



INDIAN SCHOOL NIZWA - WORKSHEET

CHEMISTRY

CH 7: EQUILIBRIUM

Name: _____

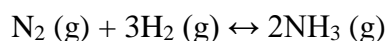
Date: 13.01.2025

Class: XI Sec: A

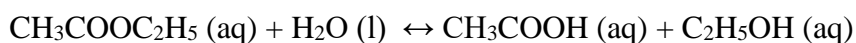
Answer the following

1. What is meant by the conjugate acid-base pair? Find the conjugate acid/base pair for the following species: HNO_2 , CN^- , HClO_4 , F^- , OH^- , CO_3^{2-} and S^{2-} .

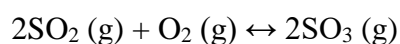
2. What is the effect of increasing pressure on the equilibrium?



3. Write the expression for the equilibrium constant (K_c) for the reaction:



4. Write K_p in terms of K_c for the following chemical reaction:



5. The equilibrium constant K_c for the reaction:



The K for the reaction $\text{HI} (\text{g}) \leftrightarrow \frac{1}{2} \text{H}_2 (\text{g}) + \frac{1}{2} \text{I}_2 (\text{g})$ at same temperature will be?

6. The ionization constant of HF, HCOOH and HCN at 298 K are 6.8×10^{-4} , 1.8×10^{-4} and 4.8×10^{-9} respectively. Calculate the ionization constants of the corresponding conjugate bases.

7. The value of K_c for the reaction $3\text{O}_2 (\text{g}) \leftrightarrow 2\text{O}_3 (\text{g})$ is 2.0×10^{-50} at 25°C . if the equilibrium concentrations of O_2 in air at 25°C is 1.6×10^{-2} , what is the concentration of O_3 ?

8. The species: H_2O , HCO_3^- , HSO_4^- and NH_3 can act both as bronsted acids and bases. For each case give the corresponding conjugate acid and base.

9. Consider the following equilibrium $\text{CO}_2(\text{g}) + \text{C} (\text{graphite}) \leftrightarrow 2\text{CO}(\text{g})$. write the equilibrium expression for K_c and calculate its units.

10. How does a catalyst affect the equilibrium constant? Explain.

11. Write the conjugate acid for NH_2^- and NH_3 .

12. Write the relationship between $\text{p}K_a$ and $\text{p}K_b$ values.

13. Explain the following:

a. Common Ion effect

b. Bronsted Lowry concept of acids and bases

c. Le-Chatelier's Principle

14. Why is NH_4Cl added before addition of NH_4OH in qualitative analysis of third group?

15. Consider the reaction:

$\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \leftrightarrow 2\text{NH}_3(\text{g}) + \text{Heat}$. Indicate the direction in which the equilibrium will shift when: (a) temperature is increased and (b) pressure is increased.

16. The value of K_c in the reaction: $2\text{A} \leftrightarrow \text{B} + \text{C}$ is 2.0×10^{-3} . At a given time, the composition of reaction mixture is $[\text{A}] = [\text{B}] = [\text{C}] = 3 \times 10^{-4} \text{ M}$. In which direction the reaction will proceed?

17. Write expression of K_p for the reaction: $\text{N}_2\text{O}_4(\text{g}) \leftrightarrow 2\text{NO}_2(\text{g})$

18. Write an expression for K_a , for ionization of HCN in aqueous solution. Give equation also.

19. Find the conjugate base for the species H_2O and NH_4^+ .

20. Which of the following is not Lewis base, Ag^+ , H_2O , CN^- and NH_3 ?

21. Write conjugate acid and conjugate base of H_2O .

22. How does common ion affect the solubility of electrolyte?
