CHAPTER 8

CHEMICAL EQUILIBRIUM

MCQs

Q.1 A reaction is reversible because
(a) reactants are reactive (b) products are reactive
(c) products are stable (d) reactants are stable

Q.2 A large value of Kc means that at equilibrium
(a) less reactants and more products
(b) more reactants and less product
(c) same amount
(d) none

Q.3 Extent to $H2 + I2 \rightarrow 2HI$ can be increased by
(a) increasing pressure (b) increasing product
(c) increasing temp (d) adding a catalyst

Q.4 Strength of an acid can be determined by
(a) PKa (b) PKp
(c) POH (d) PKw

Q.5 In an exothermic reversible reaction increase in temp shifts the equilibrium to
(a) reactant side (b) product side
(c) remains unchanged (d) none

Q.6 Units of Kw are
(a) mole dm–3 (b) mole2 dm–3
(c) mole2 dm–6 (d) mole2 dm–3

Q.7 A basic Buffer solution can be prepared by mixing
(a) weak acid and its salt with strong base
(b) strong acid and its salt with weak base
(c) weak base and its salt with strong acid
(d) strong base and its salt with weak acid

Q.8 Buffer action can be explained by
(a) common ion effect (b) law of mass action

(c) Le–Chatlier's principle (d) all above

Q.9 Ionization of weak acid is expressed in term of following constant

(a) Kw (b) Kn

(c) Ka (d) Kb

Q.10 Solubility of Ca(OH)2 is exothermic. If solubility will increase

(a) at high temp (b) at low temp

(c) temp independent (d) none

Q.11 For which system does the equilibrium constant, Kc has units of concentration

(a) $N_2 + 3H_2 \rightleftharpoons 2NH_3$ (b) $H_2 + I_2 \rightleftharpoons 2HI$

(c) $2NO_2 \rightleftharpoons N_2O_4$ (d) $2HF \rightleftharpoons H_2 + F_2$

Q.12 Which statement about the following equilibrium is correct

$2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g) \quad \Delta H = -188.3 \text{ kJ mol}^{-1}$

(a) the value of Kp falls with a rise in temp

(b) the value of Kp falls with increasing pressure

(c) adding V_2O_5 catalyst increase the equilibrium yield of sulphur trioxide

(d) the value of Kp is equal to Kc

Q.13 The PH of 10^{-3} mole dm^{-3} of an aqueous solution of H_2SO_4 is

(a) 3.0 (b) 2.7

(c) 2.0 (d) 1.5

Q.14 The solubility product of AgCl is 2.0×10^{-10} mole^2 dm^{-6}. The max concentration of Ag^+ ions in the solution is

(a) 2.0×10^{-10} mol dm^{-3} (b) 1.41×10^{-5} mol dm^{-3}

(c) 1.0×10^{-10} mol dm^{-3} (d) 4.0×10^{-20} mol dm^{-3}

Q.15 An excess of aqueous silver nitrate to added to aqueous barium chloride and precipitate is removed by filtration what are the main ions in the filtrate

(a) Ag^+ and NO only (b) Ag^+ and Ba^{2+} and NO_3

(c) Ba^{2+} and NO only (d) Ba^{+2} and NO and Cl^-

Q.16 For $N_2 + 3H_2 \rightleftharpoons 2NH_3$

(a) $K_c = K_p$ (b) $K_p = K_c RT$

(c) Kp = Kc (RT)–2 (d) Kp = Kc (RT)–1

Q.17 H2 + I2 2HI

In the above equilibrium system, if the conc. of reactants of 25oC is increased, the value of Kc will

(a) increase (b) decrease
(c) remains constant
(d) depends upon nature of reactants

Q.18 In a chemical reaction, equilibrium is said to have established when

(a) opposing reactions stops
(b) concentrations of reactants and products are equal
(c) rate constants of opposing reactions are equal

Q.19 The relation between Kc and Kp is

(a) Kc = Kp (RT) Δn (b) Kp = Kc (RT) Δn
(c) Kp = Kc (RT) Δn (d) Kp = Kc

Q.20 The precipitation occurs if the ionic concentration is

(a) less than Ksp (b) more than Ksp
(c) equal to Ksp (d) is present at any moment

Q.21 The PH of oranges is

(a) 3.5 (b) 3.1
(c) 4.6 (d) 4.2

Q.22 Which one of following solution have zero PH

(a) 1M HCl (b) 0.5 MH2SO4
(c) 0.1 M HNO3 (d) 1M CH3COOH

Q.23 The solubility product expression for BaF2 can be written as

(a) [Ba2+] [F–] (b) [Ba2+] [2F]
(c) [Ba2+] [F–]2 (d) [Ba+] [F–]2

Q.24 To prepare a buffer with PH close to 9.0, you could use a mixture of

(a) NH4OH and NH4Cl
(b) CH3COOH and CH3COONa
(c) HNO2 + NaNO2
(d) NaHCO3 + H2CO3

Q.25 For which reaction the numerical value of Kc and Kp are same

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

(c) $H_2 + Cl_2 \rightleftharpoons 2HCl$ (d) $N_2O_4 \rightleftharpoons 2NO_2$

Q.26 For which system does the equilibrium constant Kc have units (mole dm–3)–1

(a) $H_2 + I_2 \rightleftharpoons 2HI$ (b) $N_2 + 3H_2 \rightleftharpoons 2NH_3$

(c) $2NO_2 \rightleftharpoons N_2O_4$

(d) $CH_3COOH + C_2H_5OH \rightleftharpoons CH_3COOC_2H_5 + H_2O$

Q.27 What can affect the magnitude of equilibrium constant Kp of a reversible gaseous reaction

(a) temperature (b) pressure

(c) catalyst (d) none of above

Q.28 Which gas can change the PH towards acidic

(a) argon (b) carbon dioxide

(c) nitrogen (d) oxygen

Q.29 The solution having zero PH will be

(a) basic (b) high basic

(c) neutral (d) highly acidic

Q.30 A solution have H+ ions concentration 1 x 10–7 its PH will be

(a) acid (b) basic

(c) neutral (d) zero

Q.31 Which one of the following has highest PH

(a) 0.1 M HCl (b) 1.0 M HCl

(c) gastric juice (d) lemons

Q.32 Which PH is considered as basic

(a) 1 (b) 7

(c) 2 (d) 11

Q.33 The sum of PH and POH is

(a) 2 (b) 7

(c) 14 (d) 13.5

Q.34 A buffer solution can be prepared by mixing

(a) a strong acid and weak base

(b) a weak acid and weak base
(c) a strong acid and its salt
(d) a weak base and its salt with strong acid

Q.35 Law of mass action was presented by
(a) Henderson (b) Lewis
(c) Guldberg and Waage (d) Arrehenius

Q.36 The unit of Kc for reaction
$N_2 + O_2 \rightleftharpoons 2NO$
(a) mol dm–3 (b) mol–1 dm3
(c) mol–2 dm6 (d) no units

Q.37 PH of pure water is
(a) 3.2 (b) 4.2
(c) 7.0 (d) 0

Q.38 Which of following change will favour the formation of more SO_3 at equilibrium
$2SO_2 + O_2 \rightleftharpoons 2SO_3 + heat$
(a) by adding SO_3 at equilibrium
(b) by increasing temp
(c) by decreasing temp
(d) by decreasing pressure

Q.39 When pressure is applied to the given equilibrium
ice $\rightleftharpoons$ water which of the following will happen
(a) more ice will be formed
(b) more water will be formed
(c) equilibrium will not be disturbed
(d) water will formed

Q.40 Which of following change will favour the formation of more HI in the given reaction
$H_2 + I_2 \rightleftharpoons 2HI$
(a) increasing pressure
(b) decreasing pressure
(c) by adding more HI

(d) by adding more H2 and I2

ANSWERS

Questions	1	2	3	4	5
Answers	b	a	c	a	A
Questions	6	7	8	9	10
Answers	a	a	d	c	b
Questions	11	12	13	14	15
Answers	a	a	b	b	c
Questions	16	17	18	19	20
Answers	c	a	c	b	b
Questions	21	22	23	24	25
Answers	a	a	c	a	c
Questions	26	27	28	29	30
Answers	b	b	b	d	c
Questions	31	32	33	34	35
Answers	d	d	c	d	c
Questions	36	37	38	39	40
Answers	d	c	c	d	d