



Attempt questions first; check the separate key afterward. Show all working. Draw accurate figures where required.

A. Very short answers - 1 mark each

1. What is the pH of a neutral aqueous solution at 25°C?
2. What colour does blue litmus turn in acid?
3. Which ions give acidic and basic solutions their characteristic behaviour?
4. Why does dry HCl not change dry blue litmus?
5. A solution has pH 3. Is it acidic?
6. Compare hydrogen-ion concentrations at pH 3 and pH 5.
7. Name the gas formed when an acid reacts with a carbonate.
8. Give its test and balanced reaction with limewater.

B. Short answers / practice - 2 marks each

9. Write the reaction between HCl and NaOH.
10. Explain neutralisation with a daily-life example.
11. Write the formula of baking soda.
12. Explain why baking powder contains a mild edible acid.
13. Write the formula of washing soda.
14. Explain water of crystallisation using copper sulphate.
15. Write the formula of plaster of Paris.
16. Write its reaction with water to form gypsum.
17. Name the products of the chlor-alkali process.
18. Identify products at anode and cathode.
19. Does diluting an acid generally raise its pH toward 7?
20. Explain why acid is added slowly to water during dilution.

C. Application / reasoning - 3 marks each

21. Write the conventional formula of bleaching powder.

22. Write its preparation from slaked lime and chlorine.

23. Which is more acidic: pH 2 or pH 6?

24. Arrange pH 2, 7, 10 in increasing basic character.

25. An aqueous salt of strong acid and weak base is usually acidic or basic?

26. Predict whether aqueous NH_4Cl and Na_2CO_3 are acidic or basic.

27. Which is more basic: pH 8 or pH 11?

28. Write the reaction of Na_2CO_3 with dilute HCl.

29. Why should plaster of Paris be stored in moisture-proof containers?

30. What happens to blue hydrated copper sulphate crystals on strong heating?

31. Explain why an aqueous sugar solution does not show the acidic behaviour of an HCl solution.

D. Extended practice - 5 marks per pair

32. What approximate pH threshold is associated with tooth enamel decay?

33. Explain how basic toothpaste helps neutralise acids.

34. Write the heating reaction of baking soda.

35. Compare preparation, properties and two uses each of baking soda and washing soda.

ANSWER KEY - Numerical / closed questions

- 1) 7. 2) Red. 3) H_3O^+ and OH^- respectively. 5) Yes. 6) pH 3 has 100 times more. 7) CO_2 . 8) Turns limewater milky; $\text{Ca}(\text{OH})_2 + \text{CO}_2 \rightarrow \text{CaCO}_3 + \text{H}_2\text{O}$. 9) $\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$. 11) NaHCO_3 . 13) $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$. 15) $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$. 16) $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O} + 1\frac{1}{2}\text{H}_2\text{O} \rightarrow \text{CaSO}_4 \cdot 2\text{H}_2\text{O}$. 17) NaOH, H_2 , Cl_2 . 18) Anode Cl_2 ; cathode H_2 . 19) Yes. 21) CaOCl_2 . 22) $\text{Ca}(\text{OH})_2 + \text{Cl}_2 \rightarrow \text{CaOCl}_2 + \text{H}_2\text{O}$. 23) pH 2. 24) 2, 7, 10. 25) Acidic. 26) Acidic; basic. 27) pH 11. 28) $\text{Na}_2\text{CO}_3 + 2\text{HCl} \rightarrow 2\text{NaCl} + \text{H}_2\text{O} + \text{CO}_2$. 30) They lose water and become white anhydrous CuSO_4 . 32) Below about 5.5. 34) $2\text{NaHCO}_3 \rightarrow \text{Na}_2\text{CO}_3 + \text{CO}_2 + \text{H}_2\text{O}$.