

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 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) : pH of acetic acid is greater than 7.

Q.16. Assertion (A) : HCl is a stronger acid than acetic acid.

Reason (R) : On dissociation, HCl yields lesser hydrogen ions for the same concentration as compared to acetic acid.

Q.17. Assertion (A) : 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 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 NH_3 , NaCl and 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) : AlCl_3 is a basic salt.

Reason (R) : 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 KNO_3 is formed by strong base and weak acid.

Reason (R) : Salt of NH_4Cl 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 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) : CH_3COOH 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 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.

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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)