one is correct representation :

(A) $K_P = \left(P_{H_2O}\right)^2$ (B) $K_C = [H_2O]^2$

(C) $K_P = K_C(RT)^2$ (D) All

45. Vapour density of PCl_5 is 104.16 but when heated to 230°C its vapour density is reduced to 62.. The degree of dissociation of PCl_5 at this temperature will be :

(A) 6.8 % (B) 68%

(C) 46% (D) 64%

46. Match column–I having reactions with column–II having conditions.

Column I

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

(b) $2HI(g) \rightleftharpoons H_2(g) + I_2(g)$

(c) $2(CH_3COOH)_{(g)} \rightleftharpoons (CH_3COOH)_2(g)$

Column II

(p) Extent of reaction will not increase with increase in pressure.

(q) Concentration of products will increase with increase in temperature.

(r) Increase in volume will increase moles of reactant.

(s) Introduction of inert gas at constant pressure will shift equilibrium to the product side.

(A) (a) p, s (b) p, q, r (c) r, s

(B) (a) p,q,s (b) p, q (c) r

(C) (a) p,q (b) q, r (c) r, s

(D) (a) s (b) p,s (c) r

47. **A :** The reaction quotient , Q has the same form as the equilibrium constant K_{eq}, and is evaluated using any given concentrations of the species involved in the reaction, and not necessarily equilibrium concentrations.
R : If the numerical value of Q is not the same as the value of equilibrium constant, a reaction will occur.
(A) A is True, R is True; R is a correct explanation for A.
(B) A is True, R is True; R is NOT a correct explanation for A.
(C) A is True, R is False.
(D) A is False, R is True.

48. **A :** For $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$. If more Cl_2 is added the equilibrium will shift in backward direction hence equilibrium constant will decrease.
R : Addition of inert gas to the equilibrium mixture at constant volume, does not alter the equilibrium.
(A) A is True, R is True; R is a correct explanation for A.
(B) A is True, R is True; R is NOT a correct explanation for A.
(C) A is True, R is False.
(D) A is False, R is True.

49. **A :** The catalyst does not alter the equilibrium constant.
R : For the catalysed reaction and uncatalysed reaction ΔH remains same and equilibrium constant depends on ΔH.
(A) A is True, R is True; R is a correct explanation for A.
(B) A is True, R is True; R is NOT a correct explanation for A.
(C) A is True, R is False.
(D) A is False, R is True.

50. **A :** For the reaction at certain temperature $A(g) + B(g) \rightleftharpoons C(g)$ there will be no effect by addition of inert gas at constant volume.
R : Molar concentration of all gases remains constant.
(A) A is True, R is True; R is a correct explanation for A.
(B) A is True, R is True; R is NOT a correct explanation for A.
(C) A is True, R is False.
(D) A is False, R is True.