

## Chapter - 2

### Acids, Bases and Salts

#### ( Assertion and Reasoning Questions )

---

**Following questions consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:**

- (a) Both A and R are true and R is the correct explanation of A.
- (b) Both A and R are true but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) A is false but R is true.

**Q.1. Assertion (A) :** The acid must always be added to water with constant stirring.

**Reason (R) :** Mixing of an acid with water decreases the concentration of  $H^+$  ions per unit volume.

**Q.2. Assertion (A) :** Copper sulphate crystals are wet because it contains water of crystallisation.

**Reason (R) :** Water of crystallisation is the fixed number of molecules of water present in one formula unit of salt.

**Q.3. Assertion (A) :** The aqueous solutions of glucose and alcohol do not show acidic character.

**Reason (R) :** Aqueous solutions of glucose and alcohol do not give  $H^+$  ions.

**Q.4. Assertion (A) :**  $HCl$  gas does not change the colour of dry blue litmus paper.

**Reason (R) :**  $HCl$  gas dissolves in the water present in wet litmus paper to form  $H^+$  ions.

**Q.5. Assertion (A) :** Weak acids have low electrical conductivity.

**Reason (R) :** Strong acids and weak acids have equal concentration of hydrogen ions in their solutions.

**Q.6. Assertion (A):** Pure water is neither acidic nor basic.

**Reason (R) :** The pH of a solution is inversely proportional to the concentration of hydrogen ions in it.

**Q.7. Assertion (A) :** During electrolysis of concentrated aqueous solution of sodium chloride, hydrogen is produced at anode and chlorine gas is produced at cathode.

**Reason (R) :** Ions get attracted to oppositely charged electrodes.

**Q.8. Assertion (A) :** Baking powder is used in making cake instead of using only baking soda.

**Reason (R) :** Baking powder contains tartaric acid which reacts with sodium carbonate and removes bitter taste.

**Q.9. Assertion (A) :** The chemical formula of bleaching powder is  $\text{CaOCl}_2$ .

**Reason (R) :** Calcium oxide reacts with chlorine to form bleaching powder.

**Q.10. Assertion (A):** Plaster of Paris is stored in a moisture proof container.

**Reason (R) :** Plaster of Paris sets into a hard mass on wetting with water to form anhydrous calcium sulphate.

**Q.11. Assertion (A):** The chemical name of bleaching powder is calcium oxychloride.

**Reason (R) :** Bleaching powder is used as an oxidising agent in chemical industries.

**Q.12. Assertion:** The process of dissolving an acid or a base in water is highly exothermic reaction.

**Reason (R) :** Water must always be added slowly to acid with constant stirring.

**Q.13. Assertion (A) :** Phenolphthalein is an acid-base indicator.

**Reason (R) :** Phenolphthalein gives different colours in acidic and basic medium.

**Q.14. Assertion:** Calcium sulphate hemihydrate,  $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$  is called plaster of Paris.

**Reason (R) :** Plaster of Paris is used for producing moulds for pottery and ceramics and casts of statues.

**Q.15. Assertion (A) :**  $\text{pH} = 7$  signifies pure water.

**Reason (R) :**  $\text{pH}$  of acetic acid is greater than 7.

**Q.16. Assertion (A) :**  $\text{HCl}$  is a stronger acid than acetic acid.

**Reason (R) :** On dissociation,  $\text{HCl}$  yields lesser hydrogen ions for the same concentration as compared to acetic acid.

**Q.17. Assertion (A) :**  $\text{pH}$  of ammonium nitrate solution is acidic.

**Reason (R) :** Solution of a salt of weak base and strong acid is acidic.

**Q.18. Assertion (A) :** Phosphoric acid is a weak acid.

**Reason :** Phosphoric acid when dissolved in water dissociates partially and produces very little  $\text{H}^+$  ions.

**Q.19. Assertion (A) :** Antacids neutralize the effect of extra acid produced in the stomach during indigestion and thus provide relief.

**Reason (R) :** Antacids are mild bases.

**Q.20. Assertion (A) :** Acetic acid does not act as an acid in benzene solution.

**Reason (R) :** Benzene is non-polar.

**Q.21. Assertion (A) :** Bleaching powder reacts with dilute acids to evolve chlorine.

**Reason (R) :** The chlorine liberated by the action of dilute acids on bleaching powder is called available chlorine.

**Q.22. Assertion (A) :** Sodium carbonate pentahydrate is also known as washing soda.

**Reason (R) :** Chief raw materials for the manufacture of washing soda are  $\text{NH}_3$ ,  $\text{NaCl}$  and  $\text{CaCO}_3$ .

**Q.23. Assertion (A) :** Common salt is used for the preparation of many chemicals such as sodium hydroxide, bleaching powder, baking soda, washing soda etc.

**Reason :** Main source of sodium chloride is sea water.

**Q.24. Assertion (A) :**  $\text{AlCl}_3$  is a basic salt.

**Reason (R) :**  $\text{AlCl}_3$  is a salt of strong acid and a weak base.

**Q.25. Assertion (A) :** Baking soda is prepared by chlor-alkali process.

**Reason (R) :** Brine decomposes to sodium hydroxide on passing electricity through it.

**Q.26. Assertion (A) :** Salt of  $\text{KNO}_3$  is formed by strong base and weak acid.

**Reason (R) :** Salt of  $\text{NH}_4\text{Cl}$  is formed by weak base and strong acid.

**Q.27. Assertion (A) :** Strength of the acid or base decreases with dilution.

**Reason (R) :** Ionization of an acid or a base increases with dilution.

**Q.28. Assertion (A) :** Higher the  $\text{H}^+$  ion concentration, lower is the pH value.

**Reason (R) :** The pH of a neutral solution = 7, that of a basic solution < 7 and that of an acidic solution > 7.

**Q.29. Assertion (A) :**  $\text{CH}_3\text{COOH}$  is used as vinegar in cooking and food preservatives.

**Reason (R) :** Strong acids are those acids which ionise almost completely in aqueous solution and hence produce a large amount of  $\text{H}^+$  ions.

**Q.30. Assertion (A) :** Tooth decay starts when the pH of the mouth is lower than 5.5.

**Reason (R) :** Enamel starts corroding below 5.5 pH.

**-X-X-X-**

### **ANSWER KEY**

**Q.1 :** (b)

**Q.2 :** (d) The Assertion is false. Copper sulphate is not wet. It is an hydrated salt, as it contains water molecules.

**Q.3 :** (a)

**Q.4 :** (a)

**Q.5 :** (c)

**Q.6 :** (b)

**Q.7 :** (d)

**Q.8 :** (a)

**Q.9 :** (c)

**Q.10 :** (c)

**Q.11 :** (b)

**Q.12 :** (c) The process of dissolving an acid or a base in water is highly exothermic reaction. Acid must always be added slowly to water with constant stirring.

**Q.13 :** (a)

**Q.14 :** (b)

**Q.15 :** (c) pH of acetic acid is less than 7.

**Q.16 :** (c) On dissociation, HCl yields more hydrogen ions for the same concentration as compared to acetic acid.

**Q.17 :** (a) Ammonium nitrate is a salt of ammonium hydroxide (weak base) and nitric acid (strong acid).

**Q.18 :** (a)

**Q.19 :** (a).

**Q.20 :** (a) For ionization of an acid, polar solvents (like water) are required. As ionization does not take place in non-polar solvents (like benzene) so acetic acid does not acts as an acid.

**Q.21 :** (b)

**Q.22 :** (d)

**Q.23 :** (b)

**Q.24 :** (d)

**Q.25 :** (d)

**Q.26 :** (d)

**Q.27 :** (b)

**Q.28 :** (c)

**Q.29 :** (b)

**Q.30 :** (a)