

## Appendix 1

### Greek Letters & Their Names

$\alpha$	alpha
$\beta$	beta
$\gamma$	gamma
$\delta$	delta
$\zeta$	zeta
$\eta$	eta
$\theta$	theta
$\iota$	iota
$\kappa$	kappa
$\lambda$	lambda
$\mu$	mu
$\nu$	nu
$\pi$	pi
$\rho$	rho
$\sigma$	sigma
$\tau$	tau
$\phi$	phi
$\chi$	chi
$\psi$	psi
$\omega$	omega

## Appendix 2

### Fundamental Physical Constants

S. No.	Physical constant	Symbol	Value
1.	Acceleration due to gravity	$g$	$9.81 \text{ ms}^{-2}$
2.	Atomic mass unit	amu (u)	$1.660453 \times 10^{-27} \text{ kg}$
3.	Avogadro constant	$N_A$	$6.02217 \times 10^{23} \text{ mol}^{-1}$
4.	Boltzmann constant	$K$	$1.38062 \times 10^{-23} \text{ JK}^{-1}$
5.	Electronic charge	$e$	$1.602192 \times 10^{-19} \text{ C}$
6.	Faraday constant	$F$	$9.64867 \times 10^4 \text{ C mol}^{-1}$
7.	Gas constant	$R$	$8.314 \text{ JK}^{-1} \text{ mol}^{-1}$
8.	Molar volume of ideal gas at (STP)	$V_m$	$2.24136 \times 10^{-2} \text{ m}^3 \text{ mol}^{-1}$
9.	Planck constant	$h$	$6.62620 \times 10^{-34} \text{ Js}$
10.	Rydberg constant	$R_H$	$1.973731 \times 10^7 \text{ m}^{-1}$
11.	Standard pressure (atmosphere)	$p$	$101325 \text{ Nm}^{-2}$
12.	Velocity of light of vacuum	$c$	$2.997925 \times 10^8 \text{ ms}^{-1}$

### Additional Constants

$$\pi = 3.1416, \ln X = 2.303 \log_{10} X$$

# Periodic Table

## Modern Periodic Table

[illegible]



## Appendix 5

### Popular Scientist & Their Work

- 1. Angstrom, Anders Jonas** He worked mainly with emission spectra Fraunhofer absorption lines wavelengths. Since 1905, spectral wavelengths have been expressed in Å.  
 $1\text{Å} = 10^{-10}\text{ m}$  or  $1\text{Å} = 10^{-8}\text{ cm}$
- 2. Arrhenius, Svante (August)** He demonstrated that electrolytes are conductors due to the movement of ions. He gave the following equation to show the effect of temperature at rate constant.  
$$k = Ae^{-E_a/RT}$$

This equation is known by the name Arrhenius equation.
- 3. Aston, Francis William** He designed the mass spectrograph and discovered the isotopes of neon.
- 4. Avogadro, Amedeo** He proposed a method for computing molecular weights from vapour densities. He also proposed that equal volumes of all gases contain equal numbers of molecules under similar temperature and pressure condition. [Avogadro's law].
- 5. Bartlett, Neil** Bartlett synthesized first compound of a noble gas in 1962, i.e., xenon hexachloroplatin.
- 6. Becquerel, Antoine Henri** He discovered radioactivity in fluorescent salts of uranium.
- 7. Berzelius, Jons Jacob** He discovered several elements, i.e., Ce, Se, Li, Th and V. He proposed vital force theory of organic compounds.
- 8. Bohr, Niels Henrik David** He proposed atomic model in 1913 to explain line spectrum of hydrogen.
- 9. Boltzmann, Ludwig Eduard** He worked on the kinetic theory of gases and on thermodynamics.
- 10. Boyle, Robert** He worked on gases, flame tests and acid base indicators. He was the first to give a definition of a chemical element.
- 11. Bragg, Sir William Henry** He worked on X-ray crystallography analysis.
- 12. Bronsted, Johannes Nicolaus** He proposed acid base theory as Lowry-Bronsted theory.
- 13. Bunsen, Robert Wilhelm** He popularized the use of Bunsen burner and developed the Bunsen cell.
- 14. Cavendish, Henry** He correctly distinguished between hydrogen and carbon dioxide.
- 15. Charles, Jacques Alexandre Cesar** He proposed Charles law. He became the first person to make an ascent in a hydrogen balloon.
- 16. Crookes, Sir William** He discovered cathode rays and developed an improved vacuum tube.
- 17. Curie, Marie** She had discovered radium and polonium.
- 18. Dalton, John** He is best remembered for Dalton's atomic theory.
- 19. de-Broglie, Louis-Victor Pierre Raymond** He is the best known for wave particle duality of light. He gave the following relation  $\lambda = \frac{h}{p}$ . This is called de-Broglie equation.
- 20. Debye, Peter Joseph William** He introduced the idea of electric dipole moments in molecules.
- 21. Dumas, Jean Baptiste Andre** He devised a method of measuring vapour density.

- 22. Einstein, Albert** He proposed theory of relativity.
- 23. Fahrenheit, Gabriel Daniel** He developed the mercury in glass thermometer and devised a temperature scale to go with it i.e., Fahrenheit scale.
- 24. Faraday, Michael** He proposed laws of electrolysis.
- 25. Fleming, Sir Alexander** He discovered the antibiotic penicillin.
- 26. Frankland, Sir Edward** He produced organometallic compounds (zinc dialkyls) firstly.
- 27. Gay-Lussac, Joseph** He gives the laws of chemical combination in gases helped to establish the atomic theory.
- 28. Gibbs Josiah Willard** He developed the theory of chemical thermodynamics and function free energy as  $G = H - TS$ .
- 29. Graham, Thomas** He was associated with diffusion of gases and colloids.
- 30. Haber, Fritz** He proposed industrial method for production of  $\text{NH}_3$ .
- 31. Heisenberg, Werner Karl** He is the best known for his Uncertainty principle.
- 32. Huckel, Erich** He proposed Huckel rule for aromaticity.
- 33. Kekule, Friedrich August Von Stradonitz** He proposed structure of benzene.
- 34. Kelvin, Lord** He introduced the concept of absolute zero and developed Kelvin temperature scales.
- 35. Lavoisier, Antoine Laurent** He discovered oxygen and nitrogen in air. He also devised a rational nomenclature for chemical compounds.
- 36. Le- Chatelier** He proposed the principle for chemical equilibrium, known as the Le-Chatelier's principle.
- 37. Lewis, Gilbert Newton** He introduced the concept of Lewis acids and bases. He also introduced the concept of a stable octet of electrons.
- 38. Maxwell, James Clark** He was one of the founders of the kinetic theory of gases.
- 39. Mary Hordgkin** She was a British chemist who used the technique of X-ray crystallography to elucidate the structures of biomolecules.
- 40. Mendeleef, Dmitri Ivanovich** He framed the Periodic Table of the elements based on atomic masses.
- 41. Nernst, (Hermann) Walther** He mainly worked on electrochemistry and thermochemistry.
- 42. Ostwald, Friedrich Wilhelm** He worked on hydrolysis, viscosity, ionization and catalysis.
- 43. Pauli, Wolfgang Ernst** He proposed Pauli's exclusion principle which explained the electronic make up of atoms.
- 44. Planck, Max Karl Ernst Ludwig** He formulated the quantum theory.
- 45. Ramsay Sir William** He discovered the noble gases [Ne, Ar, Kr Xe and Rn].
- 46. Soddy, Frederick** He proposed the existence of isotopes.
- 47. Thomson, Sir Joseph John** He is the best known for the discovery of electron and atomic model.
- 48. Urey Harold Clayton** He is the best known for the discovery of deuterium ( ${}^2_1\text{D}$ ) [Heavy hydrogen].
- 49. Wohlder, Friedrich** He synthesised the first organic compound urea ( $\text{NH}_2\text{CONH}_2$ ) in 1828.

## Appendix 6

### Some Important Ores/Minerals and Their Chemical Formulae

S.No.	Name	Formula
1.	Alumina	$\text{Al}_2\text{O}_3$
2.	Argentite	$\text{Ag}_2\text{S}$
3.	Asbestos	$\text{CaMg}_3(\text{SiO}_3)_4$
4.	Bauxite	$\text{Al}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$
5.	Borax (tincal)	$\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$
6.	Calcite	$\text{CaCO}_3$
7.	Calamine	$\text{ZnCO}_3$
8.	Carnallite	$\text{KCl} \cdot \text{MgCl}_2 \cdot 6\text{H}_2\text{O}$
9.	Cassiterite	$\text{SnO}_2$
10.	Cerussite	$\text{PbCO}_3$
11.	Chalk (aragonite, marble, limestone)	$\text{CaCO}_3$
12.	Chile salt petre	$\text{NaNO}_3$
13.	Cinnabar	$\text{HgS}$
14.	Clay	$\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2 \cdot 2\text{H}_2\text{O}$
15.	Copper pyrites	$\text{CuFeS}_2$
16.	Corrundum	$\text{Al}_2\text{O}_3$
17.	Cryolite	$\text{Na}_3\text{AlF}_6$
18.	Cuprite (ruby copper)	$\text{Cu}_2\text{O}$
19.	Dolomite	$\text{MgCO}_3 \cdot \text{CaCO}_3$
20.	Epsomite (epsom salt)	$\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$
21.	Fluorapatite	$3\text{Ca}_3(\text{PO}_4)_2 \cdot \text{CeF}_2$
22.	Fluorspar	$\text{CaF}_2$
23.	Galena	$\text{PbS}$
24.	Gypsum	$\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$
25.	Haematite (red)	$\text{Fe}_2\text{O}_3$
26.	Horn silver	$\text{AgCl}$
27.	Iron pyrites	$\text{FeS}_2$
28.	Kieserite	$\text{MgSO}_4 \cdot \text{H}_2\text{O}$
29.	Limonite (brown)	$\text{Fe}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$
30.	Magnesite	$\text{MgCO}_3$
31.	Magnetite	$\text{Fe}_3\text{O}_4$
32.	Malachite	$\text{Cu}(\text{OH})_2 \cdot \text{CuCO}_3$
33.	Pyrolusite	$\text{MnO}_2$
34.	Siderite	$\text{FeCO}_3$
35.	Sylvine	$\text{KCl}$
36.	Talc	$\text{Mg}_3(\text{Si}_4\text{O}_{10}(\text{OH})_2$
37.	Zinc blende	$\text{ZnS}$
38.	Zincite	$\text{ZnO}$

## Appendix 7

### Important Compounds and Their Formulae

S.No.	Compound	Formula
1.	Absolute alcohol	$C_2H_5OH$
2.	Alum	$M^I_2SO_4 \cdot M^{III}_2(SO_4)_3 \cdot 24H_2O$ ( $M^I = Na^+, K^+, NH_4^+$ ; $M^{III} = Al^{3+}, Cr^{3+}, Fe^{3+}$ )
3.	Aspirin	$o-CH_3OCO - C_6H_4 - COOH$
4.	Baking soda	$NaHCO_3$
5.	Baryta water	A solution of $Ba(OH)_2$
6.	Black oxide	$MnO_2$
7.	Bleaching powder	$CaOCl_2$
8.	Blue vitriol	$CuSO_4 \cdot 5H_2O$
9.	Borax (tincal)	$Na_2B_4O_7 \cdot 10H_2O$
10.	Borazole (inorganic benzene)	$B_3N_3H_6$
11.	Calgon	$Na_2[Na_4(PO_3)_6]$
12.	Calomel	$Hg_2Cl_2$
13.	Carbolic acid	$C_6H_5OH$
14.	Carborundum	$SiC$
15.	Caustic potash	$KOH$
16.	Chloropicrin (tear gas)	$CCl_3 - NO_2$
17.	Chrome yellow	$PbCrO_4$
18.	Chromyl chloride	$CrO_2Cl_2$
19.	DDT	Dichlorodiphenyltrichloroethane
20.	Dry ice	Solid $CO_2$
21.	Ferric alum	$K_2SO_4 \cdot Fe_2(SO_4)_3 \cdot 24H_2O$
22.	Freon	$CCl_2F_2$
23.	Gammexane (BHC)	$C_6H_6Cl_6$
24.	Glauber salt	$Na_2SO_4 \cdot 10H_2O$
25.	Grape sugar	$C_6H_{12}O_6$ (fructose)
26.	Gun powder	$KNO_3$ (70%) + S (12%) + charcoal (13%)
27.	Gypsum salt (gypsum)	$CaSO_4 \cdot 2H_2O$
28.	Inorganic rubber	$(PNCl_2)_n$
29.	Hydrolith	$CaH_2$
30.	Hypo	$Na_2S_2O_3 \cdot 5H_2O$
31.	King of chemicals (oil of vitriol)	$H_2SO_4$
32.	Laughing gas	$N_2O$
33.	Litharge	$PbO$

S.No.	Compound	Formula
34.	Lunar caustic	$\text{AgNO}_3$
35.	Marshall's acid	$\text{H}_2\text{S}_2\text{O}_8$ (perdisulphuric acid)
36.	Marsh gas	$\text{CH}_4$
37.	Milk of lime (slaked lime or lime water)	$\text{Ca(OH)}_2$
38.	Milk of magnesia	$\text{Mg(OH)}_2$
39.	Mohr salt	$\text{FeSO}_4 \cdot (\text{NH}_4)_2\text{SO}_4 \cdot 6\text{H}_2\text{O}$
40.	Muriatic acid	$\text{HCl}$
41.	Mustard gas	$\text{ClCH}_2\text{CH}_2\text{SCH}_2\text{CH}_2\text{Cl}$
42.	Oleum	$\text{H}_2\text{S}_2\text{O}_7$
43.	Oil of winter green (methysalicylate)	$\text{o-HOC}_6\text{H}_4\text{COOCH}_3$
44.	Pearl ash	$\text{K}_2\text{CO}_3$
45.	Perhydrol	$30\% \text{H}_2\text{O}_2$
46.	Permutit (zeolite)	$\text{Na}_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2 \cdot 6\text{H}_2\text{O}$
47.	Philosopher's wool	$\text{ZnO}$
48.	Phosgene	$\text{COCl}_2$
49.	Plaster of Paris	$\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$
50.	Prussian blue	$\text{Fe}_4[\text{Fe(CN)}_6]_3$
51.	Prussic acid	$\text{HCN}$
52.	Quick lime (lime)	$\text{CaO}$
53.	Red oxide	$\text{Pb}_3\text{O}_4$
54.	Rochelle salt	$\text{KNaC}_4\text{H}_4\text{O}_6 \cdot 4\text{H}_2\text{O}$
55.	Rust	$\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$
56.	Smelling salt	$(\text{NH}_4)_2\text{CO}_3$
57.	Soda ash	$\text{Na}_2\text{CO}_3$ (anhydrous)
58.	Spirit of wine (grain alcohol)	$\text{C}_2\text{H}_5\text{OH}$
59.	Talc	$3\text{MgO} \cdot 4\text{SiO}_2 \cdot \text{H}_2\text{O}$
60.	Teflon	$(\text{C}_2\text{F}_4)_n$
61.	TEL	$(\text{C}_2\text{H}_5)_4\text{Pb}$
62.	TNT	Trinitrotoluene (an explosive)
63.	Turnbull's blue	$\text{KFe(F(CN)}_6)$
64.	Vinegar	$\text{CH}_3\text{COOH}$ (7–8%)
65.	Washing soda	$\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$
66.	Water glass	$\text{Na}_2\text{SiO}_3$
67.	White vitriol	$\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$
68.	Wood spirit	$\text{CH}_3\text{OH}$



## Appendix 8

### Important Facts

S. No.	Property	Element/ion
1.	Smallest cation	H <sup>+</sup>
2.	Largest cation	Cs <sup>+</sup>
3.	Solid with highest density	Iridium (Ir)
4.	Liquid with highest density	Mercury (Hg)
5.	Elements named in honour of the countries	Ru, Ge, Po, Am
6.	Most electronegative elements	Fluorine (F)
7.	Most abundant elements on earth	Oxygen (O)
8.	Most abundant metal in earth crust	Aluminium (Al)
9.	Liquid metal	Mercury (Hg)
10.	Lustrous non-metal	Iodine (I <sub>2</sub> )
11.	Hardest among non-metals	Diamond
12.	Soft metals	Na, K
13.	Best ductile metals	Au, Ag
14.	Best conductor metal	Silver (Ag)
15.	Most poisonous element	Pu
16.	Element with maximum number of isotopes	Ag
17.	Most electropositive metal	Caesium (Cs)
18.	Liquid non-metal	Br
19.	Metal kept in paraffin wax	Li
20.	Coinage metals	Ag, Au, Cu, Al

## Appendix 9

### Composition and Uses of Different Alloys

S. No.	Alloy	Composition	Uses
1.	Stainless steel	Fe = 73%, Cr = 18% Ni = 8% and carbon	For making cutlery, ornamental, pieces and automobile parts.
2.	Invar	Fe = 64%, Ni = 36%	For making measuring instruments and clock pendulums.
3.	Alinco	Fe = 63%, Ni = 20% Al = 12%, Co = 5%	For making permanent magnets.
4.	Tungsten steel	Fe = 83%, Tungsten (W) = 14% and carbon	For making cutting tools for high speed lathes.
5.	Manganese steel	Fe = 85%, Mn = 13% and carbon	For making rock drills, rail lines, burglar proof safes and crushing machinery
6.	Nickel steel	Ni = 4.2%	For making electromagnets and ocean cables.
7.	Permalloy	Fe = 21%, Ni = 78% and carbon	For making shafts and ocean cables.
8.	Silicon steel	Fe = 85%, Si = 15%	Pumps and pipes for carrying acids.
9.	Brass	Cu = 60 – 80% Zn = 40 – 20%	Utensils, condenser tubes and cartridges. Utensils, coins, statues.
10.	Bronze	Cu = 75 – 90% Sn = 25 – 10%	
11.	Monel metal	Cu = 30%, Ni = 67%, Fe + Mn = 3%	For acid containers, acid pumps etc.
12.	Bell metal	Cu = 80%, Sn = 20%	Bells, Gongs
13.	Gun metal	Cu = 87%, Sn = 10%, Zn = 3%	Guns, casting, gears.
14.	German silver	Cu = 50%, Zn = 25%, Ni = 25%	Utensils, ornaments.
15.	Constantan	Cu = 60%, Ni = 40%	For making resistance boxes, thermocouples.
16.	Phosphor bronze	Cu = 95%, Sn = 4.8% P = 0.2%	Springs electrical equipments.
17.	Aluminium bronze	Cu = 90%, Al = 10%	Coins, picture frames, cheap jewellery.
18.	Coinage silver	Ag = 90%, Cu = 10%	Silver coins.
19.	Dental alloy	Ag = 33%, Hg = 52%, Sn = 15%	For filling teeth cavities.
20.	Palladium silver	Ag = 40%, Pd = 60%	Potentiometer wires and winding of some special instruments.
21.	Silver solder	Ag = 63%, Cu = 30%, Zn = 7%	Soldering and for jointing metals.
22.	Sterling silver	Ag = 80%, Cu = 20%	A standard quality of silver used in jewellery.

## Appendix 10

### Preparation of Common Laboratory Reagents

#### I. Concentrate Acids

S.No.	Name	Approximate concentration	Specific gravity	Percentage by weight
1.	Acetic acid (glacial)	17.6 M (17.6 N)	1.06	99.5%
2.	Conc. hydrochloric acid	11.7 M (11.7 N)	1.19	36.0%
3.	Conc. nitric acid	15.6 M (15.6 N)	1.42	69.5%
4.	Conc. sulphuric acid	18 M (36.0 N)	1.84	98.0%

#### II. Dilute Acids

S. No.	Name	Concentration	Method of preparation
1.	Dil. acetic acid	5 M (5 N)	Dilute 285 mL of glacial acetic acid with distilled water and make up the volume of 1 L.
2.	Dil. hydrochloric acid	5 M (5 N)	Add 430 mL of conc. HCl in the distilled water and make up the volume to 1 L.
3.	Dil. nitric acid	5 M (5 N)	Add 320 mL of conc. nitric acid to distilled water and make up the volume to 1 L.
4.	Dil. sulphuric acid	2.5 M (5 N)	Pour 140 mL of conc. sulphuric acid slowly and with constant stirring in 500 mL of distilled water. Cool and make up the volume to 1 L.

#### III. Bases

1.	Ammonia solution (Liquor ammonia)	15 M (15 N)	As supplied
2.	Dil. ammonia solution (Ammonium hydroxide)	2 M (2 N)	Pour 266.6 mL of the conc. ammonia solution in distilled water and make up the volume of 1 L.
3.	Sodium hydroxide	5 M (5 N)	Dissolve 200 g sodium hydroxide pellets in 1 L of distilled water.

#### IV. Other Important Reagents

S. No.	Name	Concentration	Molar mass	Method of preparation
1.	Ammonium acetate	2 M (2 N)	77	Dissolve 154 g of the salt in distilled water and dilute to 1 L.
2.	Ammonium chloride	5 M (5 N)	53.5	Dissolve 267.5 g of the salt in distilled water and dilute to 1 L.
3.	Ammonium carbonate	1.7 M (3.5 N)	96	Dissolve 160 g of ammonium carbonate in 140 mL liquor ammonia and make up the solution 1 L with distilled water.
4.	Ammonium molybdate			Dissolve 100 g of the salt in a mixture of 100 mL of liquor ammonia solution and add 250 g of ammonium nitrate and dilute it to 1L with distilled water.
5.	Ammonium oxalate	0.5 M (1 N)	142	Dissolve 71 g of the salt in distilled water and dilute to 1L.
6.	Ammonium sulphate	1 M (2 N)	132	Dissolve 132 g of the salt in distilled water and dilute to 1L.
7.	Barium chloride ( $\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$ )	0.5 M (0.5 N)	244	Dissolve 61 g of the salt in distilled water and dilute to 1L.
8.	Bromine water	Approx. saturated	160	Add 2 mL of bromine in 100 mL of distilled water shake the mixture well. Keep it in a dark bottle.
9.	Calcium chloride	0.5 M (0.5 N)	219	Dissolve 55 g of the salt in distilled water and make up the volume to 1L.
10.	Chlorine water		71	Prepare chlorine by treating solid $\text{KMnO}_4$ with conc. HCl. Saturate 1 L of distilled water with chlorine gas and keep the solution in a dark coloured bottle.
11.	Copper sulphate	14%	249.5	Dissolve 14 g of the salt in distilled water and make up the volume to 100 mL.
12.	Cobalt nitrate	0.15 M (0.075 N)	291	Dissolve 43.65 g of the salt in distilled water and make up the volume to 1L.
13.	Dimethyl glyoxime	1%		Dissolve 1.0 g of the solid in 100 mL ethyl alcohol.
14.	Diphenylamine	0.5%		Dissolve 0.5 g of the solid in 85 mL of conc. sulphuric acid and dilute it with care with distilled water to 100 mL.
15.	Disodium hydrogen phosphate $\text{Na}_2\text{HPO}_4 \cdot 12\text{H}_2\text{O}$	0.3 M (N)	358	Dissolve 120.0 g of the salt in distilled water and make up the volume to 1L.

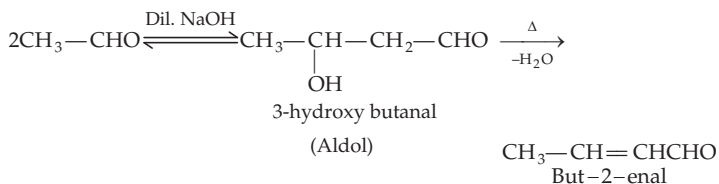
S. No.	Name	Concentration	Molar mass	Method of preparation
16.	Ferric chloride $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$	0.33 M (1 N)	270	Dissolve 90 g of the salt in distilled water containing 10 mL of conc. hydrochloric acid and make up the volume of 1 L.
17.	Iodine solution		254	Dissolve 1.0 g of iodine crystals in a solution of 2 g potassium iodide in minimum amount of water and dilute the solution to 100 mL.
18.	Lead acetate $(\text{CH}_3\text{COO})_2\text{Pb}$	0.5 M (N)		Dissolve 200 g of solid salt in 500 mL of distilled water containing 15 mL acetic acid and make up the volume to 1 L with distilled water.
19.	Lime water $\text{Ca}(\text{OH})_2$	0.02 M (0.04 N)	74	Shake 2–3 g of calcium hydroxide with 1 L distilled water, filter the solution after sometimes and keep it in a reagent bottle. Bottle should be securely stoppered in order to protect the reagent from $\text{CO}_2$ of atmosphere.
20.	Litmus solution (blue)			Dissolve 10 g of litmus in distilled water and make the volume to 1 L.
21.	Litmus solution (red)			To the blue litmus solution add about 10 drops of dilute hydrochloric acid.
22.	Methyl orange			Dissolve 1 g of the solid in 1L of distilled water.
23.	Mercuric chloride	0.25 M (0.5 N)	272	Dissolve 70 g of the salt in small amount of distilled water and make up the volume to 1 L with distilled water.
24.	Nessler's reagent $\text{K}_2[\text{HgI}_4]$			Dissolve 23 g of mercuric iodide and 16 g of potassium iodide in distilled water and make up the volume to 100 mL. Add 150 mL of 4 M NaOH solution. Allow it to stand for 24 h and decant the solution. Solution should be stored in a dark coloured bottle.
25.	Potassium chromate $\text{K}_2\text{CrO}_4$	0.25 M (0.5 N)	194	Dissolve 49 g of the salt in distilled water and make up the volume to 1L.
26.	Potassium dichromate ( $\text{K}_2\text{Cr}_2\text{O}_7$ )	0.15 M (1 N)	294	Dissolve 49.0 g of the salt in distilled water and make up the volume to 1L.
27.	Potassium ferrocyanide	0.15 M (0.5 N)	368	Dissolve 46.10 g of the salt in distilled water and dilute to 1L.

S. No.	Name	Concentration	Molar mass	Method of preparation
28.	Potassium ferricyanide	0.2 M (0.5 N)	329	Dissolve 55.0 g of the salt in distilled water and dilute to 1L.
29.	Potassium iodide KI	0.5M (0.5 N)	166	Dissolve 83.0 g of the salt in distilled water and make up the volume to 1L.
30.	Potassium permanganate $\text{KMnO}_4$	0.06 M (0.3 N)	158	Dissolve 10.0 g of the salt in 1L distilled water. Heat the solution and filter it through glass wool.
31.	Potassium thiocyanate	0.5 M (0.5 N)	97	Dissolve 49.0 g of the salt in distilled water and make up the volume to 1L.
32.	Phenolphthalein	1%		Dissolve 1.0 g of the solid in 100 mL of ethyl alcohol.
33.	Silver nitrate $\text{AgNO}_3$	0.1 M	170	Dissolve 17 g of the salt in 250 mL of distilled water and store it in a brown coloured bottle.
34.	Sodium acetate	5 M (5 N)	82	Dissolve 410 g of salt in distilled water and dilute to 1L.
35.	Sodium nitroprusside			Dissolve 4 g of the solid in 100 mL of distilled water.
36.	Starch			Prepare a paste of about 1.0 g of soluble starch in cold water and pour it gradually in 100 mL of boiling water with constant stirring. Boil it for 10 min and cool.
37.	Yellow ammonium sulphide $(\text{NH}_4)_2\text{S}_x$		6 N	Take about 200 mL of conc. ammonia solution in a bottle and saturate it with $\text{H}_2\text{S}$ gas. Add 10 g of flower of sulphur and 200 mL of conc. $\text{NH}_4\text{OH}$ . Warm gently and shake well until sulphur is completely dissolved. Dilute the solution to 1L with distilled water.

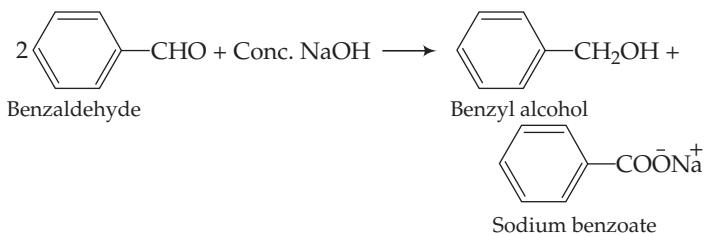
## Appendix 11

### Important Name Reactions

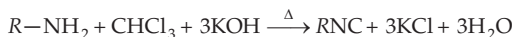
#### 1. Aldol condensation



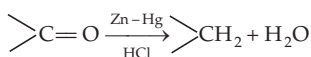
#### 2. Cannizzaro reaction



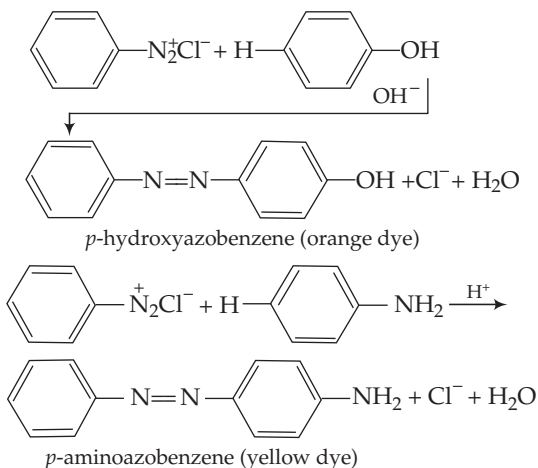
#### 3. Carbylamine reaction



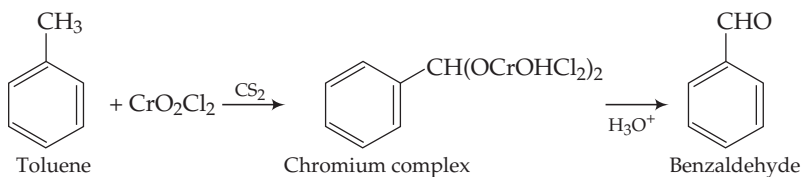
#### 4. Clemmensen reduction



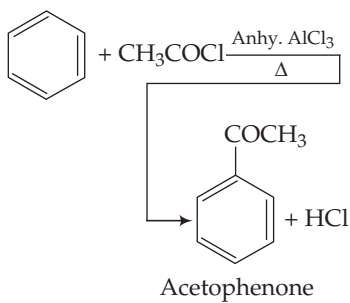
#### 5. Coupling reaction



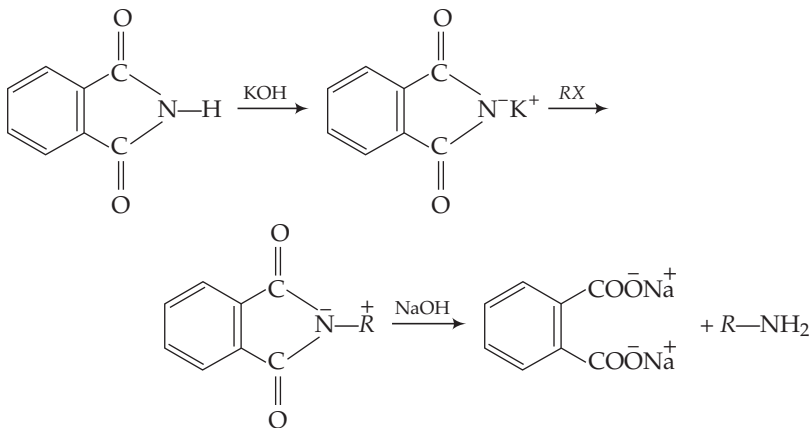
## 6. Etard reaction



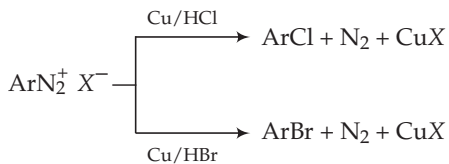
## 7. Friedel Crafts acylation reaction



## 8. Gabriel phthalimide synthesis

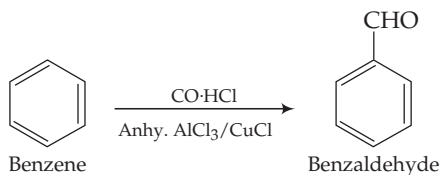


## 9. Gattermann's reaction

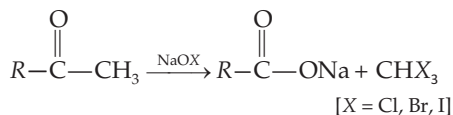




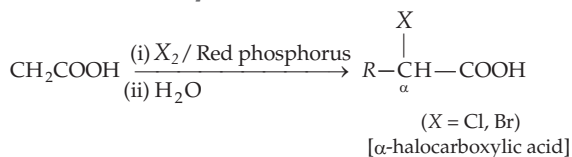
## 10. Gattermann's-Koch reaction



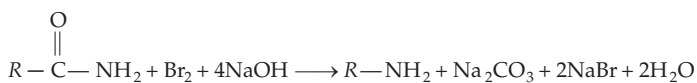
## 11. Haloform reaction



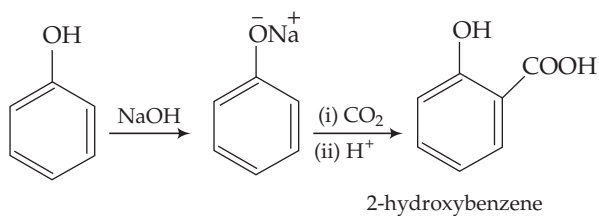
## 12. Hell-Volhard-Zelinsky reaction



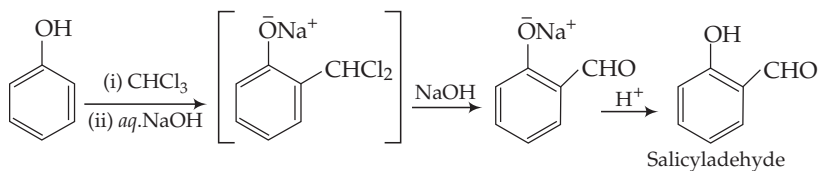
## 13. Hofmann bromamide degradation reaction



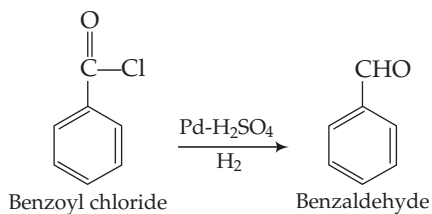
## 14. Kolbe reaction



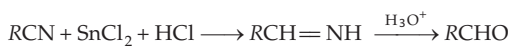
## 15. Reimer-Tiemann reaction



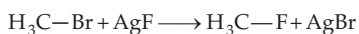
## 16. Rosenmund reduction



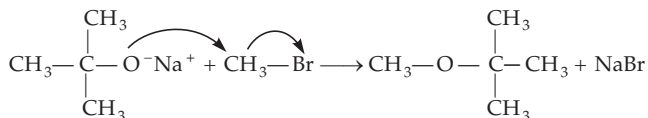
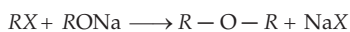
## 17. Stephen reaction



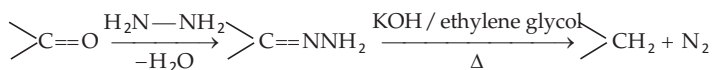
## 18. Swarts reaction



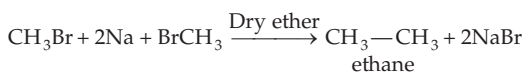
## 19. Williamson synthesis



## 20. Wolff-Kishner reduction



## 21. Wurtz reaction



## 22. Wurtz Fittig reaction

