CHAPTER 2

ANSWERS

Multiple Choice Questions

1.	(d)	2.	(d)	3.	(c)	4.	(b)
5.	(d)	6.	(a)	7.	(d)	8.	(a)
9.	(b)	10.	(b)	11.	(c)	12.	(b)
13.	(c)	14.	(d)	15.	(a)	16.	(b)
17.	(c)	18.	(d)	19.	(a)	20.	(c)
21.	(d)	22.	(b)	23.	(d)	24.	(b)
25.	(c)	26.	(c)				

- **27.** (c) **Hint** Though HCl gas is a covalent compound, in the aqueous solution it ionizes to form H^+ (aq) and Cl^- (aq) ions.
- **28.** (c) **29.** (a) **30.** (d)

(b)— (iii)

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Short Answer Questions

31.	(a)— (iv)	

32. (a)— (ii)

(c)—	(ii)
(c)—	(iv)

(d)— (i)

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- **33.**SubstanceAction on Litmus paperDry HCl gasNo changeMoistened NH3 gasTurns red to blueLemon juiceTurns blue to redCarbonated soft drinkTurns blue to redCurdTurns blue to redSoap solutionTurns red to blue
- **34.** The acid present in ant sting is methanoic acid (formic acid). The chemical formula is HCOOH. To get relief one should apply any available basic salt e.g., baking soda (NaHCO₃) on it.

35. Egg shells contain calcium carbonate. When nitric acid is added to it, carbon dioxide gas is evolved. The reaction can be given as

 $CaCO_3 + 2HNO_3 \rightarrow Ca (NO_3)_2 + H_2O + CO_2$

- 36. Hint— Using chemical indicator like phenolphthalein or natural indicators like turmeric, china rose etc.
- The chemical formula of baking powder is sodium 37. hydrogencarbonate (NaHCO₃). Whereas, that of washing soda is sodium carbonate (Na₂CO₂.10H₂O)

Sodium hydrogencarbonate on heating gives CO₂ gas which will turn lime water milky whereas no such gas is obtained from sodium carbonate.

 $2NaHCO_3 \xrightarrow{Heat} Na_2CO_3 + H_2O + CO_3$ $Na_{2}CO_{3}.10H_{2}O \longrightarrow Heat \rightarrow Na_{2}CO_{3} + 10H_{2}O$

38. Baking powder (NaHCO₂), salt A is commonly used in bakery products. On heating it forms sodium carbonate (Na₂CO₂), B and CO₂ gas, C is evolved. When CO₂ gas is passed through lime water it forms calcium carbonate (CaCO₂), which is slightly soluble in water making it milky.

A — NaHCO,

$$B - Na_2CO_3$$

 $C - CO_{o}gas$

39. In the manufacture of sodium hydroxide, hydrogen gas and chlorine gas (X) are formed as by-products. When chlorine gas (X) reacts with lime water, it forms calcium oxychloride (bleaching powder) Y. The reactions are

2NaCl (aq) + 2H₂O(l) \rightarrow 2NaOH (aq) + Cl₂(g) + H₂(g)

 $X \rightarrow Cl_{2}$ (Chlorine gas)

 $Ca (OH)_2 (s) + Cl_2 (g) \rightarrow CaOCl_2 (s) + H_2O$

Y — Calcium oxychloride (bleaching powder)

40 .	Name of the salt			Salt obtained from		
			Formula	Base	Acid	
	(i)	Ammonium chloride	NH ₄ Cl	NH ₄ OH	<u>HCl</u>	
	(ii)	Copper sulphate	\underline{CuSO}_{4}	<u>Cu(OH)₂</u>	H_2SO_4	
	(iii)	Sodium chloride	NaCl	NaOH	<u>HC1</u>	
	(iv)	Magnesium nitrate	Mg $(NO_3)_2$	<u>Mg(OH)₂</u>	HNO ₃	
	(v)	Potassium sulphate	K_2SO_4	<u>KOH</u>	$\underline{H}_{2}\underline{SO}_{4}$	
	(vi)	Calcium nitrate	Ca(NO ₃) ₂	Ca(OH) ₂	HNO ₃	

EXEMPLAR PROBLEMS - SCIENCE

41. In aqueous solutions strong acids ionise completely and provide hydronium ions. On the other hand weak acids are partially ionised and an aqueous solution of same molar concentration provides a much smaller concentration of H_3O^+ ions.

Strong acids — Hydrochloric acid, sulphuric acid, nitric acid Weak acid — Citric acid, acetic acid , formic acid

42. When zinc reacts with dilute solution of strong acid, it forms salt and hydrogen gas is evolved.

 $Zn + 2HCl \rightarrow ZnCl_2 + H_2$

When a burning splinter is brought near the mouth of the test tube, the gas burns with a pop sound.

Long Answer Questions

- **43. Hint** (a) Hydrogen gas will evolve with greater speed
 - (b) Almost same amount of gas is evloved
 - (c) Hydrogen gas is not evolved
 - (d) If sodium hydroxide is taken, hydrogen gas will be evolved $Zn + 2NaOH \rightarrow \qquad Na_2ZnO_2 + H_2$

Sodium zincate

44. (a) Baking soda is sodium hydrogencarbonate. On heating, it is converted into sodium carbonate which is bitter to taste

 $2NaHCO_3 \xrightarrow{Heat} Na_2CO_3 + H_2O + CO_2$

- (b) Baking soda can be converted into baking powder by the addition of appropriate amount of tartaric acid to it.
- (c) The role of tartaric acid is to neutralise sodium carbonate and cake will not taste bitter.
- 45. The gas evolved at anode during electrolysis of brine is chlorine (G)

When chlorine gas is passed through dry $Ca(OH)_2$ (Y) produces bleaching powder (Z) used for disinfecting drinking water.

 $Ca(OH)_2 + Cl_2 \rightarrow CaOCl_2 + H_2O$

Slaked Bleaching

lime powder

Since Y and Z are calcium salts, therefore X is also a calcium salt and is calcium carbonate.

 $CaCO_3 + 2HCl \rightarrow CaCl_2 + CO_2 + H_2O$

 $\text{Ca(OH)}_2 + \text{CO}_2 \rightarrow \text{CaCO}_3 + \text{H}_2\text{O}$

46. Sodium hydroxide (NaOH) is a commonly used base and is hygroscopic, that is, it absorbs moisture from the atmosphere and becomes sticky.

The acidic oxides react with base to give salt and water. The reaction between NaOH and CO_2 can be given as

 $2 \text{ NaOH} + \text{CO}_2 \rightarrow \text{Na}_2 \text{CO}_3 + \text{H}_2 \text{O}$

47. The substance which is used for making different shapes is Plaster of Paris. Its chemical name is calcium sulphate hemihydrate $(CaSO_4 \cdot \frac{1}{2}H_2O)$. The two formula unit of $CaSO_4$ share one molecule of water. As a result, it is soft.

When it is left open for some time, it absorbs moisture from the atmosphere and forms gypsum, which is a hard solid mass.

$$CaSO_4 \cdot \frac{1}{2} H_2O + 1\frac{1}{2} H_2O \longrightarrow CaSO_4 \cdot 2H_2O$$

Plaster of Paris

Gypsum (Hard mass)

(Sulphate salt)

(Soft)

- 48. X— NaOH (Sodium hydroxide)
 - A— Na_2ZnO_2 (Sodium zincate)
 - B— NaCl (Sodium chloride)
 - C— CH₃COONa (Sodium acetate)