

**SAINIK SCHOOL GOPALGANJ**

**ASSIGNMENTS**

**SUBJECT - Chemistry**

**CHAPTER- Equilibrium**

**CLASS-XI**

**1. Find the pH of a solution when 0.01 M HCl and 0.1 M NaOH are mixed in equal volumes**

- (a) 12.65
- (b) 1.04
- (c) 7.0
- (d) 2.0

**2. Which of the following aqueous solution will be the best conductor of electricity?**

- (a)  $\text{NH}_3$
- (b)  $\text{CH}_3\text{COOH}$
- (c) HCl
- (d)  $\text{C}_6\text{H}_{12}\text{O}_6$

**3. Highest pH will be recorded for which of the following solutions if they are equimolar**

- (a)  $\text{AlCl}_3$
- (b)  $\text{BaCl}_2$
- (c)  $\text{BeCl}_2$
- (d) LiCl

**4. On increasing the concentration of reactants in a reversible reaction, then equilibrium constant will**

- (a) depend on the concentration
- (b) increase
- (c) unchanged
- (d) decrease

**5. Find the conjugate acid of  $\text{NH}_2^-$**

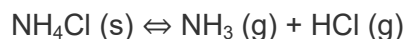
- (a) NH
- (b)  $\text{NH}_4\text{OH}$



6. We know that the relationship between  $K_c$  and  $K_p$  is

$$K_p = K_c (RT)^{\Delta n}$$

What would be the value of  $\Delta n$  for the reaction



(i) 1

(ii) 0.5

(iii) 1.5

(iv) 2

7 Which of the following is not a general characteristic of equilibria involving physical processes?

(i) Equilibrium is possible only in a closed system at a given temperature.

(ii) All measurable properties of the system remain constant.

(iii) All the physical processes stop at equilibrium.

(iv) The opposing processes occur at the same rate and there is dynamic but stable condition.

8.  $\text{PCl}_5$ ,  $\text{PCl}_3$  and  $\text{Cl}_2$  are at equilibrium at 500K in a closed container and their concentrations are  $0.8 \times 10^{-3} \text{ mol L}^{-1}$ ,  $1.2 \times 10^{-3} \text{ mol L}^{-1}$  and  $1.2 \times 10^{-3} \text{ mol L}^{-1}$  respectively. The value of  $K_c$  for the reaction  $\text{PCl}_5 \text{ (g)} \rightleftharpoons \text{PCl}_3 \text{ (g)} + \text{Cl}_2 \text{ (g)}$  will be

(i)  $1.8 \times 10^3 \text{ mol L}^{-1}$

(ii)  $1.8 \times 10^{-3}$

(iii)  $1.8 \times 10^{-3} \text{ L mol}^{-1}$

(iv)  $0.55 \times 10^4$

9. Which of the following statements is incorrect?

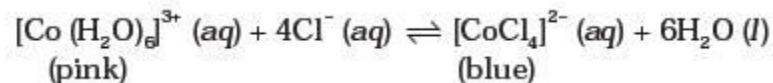
(i) In equilibrium mixture of ice and water kept in perfectly insulated flask mass of ice and water does not change with time.

(ii) The intensity of red colour increases when oxalic acid is added to a solution containing iron (III) nitrate and potassium thiocyanate.

(iii) On addition of catalyst the equilibrium constant value is not affected.

(iv) Equilibrium constant for a reaction with negative  $\Delta H$  value decreases as the temperature increases.

9. When hydrochloric acid is added to cobalt nitrate solution at room temperature, the following reaction takes place and the reaction mixture becomes blue. On cooling the mixture it becomes pink. On the basis of this information mark the correct answer.



(i)  $\Delta H > 0$  for the reaction

(ii)  $\Delta H < 0$  for the reaction

(iii)  $\Delta H = 0$  for the reaction

(iv) The sign of  $\Delta H$  cannot be predicted on the basis of this information.

10. The conjugate base of acetic acid is

- (a)  $\text{Cl}^-$
- (b)  $\text{SO}_4^{2-}$
- (c)  $\text{HCOO}^-$
- (d)  $\text{CH}_3\text{COO}^-$

**VSA type**

11. Define an acid and a base according to Bronsted – Lowry concept.

12. What is the conjugate base of HCl?

13. Write expression for ionic product of water . What is the value of ionic product of Water?

14. What do you understand by the term Buffer solution. Give an example.

15. Why ammonia is termed as a base although it does not have  $\text{OH}^-$  ions in it ?

**SA type**

16. What is meant by  $\text{p}^{\text{H}}$  of a solution ? What is  $\text{p}^{\text{H}}$  of a neutral solution ? What happens to  $\text{P}^{\text{H}}$  of water on increasing the temperature ?

17. Calculate the  $\text{p}^{\text{H}}$  of a  $1 \times 10^{-8}\text{M}$  solution of HCl.

18. Justify the statement ‘ all Bronsted bases are also Lewis bases but all Bronsted acids are not Lewis acids.’

19. What is the Arrhenius theory of acids and bases/ Give its two important limitations.

20. What do you understand by dissociation constant of an acid? How is it related to the strength of the acid?