

NEET : CHAPTER WISE TEST-6

SUBJECT :- CHEMISTRY

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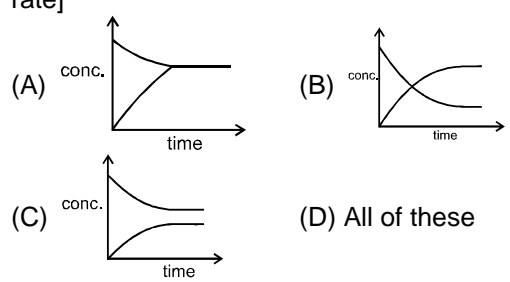
CLASS :- 11<sup>th</sup>

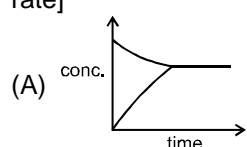
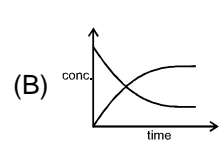
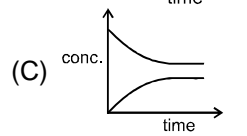
NAME.....

CHAPTER :- CHEMICAL EQUILIBRIUM

SECTION.....

(SECTION-A)

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


(A)  (B)   
(C)  (D) All of these
- 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
- 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
- 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)  $K = k_1 + k_2$
- 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)  $\frac{[Z]^2}{[X][Y]}$
- $N_2 + O_2 \rightleftharpoons 2NO$ . 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
- 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)  $K_2 = \frac{1}{K_1}$
- 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
- 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)  $2 \text{NOCl(g)} \rightleftharpoons 2 \text{NO(g)} + \text{Cl}_2(\text{g})$   
(B)  $\text{N}_2(\text{g}) + 3 \text{H}_2(\text{g}) \rightleftharpoons 2 \text{NH}_3(\text{g})$   
(C)  $\text{H}_2(\text{g}) + \text{Cl}_2(\text{g}) \rightleftharpoons 2 \text{HCl(g)}$   
(D)  $2 \text{SO}_2(\text{g}) + \text{O}_2(\text{g}) \rightleftharpoons 2 \text{SO}_3(\text{g})$
12. For hypothetical equilibrium,  $4\text{A(g)} + 5\text{B(g)} \rightleftharpoons 4\text{X(g)} + 6\text{Y(g)}$   
The unit of  $K_c$  will be :  
(A) litre mole<sup>-1</sup> (B) mole litre<sup>-1</sup>  
(C) litre mole<sup>-2</sup> (D) mole<sup>2</sup> litre<sup>-2</sup>
13.  $\text{PCl}_5(\text{g}) \rightleftharpoons \text{PCl}_3(\text{g}) + \text{Cl}_2(\text{g})$   
In above reaction, at equilibrium condition mole fraction of  $\text{PCl}_5$  is 0.4 and mole fraction of  $\text{Cl}_2$  is 0.3. Then find out mole fraction of  $\text{PCl}_3$   
 $\text{PCl}_5(\text{g}) \rightleftharpoons \text{PCl}_3(\text{g}) + \text{Cl}_2(\text{g})$   
(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,  $\text{A} + \text{B} \rightleftharpoons \text{C} + \text{D}$ . The equilibrium constant is :  
(A) 4 (B) 1  
(C) 8 (D) 12
15. In the reaction  $2\text{P(g)} + \text{Q(g)} \rightleftharpoons 3\text{R(g)} + \text{S(g)}$ . If 2 moles each of P and Q taken initially in a 1 litre flask. At equilibrium which is true :  
(A)  $[\text{P}] < [\text{Q}]$  (B)  $[\text{P}] = [\text{Q}]$   
(C)  $[\text{Q}] = [\text{R}]$  (D) None of these
16.  $K_c = 9$  for the reaction,  $\text{A} + \text{B} \rightleftharpoons \text{C} + \text{D}$ , 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  $\text{N}_2$  and 2 moles of  $\text{H}_2$  are allowed to react in a 1 dm<sup>3</sup> vessel. At equilibrium, 0.8 mole of  $\text{NH}_3$  is formed. The concentration of  $\text{H}_2$  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.  $\text{PCl}_5 \rightleftharpoons \text{PCl}_3 + \text{Cl}_2$  in the reversible reaction the moles of  $\text{PCl}_5$ ,  $\text{PCl}_3$  and  $\text{Cl}_2$  are a, b and c at equilibrium respectively and total pressure is P then value of  $K_p$  is :  
(A)  $\frac{bc}{a} \cdot \text{RT}$  (B)  $\frac{b}{(a+b+c)} \cdot \text{P}$   
(C)  $\frac{bc \cdot \text{P}}{a(a+b+c)}$  (D)  $\frac{c}{(a+b+c)} \cdot \text{P}$
19. For the reaction  
 $\text{A}_2(\text{g}) + 3\text{B}_2 \rightleftharpoons 2\text{C}_2(\text{g})$   
the partial pressure of  $\text{A}_2$ ,  $\text{B}_2$  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  
 $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightleftharpoons 2\text{NH}_3(\text{g})$   
is given by  $Q = \frac{[\text{NH}_3]^2}{[\text{N}_2][\text{H}_2]^3}$ . 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  $\text{H}_2$ ,  $\text{N}_2$  and  $\text{NH}_3$  has partial pressure 2 atm, 1 atm and 3 atm respectively at 725 K. If the value of  $K_p$  for the reaction,  $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$  is

- $4.28 \times 10^{-5} \text{ atm}^{-2}$  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  $\text{CO}_2$  can be expressed as  $2\text{CO}_2 \rightleftharpoons 2\text{CO} + \text{O}_2$ . If the 2 moles of  $\text{CO}_2$  is taken initially and 40% of the  $\text{CO}_2$  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  $2\text{NO} \rightleftharpoons \text{N}_2 + \text{O}_2$  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  
 $\text{PCl}_5 \rightleftharpoons \text{PCl}_3 + \text{Cl}_2$  ? (Assume dissociation is negligible)  
(A) 4 times (B)  $\frac{1}{4}$  times  
(C) 2 times (D)  $\frac{1}{5}$  times
27. For  $\text{NH}_4\text{HS(s)} \rightleftharpoons \text{NH}_3\text{(g)} + \text{H}_2\text{S(g)}$  reaction started only with  $\text{NH}_4\text{HS(s)}$ , the observed pressure for reaction mixture in equilibrium is 1.2 atm at  $106^\circ\text{C}$ . What is the value of  $K_p$  for the reaction ?  
(A)  $1.44 \text{ atm}^2$  (B)  $0.36 \text{ atm}^2$   
(C)  $0.16 \text{ atm}^2$  (D)  $3.6 \text{ atm}^2$
28. The correct relationship between free energy change in a reaction and the corresponding equilibrium constant K is :  
(A)  $-\Delta G^\circ = RT \ln K$  (B)  $\Delta G = RT \ln K$   
(C)  $-\Delta G = RT \ln K$  (D)  $\Delta G^\circ = RT \ln K$
29. In an equilibrium reaction for which  $\Delta G^\circ = 0$ , 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)  $\left[ \frac{1}{T_2} - \frac{1}{T_1} \right] = \text{positive}$   
(B)  $\Delta H = \text{positive}$   
(C)  $\log K_2 > \log K_1$   
(D)  $K_2 > K_1$
31. The equilibrium constant for the reaction  $\text{Br}_2 \rightleftharpoons 2\text{Br}$  at 500 K and 700 K are  $1 \times 10^{-10}$  and  $1 \times 10^{-5}$  respectively. The reaction is :  
(A) Endothermic (B) Exothermic  
(C) Fast (D) Slow
32. For the reaction  $\text{CO(g)} + \text{H}_2\text{O(g)} \rightleftharpoons \text{CO}_2\text{(g)} + \text{H}_2\text{(g)}$  at a given temperature the equilibrium amount of  $\text{CO}_2$  (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  $\text{CO(g)}$
33. Given the following reaction at equilibrium  
 $\text{N}_2\text{(g)} + 3\text{H}_2\text{(g)} \rightleftharpoons 2\text{NH}_3\text{(g)}$ . Some inert gas at constant pressure is added to the

system. Predict which of the following facts will be affected.

- (A) More  $\text{NH}_3(\text{g})$  is produced
- (B) Less  $\text{NH}_3(\text{g})$  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

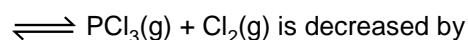
- (i)  $\text{PCl}_5(\text{g}) \rightleftharpoons \text{PCl}_3(\text{g}) + \text{Cl}_2(\text{g})$
- (ii)  $\text{N}_2\text{O}_4(\text{g}) \rightleftharpoons 2\text{NO}_2(\text{g})$

The addition of an inert gas at constant volume

- (A) will increase the dissociation of  $\text{PCl}_5$  as well as  $\text{N}_2\text{O}_4$
- (B) will reduce the dissociation of  $\text{PCl}_5$  as well as  $\text{N}_2\text{O}_4$
- (C) will increase the dissociation of  $\text{PCl}_5$  and step up the formation of  $\text{NO}_2$
- (D) will not disturb the equilibrium of the reactions

**(SECTION-B)**

36. Vapour density of equilibrium  $\text{PCl}_5(\text{g})$



- (A) increasing temperature
- (B) decreasing volume
- (C) increasing pressure
- (D) decreasing temperature

37. For the reaction :  $\text{PCl}_5(\text{g}) \rightleftharpoons \text{PCl}_3(\text{g}) + \text{Cl}_2(\text{g})$

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  $\text{PCl}_5$  at constant volume

38. For the reaction,  $\frac{1}{2} \text{N}_2(\text{g}) + \frac{1}{2} \text{O}_2(\text{g}) \rightleftharpoons \text{NO}(\text{g})$

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 solubility 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  $\text{H}_2\text{O}(\text{s}) \rightleftharpoons \text{H}_2\text{O}(\ell)$

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  $K_3$
- $$N_2 + 3H_2 \rightleftharpoons 2NH_3 \quad K_1$$
- $$N_2 + O_2 \rightleftharpoons 2NO \quad K_2$$
- $$H_2 + \frac{1}{2} O_2 \rightleftharpoons H_2O \quad K_3$$
- $$2NH_3 + \frac{5}{2} O_2 \rightleftharpoons 2NO + 3H_2O \quad K_4$$
- 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  $CuSO_4 \cdot 5H_2O(s) \rightleftharpoons CuSO_4 \cdot 3H_2O(s) + 2H_2O(g)$  Which one is correct representation :
- (A)  $K_p = (P_{H_2O})^2$  (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  $230^\circ C$  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.

$A(g) + B(g) \rightleftharpoons C(g)$  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.

49. **A** : The catalyst does not alter the equilibrium constant.  
**R** : For the catalysed reaction and uncatalysed reaction  $\Delta H$  remains same and equilibrium constant depends on  $\Delta H$ .  
(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