DAILY PRACTICE PROBLEM OF PHYSICAL CHEMISTRY FOR NEET

BY

JITENDRA HIRWANI

CHEMICAL EQUILIBRIUM

ETOOSINDIA
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Plot No. 38, Near Union Bank of India, Rajeev Gandhi Nagar,
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DPP -1

1. For the reaction $2A + 3B \rightleftharpoons 2C$
the expression for K_C is :

(1) $\frac{[A]^2[B]^3}{[C]^2}$ (2) $\frac{[C]}{[A][B]}$ (3) $\frac{[C]^2}{[A]^2[B]^3}$ (4) $\frac{[C]^2}{[A]^3[B]^2}$

Ans. **(3)**

2. If K_C is 41 for, $N_2 + 3H_2 \rightleftharpoons 2NH_3$ then for

$NH_3 \rightleftharpoons \frac{1}{2} N_2 + \frac{3}{2} H_2$ K_C will be :–

(1) 41 (2) $\sqrt{41}$ (3) 20·5 (4) $\sqrt{\frac{1}{41}}$

Ans. **(4)**

3. For which of the following reaction value of K_P and K_C is equal :–

(1) $2NOCl \rightleftharpoons 2NO + Cl_2$ (2) $PCl_5 \rightleftharpoons PCl_3 + Cl_2$

(3) $H_2 + Cl_2 \rightleftharpoons 2HCl$ (4) $N_2 + 3H_2 \rightleftharpoons 2NH_3$

Ans. **(3)**

4. The K_c for given reaction will be
$A_2(g) + 2B(g) \rightleftharpoons C(g) + 2D(s)$

(1) $K = \frac{[C][D]^2}{[A_2][B]^2}$ (2) $K = \frac{[C]}{[A_2][B]^2}$ (3) $K = \frac{[A_2][B]^2}{[C][D]^2}$ (4) $K = \frac{[A_2][B]^2}{[C]}$

Ans. **(2)**

5. In which of the following does the reaction go almost to completion ?

(1) $K_c = 10^3$ (2) $K_c = 10^2$ (3) $K_c = 10^{-2}$ (4) $K_c = 10^{-3}$

Ans. **(1)**

6. In a chemical equilibrium the rate constant of the backward reaction is 7.5×10^{-4} and the equilibrium constant is 1.5. So the rate constant of the forward reaction is

(1) 2×10^{-3} (2) 15×10^{-4} (3) 1.125×10^{-3} (4) 9.0×10^{-4}

Ans. **(3)**

7. K_p is how many times equal to K_c for the given reaction ?
$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$

(1) $\frac{1}{R^2T^2}$ (2) R^2T^2 (3) $\frac{R}{T}$ (4) RT

Ans. **(1)**

8. 4 g H_2, 32 g O_2, 14 g N_2 and 11g CO_2 are taken in a bulb of 500 ml. When one of these has maximum active mass ?

(1) H_2 (2) O_2 (3) N_2 (4) CO_2

Ans. **(1)**

9. For reaction, $2A + B \rightleftharpoons 2C$, $K = x$. Equilibrium constant for $C \rightleftharpoons A + \frac{1}{2}B$ will be

(1) x (2) $\frac{x}{2}$ (3) $\frac{1}{\sqrt{x}}$ (4) $\sqrt{x}$

Ans. **(3)**

10. At 700 K, the equilibrium constant, K_p, for the reaction $2SO_3(g) \rightleftharpoons 2SO_2(g) + O_2(g)$ is 1.8×10^{-3} atm. The value of K_c for the above reaction at the same temperature in moles per litre would be

(1) 1.1×10^{-7} (2) 3.1×10^{-5} (3) 6.2×10^{-7} (4) 9.3×10^{-7}

Ans. **(2)**

11. For which of the following reaction $K_P = K_C$ –

(1) $H_2 + I_2 \rightleftharpoons 2HI$ (2) $PCl_5 \rightleftharpoons PCl_3 + Cl_2$

(3) $2NH_3 \rightleftharpoons 3H_2 + N_2$ (4) $2SO_2 + O_2 \rightleftharpoons 2SO_3$

Ans. **(1)**

12. K for the synthesis of HI is 50. What is K for its dissociation

(1) 50 (2) 5 (3) 0.2 (4) 0.02

Ans. **(4)**

13. Match List –I (hypothetical reactions) with List–II (ratio $\frac{K_p}{K_c}$ for the given reactions) and select the correct answer using the code given below the lists :-

(a) $A_2(g) + 3B_2(g) \rightleftharpoons 2AB_3(g)$ (i) $(RT)^{-2}$

(b) $A_2(g) + B_2(g) \rightleftharpoons 2AB(g)$ (ii) $(RT)^0$

(c) $A(s) + 1.5\, B_2(g) \rightleftharpoons AB_3(g)$ (iii) $(RT)^{\frac{1}{2}}$

(d) $AB_2(g) \rightleftharpoons AB(g) + 0.5\, B_2(g)$ (iv) $(RT)^{-\frac{1}{2}}$

CODES :

	a	b	c	d		a	b	c	d
(1)	(i)	(ii)	(iii)	(iv)	(2)	(i)	(iv)	(iii)	(ii)
(3)	(ii)	(i)	(iv)	(iii)	(4)	(i)	(ii)	(iv)	(iii)

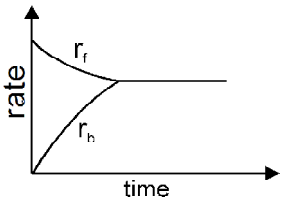
Ans. **(4)**

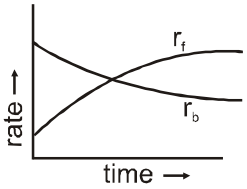
14. What should be the respective active masses of methyl alcohol and carbon tetrachloride, if their densities are 0.5 and 1.2 g/mL ?

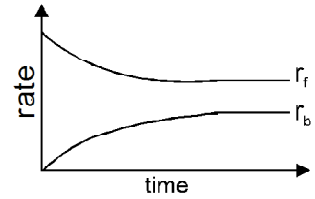
(1) 15.62 and 7.79 (2) 15.65 and 7.40 (3) 15.46 and 7.80 (4) 15.40 and 6.50

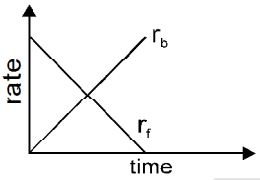
Ans. (1)

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

(1) 

(2) 

(3) 

(4) 

Ans. (1)

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

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

(1) atm (2) atm^{-2} (3) atm^2 (4) atm^{-1}

Ans. (2)

DPP -2

1. For the equation $2A + B \rightleftharpoons BA_2$, the equilibrium concentration of A, B, BA_2 is 4, 2 and 2 respectively. The value of K_c will be :-

(1) 0.0625 (2) 0.625 (3) 6.280 (4) 6.250

Ans. **(1)**

2. If K_p for the reaction $N_2O_4 \rightleftharpoons 2NO_2$ is 0.66 then what is the equilibrium pressure of N_2O_4. (Total pressure at equilibrium is 0.5 atm)

(1) 0.168 (2) 0.322 (3) 0.1 (4) 0.5

Ans. **(1)**

3. For which of the following reaction, the degree of dissociation (α) and equilibrium constant (K_p) are related as

$$K_p = \frac{4\alpha^2 P}{(1-\alpha^2)}?$$

(1) $N_2O_4(g) \rightleftharpoons 2NO_2(g)$ (2) $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$

(3) $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$ (4) $PCl_3(g) + Cl_2(g) \rightleftharpoons PCl_5(g)$

Ans. **(1)**

4. XY_2 dissociates as,

$XY_2(g) \rightleftharpoons XY(g) + Y(g)$

Initial pressure of XY_2 is 600 mm Hg. The total pressure at the equilibrium is 800 mm Hg. Assuming volume of system to remain constant, the value of K_p is

(1) 50 (2) 100 (3) 20 (4) 400

Ans. **(2)**

5. The initial pressure of $COCl_2$ is 1000 torr. The total pressure of the system becomes 1500 torr, when the equilibrium $COCl_2(g) \rightleftharpoons CO(g) + Cl_2(g)$ is attained at constant temperature. The value of K_p of a reaction

(1) 1500 (2) 1000 (3) 2500 (4) 500

Ans. **(4)**

6. Hydrogen (a moles) and iodine (b moles) react to give 2x moles of the HI at equilibrium. The total number of moles at equilibrium is

(1) a + b + 2x (2) (a – b) + (b – 2x) (3) (a + b) (4) a + b – x

Ans. **(3)**

7. When ethyl alcohol and acetic acid mixed together in equimolecular proportions, equilibrium is attained when two-third of the acid and alcohol are consumed. The equilibrium constant of the reaction will be

(1) 0.4 (2) 4 (3) 40 (4) 0.04

Ans. **(2)**

8. Two moles of N_2 and two moles of H_2 are taken in a closed vessel of 5 litres capacity and suitable conditions are provided for the reaction. When the equilibrium is reached, it is found that a half mole of N_2 is used up. The equilibrium concentration of NH_3 is

(1) 0.3 (2) 0.4 (3) 0.2 (4) 0.1

Ans. **(3)**

9. 1 mole of NO_2 and 2 moles of CO are enclosed in a one litre vessel to attain the following equilibrium $NO_2 + CO \rightleftharpoons NO + CO_2$. It was estimated that at the equilibrium, 25% of initial amount of CO is consumed. The equilibrium constant K_p is

(1) 1 (2) 1/2 (3) 1/4 (4) 1/3

Ans. **(4)**

10. Two moles of NH_3 gas are introduced into a previously evacuated one litre vessel in which it partially dissociates at high temperature as $2NH_3(g) \rightleftharpoons N_2(g) + 3H_2(g)$. At equilibrium, one mole of $NH_3(g)$ remain. The value of K_c is

(1) 3 (2) 27/16 (3) 3/2 (4) 27/64

Ans. **(2)**

11. 4.0 moles of PCl_5 dissociate at 760 K in a 2 litre flask, $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$ at equilibrium. 0.8 mole of Cl_2 was present in the flask. The equilibrium constant would be

(1) 1.0×10^{-1} (2) 1.0×10^{-4} (3) 1.0×10^{-2} (4) 1.0×10^{-3}

Ans. **(1)**

12. When 3.00 mole of A and 1.00 mole of B are mixed in a 1.00 litre vessel, the following reaction takes place

$A(g) + B(g) \rightleftharpoons 2C(g)$

The equilibrium mixture contains 0.5 mole of C. What is the value of equilibrium constant for the reaction ?

(1) 0.12 (2) 6 (3) 1.5 (4) 3

Ans. **(1)**

13. For the reaction, $A+B \rightleftharpoons C + D$, $K_c = 9$. If A and B are taken in equal amounts, then amount of C at equilibrium is:-

(1) 1 (2) 0.25 (3) 0.75 (4) None of these

Ans. **(3)**

14. For $I_2(g) \rightleftharpoons 2I(g)$, K_c at 1000 K is 10^{-6}. One mole I_2 is added in a one-litre container. Which of the following expressions is correct for the above system at equilibrium ?

(1) $[I_2] + [I] = 1 + x$ (2) $[I_2] = \frac{1}{2}[I]$ (3) $[I_2(g)] >> [I(g)]$ (4) Both (1) and (3)

Ans. (4)

15. Value of K_c at 300° C for $N_2 + O_2 \rightleftharpoons 2NO$ is 9×10^{-4} and equimolecular amounts of N_2 and O_2 are used. The concentration of NO at equilibrium will be

(1) 0.0148a (2) 0.296a (3) 0.148a (4) 0.0296a

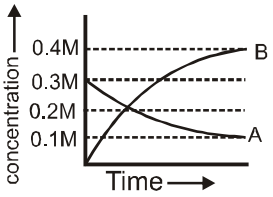
Ans. (4)

16. An equilibrium mixture in a vessel of capacity 100 litre contain 1 mol N_2, 2 mol O_2 and 3 mol NO. Number of moles of O_2 to be added so that at new equilibrium the conc. of NO is found to be 0.04 mol/lit.:

(1) (101/18) (2) (101/9) (3) (202/9) (4) None of these

Ans. (1)

17. The figure show the change in concentration of species A and B as a functional of time . The equilibrium constant K_C for the reaction $A(g) \rightleftharpoons 2B(g)$ is :



(1) $K_c > 1$ (2) $K < 1$ (3) $K = 1$ (4) data insufficient

Ans. (1)

DPP -3

1. For the process $A(g) \rightleftharpoons 2B(g)$. If pressure is doubled then which is true information about A :-

(1) Increase in A (2) Decrease in A

(3) No effect (4) can't say because data is insufficient

Ans. **(1)**

2. Which one of the following equilibrium moves backward when pressure is applied ?

(1) $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$ (2) $N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$

(3) Water $\rightleftharpoons$ Ice (4) $I_2(g) \rightleftharpoons I_2(s)$

Ans. **(3)**

3. In melting of ice, which one of the conditions will be more favourable ?

(1) High temp. & high pressure (2) Low temp. & low pressure

(3) Low temp. & high pressure (4) High temp. & low pressure

Ans. **(1)**

4. Given the reaction,

$2X(g) + Y(g) \rightleftharpoons Z(g) + 80\ kcal$

Which combination of pressure and temperature gives the highest yield of Z at equilibrium ?

(1) 1000 atm and 500°C (2) 500 atm and 500°C (3) 1000 atm and 100°C (4) 500 atm and 100°C

Ans. **(3)**

5 What changes will possibly take place in a reversible reaction in equilibrium at constant temperature on changing concentration and pressure, respectively ?

(1) Rate of both the reactions and position of equilibrium will respectively change.

(2) Percentage of the product and position of the equilibrium will respectively change.

(3) Volume and position of the equilibrium will respectively change.

(4) No change will take place

Ans. (1)

6. For the reaction $N_2O_4(g) \rightleftharpoons 2NO_2(g)$, if percentage dissociation of N_2O_4 are 20%, 45%, 65% & 80%, then the sequence of observed vapour densities will be :

(1) $d_{20} > d_{45} > d_{65} > d_{80}$ (2) $d_{80} > d_{65} > d_{45} > d_{20}$

(3) $d_{20} = d_{45} = d_{65} = d_{80}$ (4) $(d_{20} = d_{45}) > (d_{65} = d_{80})$

Ans. (1)

7. 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:

(1) $\alpha = \sqrt{\dfrac{4p + K_p}{K_p}}$ (2) $\alpha = \sqrt{\dfrac{K_p}{4p + K_p}}$ (3) $\alpha = \sqrt{\dfrac{K_p}{4p}}$ (4) None of these

Ans. (2)

8. The degree of dissociation of SO_3 is α at equilibrium pressure P_0.

K_p for $2SO_3(g) \rightleftharpoons 2SO_2(g) + O_2(g)$ is

(1) $[(P_0\alpha^3)/2(1-\alpha)^3]$ (2) $[(P_0\alpha^3)/(2+\alpha)(1-\alpha)^2]$ (3) $[(P_0\alpha^2)/2(1-\alpha)^2]$ (4) None of these

Ans. (2)

9. The degree of dissociation of PCl_5 (α) obeying the equilibrium, $PCl_5 \rightleftharpoons PCl_3 + Cl_2$, is approximately related to the pressure at equilibrium by (given $\alpha << 1$) :

(1) $\alpha \propto P$ (2) $\alpha \propto \frac{1}{\sqrt{P}}$ (3) $\alpha \propto \frac{1}{P^2}$ (4) $\alpha \propto \frac{1}{P^4}$

Ans. (2)

10. At a temperature T, a compound $AB_4(g)$ dissociates as $2AB_4(g) \rightleftharpoons A_2(g) + 4B_2(g)$ with a degree of dissociation x, which is small compared with unity. The expression of K_p in terms of x and total pressure P is ;

(1) $8P^3x^5$ (2) $256P^3x^5$ (3) $4Px^2$ (4) None of these

Ans. (1)