UNIT – 2

ACIDS, BASES AND SALTS

Learning Points

- Physical properties of acids and bases.
- Chemical properties of acids and bases.
- How strong are solutions of acids and bases.
- Importance of pH in daily life.
- More about salts.
- Uses of salts.

Difficulty Level	No. of Questions	Marks	%
Easy (E)	20	35	26
Average (A)	35	59	43
Difficulty (D)	23	42	31

I. Four alternatives are given for each of the following questions / incomplete statements. Choose the correct alternative and write the complete answer along with its letter of alphabet. **(1 Mark)**

1. The chemical equation that represents neutralization reaction among the following is **[Difficulty]**

(a) $BaCl_2 + H_2SO_4 \longrightarrow BaSO_4 + 2HCl$

(b) $MnO_2 + 4HCl \longrightarrow MnCl_2 + 2H_2O + Cl_2$

(c) $2NaOH + H_2SO_4 \longrightarrow Na_2SO_4 + 2H_2O$

(d) $AgNO_3 + HCl \longrightarrow AgCl + HNO_3$

2. As the pH value of a neutral solution increases, **[Difficulty]**

(a) basic property decreases and number of OH− ions increases

(b) acidic property increases and number of H+ ions decreases

(c) basic property increases and number of OH− ions increases

(d) acidic property decreases and number of H+ ions increases.

3. A compound that reacts with both acids as well as bases to produce salts and water is **[Average]**

(a) Aluminium Oxide **(b)** Copper Oxide

(c) Iron Oxide **(d)** Sodium Oxide

4. The gas liberated when sodium carbonate reacts with dilute hydrochloric acid is **[Average]**

(a) Carbon Dioxide **(b)** Nitrogen Dioxide

(c) Hydrogen **(d)** Chlorine

5. The substance that converts blue litmus paper into red colour is **[Average]**

(a) Lime water **(b)** Pure water

(c) Sodium hydroxide solution **(d)** Gastric juice

6. An acid present in the stinging hair of nettle plant leaves is **[Easy]**

(a) Methanoic acid **(b)** Oxalic acid

(c) Citric acid **(d)** Lactic acid

7. The compound used to remove the permanent hardness of water is **[Average]**

(a) Sodium carbonate **(b)** Sodium hydroxide

(c) Sodium hydrogen carbonate **(d)** Sodium chloride

8. The pH value range of an acid. **[Easy]**

(a) 0-7 **(b)** 2-12 **(c)** 7-14 **(d)** 12-14

9. As the number of hydrogen ions increases in a solution, then it **[Average]**

(a) becomes neutral **(b)** increases acidity

(c) Increases the basicity **(d)** reduces acidity

10 Gas released when the dilute sulphuric acid is mixed with lead is **[Average]**

(a) Oxygen **(b)** Nitrogen **(c)** Hydrogen **(d)** Carbon

11. The product obtained when an acid is mixed with a metal is **[Average]**

(a) Metal oxide & water **(b)** Salt & water

(c) Metal oxide & hydrogen gas **(d)** Salt & hydrogen gas

12. The molecular formula of lime water is **[Easy]**

(a) CaO **(b)** $Ca(OH)_2$ **(c)** $CaCO_3$ **(d)** CO_2

13. When hydrochloric acid is added to a copper oxide solution, its colour turns into blue-green due to **[Difficulty]**

(a) Copper oxide **(b)** Water

(c) Copper hydroxide **(d)** Copper chloride

14. Acid should be added to water, not water to acid. Because it is **[Average]**

(a) Exothermic and may explode. **(b)** Endothermic and may explode

(c) It does not mix **(d)** Mixes very slowly

15. An acidic salt is to be obtained. Then the kinds of acid and base that have to be reacted with each other are **[Difficulty]**

(a) Weak base and weak acid **(b)** Weak acid and strong base

(c) Strong acid and strong base **(d)** Strong acid and weak base

16. A change that can be observed when red and blue litmus papers are dipped one after the other in two solutions M and N is **[Difficulty]**

(a) If M is a metallic oxide solution, the blue litmus turns red.

(b) If N is a metallic oxide solution, the red litmus does not change colour.

(c) If M is a non-metallic oxide solution, the blue litmus turns red.

(d) If N is a non-metallic oxide solution, the red litmus turns blue.

II. Answer the following questions. (1 Mark)

17. What is neutralization reaction ? **[Easy]**

18. Plaster of Paris should be stored in a moisture-proof container. Give scientific reason. **[Average]**

19. What are amphoteric oxides ? **[Easy]**

20. Can detergents be used to detect the permanent hardness of water ? Give reason. **[Difficulty]**

21. Name the ions responsible for acidic and basic natures of the substances. **[Easy]**

22. Write any two uses of washing soda. **[Easy]**

23. 1ml of acetic acid is mixed with 1ml of sodium hydroxide solution. Determine the nature of the salt forms here with suitable reason. **[Difficulty]**

24. How is concentrated acid diluted ? **[Average]**

25. How do you detect acid with litmus paper ? **[Difficulty]**

26. What is an acid ? **[Easy]**

27. Write a chemical equation for the reaction of a metal with a base. **[Average]**

28. What is the reaction product when air is blown into lime water ? **[Average]**

29. Which is the gas released when acids react with metal carbonate and metal hydrogen carbonate ? **[Average]**

30. Why is a metal oxide called a basic oxide ? **[Average]**

31. Why is a non-metal oxide called an acidic oxide ? **[Average]**

32. What are bases ? **[Easy]**

33. What is the ion formed when an acid dissolves in water ? **[Average]**

34. What happens as the number of hydroxide ions in a solution increases ? **[Average]**

35. What is the pH value of acid rain ? **[Easy]**

36. What is the chemical name of baking powder **[Easy]**

37 Write the chemical equation for the preparation of bleaching powder. **[Average]**

38. What is baking powder ? **[Easy]**

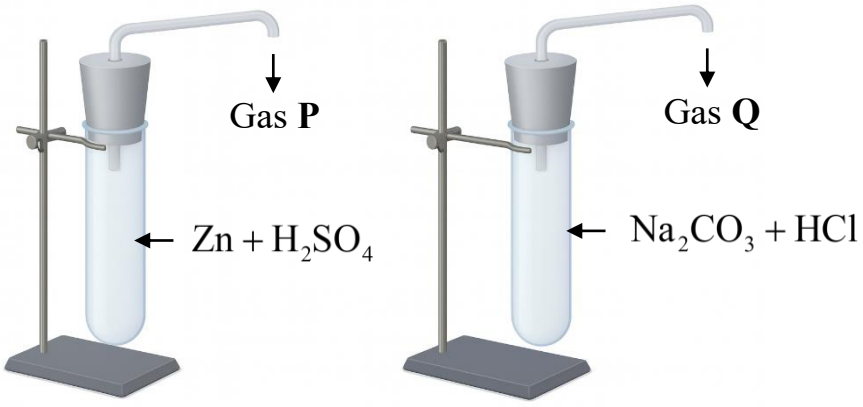
39. Give the molecular formula and chemical name of washing soda. **[Average]**

40. Which salt is used in fire extinguishers ? **[Average]**

41. Why does baking soda swell when mixed with bread dough ? **[Average]**

42. 20 ml of concentrated sodium hydroxide solution is added to a beaker containing 100 ml of water. How does this affect the concentration and the strength of OH^- ions in that solution ? **[Average]**

43. How are the released gases **P** and **Q** detected in the experiments depicted in the following figures ? **[Difficulty]**



Experiment **1** Experiment **2**

III. Answer the following questions. (2 Marks)

44. Give scientific reason: While diluting an acid, the acid should be added to water.

[Difficulty]

45. Agricultural scientists have suggested to add a certain amount of lime powder to an agricultural field. What may be the reasons for this ? Explain.

[Difficulty]

46. The PH values of the solutions A, B and C are 5, 6 and 7 respectively. Which of these solutions has the most acidic nature and why ? **[Difficulty]**

47. State the properties of acids. **[Easy]**

48. State the properties of bases. **[Easy]**

49. You are given three test tubes, one containing distilled water and the other two containing acidic and basic solutions respectively. If you are given only red litmus paper, how will you identify each sample in the test tube ? **[Difficulty]**

50. HCl, HNO_3 etc. exhibit acidic properties in aqueous solution but compounds like alcohol and glucose do not exhibit acidic properties. Why ? **[Difficulty]**

51. Rain water conducts electric current but distilled water does not. Why ?

[Difficulty]

52. The pH of fresh milk is 6. How does its pH change as it curdles ? Explain ?

[Difficulty]

53. A milkman adds a small amount of baking soda to fresh milk. **[Difficulty]**

54. Write the equations for preparing sodium hydroxide and baking soda from sodium chloride. **[Difficulty]**

55. A solution of baking soda is commonly applied to the area of a honeybee stung area. Justify this action. **[Difficulty]**

56. When an aqueous solution of 'P' is subjected to electrolysis in the chlor-alkali process, then the gases 'Q' and 'R' released at cathode and anode respectively

[Average]

(i) Name P, Q and R.

(ii) Write any one use of the gas Q.

57. Solutions A, B, C and D have pH values of 5.6, 1.8, 13.5 and 8.1 respectively.

[Average]

(a) Which of these solutions used to neutralize the acidity of the stomach ?

(b) Predict the change in the concentration of OH^+ and OH^- ions in the solution that forms when solutions B and D are mixed in equal volumes.

58. When carbon dioxide is passed through the lime water, then a white precipitate forms first. If passing Carbon dioxide is continued, then precipitate disappears. What is the reason for this effect ? Name the final product of this reaction.

[Average]

59. When an acid is diluted with distilled water what happens on the OH^+ ions concentration of that solution ? Is there any change in the pH value of this solution? Clarify. **[Average]**

IV. Answer the following questions. (3 Marks)

60. Draw the diagram of arrangement of the apparatus to show the reaction of zinc granules with dilute sulphuric acid and testing hydrogen gas by burning. Label the parts. **[Average]**

61. Name the gas liberated when an acid reacts with metal carbonate. Write the chemical equation of the reaction when this gas is passed through lime water. What is the colour of the precipitate obtained in this reaction ? **[Average]**

62. There is no change in the colour of red litmus and blue litmus paper when dipped into an aqueous solution of sodium chloride. After passing direct current through

the same solution, red litmus changes to blue colour. Which product is responsible for this change ? Mention any two uses of this product. **[Difficulty]**

63. What is a strong acid ? Explain how tooth decay is caused. How can it be prevented ? **[Easy]**

64. Write the molecular formulae and two uses of each of the following compounds **[Easy]**

(a) Bleaching powder

(b) Plaster of Paris.

65. What is neutralisation reaction ? Give an example. **[Easy]**

66. What is the common name of the compound that has molecular formula $CaSO_4.\frac{1}{2}H_2O$. **[Easy]**

67. How are concentrated acids and weak acids different ? State the precautions to be taken while concentrating an acid. **[Average]**

68. Name the salts used in the following situations and write their molecular formula: **[Average]**

(a) To remove permanent hardness of water.

(b) To make drinking water free from germs.

(c) To support fractured bones in their right position.

69. The pH values of four solutions are given in the below table. **[Difficulty]**

Solutions	pH value
e	5
f	13
g	9
h	2

(a) Classify these into acidic and basic solutions:

(b) Name the antacid used to neutralize excess of acid in the stomach.

70. Simultaneously red and blue litmus papers are dipped in the brine solution and in the aqueous product produced by subjecting that solution to electrolysis. What changes do you observe in litmus papers ? Support your answer with reasons.

[Difficulty]

71. Observe the pH values of four solutions given in the following table and answer the questions below. **[Average]**

Solutions	pH value
p	10.0
q	13.7
r	7.0
s	1.2

(i) Which solution can be used to prepare an antacid ? Why ?

(ii) Which two solutions can be used to get a neutral salt ? Why ?

72. Name the acid present in the following substances. **[Easy]**

(i) Curd

(ii) Gastric juice

73. Solutions A, B, C and D are having pH values of 2, 6, 8 and 13 respectively. Then,

(i) Which solution has more H^+ and which solution has more OH^- ions concentration ? Why ? **[Average]**

(ii) Which solutions can be made to react each other to get neutral salts ?

74. Four solutions A, B, C and D when tested with universal indicator showed pH as 5, 2, 7 and 11 respectively. Which solution **[Average]**

(i) has more hydronium ions ?

(ii) is neutral ?

(iii) is the strong acid ?

V. Answer the following questions. (4 Marks)

75. Name the products of chlor - alkali process. Write one use of each.

[Easy]

76. NaOH, $Ca(OH)_2$, H_2 and Cl_2 materials are given to you. By using which of these materials you can prepare bleaching powder ? Write the chemical name and one use of the bleaching powder. **[Average]**

77. **(i)** How do you identify a solution as basic solution by using blue litmus paper? **[Difficulty]**

(ii) Under what condition does a farmer treat the soil of his field with slaked lime. **[Difficulty]**

78. Write the differences between acid and base. **[Average]**