

Law of equilibrium and Equilibrium constant

1. For the system $3A + 2B \rightleftharpoons C$, the expression for equilibrium constant is

$$(a) \frac{[3A][2B]}{C}$$

$$(b) \frac{[C]}{[3A][2B]}$$

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

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

3. 4 moles of A are mixed with 4 moles of B. At equilibrium for the reaction $A + B \rightleftharpoons C + D$, 2 moles of C and D are formed. The equilibrium constant for the reaction will be

(a) $\frac{1}{4}$

(b) $\frac{1}{2}$

(c) 1

(d) 4

(a) 64

(b) 12

- (c) 8 (d) 0.8

5. In which of the following, the reaction proceeds towards completion
(a) $K = 10^3$ (b) $K = 10^{-2}$
(c) $K = 10$ (d) $K = 1$

6. A reversible chemical reaction having two reactants in equilibrium. If the concentrations of the reactants are doubled, then the equilibrium constant will
(a) Also be doubled
(b) Be halved
(c) Become one-fourth
(d) Remain the same

7. The equilibrium constant in a reversible reaction at a given temperature
(a) Depends on the initial concentration of the reactants
(b) Depends on the concentration of the products at equilibrium
(c) Does not depend on the initial concentrations
(d) It is not characteristic of the reaction

8. Pure ammonia is placed in a vessel at temperature where its



- dissociation constant (α) is appreciable. At equilibrium
- (a) K_p does not change significantly with pressure
 (b) α does not change with pressure
 (c) Concentration of NH_3 does not change with pressure
 (d) Concentration of H_2 is less than that of N_2
9. For the system $A(g) + 2B(g) \rightleftharpoons C(g)$, the equilibrium concentrations are
 (A) 0.06 mole/litre (B) 0.12 mole/litre
 (C) 0.216 mole/litre. The K_{eq} for the reaction is
 (a) 250 (b) 416
 (c) 4×10^{-3} (d) 125
10. The equilibrium constant for the given reaction $H_2 + I_2 \rightleftharpoons 2HI$ is correctly given by expression
 (a) $K_c = \frac{[H_2][I_2]}{[HI]}$ (b) $K_c = \frac{[H_2][I_2]}{[2HI]}$
 (c) $K_c = \frac{[H_2][I_2]}{[HI]^2}$ (d) $K_c = \frac{[HI]^2}{[H_2][I_2]}$
11. Partial pressures of A , B , C and D on the basis of gaseous system $A + 2B \rightleftharpoons C + 3D$ are $A = 0.20$; $B = 0.10$; $C = 0.30$ and $D = 0.50$ atm. The numerical value of equilibrium constant is
 (a) 11.25 (b) 18.75
- (c) 5 (d) 3.75
12. For the reaction $A + 2B \rightleftharpoons C$, the expression for equilibrium constant is
 (a) $\frac{[A][B]^2}{[C]}$ (b) $\frac{[A][B]}{[C]}$
 (c) $\frac{[C]}{[A][B]^2}$ (d) $\frac{[C]}{2[B][A]}$
13. 2 moles of PCl_5 were heated in a closed vessel of 2 litre capacity. At equilibrium, 40% of PCl_5 is dissociated into PCl_3 and Cl_2 . The value of equilibrium constant is
 (a) 0.266 (b) 0.53
 (c) 2.66 (d) 5.3
14. For which of the following reactions does the equilibrium constant depend on the units of concentration
 (a) $NO_{(g)} \rightleftharpoons \frac{1}{2}N_{2(g)} + \frac{1}{2}O_{2(g)}$
 (b) $Zn_{(s)} + Cu^{2+}_{(aq)} \rightleftharpoons Cu_{(s)} + Zn^{2+}_{(aq)}$
 (c) $C_2H_5OH_{(l)} + CH_3COOH_{(l)} \rightleftharpoons CH_3COOC_2H_5_{(l)} + H_2O_{(l)}$ (Reaction carried in an inert solvent)
 (d) $COCl_{2(g)} \rightleftharpoons CO_{(g)} + Cl_{2(g)}$
15. Unit of equilibrium constant for the reversible reaction $H_2 + I_2 \rightleftharpoons 2HI$ is
 (a) $mol^{-1}litre$
 (b) $mol^{-2}litre$



- (c) mollitre^{-1}
(d) None of these

16. The decomposition of N_2O_4 to NO_2 is carried out at 280K in chloroform. When equilibrium has been established, 0.2 mol of N_2O_4 and 2×10^{-3} mol of NO_2 are present in 2 litre solution. The equilibrium constant for reaction $\text{N}_2\text{O}_4 \rightleftharpoons 2\text{NO}_2$ is
(a) 1×10^{-2} (b) 2×10^{-3}
(c) 1×10^{-5} (d) 2×10^{-5}

17. Concentration of a gas is expressed in the following terms in the calculation of equilibrium constant
(a) No. of molecules per litre
(b) No. of grams per litre
(c) No. of gram equivalent per litre
(d) No. of molecules equivalent per litre

18. The unit of equilibrium constant K for the reaction $A + B \rightleftharpoons C$ would be
(a) mollitre^{-1}
(b) litremol^{-1}
(c) mollitre
(d) Dimensionless

19. In a reaction $A + B \rightleftharpoons C + D$, the concentrations of A , B , C and D (in moles/litre) are 0.5 , 0.8 , 0.4 and 1.0 respectively. The equilibrium constant is
(a) 0.1 (b) 1.0
(c) 10 (d) ∞

20. In a chemical equilibrium $A + B \rightleftharpoons C + D$, when one mole each of the two reactants are mixed, 0.6 mole each of the products are formed. The equilibrium constant calculated is
(a) 1 (b) 0.36
(c) 2.25 (d) $4/9$

