



**For GEM Complete Chemistry Material
Contact No. 9080228421**

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+2 CHEMISTRY

MEMORY HINTS

I. Smell / Odour

- | | | |
|--|---|---------------------------------|
| 1. Garlic odour | - | P_2O_3 |
| 2. Garlic taste | - | H_3PO_3 |
| 3. Pungent odour | - | PCl_5 |
| 4. Rotten Fish | - | Phosphine (PH_3) |
| 5. Fish like odour | - | Amines |
| 6. Foul Smell | - | Carbylamine |
| 7. Foul smell of Rancid butter | - | Butric Acid |
| 8. Fruity odour | - | Ester |
| 9. Pungent odour & fumes in moist air | - | Acetyl chloride |
| 10. Pungent Odour & no fumes in moist air | - | Acetic anhydride |
| 11. Mustard like odour | - | Methyl isothio cyanate |
| 12. Smell of Jasmine (or) Fragrance of Jasmine | - | Benzyl acetate |
| 13. Smell of bitter almonds | - | Nitro benzene (or) Benzaldehyde |
| 14. 'Carbolic acid'-odour | - | Phenol |
| 15. Hypnotic as hypnone | - | acetophenone |

II. Common Name

Chemical Name

- | | | |
|--------------------------|---|-------------------|
| 1. Oil of bitter almonds | - | Benzaldehyde |
| 2. Oil of winter green | - | Methyl salicylate |

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- | | | | |
|-----|-------------------------------|---|--|
| 3. | Oil of mirbane | - | Nitro benzene |
| 4. | Mustard oil | - | Methyl isothiocyanate |
| 5. | Supercooled liquid | - | Glass |
| 6. | Wood spirit | - | Methyl alcohol |
| 7. | Grain alcohol | - | Ethyl alcohol |
| 8. | Reducing sugar | - | Glucose, Lactose |
| 9. | Non-Reducing sugar | - | Sucrose |
| 10. | Optically inactive amino acid | - | Glycine |
| 11. | Calamine | - | ZnCO ₃ |
| 12. | Philosophers wool | - | ZnO |
| 13. | Lunar Caustic | - | AgNO ₃ |
| 14. | Blue vitriol | - | CuSO ₄ .5H ₂ O |
| 15. | Purple of cassius | - | Colloidal gold |
| | Purple of cassius | - | Gold with colloidal stannic hydroxide |
| 16. | Agua regia | - | 3 part con. HCl +
1 part con. HNO ₃ |
| 17. | State functions | - | S, ΔS |
| 18. | Path functions | - | q, δq |
| 19. | Sodalime | - | CaO + NaOH |
| 20. | Bordeaux Mixture | - | CuSO ₄ + Ca(OH) ₂ or
Copper Sulphate + lime |
| 21. | Galena | - | PbS |
| 22. | Litharge | - | PbO |
| 23. | Red lead | - | Pb ₃ O ₄ |

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- | | | |
|--|---|---|
| 24. Coinage metals | - | Cu, Ag, Au |
| 25. Laughing gas | - | N_2O (Nitrous Oxide) |
| 26. Aspirin | - | Acetyl Salicylic acid |
| 27. Freon | - | Dichloro difluoro methane
(CF_2Cl_2) |
| 28. Blister copper | - | 98% copper + 2% impurities |
| 29. Matte | - | Cuprous sulphide +
Ferrous sulphide
[$Cu_2S + FeS$] |
| 30. Methylated (or)
denatured spirit | - | Ehanol with 5% Methanol |
| 31. Phenyl carbinol | - | Benzyl alcohol |
| 32. Benzoin | - | Dimer of benzaldehyde |
| 33. Benzhydrol | - | Diphenyl carbinol |
| 34. Father of co-ordination
Chemistry | - | Werner |
| 35. Mohr's salt | - | $FeSO_4 (NH_4)_2 SO_4 \cdot 6H_2O$ |
| 36. Potash Alum | - | $K_2SO_4 \cdot Al_2(SO_4)_3 \cdot 24H_2O$ |

III. Reagent

Composition

- | | | |
|-----------------------|---|--|
| 1. Dehydrating Agent | - | P_2O_5 (or) P_4O_{10} |
| 2. Fenton's Reagent | - | $FeSO_4 + H_2O_2$ |
| 3. Bayer's Reagent | - | Cold dil. alkaline $KMnO_4$ |
| 4. Lucas Reagent | - | Con. $HCl +$ anhydrous $ZnCl_2$ |
| 5. Tollen's Reagent | - | Ammoniacal silver nitrate |
| 6. Fehling's solution | - | Sodium Potassium
Tartarate in $CuSO_4$ solution |

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- | | | |
|----------------------|---|---|
| 7. Schiff's reagent | - | Benzilidene |
| 8. Hypnone | - | acetophenone |
| 9. Nitrating Mixture | - | Con.HNO ₃ & Con.H ₂ SO ₄ |
| 10. Formalin | - | Aqueous solution of 40% formaldehyde |

IV. Compounds

Example

- | | | |
|------------------------------------|---|---|
| 1. Aldol | - | 3-hydroxy butanal |
| 2. α-hydroxy ketones | - | Benzoin |
| 3. Aromatic alcohol | - | Benzyl alcohol |
| 4. Dihydric alcohol | - | Ethylene glycol |
| 5. Trihydric alcohol | - | Glycerol |
| 6. Hygroscopic liquid | - | Glycol, Glycerol |
| 7. Antifreeze in automobile engine | - | Glycol, Glycerol |
| 8. Uniary antiseptic | - | Urotropine, Benzoic acid, salicylic acid |
| 9. Soil sterilizing agent | - | Chloropicrin CCl ₃ NO ₂ |
| 10. Dihydric phenol | - | Catechol, Resorcinol, Quinol |
| 11. Trihydric phenol | - | Pyrogallol, Hydroxy quinol, Phluroglucinol |
| 12. Simple Ether | - | Dimethyl ether |
| 13. Mixed Ether | - | Ethyl methyl ether |
| 14. Phenolic Ether | - | Anisole |
| 15. Unsaturated aliphatic aldehyde | - | Acrolin |
| 16. Unsaturated aromatic aldehyde | - | Cinnamaldehyde |

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V. Physical Terms	Units
1. Enthalpy change $\Delta H, \Delta E$	- KJ.mole ⁻¹
2. Specific heat	- Jg ⁻¹ (or) J kg ⁻¹
3. Concentration	- moles. dm ⁻³
4. Molar Concentration (x)	- mol. dm ⁻³
5. Energy of activation (E _a)	- Jmol ⁻¹
6. Rate of reaction	- mol. dm ⁻³ S ⁻¹
7. Unit for order of reaction (in general)	- (dm ³) ⁿ⁻¹ mol ¹⁻ⁿ sec ⁻¹
8. Half life period for I order reaction	- min (or) seconds
9. Entropy (cgs)	- cal deg ⁻¹ mol ⁻¹
10. Entropy (SI)	- JK ⁻¹ mol ⁻¹
11. Rate constant for I order	- S ⁻¹ (or) min ⁻¹ (or) time ⁻¹
12. Rate constant for zero order	- mole. dm ⁻³ S ⁻¹
13. Quantity of current	- coulombs (or) faraday
14. Electro chemical equivalent-	- Kg. Columb ⁻¹
15. Current(I)	- ampere
16. Time (t)	- seconds
17. Quantity of current	- coulomb
18. Resistance	- ohm
19. Potential difference (V)	- volt
20. Specific Resistance (S)	- Ohm – meter
21. Specific Conductance (κ)	- S meter ⁻¹ (or) ohm ⁻¹ meter ⁻¹
22. Conductance	- ohm ⁻¹ (or) Siemens (or) mho
23. Cell constant (s)	- metre ⁻¹

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24. Equivalent conductance (λ_c) - $\text{ohm}^{-1} \text{m}^2(\text{gm.eq})^{-1}$
(or) $\text{S.m}^2 (\text{g.equi})^{-1}$
(or) $\text{mho.m}^2 (\text{gm.eq})^{-2}$
25. Molar conductance (μ_c) - $\text{S.m}^2.\text{mol}^{-1}$
(or) $\text{ohm}^{-1} \text{m}^2.\text{mol}^{-1}$
26. Ionic product of water (K_w) - $\text{mol}^2.\text{dm}^{-6}$

Indicators	pH Range	Acidic	Basic
Methyl Orange	3.1 to 4.4	Pink	Yellow
Methyl Red	4.4 to 6.2	Red	Yellow
Phenol	6.8 to 8.4	Yellow	Red
Phenolphthalein	8.3 to 10	Colourless	Pink

Gem
ORGANIC CHEMISTRY

Some Important tips to identify organic compounds

- 1. Alcohol** : Liberates H_2 gas with Na metal
- 1° alcohol : (i) Gives RED colour in Victor Mayer's test
(ii) No turbidity in Lucas test
- 2° alcohol : (i) Gives BLUE colour in Victor Mayer's test
(ii) Turbidity appears after 5 to 10 min in Lucas test
- 3° alcohol : (i) No change (colourless) in Victor Mayer's test
(ii) Turbidity appears immediately in Lucas test

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2. Ethers

- (i) Do not liberate H_2 with Na metal
- (ii) Do not give HCl with PCl_5

3. Aldehydes

- (i) Restores the red colour of the Schiff's base
- (ii) Reduces Tollen's reagent
- (iii) Reduces Fehling's solution (except C_6H_5CHO)

(Only acetaldehyde gives yellow precipitate with I_2 & KOH i.e., only acetaldehyde answers Iodo form test)

4. Ketones

- (i) Does not restore the red colour of the Schiff's base
- (ii) Does not reduce Tollen's reagent
- (iii) Does not reduce Fehling solution

5. Acid

- (i) Gives effervescence with Na_2CO_3 (or) $NaHCO_3$ solutions.
- (ii) Gives sweet smelling ester when treated with alcohol + $con.H_2SO_4$
- (iii) Aqueous solution of acid turns blue into red.
- (iv) Except formic acid, other acids give alkane when heated with soda lime ($NaOH + CaO$)

6. Iodo form test

When treated with I_2 & KOH give yellow precipitate. C_2H_5OH , CH_3-CHO , $CH_3-CO-CH_3$, $CH_3-CO-C_6H_5$ answer Iodoform test.

II. Dehydrating agents

- (i) $Con H_2SO_4$
- (ii) P_2O_5
- (iii) $KHSO_4$
- (iv) dry anhydrous $ZnCl_2$

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III. Oxidising Agents

1. $\text{KMnO}_4 / \text{NaOH}$ (Bayer's Reagent)
2. $\text{KMnO}_4 / \text{Con. H}_2\text{SO}_4$
3. $\text{K}_2\text{Cr}_2\text{O}_7 / \text{Con.H}_2\text{SO}_4$
4. $\text{Na}_2\text{Cr}_2\text{O}_7 / \text{Con.H}_2\text{SO}_4$
5. $\text{Cr.O}_2\text{Cl}_2$
6. dil. HNO_3
7. Con. HNO_3
8. Fentons reagent ($\text{FeSO}_4 / \text{H}_2\text{O}_2$)
9. KMnO_4
10. Con. H_2SO_4
11. $\text{V}_2\text{O}_5 / \text{O}_2$

IV. Reducing Agents

- | | |
|---|--|
| 1. Zn/dil.HCl | 2. Sn/dil.HCl |
| 3. Zn/NaOH | 4. Zn/ NH_4Cl |
| 5. Raney Ni | 6. Palladium / BaSO_4 (Stephen Reduction) |
| 7. Na/Hg + H_2O | 8. Zn/Hg + con.HCl (Clemmenson Reduction) |
| 9. Na/ $\text{C}_2\text{H}_5 \text{OH}$ | 10. $\text{NH}_2\text{-NH}_2 / \text{C}_2\text{H}_5\text{ONa}$ (Wolf Kisher Reduction) |
| 11. LiAlH_4 | 12. NaBH_4 |
| 13. Ni-Al/NaOH | 14. Zn/dil HCl |
| 15. H_2/pt | 16. Pd/ BaSO_4 (Rosemund Reduction) |

USES OF INORGANIC AND ORGANIC COMPOUNDS

Potash Alum

- * Purification of water, water proofing of textiles and in dyeing and paper industry.
- * To arrest bleeding.

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Silicones

- * Insulator - water repellent - in textiles as lubricants and as polish.
- * Mixed with paint for damp - resistant.
- * Non-stick coating for pans and in paints and varnish.
- * Used for high temperature oil bath, high vacuum pump.

Lead

- * Lead pipes-telegraph and telephone wire-bullets and lead accumulators - lead champers-alloys like solder, pewter and type metal - tetra ethyl lead $Pb(C_2H_5)_4$.

Phosphorous trioxide [(P₂O₃) or (P₄O₆)]

- * Dehydrating agent.

H₃PO₃-Phosphorus acid-used as Reducing Agent

H₃PO₄-Phosphoric acid

- * Preparation of HBr and HI.
- * Souring agent for soft drinks.
- * Preparation of phosphate salt of sodium, potassium and ammonium.
- * Manufacture of phosphatic fertilisers.

Phosphine-PH₃

- * Smoke screens and Holme's signal.

Fluorine

- * Manufacture of freons.
- * CaF₂ - flux in metallurgy.
- * NaF - preventing fermentation and dental cavities.
- * SF₆ - insulating material in high voltage equipment.
- * Teflon - to store hydrofluoric acid.
- * UF₆ - separation of U²³⁵ and U²³⁸.

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Helium

- * To fill balloons for metrological observations.
- * Used in inflating aeroplane tyres.
- * Nitrogen - oxygen mixture used by deep - sea divers.
- * Mixture of oxygen and helium for treatment of asthma.
- * Liquid helium - cryogenic agent.
- * Used to produce super conducting magnets for NMR and MRI.

Neon

- * In discharge tubes and fluorescent bulbs.
- * Mixed with helium to protect electrical instruments from high voltage.
- * Used in beacon lights for safety of air - navigation.
- * Neon lights used in botanical gardens.

Argon

- * Mixed with 28% nitrogen to fill electrical lamps.
- * Used in radio valves and tubes.

Krypton and Xenon

- * Used in filling incandescent metal filament electric bulbs.
- * Used in discharge - tubes.

Radon

- * Used in radioactive research and radio-therapy.

Copper

- * Used to make electric cables, appliance, utensils, containers, calorimeters, coins.
- * Used in electroplating.
- * Used to make coins and jewellery.

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Chromium

- * In chrome plating, alloy steel manufactures (eg. Chrome steel, Chrome vanadium steel).
- * Chrome nickel for armour plates.
- * Chromium salts - mordants, coloured glass and pottery.
- * Chromium compounds - dyeing and tanning of leather.

Zinc

- * Used for galvanisation of iron sheets.
- * In extraction of gold and silver.
- * Zinc plates and rods in batteries and dry cell.
- * Zinc dust and granulated zinc as reducing agents.

Silver

- * Silver salts in silvering of mirrors and silver plating.
- * AgBr in photography.
- * Silver in making electrodes and medicines.
- * Silver amalgam in dental filling.

Gold

- * Used in coinage, jewellery, ornament vessels decorations and lettering.
- * In medicine as tonic.
- * Purple of cassius (gold with stannic hydroxides) in making ruby red glass and high class pottery.

Potassium dichromate

- * Used in volumetric analysis, caligo printing, dyeing, photography and hardening gelatin film.
- * Chrome tanning in leather industry.

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Copper sulphate (or) Blue vitriol

- * Used as germicide and insecticide.
- * Copper sulphate and lime (Bordeaux mixture) as fungicide.
- * Used in electroplating, calico printing and electrical batteries.

Silver nitrate or Lunar caustic

- * As silver halides in photography.
- * Used in silvering mirrors, marking inks, hair dyes, silver plating and laboratory reagent.

Zinc carbonate or Calamine

- * Used in ointment for curing skin diseases.
- * Used in cosmetics and pigment for rubber.

Purple of cassius or Colloidal gold

- * In making ruby-red glass and high class pottery.

Lanthanides

- * Pyrophoric alloy in cigarette lighter, toys flame throwing tanks and tracer bullets.
- * Ceria, Thoria in gas lamp materials.
- * Cerium salts in dyeing cotton, lead storage batteries and catalyst.
- * Used in Lanthanido – thermic process.
- * Alloy of lanthanides (Mish metal) used in heat resistant, stainless and instrumental steels.
- * Mg-alloy (30% mish metal + 1% Zr) used in making jet engine parts.

Actinides

- * U^{235} -fuel in nuclear power plants and in nuclear weapons.
- * Plutonium-238 \Rightarrow power source in long mission space probes.

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Co-ordination Compounds

- * Madder dye - red colour, copper phthalocyanine-blue colour.
- * Colourimetric agents \Rightarrow 2,2'-bipyridal and 1,10-phenanthroline.
- * Gravimetric Analysis-chelating agents-Ni(DMG)₂ and Al(oxine)₃.
- * Complexometric titrations and masking agent - EDTA.
- * Chemotherapy \Rightarrow anti-tumour drug. eg: cis-Pt(NH₃)₂Cl₂.
- * Synthetic detergents-chelating agent – tripolyphosphate.

Radioactive Isotopes

- * Tritium(₁H³) - measure water content of body.
- * Carbon-11 \Rightarrow (Brain scan), Carbon-14 \Rightarrow Radio immunology.
- * Iodine-131 \Rightarrow diagnosis of damaged heart muscles and hyperthyroidism.
- * Mercury-197 \Rightarrow kidney scan.
- * Phosphorous-32 \Rightarrow detection of eye tumours.
- * Iron-59 \Rightarrow anemia, Cobalt-60 \Rightarrow treat cancer.
- * Sodium-24 \Rightarrow locate blood clots & circulating disorder.
- * Strontium-90 \Rightarrow Thickness of coatings and level of liquids in tanks.

Methyl alcohol (or) Methanol

- * Industrial solvent, antifreeze in automobiles and to produce formaldehyde.
- * Methylated spirit or denatured spirit used in spirit lamp and solvent for wood polish.
- * Methanol used as motor fuel with petrol.

Ethyl alcohol (or) Ethanol

- * In alcoholic beverage, industrial solvent, pharmaceutical preparation, preservative for biological specimens, preparation of ether, iodoform, acetaldehyde and good solvent for recrystallisation.

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Glycol (or) Ethane-1,2-diol

- * Used as antifreeze in automobiles radiators, coolant in aeroplane engines, an explosive, solvent and preservative.
- * Preparations of synthetic fibre, terylene and dioxan.

Glycerol (or) Propane-1,2,3-trol

- * To manufacture explosive (TNG), antifreeze agent - sweetening agent in beverage - moisturizing creams and other cosmetics - copying inks and stamp pad inks.

Benzyl alcohol (or) phenyl carbinol (or) phenyl methanol

- * Used as local anaesthetic, antiseptic in ointments and as esters in perfumery.
- * As esters in perfumery (Benzyl acetate – smell of Jasmine).
- * As benzyl benzoate in treating asthma and whooping cough.
- * Manufactures of synthetic resins.

Phenol (or) hydroxy benzene

- * Used in manufactures of dyes, drugs, plastic, explosives, pesticide, antiseptic and germicide.

Diethyl ether (or) ethoxy ethane

- * Used as refrigerant, anaesthetic, solvent for extraction of organic compounds.
- * Medium for preparation of Grignard reagent.

Anisole (or) Methoxy benzene (or) Methyl phenyl ether

- * Used in perfumery and a starting material in organic synthesis.

Formaldehyde (or) Methanal

- * 40% aqueous solutions of formaldehyde (Formalin)-preservative for biological specimen and leather tanning.
- * Urotropine - medicine for urinary infection.
- * To decolourise vat dyes.
- * To prepare Bakelite.

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Acetaldehyde (or) Ethanol

- * For silvering of mirror.
- * Its trimer of paraldehyde is hypnotic.
- * Preparation of chloroform, acetic acid, ethanol and acetic acid.

Benzaldehyde

- * In the preparations of cinnamaldehyde, cinnamic acid and mandalic acid.
- * Benzoin (dimer of benzaldehyde) used as tincture benzoin for throat infection.
- * In perfumery as flavouring agent.

Acetone (or) Dimethyl ketone (or) Propanone

- * Laboratory and industrial solvent.
- * Preparation of tranquilisers like sulphonal.
- * Manufacture of cordite.

Acetophenone (or) Methyl phenyl ketone

- * Used as hypnotic (hypnone) and perfumary.

Benzophenone (or) Diphenyl ketone

- * Used in perfumery and in preparation of benzhydrol drop and diphenyl methane.

Formic acid (or) Methanoic acid

- * As mordants - leather tanning - coagulating rubber latex - stimulant for growth of yeast - antiseptic - preservative for fruits - treatment of gout - Nickel formate as hydrogenation catalyst.

Lactic acid (or) α -hydroxy propionic acid

- * Tanning industry - soft drinks - silver lactate as an antiseptic and astringent - treatment of digestive disorder in children.
- * Preparations of lactates, ethyl lactate as solvent.

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Oxalic acid (or) Ethane dioic acid

- * For removing ink stains and iron stains - as mordent in dyeing and calico printing - ink and metal polishes - redox titration.

Succinic acid (or) Butane dioic acid

- * Manufactures of lacquers and dyes - laboratory reagent.

Benzoic acid

- * Urinary antiseptic - sodium benzoate used as food preservative - vapours used to disinfect bronchial tube - manufacture of dyes.

Salicylic acid (or) o-hydroxy benzoic acid

- * Antiseptic and disinfectant - food preservative - medicine for rheumatic pain - preparations of azo dyes- manufactures of aspirin, salol, methyl salicylate.

Acetyl chloride

- * As an acylating agent - organic reagent - preparations of acetic anhydride-detection and estimation of alcoholic and amino groups.

Acetic anhydride

- * As an acetylating agent for manufacture of dyes, cellulose acetate- manufacture of aspirin and some drugs.

Methyl acetate

- * Good laboratory and industrial solvent.
- * Used for preparations of acetoacetic ester.

Acetamide

- * Preparations of methyl cyanide - leather tanning - soldering flux - plasticiser in cloth.

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REACTIVITY SERIES

- * Electronegativity order for H-bond $\Rightarrow F > O > N$
- * Order of strength of Hydrogen bond is
 $H - F \dots H > H - O \dots H > H - N \dots H$
- * Order of bond strength
ionic bond > covalent bond > hydrogen bond > dipole-dipole,
van der Waals force.
- * Order of Ionisation energy
 $s > p > d > f$
- * Order of electron affinity.
 $I < Br < F < Cl$
- * Screening effect of various orbital
 $s > p > d > f$
- * The order of size of Ln^{3+} ions (Lanthanide ions)
 $La^{3+} > Ce^{3+} > \dots > Lu^{3+}$
- * Order of reactivity of alcohols with sodium
Primary > Secondary > Tertiary (or) $1^\circ > 2^\circ > 3^\circ$
- * Strength of acidity of alcohol
Primary > Secondary > Tertiary (or) $1^\circ > 2^\circ > 3^\circ$
- * Reactivity of alcohols with Lucas test
Tertiary > Secondary > Primary (or) $3^\circ > 2^\circ > 1^\circ$
- * Strength of the acid
 $CH_3CH_2COOH < CH_3COOH < HCOOH < ClCH_2COOH$
- * Increasing order of acidity
 $CH_3COOH < CH_2ClCOOH < CHCl_2COOH < CCl_3COOH$
- * Basic strength of amines (steric effect)
 $(CH_3)_2NH > CH_3NH_2 > NH_3$ (or) 2° amine > 1° amine > ammonia

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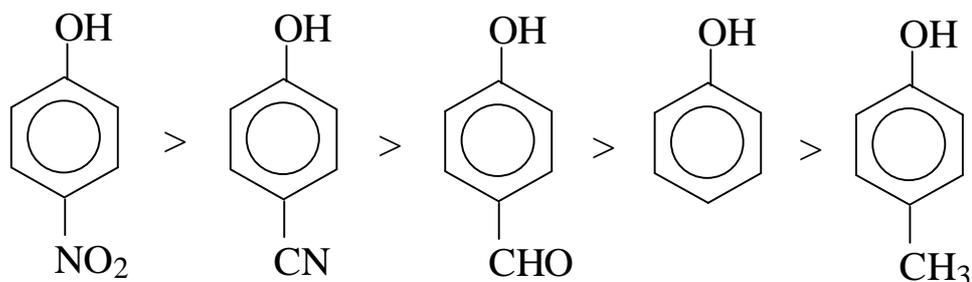
* Increasing order of basic strength of amines



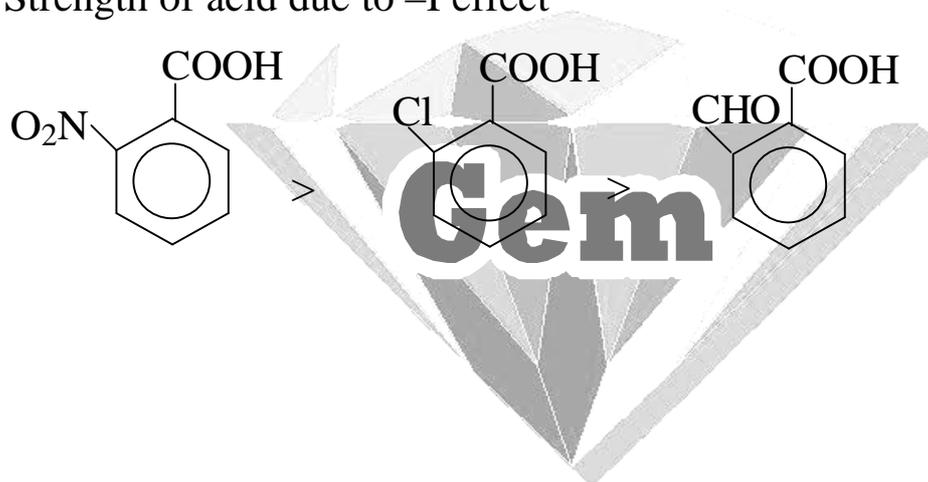
* Order of strength of hydrogen bond and boiling points of amine is



* Strength of phenols



* Strength of acid due to $-I$ effect



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gem

+2

CHEMISTRY

75
75

**One and Three Mark
Questions & Answers**

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65
65

+2

Gem

CHEMISTRY

$2CO_2 + 2O_3 \rightarrow Cl_2O_6$

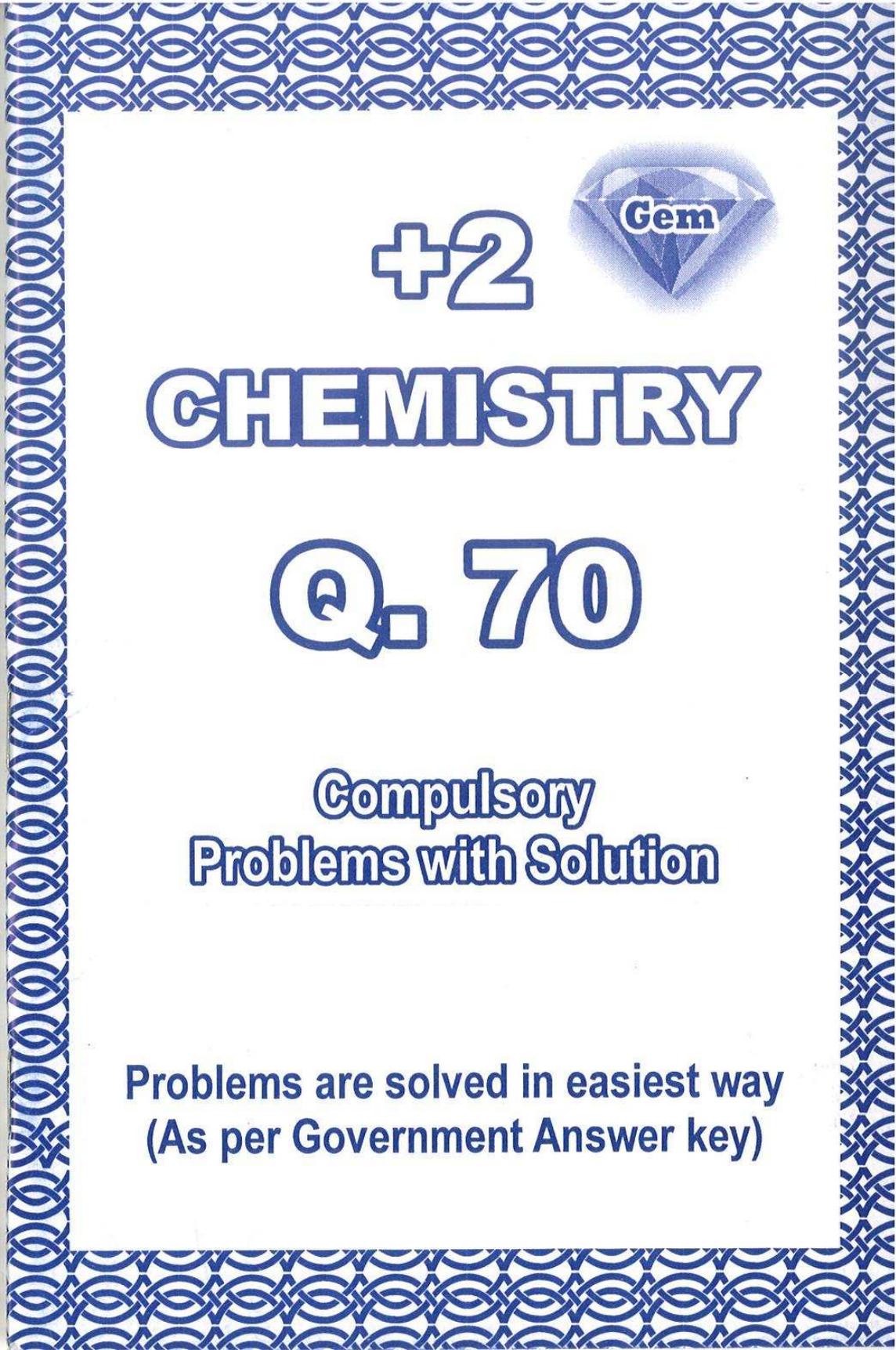
$H_2 + Cl_2 \rightarrow 2HCl$

H₂O

This Material is prepared on the basis of Govt. Question Paper Answer Key

5 & 10 Mark Question and Answers
(Selected 17 Lessons)

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+2 

CHEMISTRY

Q. 70

**Compulsory
Problems with Solution**

Problems are solved in easiest way
(As per Government Answer key)

எங்களது வெளியீடுகள் +2 வேதியியல்

- * 1 & 3 மதிப்பெண் வினா-விடைகள்
- * 5 & 10 மதிப்பெண் வினா-விடைகள்
- * Q-70(Compulsory) கட்டாயக் கணக்குகள் விடைகளுடன்
- * 1 மதிப்பெண் வினா வங்கி (தன் மதிப்பீடு மற்றும் அரசு பொதுத்தேர்வு வினாக்கள்) (இத்துடன் விடைக்குறிப்பு இலவசம்)
- * வினா வங்கி (3, 5, 10 மதிப்பெண் மற்றும் Q-70 கட்டாயக் கணக்குகள்)
- * புத்தகங்கள் தமிழ் மற்றும் ஆங்கில வழியில் கிடைக்கும்.
- * தனித்தனி புத்தகமாகவும், அனைத்தும் சேர்த்து ஒரே புத்தகமாகவும் கிடைக்கும்.

CHELLAMMAL TRUST,
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