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)

Short Answer Questions

31. (a)— (iv) (b)— (iii) (c)— (ii) (d)— (i)

32. (a)— (ii) (b)— (iii) (c)— (iv) (d)— (i)

33.

Substance	Action on Litmus paper
Dry HCl gas	No change
Moistened NH_3 gas	Turns red to blue
Lemon juice	Turns blue to red
Carbonated soft drink	Turns blue to red
Curd	Turns blue to red
Soap solution	Turns 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 ($NaHCO_3$) 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.

37. The chemical formula of baking powder is sodium hydrogencarbonate ($NaHCO_3$). Whereas, that of washing soda is sodium carbonate ($Na_2CO_3.10H_2O$)

Sodium hydrogencarbonate on heating gives CO_2 gas which will turn lime water milky whereas no such gas is obtained from sodium carbonate.

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

$Na_2CO_3.10H_2O \xrightarrow{\text{Heat}} Na_2CO_3 + 10H_2O$

38. Baking powder ($NaHCO_3$), salt A is commonly used in bakery products. On heating it forms sodium carbonate (Na_2CO_3), B and CO_2 gas, C is evolved. When CO_2 gas is passed through lime water it forms calcium carbonate ($CaCO_3$), which is slightly soluble in water making it milky.

A — $NaHCO_3$

B — Na_2CO_3

C — CO_2 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

$2NaCl(aq) + 2H_2O(l) \rightarrow 2NaOH(aq) + Cl_2(g) + H_2(g)$

$X \rightarrow Cl_2$ (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	Formula	Salt obtained from	
			Base	Acid
(i)	Ammonium chloride	NH_4Cl	NH_4OH	$\underline{HCl}$
(ii)	Copper sulphate	$\underline{CuSO_4}$	$\underline{Cu(OH)_2}$	H_2SO_4
(iii)	Sodium chloride	$NaCl$	$NaOH$	$\underline{HCl}$
(iv)	Magnesium nitrate	$Mg(NO_3)_2$	$\underline{Mg(OH)_2}$	HNO_3
(v)	Potassium sulphate	K_2SO_4	$\underline{KOH}$	$\underline{H_2SO_4}$
(vi)	Calcium nitrate	$Ca(NO_3)_2$	$Ca(OH)_2$	$\underline{HNO_3}$

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

$Zn + 2NaOH \rightarrow Na_2ZnO_2 + H_2$

Sodium zincate

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

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

(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 lime — Bleaching powder

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

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

$Ca(OH)_2 + CO_2 \rightarrow CaCO_3 + H_2O$

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

$2\ NaOH + CO_2 \rightarrow Na_2CO_3 + H_2O$

47. The substance which is used for making different shapes is Plaster of Paris. Its chemical name is calcium sulphate hemihydrate ($CaSO_4 . \square H_2O$). 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.

$$CaSO_4 . \frac{1}{2} H_2O + 1\frac{1}{2} H_2O \rightarrow CaSO_4 . 2H_2O$$

Plaster of Paris (Soft) (Sulphate salt) — Gypsum (Hard mass)

48. X— NaOH (Sodium hydroxide)
A— Na_2ZnO_2 (Sodium zincate)
B— NaCl (Sodium chloride)
C— CH_3COONa (Sodium acetate)