CLASS XI CHE CH: 6

SET 4 –

1. A buffer solution is a solution which –
   a) Resists change in pH
   b) Increases pH
   c) Decreases pH
   d) Has very high pH

2. Buffer solution consists of –
   a) Weak acid and its salt with strong base
   b) Strong acid and strong base
   c) Weak base and strong acid
   d) Neutral solution

3. Example of acidic buffer –
   a) $CH_3COOH + CH_3COONa$
   b) $NH_4OH + NH_4Cl$
   c) $NaOH + HCl$
   d) $Na_2CO_3 + NaHCO_3$

4. Example of basic buffer –
   a) $NH_4OH + NH_4Cl$
   b) $CH_3COOH + CH_3COONa$
   c) $HCl + NaCl$
   d) $Na_2CO_3 + NaHCO_3$

5. The pH of a buffer solution is given by –
   a) Henderson–Hasselbalch equation
   b) van't Hoff equation
   c) Raoult's law
   d) Nernst equation

6. Henderson–Hasselbalch equation for acidic buffer is –
   a) pH = pKa + log ([salt]/[acid])
   b) pH = pKa – log ([salt]/[acid])
   c) pH = pKa + [acid]/[salt]
   d) pH = pKa – [acid]/[salt]

7. The equation for basic buffer is –
   a) pOH = pKb + log ([salt]/[base])
   b) pOH = pKb – log ([salt]/[base])
   c) pH = pKb + log ([base]/[salt])
   d) None

8. The pH of $CH_3COOH + CH_3COONa$ buffer depends on –
   a) Ka of acid and ratio of salt/acid

b) Temperature only
c) Concentration only
d) Volume of solution

9. Buffer capacity is –
a) The ability to resist pH change
b) Ability to neutralise acid only
c) Ability to neutralise base only
d) None

10. Buffer capacity depends on –
a) Concentration of acid and salt
b) pH only
c) Temperature only
d) None

11. Blood is an example of –
a) Natural buffer
b) Acidic buffer
c) Basic buffer
d) None

12. The pH of human blood is nearly –
a) 7.4
b) 6.4
c) 5.4
d) 8.4

13. Buffer in blood is mainly –
a) H_2CO_3/HCO_3^- system
b) CH_3COOH/CH_3COONa
c) NH_4OH/NH_4Cl
d) H_2SO_4/Na_2SO_4

14. Buffer used in stomach acidity –
a) $Mg(OH)_2$ / $Al(OH)_3$
b) NaCl / HCl
c) CH_3COOH / CH_3COONa
d) NH_4OH / NH_4Cl

15. The pH of a buffer solution remains constant on –
a) Dilution
b) Addition of small acid or base
c) Both (a) and (b)
d) None

CLASS XI CHE CH: 6

16. Buffer action is maximum when –
    a) [Salt] = [Acid]
    b) [Salt] >> [Acid]
    c) [Acid] >> [Salt]
    d) None

17. When [Salt] = [Acid], then –
    a) pH = pKa
    b) pH = ½pKa
    c) pH = 2pKa
    d) pH = 0

18. The pH of a buffer changes significantly if –
    a) Acid or base added in large quantity
    b) Slightly diluted
    c) Heated
    d) None

19. Hydrolysis is –
    a) Reaction of salt with water
    b) Reaction of acid with base
    c) Neutralisation
    d) None

20. Salts formed from weak acid and strong base give –
    a) Basic solution
    b) Acidic solution
    c) Neutral solution
    d) None

21. Example of such a salt –
    a) CH_3COONa
    b) NaCl
    c) NH_4Cl
    d) $NaNO_3$

22. Salts formed from strong acid and weak base give –
    a) Acidic solution
    b) Basic solution
    c) Neutral solution
    d) None

23. Example of such a salt –
    a) NH_4Cl
    b) CH_3COONa
    c) Na_2CO_3

CLASS XI CHE CH: 6

d) K_2SO_4

24. Salt of strong acid and strong base is –
    a) Neutral
    b) Acidic
    c) Basic
    d) Amphoteric

25. Example of neutral salt –
    a) NaCl
    b) NH_4Cl
    c) CH_3COONa
    d) Na_2CO_3

26. Hydrolysis constant Kh =
    a) Kw / (Ka or Kb)
    b) Ka × Kb
    c) 1 / Ka
    d) Ka / Kb

27. For salt of weak acid and strong base,
    a) Kh = Kw / Ka
    b) Kh = Ka / Kw
    c) Kh = Kw × Ka
    d) Kh = 1 / Kw

28. For salt of weak base and strong acid,
    a) Kh = Kw / Kb
    b) Kh = Kb / Kw
    c) Kh = Ka × Kw
    d) None

29. Degree of hydrolysis (h) =
    a) √(Kh / C)
    b) √(C / Kh)
    c) Kh × C
    d) Kh / C

30. pH of salt solution =
    a) 7 + ½(pKa + log C)
    b) 7 + ½(pKb + log C)
    c) 7 ± ½pKa ± ½pKb
    d) Depends on salt type

31. For NH_4Cl (weak base + strong acid), solution is –
    a) Acidic
    b) Basic

c) Neutral
d) Amphoteric

32. For CH_3COONa (weak acid + strong base), solution is –
a) Basic
b) Acidic
c) Neutral
d) Amphoteric

33. For NaCl (strong acid + strong base), solution is –
a) Neutral
b) Acidic
c) Basic
d) Amphoteric

34. The pH of 0.1 M NH_4Cl (Kb of $NH_3 = 1.8\times10^{-5}$) is approximately –
a) 5.1
b) 9.2
c) 7
d) 6.2

35. The pH of 0.1 M CH_3COONa (Ka = 1.8×10^{-5}) ≈
a) 8.9
b) 7
c) 5.1
d) 6.2

36. When equal volumes of acid and base buffer are mixed, pH –
a) Remains unchanged
b) Becomes 7
c) Increases
d) Decreases

37. The addition of small acid to buffer –
a) Slightly decreases pH
b) Greatly decreases pH
c) Increases pH
d) No effect

38. The addition of small base to buffer –
a) Slightly increases pH
b) Greatly increases pH
c) Decreases pH
d) None

39. In basic buffer $NH_4OH + NH_4Cl$, pH increases on addition of –
a) NH_4OH

b) NH_4Cl
c) HCl
d) None

40. pH of a solution containing equal CH_3COOH and CH_3COONa is –
a) pH = pKa
b) pH = ½pKa
c) pH = 2pKa
d) None

41. Hydrolysis constant depends on –
a) Temperature
b) Concentration
c) Both
d) None

42. The product of Ka and Kb of conjugate acid–base pair equals –
a) Kw
b) Ka^2
c) Kb^2
d) 1

43. Buffer is most effective when –
a) pH = pKa
b) pH = 7
c) pH = pKw
d) None

44. The capacity of buffer is higher when –
a) Both components are concentrated
b) Both are dilute
c) Only acid concentrated
d) Only salt concentrated

45. In an acidic buffer, if acid concentration increases –
a) pH decreases
b) pH increases
c) No change
d) None

46. In basic buffer, if salt concentration increases –
a) pH decreases
b) pH increases
c) No change
d) None

CLASS XI CHE CH: 6

47. Buffer maintains pH by –
    a) Neutralising added acid/base
    b) Absorbing ions
    c) Forming precipitate
    d) None

48. Buffer solutions are used in –
    a) Biological systems
    b) Analytical chemistry
    c) Industrial processes
    d) All of these

49. Salts of weak acids and weak bases are –
    a) Hydrolysed completely
    b) Not hydrolysed
    c) Partially ionised
    d) None

50. The pH of salt of weak acid and weak base depends on –
    a) Ka and Kb both
    b) Only Ka
    c) Only Kb
    d) None

✅ Answer Key – SET 4

1–a 2–a 3–a 4–a 5–a 6–a 7–a 8–a 9–a 10–a
11–a 12–a 13–a 14–a 15–c 16–a 17–a 18–a 19–a 20–a
21–a 22–a 23–a 24–a 25–a 26–a 27–a 28–a 29–a 30–d
31–a 32–a 33–a 34–a 35–a 36–a 37–a 38–a 39–a 40–a
41–a 42–a 43–a 44–a 45–a 46–a 47–a 48–d 49–a 50–a