CHEMICAL EQUILIBRIUM

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Questions

Q.1 | **Encircle the correct option:** | **10**

1) The pH of 10^{-3} mol.dm³ of an aqueous solution of H_2SO_4 is

   a) 3.0   b) 2.7   c) 2.0   d) 1.5

2) The relationship b/w Kc and Kp is given by

   a) Kc=Kp   b) Kc=Kp$(\frac{P}{N})^{\Delta H}$ c) Kc=Kp(RT)$^{\Delta H}$ d) Kc=Kp(RT)$^{-\Delta n}$

3) When Kc value is small, the equilibrium position is

   a) towards left   b) towards right   c) remain unchanged   d) none of these

4) For what value of Kc almost forward reaction is complete.

   a) Kc=10^{-30} b) Kc=10^{30} c) Kc=1   d) Kc=0

5) For which system does the equilibrium constant, Kc has unit $(conc)^{-1}$.

   a) $N_2 + 3H_2 \rightleftharpoons 2NH_3$ b) $H_2 + I_2 \rightleftharpoons 2HI$ c) $2NO_2 \rightleftharpoons N_2O_4$ d) $2HF \rightleftharpoons H_2 + F_2$

6) 1 dm³ of a buffer solution containing 0.01M NH_4Cl and 0.1M NH_4OH having pK_b of 5 has pH of

   a) 10   b) 9   c) 4   d) 6

7) Law of mass action was derived by Guldberg and Waage in

   a) 1909   b) 1906   c) 1846   d) 1864

8) The concentration of reactants and products at equilibrium are

   a) equal   b) maximum   c) minimum   d) Constant

9) What cab affect the magnitude of Kp, Of a reversible gaseous reaction

   a) temperature   b) pressure   c) catalyst   d) concentration

10) Which is correct for given reaction.

   $N_2 + O_2 \rightleftharpoons 2NO$

   a) Kp>Kc   b) Kp<Kc   c) Kp=Kc   d) All of these

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Questions

SHORT QUESTIONS

Q2. **20**

1. Describe the effect of common ion effect on solubility with example.

2. Derive Kc expression for the reaction:

$$CH_3COOH + C_2H_5OH \rightleftharpoons CH_3COO\ C_2H_5 + H_2O$$

3. Why do rate of forward reaction slow down when the reversible reaction approaches the equilibrium stage?

4. State Lechatlier's Principle. What happens when pressure is increased on the reaction

$$N_2 + 3H_2 \rightarrow 2NH_3$$

5. Calculate the pH of 10^{-4} mole dm^3 of $Ba(OH)_2$.

6. What are buffer solutions? How a basic buffer can be prepared?

7. Write down optimum conditions for the preparation of ammonia?

8. Why change of volume disturbs the equilibrium position for some of the gaseous phase reactions but not the equilibrium constant.?

9. What is Henderson's equation and For which purpose is it used?

10. What are applications of buffer in daily life?

LONG QUESTIONS

Q3.

(a) K_c value for the following reaction is 0.016 at 520°C **04**
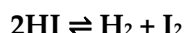
$$2HI \rightleftharpoons H_2 + I_2$$

Equilibrium mixture contain [HI]=0.08M, [H_2]=0.01M, [I_2]=0.01M. To this mixture more HI is added so that its new concentration is 0.096M. What will be the concentration of [HI], [H_2], [I_2] when equilibrium is re-established.

(b) Benzoic acid C_6H_5COOH is a weak monobasic acid K_a=6.4x10^{-4} $moldm^{-3}$. What is the pH of **04** buffer containing 7.2g of sodium benzoate and 0.02 mol benzoic acid.