

10TH ACID, BASE AND SALT - EXERCISE SOLUTION

LEVEL 1

- (A)
Species which can donate electron pair are lewis base. H₂O has two lone pair which can be donated.
- (D)
Lewis acids are electron pair acceptors. AlCl₃ is an electron deficient molecule.
- (A)
Acids are the substances which release H⁺ ions in water.
- (D)
Reaction of acid with base is known as neutralization reaction.
- (B)
It is a weak acid.
- (C)
Na₂CO₃ is made up of two ions Na⁺ and CO₃²⁻ and C and O in CO₃²⁻ are covalently bonded.
- (A)
$$\text{HNO}_3 + \text{KOH} \rightarrow \text{KNO}_3 + \text{H}_2\text{O}$$

Initial millimoles	100	80	0	0
Millimoles at equilibrium	20	0	80	80

Hence $[\text{H}^+] = (20 \times 10^{-3})/0.2 = 0.1 \text{ M}$
$$\text{pH} = -\log[\text{H}^+]$$
$$= -\log[0.1]$$
$$= 1$$
- (B)
Double salt gives positive test for all the ions whereas complex salt does not.
- (A)
NaCl solution is a neutral solution so it pH = 7.
- (C)
Reaction is balanced.
- (C)
On heating washing soda it loses its water of crystallization.
- (B)
Keene's cement is a hard plaster formulation, primarily used for ornamental work.
- (C)
$$2\text{NaOH} + \text{H}_2\text{CO}_3 \rightarrow \text{Na}_2\text{CO}_3 + 2\text{H}_2\text{O}$$

14. (B)
Sodium hydroxide is a deliquescent substance.
15. (B)
Washing soda is used to remove permanent hardness of water.
16. (D)
 $\text{NaCl} + \text{H}_2\text{O} + \text{CO}_2 + \text{NH}_3 \rightarrow \text{NH}_4\text{Cl} + \text{NaHCO}_3$
17. (B)
 $(\text{NH}_4)_2\text{SO}_4$ is a salt of strong acid (H_2SO_4) + weak base (NH_4OH).
18. (A)
 H_2SO_4 is commonly known as oil of vitriol.
19. (B)
Molarity = $0.02 / 2 = 0.01 = [\text{H}^+]$
 $\text{pH} = -\log [\text{H}^+]$
= $-\log [0.01]$
= 2
20. (D)
HCl is highly diluted to solution will be slightly acidic.

LEVEL 2

1. (D)
Arrhenius proposed ionic theory of acid and base.
2. (B)
Acetic acid is used in making of vinegar.
3. (B)
 NH_4OH is the weakest base among all.
4. (D)
Red litmus turns blue in basic solution. For base $\text{pH} > 7$.
5. (D)
For base $\text{pH} > 7$
Basic nature is directly proportional to pH.
6. (A)
For a basic solution, on dilution pH will decrease.
7. (A)
Baking powder is NaHCO_3

8. (D)

All are uses of bleaching powder.

9. (A)

Lewis bases are electron pair donor.

10. (B)

$$\text{pH} = -\log [\text{H}^+]$$

$$2 = -\log [\text{H}^+]$$

$$\text{H}^+ = \text{Antilog} [-2]$$

$$[\text{H}^+] = 10^{-2}$$

11. (B)

Salts dissolve in water through an endothermic process.

12. (C)

$$\text{pOH} = -\log [\text{OH}^-]$$

$$= -\log [0.1]$$

$$= 1$$

$$\text{pH} + \text{pOH} = 14$$

$$\text{Therefore pH} = 13$$

13. (D)

$$\text{pH} = -\log [\text{H}^+]$$

$$= -\log [0.1]$$

$$= 1$$

$$\text{pH} + \text{pOH} = 14$$

14. (C)

$$\text{pOH} = -\log [\text{OH}^-]$$

$$= -\log [0.01]$$

$$= 2$$

$$\text{pH} + \text{pOH} = 14 \quad (\text{as } K_w = 10^{-14})$$

$$\text{Therefore pH} = 12$$

15. (D)

K_2CO_3 is a basic salt hence its pH will be highest among all.

16. (C)

NaH_2PO_4 is an acidic salt as it contains replaceable hydrogen and it can react with one mole of base as H_2PO_4^- has only one replaceable hydrogen.

17. (B)

Equilibrium shifting is the factor responsible for colour change of the indicators.

18. (C)

Mixed salt and complex salt are two different category they don't resemble each other.

19. (A)

$$\begin{aligned} \text{pOH} &= -\log [\text{OH}^-] \\ &= -\log [2 \times 10^{-4}] \\ &= 4 - \log 2 \\ &= 4 - 0.3010 \\ &= 3.7 \end{aligned}$$

