Topic :- Equilibrium

1. A white salt is readily soluble in water and gives a colourless solution with a pH of about 9. The salt would be:
   a) NH_4NO_3 b) CH_3COONa c) CH_3COONH_4 d) $CaCO_3$

2. The dissociation constant of NH_4OH is 1.8×10^{-5}. The hydrolysis constant of NH_4Cl would be:
   a) 1.8×10^{-19} b) 1.8×10^{-5} c) 5.55×10^{-5} d) 5.55×10^{-10}

3. 50 mL of H_2O is added to 50 mL of 1×10^{-3} M barium hydroxide solution. What is the pH of the resulting solution?
   a) 3.0   b) 3.3   c) 11.0   d) 11.7

4. The indicator used in titration of oxalic acid with caustic soda solution is
   a) Methyl orange   b) Methyl red   c) Fluorescein   d) Phenolphthalein

5. For $H_2 + I_2 \rightleftharpoons 2HI$, at equilibrium some I_2 is added. What happens to the equilibrium?
   a) It is shifted to the right   b) It gets shifted to the left   c) It remains unchanged   d) None of the above

6. Which of the following is a characteristic of a reversible reaction?
   a) It can never proceed to completion
   b) It can be influenced by a catalyst
   c) Number of moles of reactants and products are equal
   d) None of the above

7. An aqueous solution of hydrogen sulphide shows the equilibrium,
   $$H_2S \rightleftharpoons H^+ + HS^-$$
   If dilute hydrochloric acid is added to an aqueous solution of hydrogen sulphide without any change in temperature, then:
   a) The equilibrium constant will change
   b) The concentration of HS^- will increase
   c) The concentration of undissociated hydrogen sulphide will decrease
   d) The concentration of HS^- will decreases

8. Le-Chatelier's principle is not applicable to:
   a) Homogeneous reactions
   b) Heterogeneous reactions
   c) Homogeneous or heterogeneous systems in equilibrium
   d) Systems not in equilibrium

9. If pK_a values of four acids are given below at 25℃, the strongest acid is

a) 2.0   b) 2.5   c) 3.0   d) 4.0

10. Weakest base among the following is:
    a) NaOH   b) $Ca(OH)_2$ c) $Zn(OH)_2$ d) KOH

11. A solution of pH 9.0 is one thousand times as basic as a solution of pH:
    a) 6   b) 7   c) 4   d) 10

12. Aprotic solvent is:
    a) CCl_4 b) C_6H_6 c) SO_2 d) All of these

13. The hydroxide with highest solubility product is:
    a) $Al(OH)_3$ b) $Co(OH)_2$ c) $Cr(OH)_3$ d) $Fe(OH)_3$

14. In the absence of formation of complex ions by the addition of a common ion, the solubility of a given salt is:
    a) Increased
    b) Decreased
    c) Unaffected
    d) First increased and then decreased

15. The pH of 0.1 M NaHS is, K_{a_1} and K_{a_2} for H_2S are 1.3×10^{-7} and 7.1×10^{-15} respectively:
    a) 10.52   b) 9.52   c) 12.52   d) 13.52

16. $A + B \rightleftharpoons C + D$
    Initially moles of A and B are equal. At equilibrium, moles of C are three times that of A. the equilibrium constant of the reaction will be
    a) 1   b) 3   c) 4   d) 9

17. The strongest acid among the following is:
    a) $ClO_3(OH)$
    b) $ClO_2(OH)$
    c) $SO(OH_2)$
    d) $SO_2(OH)_2$

18. The equilibrium constant in a reversible reaction at a given temperature
    a) Does not depend on the initial concentrations
    b) Depends on the initial concentrations of the reactants
    c) Depends on the concentration of the products at equilibrium
    d) It is not characteristic of the reaction

19. For the reaction, $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$ at 720 K, the value of equilibrium constant is 50, when equilibrium concentration of both H_2 and I_2 is 0.5 M. K_p under the same conditions will be :
    a) 0.02   b) 0.2   c) 50   d) 50 RT

20. If 340 g of a mixture of N_2 and H_2 in the correct ratio gave a 20% yield of NH_3. The mass produced would be :
    a) 16 g   b) 17 g   c) 20 g   d) 68 g