Acid Bases and Salts

SECTION - I
Straight Objective Type

1. *A strong Bronsted base accepts protons easily forming its conjugate acid. The conjugate acid thus formed shows a reluctance to loose the proton. Example:*
$CH_3COO^- + H^+ \rightarrow CH_3COOH$.
Hence option B is correct.

2. *A very weak acid has pH near to but less than 7. Its pOH will thus be close to 7 but greater than 7 as pH + pOH = 14.*
Hence option C is correct.

3. *Strong acids and bases do not require any energy to be dissociated into ions. Hence Heat of Neutralisation is 13.7 kcal/mole.*
Hence option C is correct.

4. *A low pH indicates acidic nature.* NH_4Cl *is formed by the action of a strong acid on a weak base. See discussion on salt hydrolysis.*
Hence option B is correct.

5. *As temperature increases from room temperature, it can be expected that water will ionize more. Thus the product of* $\left[H^+\right]$ *and* $\left[OH^-\right]$ *would be greater than* 1×10^{-14}.
Hence option A is correct.

6. *The solution having the largest pOH will have the smallest pH and therefore be more acidic.* $MgCl_2$ *is formed from reaction of* $Mg(OH)_2$ *and HCl. Relatively HCl is stronger acid. Hence the salt solution will be acidic.*
Hence option A is correct.

7. *The higher the pH, the less acidic the substance. Since* CH_3COOH *is least dissociated and weakest acid its pH will be highest.*
Hence option B is correct.

8. *Any acid on adding water dissociates more.*
Hence option D is correct.

9. *Heat of Neutralisation on increasing temperature will depend on reactants and other reaction conditions.*
Hence option D is correct.

10. *Since a base is ionized more the salt solution will be basic.*
Hence option C is correct.

11. *For bases range of pH >7 to pH < = 14.*
Hence option B is correct.

12. *As* NH_3 *accepts a proton it acts as a base.*
Hence option B is correct.

13. *The option d can be written as* $\log\left[H^+\right]^{-1} = -\log\left[H^+\right] = pH.$
Hence option D is corrects

14. *As acetic acid is dissociated less* $\left[H^+\right] > 10^{-1}, pH > 1.$
Hence option B is correct.

15. *Oxide of zinc reacts with acids to give simple salt and water and with bases to give complex salts and water.*
Hence option D is correct.

16. *Heat of neutralization will be less as part of the heat is used to dissociate the weak base.*
Hence option C is correct.

17. *The lowest pH aqueous compound will be the most acidic.* NH_4Cl *is formed from reaction of strong acid with weak base and hence will be acidic. (See discussion on salt hydrolysis).*

Hence option B is correct.

18. *The conjugate base of* OH^- *is* O^{2-} *as it can accept proton to form* OH^-.

Hence option A is correct.

19. *The conjugate base of* $H_2PO_4^-$ *is* $H_2PO_4^{2-}$ *as it can accept proton to form* $H_2PO_4^-$.

Hence option B is correct.

20. *As temperature increases more water molecule ionize. So,* $\left[H^+\right]$ *and* $\left[OH^-\right]$ *will be more then* 10^{-14}.

Hence option B is correct.

21. *Ammonium sulphate is formed by the action of strong acid on weak base. So its aqueous solution will be acidic. The* $\left[H^+\right] > 10^{-7}$.

Hence option A is correct.

22. *The formula of slaked lime is* $Ca(OH)_2$ *a base. All other options are salts.*

Hence option B is correct.

23. *The strongest Bronsted Base is formed from the weakest Brontsed acid. HC1O is the weakest out of HClO,* $HClO_2, HClO_3, HClO_4$.

Hence option B is correct.

24. *By definition a Lewis acid accepts a pair of electrons from a Lewis base to form a dative bond.*

Hence option C is correct.

25. *As HF is more polar than HCl than HBr than HI, reactivity of HI is least as it will be the least ionized.*
Hence option D is correct.

26. *By definition Arrhenius base form OH^- in aqueous solution.*
Hence option D is correct.

27. *An acidic salt is a salt that has replaceable H atoms.*
Hence option B is correct.

28. *As $K_w = 1 \times 10^{-14}$ at 25°C, pH + pOH = 14 at 25°C.*
Hence option C is correct.

29. *As pH approaches O acidic nature increases.*
Hence option A is correct.

30. *Sodium acetate is formed by reaction of weak acid with strong base and hence the salt solution will be basic.*
Hence option C is correct.

31. *By definition strength of an acid is dependent on extent of dissociation.*
Hence option A is correct.

32. *By definition buffers resist pH changes even if a little strong acid or base is added to the buffer.*
Hence option D is correct.

33. *Human blood is slightly alkaline. pH of human blood is approximately 7.4.*
Hence option C is correct.

34. *As acidity increases the equilibrium shifts to decrease hydrogen ion concentration, that is, in the backward direction.*

Hence option A is correct.

35. *The pH of an acid is always lesser than 7. So if* $\left[H^+\right]=10^{-8}$ *the acid is so weak that the ionisation of pure water to give* $\left[H^+\right]\left(=10^{-7}\,moles/l\right)$ *also has to be taken into consideration. The total* $\left[H^+\right]$ *is thus* $10^{-8}+10^{-7}$.

Hence option B is correct.

SECTION - II
Assertion - Reason Questions

36. *As temperature increases more water molecule ionize. So,* $\left[H^+\right]$ *and* $\left[OH^-\right]$ *will be more then* 10^{-14}.

Hence option A is correct.

37. *Statement 2 is not the reason for Statement 1, which is correct. The correct reason is that sulphuric acid form constant boiling mixture above concentration of 98% - if boiled, both remaining water and acid boil off together beyond this concentration.*

Hence option C is correct.

38. *Heat of Neutrlisation will be below 13.7 kcal/mole as part of heat is utilized to dissociate weak acid.*

Hence option D is correct.

39. *The rule is as given in Statement 1. Statement 2 is wrong, as it is not necessary that a less volatile acid is dissociated less.*

Hence option C is correct.

40. *As temperature increases more water molecule ionize. So,* $\left[H^+\right]$ *and* $\left[OH^-\right]$ *will be more then* 10^{-14}.

Hence option A is correct.

41. *The pH of an acid is always lesser than 7. So if* $\left[H^+\right]=10^{-8}$ *the acid is so weak that the ionisation of pure water to give* $\left[H^+\right]\left(=10^{-7}\ moles/l\right)$ *also has to be taken into consideration. The total* $\left[H^+\right]$ *is thus* $10^{-8}+10^{-7}$.

Hence option B is correct.

42. *Above room temperature pH + pOH < 14 as* $\left[H^+\right]$ *and* $\left[OH^-\right]>10^{-7}$ *moles/l. Statement 2 is thus correct but statement 1 is wrong.*

Hence option D is correct.

43. *Both statements are correct but Statement 2 is not the reason. See discussion on salt hydrolysis.*

Hence option B is correct.

44. *As pH of strong acid is close to 0, pOH is close to 14. Statement 2 is correct but not the reason.*

Hence option B is correct.

45. H_3O^+ *ion is formed due to dative bond formation. Statement 2 is also correct but not the reason.*

Hence option B is correct.

SECTION - III

Linked Comprehension Type

46. *The common ion is* Cl^-, *As* $\left[Cl^-\right]$ *increases the equilibrium shifts in such a way that the excess is removed.*

Hence option B is correct.

47. *In unsaturated solution no equilibrium is present and as such no shift – either backward or forward takes place.*
Hence option B is correct.

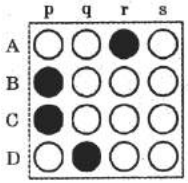
48. *The* $\left[Cl^{-}\right]$ *remains unchanged or is constant.*
Hence option A is correct.

49. *The common ion concentration remains unchanged.*
Hence option A is correct.

50. *Ionic Product of water of an aqueous solution at room temperature is irrespective of substance dissolved/a constant at* $K_w = 1\times10^{-14}$.
Hence option A is correct.

SECTION - IV
Matrix - Match Type

51.



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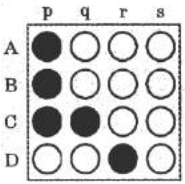

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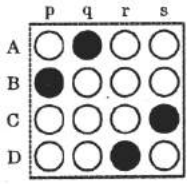

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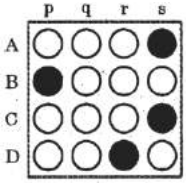

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