DPP
DAILY PRACTICE PROBLEMS

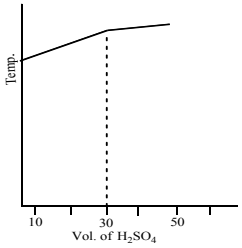
Class : XIth **Subject : CHEMISTRY**
Date : **DPP No. : 6**

Topic :- Equilibrium

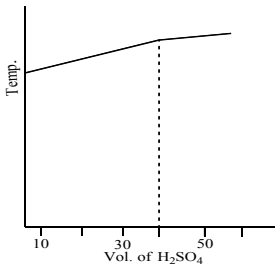
1. A buffer mixture of acetic acid and potassium acetate has pH = 5.24. The ratio of $[CH_3COO^-]/[CH_3COOH]$ in this buffer is, $(pK_a = 4.74)$:
   a) 3 :1 b) 1 :3 c) 1 :1 d) 1 :2
2. pK_a of acetic acid is 4.74. The concentration of CH_3COONa is 0.01 M. The pH of CH_3COONa is
   a) 3.37 b) 4.37 c) 4.74 d) 0.474
3. If 1 M CH_3COONa is added to 1 M CH_3COOH:
   a) pH of the solution increases
   b) pH decreases
   c) pH does not change
   d) None of the above
4. 2.5 mL of $\frac{2}{5}$ M weak monoacidic base ($K_b = 1 \times 10^{-12}$ at 25°C) is titrated with $\frac{2}{15}$ M HCl in water at 25°C. The concentration of H^+ at equivalence point is $(K_w = 1 \times 10^{-14}$ at 25°C)
   a) 3.7×10^{-13} M b) 3.2×10^{-7} M c) 3.2×10^{-2} M d) 2.7×10^{-2} M
5. Solubility product of a salt AB is 1×10^{-8} M^2 in a solution in which the concentration of A^+ ions is 10^{-3} M. The salt will precipitate when the concentration of B^- ions is kept
   a) Between 10^{-8} to 10^{-7} M b) Between 10^{-7}M to 10^{-8} M
   c) $> 10^{-5}$ M d) $< 10^{-8}$ M
6. For the gaseous reaction, $C_2H_4 + H_2 \rightleftharpoons C_2H_6$, $\Delta H = -130$ kJ mol^{-1} carried in a closed vessel, the equilibrium concentration of the C_2H_6 can definitely be increased by
   a) Increasing temperature and decreasing pressure b) Decreasing temperature and increasing pressure
   c) Increasing temperature and pressure both d) Decreasing temperature and pressure only
7. Chemical equilibrium is dynamic in nature because:
   a) The equilibrium is maintained rapidly
   b) The concentration of reactants and products become same at equilibrium
   c) The concentration of reactants and products decrease with time
   d) Both forward and backward reactions occur at all times with same speed

8. What happens to the yield on application of high pressure in the Haber's synthesis of ammonia?
   a) Increases b) Decreases c) Unaffected d) Reaction stops
9. The buffering action of an acidic buffer is maximum when its pH is equal to
   a) 5 b) 7 c) 1 d) pK_a
10. HA is a weak acid. The pH of 0.1 M HA solution is 2. What is the degree of dissociation (α) of HA?
   a) 0.5 b) 0.2 c) 0.1 d) 0.301
11. Which of the following is a wrong statement about equilibrium state?
   a) Rate of forward reaction= Rate of backward reaction
   b) Equilibrium is dynamic
   c) Catalysts increase value of equilibrium constant
   d) Free energy change is zero
12. In an experiment to determine the enthalpy of neutralization of sodium hydroxide with sulphuric acid, 50 cm^3 of 0.4 M sodium hydroxide were titrated thermometrically with 0.25 M sulphuric acid. Which of the following plots gives the correct representation?

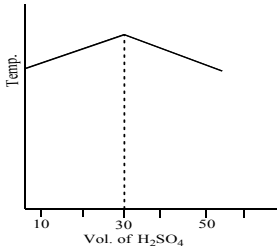
a)



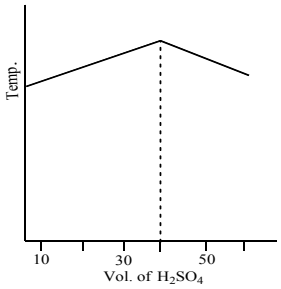
b)



c)



d)



13. H^+ ion produces common ion effect in the wet analysis of:
    a) Group I metals b) Group II metals c) Group III metals d) Group IV metals
14. 15 moles of H_2 and 5.2 moles of I_2 are mixed and allowed to attain equilibrium at 500°C . At equilibrium, the concentration of HI is found to be 10 moles. The equilibrium constant for the formation of HI is
    a) 50 b) 15 c) 100 d) 25
15. $10^{-6}M$ HCl is diluted to 100 times. Its pH is:
    a) 6.0 b) 8.0 c) 6.95 d) 9.5
16. For the reaction, $PCl_3(g) + Cl_2(g) \rightleftharpoons PCl_5(g)$, the position of equilibrium can be shifted to the right by
    a) Doubling the volume
    b) Increasing the temperature
    c) Addition of Cl_2 at constant volume
    d) Addition of equimolar quantities of PCl_3 and PCl_5
17. The pH of an aqueous solution containing $[H^+]$ concentration $=3.0 \times 10^{-3}$ M. The pH of the solution is
    a) 2.523 b) 3.0 c) 2.471 d) None of these
18. The addition of which salt will decrease the H^+ concentration of HCN solution?
    a) NH_4Cl b) $Al_2(SO_4)_3$ c) $AgNO_3$ d) NaCN
19. The pH of the solution obtained by mixing 10 mL of $10^{-1}N$ HCl and 10 mL of 10^{-1} N NaOH is:
    a) 8 b) 2 c) 7 d) None of these
20. The solubility product of $PbCl_2$ is 2.3×10^{-32}. Its solubility will be
    a) 1.78×10^{-11} g/L b) 2.95×10^{-9} g/L c) 3.42×10^{-9} g/L d) 4.95×10^{-9} g/L