Equilibrium

1. Solid $Ba(NO_3)_2$ is gradually dissolved in a 1.0×10^{-4} M Na_2CO_3 solution. At what concentration of Ba^{2+} will a precipitate begin to form? (K_{sp} for $BaCO_3 = 5.1 \times 10^{-9}$) **[AIEEE-2009]**

   (1) 5.1×10^{-5} M (2) 8.1×10^{-8} M

   (3) 8.1×10^{-7} M (4) 4.1×10^{-5} M

2. In aqueous solution the ionisation constants for carbonic acid are

   $K_1 = 4.2 \times 10^{-7}$ and $K_2 = 4.8 \times 10^{-11}$

   Select the correct statement for a saturated 0.034 M solution of the carbonic acid. **[AIEEE-2010]**

   (1) The concentration of H^+ is double that of CO_3^{2-}

   (2) The concentration of CO_3^{2-} is 0.034 M

   (3) The concentration of CO_3^{2-} is greater than that of HCO_3^-

   (4) The concentrations of H^+ and HCO_3^- are approximately equal

3. Solubility product of silver bromide is 5.0×10^{-13}. The quantity of potassium bromide (molar mass taken as 120 g mol^{-1}) to be added to 1 litre of 0.05 M solution of silver nitrate to start the precipitation of AgBr is **[AIEEE-2010]**

   (1) 5.0×10^{-8} g (2) 1.2×10^{-10} g

   (3) 1.2×10^{-9} g (4) 6.2×10^{-5} g

4. Three reactions involving $H_2PO_4^-$ are given below

   (i) $H_3PO_4 + H_2O \rightarrow H_3O^+ + H_2PO_4^-$

   (ii) $H_2PO_4^- + H_2O \rightarrow H_2PO_4^{2-} + H_3O^+$

   (iii) $H_2PO_4^- + OH^- \rightarrow H_3PO_4 + O^{2-}$

   In which of the above does $H_2PO_4^-$ act as an acid? **[AIEEE-2010]**

   (1) (i) only (2) (ii) only

   (3) (i) and (ii) (4) (iii) only

5. At 25°C, the solubility product of $Mg(OH)_2$ is 1.0×10^{-11}. At which pH, will Mg^{2+} ions start precipitating in the form of $Mg(OH)_2$ from a solution of 0.001 M Mg^{2+} ions? **[AIEEE-2010]**

   (1) 8 (2) 9

   (3) 10 (4) 11

6. The K_{sp} for $Cr(OH)_3$ is 1.6×10^{-30}. The molar solubility of this compound in water is **[AIEEE-2011]**

   (1) $1.6 \times 10^{-30}/27$ (2) $\sqrt[2]{1.6\times10^{-30}}$

   (3) $\sqrt[4]{1.6\times10^{-30}}$ (4) $\sqrt[4]{1.6\times10^{-30}/27}$

7. An acid HA ionises as

   $HA \rightleftharpoons H^+ + A^-$

   The pH of 1.0 M solution is 5. Its dissociation constant would be **[AIEEE-2011]**

   (1) 1×10^{-5} (2) 1×10^{-10}

   (3) 5 (4) 5×10^{-8}

8. The pH of a 0.1 molar solution of the acid HQ is 3. The value of the ionization constant, Ka of this acid is **[AIEEE-2012]**

   (1) 1×10^{-3} (2) 1×10^{-5}

   (3) 1×10^{-7} (4) 3×10^{-1}

9. The equilibrium constant (K_c) for the reaction $N_2(g) + O_2(g) \rightarrow 2NO(g)$ at temperature T is 4×10^{-4}. The value of K_c for the reaction,

   $NO(g) \rightarrow \frac{1}{2} N_2(g) + \frac{1}{2} O_2(g)$ at the same temperature is **[AIEEE-2012]**

   (1) 2.5×10^2 (2) 4×10^{-4}

   (3) 50.0 (4) 0.02

10. How many litres of water must be added to 1 litre of an aqueous solution of HCl with a pH of 1 to create an aqueous solution with pH of 2? **[JEE (Main)-2013]**

    (1) 0.1 L (2) 0.9 L

    (3) 2.0 L (4) 9.0 L

11. For the reaction $SO_{2(g)}+\frac{1}{2}O_{2(g)} \rightleftharpoons SO_{3(g)}$, if $K_P = K_C(RT)^x$ where the symbols have usual meaning then the value of x is (assuming ideality) **[JEE (Main)-2014]**

(1) –1 (2) $-\frac{1}{2}$

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

12. The standard Gibbs energy change at 300 K for the reaction $2A \rightleftharpoons B + C$ is 2494.2 J. At a given time, the composition of the reaction mixture is $[A]=\frac{1}{2}, [B]=2$ and $[C]=\frac{1}{2}$. The reaction proceeds in the : [R = 8.314 J/K/mol, e = 2.718] **[JEE (Main)-2015]**

(1) Forward direction because $Q > K_C$

(2) Reverse direction because $Q > K_C$

(3) Forward direction because $Q < K_C$

(4) Reverse direction because $Q < K_C$

13. The equilibrium constant at 298 K for a reaction $A+B \rightleftharpoons C+D$ is 100. If the initial concentration of all the four species were 1 M each, then equilibrium concentration of D (in mol L^{-1}) will be **[JEE (Main)-2016]**

(1) 0.818 (2) 1.818

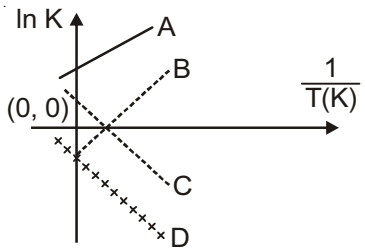
(3) 1.182 (4) 0.182

14. pK_a of a weak acid (HA) and pK_b of a weak base (BOH) are 3.2 and 3.4, respectively, The pH of their salt (AB) solution is **[JEE (Main)-2017]**

(1) 7.0 (2) 1.0

(3) 7.2 (4) 6.9

15. Which of the following lines correctly show the temperature dependence of equilibrium constant K, for an exothermic reaction? **[JEE (Main)-2018]**



(1) A and B (2) B and C

(3) C and D (4) A and D

16. An aqueous solution contains 0.10 M H_2S and 0.20 M HCl. If the equilibrium constant for the formation of HS^- from H_2S is 1.0×10^{-7} and that of S^{2-} from HS^- ions is 1.2×10^{-13} then the concentration of S^{2-} ions in aqueous solution is **[JEE (Main)-2018]**

(1) 5×10^{-8} (2) 3×10^{-20}

(3) 6×10^{-21} (4) 5×10^{-19}

17. An aqueous solution contains an unknown concentration of Ba^{2+}. When 50 mL of a 1 M solution of Na_2SO_4 is added, $BaSO_4$ just begins to precipitate. The final volume is 500 mL. The solubility product of $BaSO_4$ is 1×10^{-10}. What is original concentration of Ba^{2+}? **[JEE (Main)-2018]**

(1) 5×10^{-9} M (2) 2×10^{-9} M

(3) 1.1×10^{-9} M (4) 1.0×10^{-10} M

18. Which of the following salts is the most basic in aqueous solution? **[JEE (Main)-2018]**

(1) $Al(CN)_3$ (2) CH_3COOK

(3) $FeCl_3$ (4) $Pb(CH_3COO)_2$

19. An alkali is titrated against an acid with methyl orange as indicator, which of the following is a correct combination? **[JEE (Main)-2018]**

	Base	Acid	End point
(1)	Weak	Strong	Colourless to pink
(2)	Strong	Strong	Pinkish red to yellow
(3)	Weak	Strong	Yellow to pinkish red
(4)	Strong	Strong	Pink to colourless

20. 20 ml of 0.1 M H_2SO_4 solution is added to 30 mL of 0.2 M NH_4OH solution. The pH of the resultant mixture is : [pK_b of NH_4OH = 4.7] **[JEE (Main)-2019]**

(1) 9.0 (2) 5.2

(3) 5.0 (4) 9.4

21. Consider the following reversible chemical reactions

$A_2(g)+B_2(g) \overset{K_1}{\rightleftharpoons} 2AB(g)$ ...(1)

$6AB(g) \overset{K_2}{\rightleftharpoons} 3A_2(g)+3B_2(g)$ ...(2)

The relation between K_1 and K_2 is **[JEE (Main)-2019]**

(1) $K_2 = K_1^3$ (2) $K_1K_2 = \frac{1}{3}$

(3) $K_2 = K_1^{-3}$ (4) $K_1K_2 = 3$

22. The pH of rain water, is approximately **[JEE (Main)-2019]**

(1) 7.0 (2) 7.5

(3) 5.6 (4) 6.5

23. The values of $\frac{K_p}{K_c}$ for the following reactions at 300 K are, respectively (At 300 K, RT = 24.62 dm^3 atm mol^{-1})

$N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$

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

$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$ **[JEE (Main)-2019]**

(1) 24.62 dm^3 atm mol^{-1}, 606.0 dm^6 atm^2 mol^{-2}, 1.65×10^{-3} dm^{-6} atm^{-2} mol^2

(2) 1, 24.62 dm^3 atm mol^{-1}, 1.65×10^{-3} dm^{-6} atm^{-2} mol^2

(3) 1, 24.62 dm^3 atm mol^{-1}, 606.0 dm^6 atm^2 mol^{-2}

(4) 1, 4.1×10^{-2} dm^{-3} atm^{-1} mol, 606 dm^6 atm^2 mol^{-2}

24. A mixture of 100 m mol of $Ca(OH)_2$ and 2 g of sodium sulphate was dissolved in water and the volume was made up to 100 mL. The mass of calcium sulphate formed and the concentration of OH^- in resulting solution, respectively, are (Molar mass of $Ca(OH)_2$, Na_2SO_4 and $CaSO_4$ are 74, 143 and 136 g mol^{-1}, respectively; K_{sp} of $Ca(OH)_2$ is 5.5×10^{-6}) **[JEE (Main)-2019]**

(1) 1.9 g, 0.14 mol L^{-1} (2) 13.6 g, 0.28 mol L^{-1}

(3) 13.6 g, 0.14 mol L^{-1} (4) 1.9 g, 0.28 mol L^{-1}

25. The process with negative entropy change is **[JEE (Main)-2019]**

(1) Sublimation of dry ice

(2) Dissociation of $CaSO_4(s)$ to $CaO(s)$ and $SO_3(g)$

(3) Synthesis of ammonia from N_2 and H_2

(4) Dissolution of iodine in water

26. 5.1 g NH_4SH is introduced in 3.0 L evacuated flask at 327ºC. 30% of the solid NH_4SH decomposed to NH_3 and H_2S as gases. The K_p of the reaction at 327ºC is (R = 0.082 L atm $mol^{-1}K^{-1}$, Molar mass of S = 32 g mol^{-1}, molar mass of N = 14 g mol^{-1}) **[JEE (Main)-2019]**

(1) 4.9×10^{-3} atm^2 (2) 0.242 atm^2

(3) 1×10^{-4} atm^2 (4) 0.242×10^{-4} atm^2

27. Consider the reaction

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

The equilibrium constant of the above reaction is K_P. If pure ammonia is left to dissociate, the partial pressure of ammonia at equilibrium is given by (Assume that $P_{NH_3} << P_{total}$ at equilibrium) **[JEE (Main)-2019]**

(1) $\frac{K_P^{1/2} P^2}{4}$ (2) $\frac{3^{3/2} K_P^{1/2} P^2}{4}$

(3) $\frac{K_P^{1/2} P^2}{16}$ (4) $\frac{3^{3/2} K_P^{1/2} P^2}{16}$

28. For the equilibrium

$2H_2O \rightleftharpoons H_3O^+ + OH^-$, the value of ΔG^o at 298 K is approximately **[JEE (Main)-2019]**

(1) –80 kJ mol^{-1} (2) –100 kJ mol^{-1}

(3) 80 kJ mol^{-1} (4) 100 kJ mol^{-1}

29. Two solids dissociate as follows

$A(s) \rightleftharpoons B(g) + C(g); K_{P_1} = x\,atm^2$

$D(s) \rightleftharpoons C(g) + E(g); K_{P_2} = y\,atm^2$

The total pressure when both the solids dissociate simultaneously is **[JEE (Main)-2019]**

(1) $x^2 + y^2$ atm

(2) $(x + y)$ atm

(3) $\sqrt{x + y}$ atm

(4) $2\left(\sqrt{x + y}\right)$ atm

30. In a chemical reaction, $A + 2B \overset{K}{\rightleftharpoons} 2C + D$, the initial concentration of B was 1.5 times of the concentration of A, but the equilibrium concentrations of A and B were found to be equal. The equilibrium constant (K) for the aforesaid chemical reaction is **[JEE (Main)-2019]**

(1) 1 (2) 16

(3) 4 (4) $\frac{1}{4}$

31. If K_{sp} of Ag_2CO_3 is 8×10^{-12}, the molar solubility of Ag_2CO_3 in 0.1 M $AgNO_3$ is **[JEE (Main)-2019]**

(1) 8×10^{-11} M (2) 8×10^{-12} M

(3) 8×10^{-13} M (4) 8×10^{-10} M

32. If solubility product of $Zr_3(PO_4)_4$ is denoted by K_{sp} and its molar solubility is denoted by S, then which of the following relation between S and K_{sp} is correct? **[JEE (Main)-2019]**

(1) $S = \left(\frac{K_{sp}}{929}\right)^{\frac{1}{9}}$ (2) $S = \left(\frac{K_{sp}}{216}\right)^{\frac{1}{7}}$

(3) $S = \left(\frac{K_{sp}}{144}\right)^{\frac{1}{6}}$ (4) $S = \left(\frac{K_{sp}}{6912}\right)^{\frac{1}{7}}$

33. For the following reactions, equilibrium constants are given :

$S(s) + O_2(g) \rightleftharpoons SO_2(g); K_1 = 10^{52}$

$2S(s) + 3O_2(g) \rightleftharpoons 2SO_3(g); K_2 = 10^{129}$

The equilibrium constant for the reaction,

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

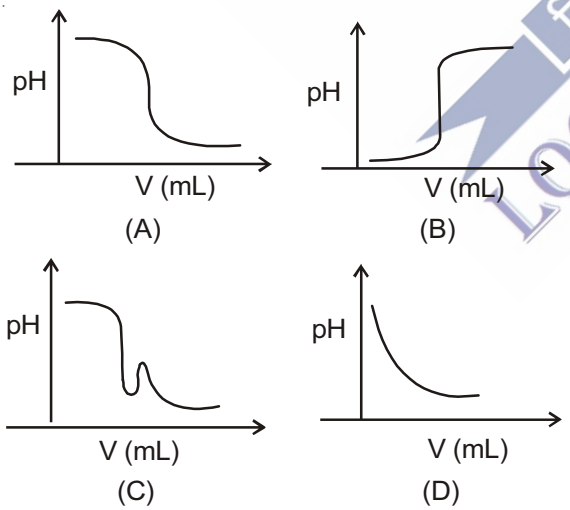
[JEE (Main)-2019]

(1) 10^{154} (2) 10^{25}

(3) 10^{77} (4) 10^{181}

34. In an acid-base titration, 0.1 M HCl solution was added to the NaOH solution of unknown strength. Which of the following correctly shows the change of pH of the titration mixture in this experiment?

[JEE (Main)-2019]



(1) (A) (2) (C)

(3) (B) (4) (D)

35. Consider the following statements

(a) The pH of a mixture containing 400 mL of 0.1 M H_2SO_4 and 400 mL of 0.1 M NaOH will be approximately 1.3.

(b) Ionic product of water is temperature dependent.

(c) A monobasic acid with $K_a = 10^{-5}$ has a pH = 5. The degree of dissociation of this acid is 50%.

(d) The Le Chatelier's principle is not applicable to common-ion effect.

The correct statements are **[JEE (Main)-2019]**

(1) (a), (b) and (d)

(2) (b) and (c)

(3) (a) and (b)

(4) (a), (b) and (c)

36. The pH of a 0.02 M NH_4Cl solution will be [given $K_b(NH_4OH) = 10^{-5}$ and log2 = 0.301]

[JEE (Main)-2019]

(1) 2.65 (2) 5.35

(3) 4.35 (4) 4.65

37. For the reaction,

$2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$,

$\Delta H = -57.2$ kJ mol^{-1} and $K_c = 1.7 \times 10^{16}$.

Which of the following statement is INCORRECT?

[JEE (Main)-2019]

(1) The equilibrium constant is large suggestive of reaction going to completion and so no catalyst is required.

(2) The addition of inert gas at constant volume will not affect the equilibrium constant.

(3) The equilibrium will shift in forward direction as the pressure increases.

(4) The equilibrium constant decreases as the temperature increases.

38. What is the molar solubility of $Al(OH)_3$ in 0.2 M NaOH solution? Given that, solubility product of $Al(OH)_3 = 2.4 \times 10^{-24}$ **[JEE (Main)-2019]**

(1) 3×10^{-19} (2) 12×10^{-21}

(3) 12×10^{-23} (4) 3×10^{-22}

39. In which one of the following equilibria, $K_P \neq K_C$? **[JEE (Main)-2019]**

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

(2) $2NO(g) \rightleftharpoons N_2(g) + O_2(g)$

(3) $NO_2(g) + SO_2(g) \rightleftharpoons NO(g) + SO_3(g)$

(4) $2C(s) + O_2(g) \rightleftharpoons 2CO(g)$

40. The INCORRECT match in the following is

[JEE (Main)-2019]

(1) $\Delta G° = 0, K = 1$ (2) $\Delta G° < 0, K < 1$

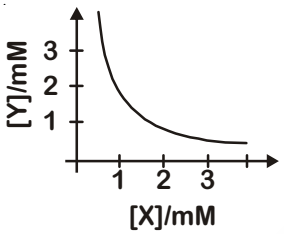
(3) $\Delta G° > 0, K < 1$ (4) $\Delta G° < 0, K > 1$

41. The molar solubility of $Cd(OH)_2$ is 1.84×10^{-5} M in water. The expected solubility of $Cd(OH)_2$ in a buffer solution of pH = 12 is **[JEE (Main)-2019]**

(1) 1.84×10^{-9} M (2) 6.23×10^{-11} M

(3) $\frac{2.49}{1.84} \times 10^{-9}$ M (4) 2.49×10^{-10} M

42. The stoichiometry and solubility product of a salt with the solubility curve given below is, respectively



[JEE (Main)-2020]

(1) X_2Y, 2×10^{-9} M^3 (2) XY_2, 4×10^{-9} M^3

(3) XY_2, 1×10^{-9} M^3 (4) XY, 2×10^{-6} M^3

43. For the following Assertion and Reason, the correct option is

Assertion : The pH of water increases with increase in temperature.

Reason : The dissociation of water into H^+ and OH^- is an exothermic reaction.

[JEE (Main)-2020]

(1) Both assertion and reason are false

(2) Assertion is not true, but reason is true

(3) Both assertion and reason are true, and the reason is the correct explanation for the assertion

(4) Both assertion and reason are true, but the reason is not the correct explanation for the assertion

44. The K_{sp} for the following dissociation is 1.6×10^{-5}

$$PbCl_{2(s)} \rightleftharpoons Pb^{2+}_{(aq)} + 2Cl^-_{(aq)}$$

Which of the following choices is correct for a mixture of 300 mL 0.134 M $Pb(NO_3)_2$ and 100 mL 0.4 M NaCl? **[JEE (Main)-2020]**

(1) $Q < K_{sp}$

(2) $Q = K_{sp}$

(3) Not enough data provided

(4) $Q > K_{sp}$

45. The solubility product of $Cr(OH)_3$ at 298 K is 6.0×10^{-31}. The concentration of hydroxide ions in a saturated solution of $Cr(OH)_3$ will be

[JEE (Main)-2020]

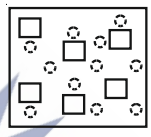
(1) $(2.22 \times 10^{-31})^{1/4}$

(2) $(18 \times 10^{-31})^{1/2}$

(3) $(18 \times 10^{-31})^{1/4}$

(4) $(4.86 \times 10^{-29})^{1/4}$

46. In the figure shown below reactant A (represented by square) is in equilibrium with product B (represented by circle). The equilibrium constant is



[JEE (Main)-2020]

(1) 4 (2) 2

(3) 8 (4) 1

47. For the following Assertion and Reason, the correct option is

Assertion (A): When Cu (II) and sulphide ions are mixed, they react together extremely quickly to give a solid.

Reason (R): The equilibrium constant of $Cu^{2+}(aq) + S^{2-}(aq) \rightleftharpoons CuS(s)$ is high because the solubility product is low. **[JEE (Main)-2020]**

(1) (A) is false and (R) is true.

(2) Both (A) and (R) are true but (R) is not the explanation for (A).

(3) Both (A) and (R) are true and (R) is the explanation for (A).

(4) Both (A) and (R) are false.

48. An acidic buffer is obtained on mixing

[JEE (Main)-2020]

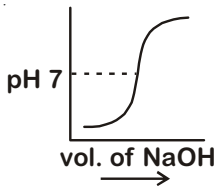
(1) 100 mL of 0.1 M HCl and 200 mL of 0.1 M NaCl

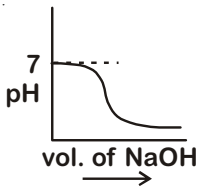
(2) 100 mL of 0.1 M HCl and 200 mL of 0.1 M CH_3COONa

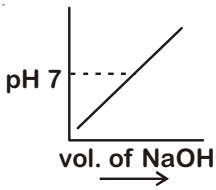
(3) 100 mL of 0.1 M CH_3COOH and 100 mL of 0.1 M NaOH

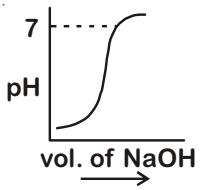
(4) 100 mL of 0.1 M CH_3COOH and 200 mL of 0.1 M NaOH

49. 100 mL of 0.1 M HCl is taken in a beaker and to it 100 mL of 0.1 M NaOH is added in steps of 2 mL and the pH is continuously measured. Which of the following graphs correctly depicts the change in pH? **[JEE (Main)-2020]**

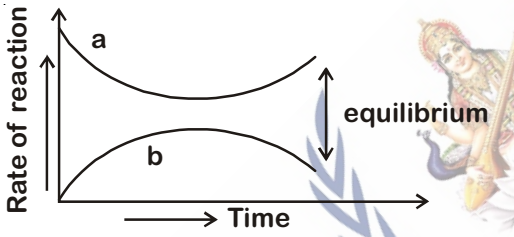
(1) 

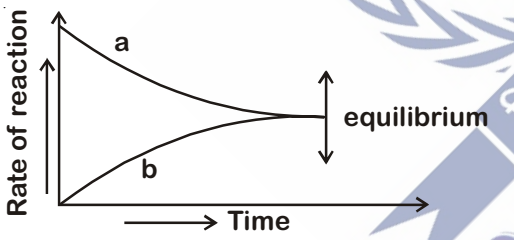
(2) 

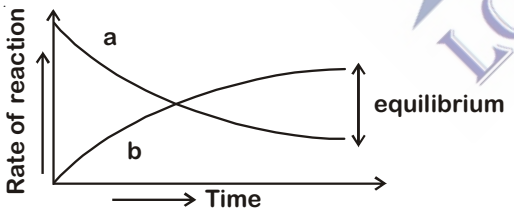
(3) 

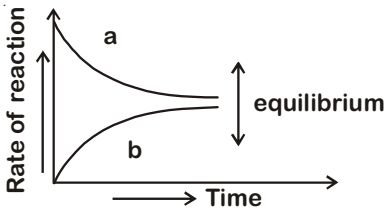
(4) 

50. For the equilibrium $A \rightleftharpoons B$, the variation of the rate of the forward (a) and reverse (b) reaction with time is given by **[JEE (Main)-2020]**

(1) 

(2) 

(3) 

(4) 

51. If the equilibrium constant for $A \rightleftharpoons B + C$ is $K_{eq}^{(1)}$ and that of $B + C \rightleftharpoons P$ is $K_{eq}^{(2)}$, the equilibrium constant for $A \rightleftharpoons P$ is **[JEE (Main)-2020]**

(1) $K_{eq}^{(1)} / K_{eq}^{(2)}$ (2) $K_{eq}^{(1)} + K_{eq}^{(2)}$

(3) $K_{eq}^{(2)} - K_{eq}^{(1)}$ (4) $K_{eq}^{(1)} K_{eq}^{(2)}$

52. Consider the following reaction :

$N_2O_4(g) \rightleftharpoons 2NO_2(g)$; $\Delta H^0 = +58$ kJ

For each of the following cases (a, b), the direction in which the equilibrium shifts is

[JEE (Main)-2020]

(a) Temperature is decreased

(b) Pressure is increased by adding N_2 at constant T.

(1) (a) Towards product, (b) towards reactant

(2) (a) Towards reactant, (b) no change

(3) (a) Towards reactant, (b) towards product

(4) (a) Towards product, (b) no change

53. Arrange the following solutions in the decreasing order of pOH

(A) 0.01 M HCl

(B) 0.01 M NaOH

(C) 0.01 M CH_3COONa

(D) 0.01 M NaCl **[JEE (Main)-2020]**

(1) (B) > (C) > (D) > (A) (2) (A) > (D) > (C) > (B)

(3) (A) > (C) > (D) > (B) (4) (B) > (D) > (C) > (A)

54. For the reaction

$$Fe_2N(s) + \frac{3}{2}H_2(g) \rightleftharpoons 2Fe(s) + NH_3(g)$$

[JEE (Main)-2020]

(1) $K_C = K_p(RT)^{1/2}$ (2) $K_C = K_p(RT)$

(3) $K_C = K_p(RT)^{3/2}$ (4) $K_C = K_p(RT)^{-1/2}$

55. The variation of equilibrium constant with temperature is given below

Temperature	Equilibrium Constant
T_1 = 25°C	K_1 = 10
T_2 = 100°C	K_2 = 100

The values of $\Delta H°$, $\Delta G°$ at T_1 and $\Delta G°$ at T_2 (in kJ mol^{-1}) respectively, are close to [Use R = 8.314 J K^{-1} mol^{-1}] **[JEE (Main)-2020]**

(1) 28.4, –5.71 and –14.29

(2) 0.64, –7.14 and –5.71

(3) 28.4, –7.14 and –5.71

(4) 0.64, –5.71 and –14.29

56. The value of K_C is 64 at 800 K for the reaction

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

The value of K_C for the following reaction is

$NH_3(g) \rightleftharpoons \frac{1}{2}N_2(g) + \frac{3}{2}H_2(g)$ **[JEE (Main)-2020]**

(1) 1/8 (2) 1/64

(3) 8 (4) 1/4

57. Two solutions, A and B, each of 100 L was made by dissolving 4 g of NaOH and 9.8 g of H_2SO_4 in water, respectively. The pH of the resultant solution obtained from mixing 40 L of solution A and 10 L of solution B is_____. **[JEE (Main)-2020]**

58. 3 g of acetic acid is added to 250 mL of 0.1 M HCl and the solution made up to 500 mL. To 20 mL of this solution $\frac{1}{2}$mL of 5 M NaOH is added. The pH of the solution is_____.

[Given : pK_a of acetic acid = 4.75, molar mass of acetic acid = 60 g/mol, log3 = 0.4771]

Neglect any changes in volume.

[JEE (Main)-2020]

59. For a reaction X + Y = 2Z, 1.0 mol of X, 1.5 mol of Y and 0.5 mol of Z were taken in a 1 L vessel and allowed to react. At equilibrium, the concentration of Z was 1.0 mol L^{-1}. The equilibrium constant of the reaction is _____ $\frac{x}{15}$. The value of x is _____. **[JEE (Main)-2020]**

60. If the solubility product of AB_2 is 3.20×10^{-11} M^3, then the solubility of AB_2 in pure water is _____ $\times 10^{-4}$ mol L^{-1}. [Assuming that neither kind of ion reacts with water] **[JEE (Main)-2020]**

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