



**PRIT EDUCATION**

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**CHEMISTRY**

**USES &  
APPLICATIONS**

GIVEN AS SHORT-HINTS

**MR. SS PRITHVI**

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**GETTING IN:**

- ✚ On analysis, uses and applications questions are asked in 2m or 3m sections or combined as 3m qn in 5 marks section.
- ✚ According to official key answer, only 3 points are enough.
- ✚ Sometimes it may be asked in 1 mark section.
- ✚ Here, important applications/uses are given bolded.

Aluminium	<ul style="list-style-type: none"> <li>✓ good conductor of electricity and heat</li> <li>✓ resists corrosion. Used in: heat exchangers/sinks</li> <li>✓ wraps, packing materials for food</li> <li>✓ Al alloys are light weight and strong</li> <li>✓ <b>Airplanes</b>, chemical reactors, <b>refrigeration units</b>, gas pipelines</li> <li>✓ <b>Electrical overhead electric cables</b> with steel core.</li> </ul>
Zinc	<ul style="list-style-type: none"> <li>✓ <b>galvanizing</b> metals</li> <li>✓ To produce <b>die-castings</b> in automobile, electrical and hardware industries.</li> <li>✓ <b>Zinc oxide</b> → paints, rubber, cosmetics, pharmaceuticals, plastics, inks, batteries, textiles and electrical equipment.</li> <li>✓ <b>Zinc sulphide</b> → luminous paints, fluorescent lights and x-ray screens.</li> <li>✓ <b>Brass-alloy of zinc</b> : water valves and communication equipment</li> </ul>
Iron (Fe)	<ul style="list-style-type: none"> <li>✓ Iron <b>alloys</b> → electricity pylons, rifle barrels.</li> <li>✓ <b>Cast iron</b> → pipes pumps, stoves, <b>Magnets</b></li> <li>✓ <b>stainless steel</b> → resistant to corrosion → architecture, bearings, cutlery, surgical instruments,</li> <li>✓ <b>Nickel steel</b> → cables, automobiles, airplane parts.</li> <li>✓ <b>Chrome steels</b> → cutting tools, crushing machines</li> </ul>
Copper(Cu)	<ul style="list-style-type: none"> <li>✓ <b>Coins</b>, ornaments, wires, <b>water pipes</b>, electrical parts.</li> </ul>
Gold (Au)	<ul style="list-style-type: none"> <li>✓ <b>Coinage, Jewellery</b> → with copper.</li> <li>✓ <b>Electroplating</b> → in watches, artificial limb joints, dental fillings.</li> <li>✓ Gold <b>nanoparticles</b> → increase efficiency of solar cells &amp; catalysts.</li> </ul>
Boron:	<ul style="list-style-type: none"> <li>✓ Boron → <b>capacity to absorb neutrons</b>.</li> <li>✓ 10 B 5 → <b>moderators</b> in nuclear reactors.</li> <li>✓ Amorphous boron → <b>rocket fuel igniter</b></li> <li>✓ <b>cell walls</b> of plants</li> <li>✓ Eye drops, antiseptics, washing powders → contains boric acid and borax.</li> <li>✓ <b>Pyrex glass</b> → <b>boric oxide</b>.</li> </ul>
Borax [Na <sub>2</sub> B <sub>4</sub> O <sub>7</sub> ·10H <sub>2</sub> O]:	<ul style="list-style-type: none"> <li>✓ <b>Identification</b> of <b>coloured</b> metal ions</li> <li>✓ <b>optical</b> and borosilicate glass</li> <li>✓ enamels, <b>flux</b> and preservative</li> <li>✓ <b>glazes</b> → pottery</li> </ul>

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Boric acid [H <sub>3</sub> B <sub>3</sub> O <sub>3</sub> or B(OH) <sub>3</sub> ]:	<ul style="list-style-type: none"> <li>✓ <b>pottery glasses</b></li> <li>✓ enamels &amp; pigments</li> <li>✓ antiseptic, <b>eye lotion</b>, food preservative</li> </ul>
Diborane	<ul style="list-style-type: none"> <li>✓ <b>high energy fuel</b> for propellant</li> <li>✓ reducing agent</li> <li>✓ <b>welding torches</b></li> </ul>
Aluminium chloride:	<ul style="list-style-type: none"> <li>✓ Anh. AlCl<sub>3</sub> → catalyst in <b>Friedel Crafts rxn.</b></li> <li>✓ Manufacture of <b>petrol</b></li> <li>✓ <b>Catalyst</b> in the manufacture of dyes, drugs, perfumes</li> </ul>
Alum:	<ul style="list-style-type: none"> <li>✓ <b>Purification</b>, Paper</li> <li>✓ water proofing, textiles dyeing, <b>leather tanning</b></li> <li>✓ As a styptic agent → <b>arrest bleeding</b></li> </ul>
Carbon monoxide	<ul style="list-style-type: none"> <li>✓ Mixture of → CO &amp; H<sub>2</sub> - <b>water gas</b> → CO &amp; nitrogen - <b>producer gas</b></li> <li>✓ <b>Reducing agent</b></li> <li>✓ It's <b>ligand</b> → forms carbonyl compound with transition metals</li> </ul>
CO <sub>2</sub>	<ul style="list-style-type: none"> <li>✓ To <b>produce an inert atmosphere</b> for chemical processing</li> <li>✓ Photosynthesis, <b>fire extinguisher</b>, propellant.</li> <li>✓ <b>carbonated beverages &amp; foam</b></li> </ul>
Silicon tetrachloride	<ul style="list-style-type: none"> <li>✓ production of <b>semiconducting silicon</b></li> <li>✓ <b>starting material</b> in the synthesis of silica gel, silicic esters.</li> <li>✓ <b>As a Binder</b> for <b>ceramic materials</b>.</li> </ul>
Silicones	<ul style="list-style-type: none"> <li>✓ <b>low temperature lubrication</b>, water proofing clothes</li> <li>✓ vacuum pumps, <b>high temperature oil baths</b></li> <li>✓ as <b>insulating</b> material</li> <li>✓ <b>Mixed</b> with paints and enamels <b>to make</b> them more <b>resistant</b></li> </ul>
Nitrogen	<ul style="list-style-type: none"> <li>✓ Manufacturing → ammonia, nitric acid and <b>calcium cyanamide</b>.</li> <li>✓ <b>Liquid nitrogen</b> → for producing low temperature required in <b>cryosurgery</b></li> <li>✓ In <b>biological preservation</b></li> </ul>
Nitric acid (HNO <sub>3</sub> )	<ul style="list-style-type: none"> <li>✓ <b>Oxidizing agent</b> and in the <b>preparation of aquaregia</b></li> <li>✓ <b>Salts</b> of nitric acid → photography (<b>AgNO<sub>3</sub></b>) → gunpowder for firearms. (<b>NaNO<sub>3</sub></b>)</li> </ul>
Phosphorus	<ul style="list-style-type: none"> <li>✓ <b>Red phosphorus</b> → match boxes</li> <li>✓ Production of alloys such as <b>phosphor bronze</b></li> </ul>
Phosphine	<ul style="list-style-type: none"> <li>• Producing smoke screen → gives large smoke.</li> <li>✓ <b>HOLMES SIGNAL:</b> In a ship, a pierced container with mixture of calcium carbide and calcium phosphide, liberates phosphine and acetylene when thrown into sea. The liberated phosphine catches fire and ignites acetylene. These burning gases serves as a <b>signal to the approaching ships</b>.</li> </ul>
Phosphorus Trichloride	<ul style="list-style-type: none"> <li>✓ Chlorinating agent</li> <li>✓ Preparation of H<sub>3</sub> PO<sub>3</sub> .</li> </ul>
Phosphorus pentachloride	<ul style="list-style-type: none"> <li>✓ <b>Chlorinating agent</b></li> <li>✓ For <b>replacing hydroxyl groups</b> by chlorine atom.</li> </ul>
Oxygen	<ul style="list-style-type: none"> <li>✓ Survival of living organisms.</li> <li>✓ <b>Welding</b> (oxyacetylene welding)</li> <li>✓ <b>Liquid oxygen</b> → <b>fuel in rockets</b></li> </ul>
Sulphur dioxide	<ul style="list-style-type: none"> <li>✓ <b>Bleaching</b> hair, silk, wool, Disinfecting drops and @lensl.com</li> </ul>

Sulphuric acid	<ul style="list-style-type: none"> <li>✓ <b>Manufacture</b> of fertilisers, ammonium sulphate &amp; super phosphates, hydrochloric acid, nitric acid</li> <li>✓ As a <b>drying agent</b></li> <li>✓ Pigments, <b>Explosives</b></li> </ul>
Chlorine	<ul style="list-style-type: none"> <li>✓ <b>Purification</b> of drinking water</li> <li>✓ <b>Bleaching</b> of cotton textiles, paper, rayon.</li> <li>✓ <b>Extraction of gold</b> and platinum</li> </ul>
Hydrochloric acid	<ul style="list-style-type: none"> <li>✓ <b>Manufacture</b> of chlorine, ammonium chloride, glucose.</li> <li>✓ Extraction of <b>glue from bone</b></li> <li>✓ Purification of <b>bone black</b></li> </ul>
Helium	<ul style="list-style-type: none"> <li>✓ Helium &amp; oxygen mixture used <b>by divers</b> → prevents the <b>dangerous condition "bends"</b>.</li> <li>✓ Inert atmosphere in <b>electric arc welding</b> of metals</li> <li>✓ <b>Cryogenics</b> (low temperature science), Air balloons</li> </ul>
Neon	<ul style="list-style-type: none"> <li>✓ In advertisement as <b>neon sign</b></li> <li>✓ <b>Brilliant red glow</b> is caused by <b>passing electric current</b> through neon gas.</li> </ul>
Argon	<ul style="list-style-type: none"> <li>✓ <b>Prevents the oxidation</b> of hot filament and <b>prolongs the life</b> in filament bulbs</li> </ul>
Krypton	<ul style="list-style-type: none"> <li>✓ Fluorescent bulbs, flash bulbs</li> <li>✓ Lamps filled with krypton <b>are used in airports</b> as approaching lights as they can <b>penetrate through dense fog</b>.</li> </ul>
Xenon	<ul style="list-style-type: none"> <li>✓ Fluorescent bulbs, flash bulbs and lasers.</li> <li>✓ It <b>emits an intense light</b> in discharge tubes instantly.</li> <li>✓ high speed <b>electronic flash bulbs</b> → photographers.</li> </ul>
Radon	<ul style="list-style-type: none"> <li>✓ Radioactive → <b>source of gamma rays</b></li> <li>✓ To <b>destroy malignant</b> i.e. cancer growth</li> </ul>
Potassium dichromate	<ul style="list-style-type: none"> <li>✓ strong <b>oxidizing agent</b>.</li> <li>✓ <b>dyeing</b>, printing.</li> <li>✓ Used in leather tanneries for <b>chrome tanning</b>.</li> <li>✓ In <b>quantitative analysis</b> for estimating <b>iron</b> compounds and <b>iodides</b>.</li> </ul>
Potassium permanganate	<ul style="list-style-type: none"> <li>✓ Strong <b>oxidizing agent</b>, treatment of <b>skin &amp; fungal</b> infections.</li> <li>✓ In <b>Water treatment</b> to remove iron and hydrogen sulphide.</li> <li>✓ As <b>Bayer's reagent</b> → detecting unsaturation.</li> <li>✓ In <b>quantitative analysis</b> for the estimation of ferrous salts, oxalates, hydrogen peroxide and iodides.</li> </ul>
EMULSIONS	<ul style="list-style-type: none"> <li>✓ <b>Cleansing action</b> of soaps</li> <li>✓ Preparation of <b>vanishing cream</b></li> <li>✓ Prep. <b>Of cold liver oil</b></li> </ul>
Methanol	<ul style="list-style-type: none"> <li>✓ <b>Solvent</b> for paints, varnishes, shellac, gums, cement</li> <li>✓ Manufacture of <b>dyes, drugs, perfumes</b> and formaldehyde.</li> </ul>
Ethanol	<ul style="list-style-type: none"> <li>✓ <b>Preparation</b> of Paints, varnishes, Organic compounds, Dyes, transparent soaps.</li> <li>✓ <b>Substitute for petrol</b> → <b>power alcohol</b>-fuel-aeroplane</li> <li>✓ <b>Preservative</b> for biological specimens.</li> </ul>
Ethylene glycol	<ul style="list-style-type: none"> <li>✓ As <b>antifreeze</b> in automobile radiator. <b>Its dinitrate</b> → <b>explosive with TNG</b></li> </ul>

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Glycerol	<ul style="list-style-type: none"> <li>✓ <b>Sweetening</b> agent.</li> <li>✓ <b>Cosmetics &amp; transparent soaps</b>, printing inks, <b>Stamp pad ink</b></li> <li>✓ <b>Lubricant</b> for watches &amp; clocks.</li> <li>✓ <b>Manufacture of explosive</b> like <b>dynamite&amp;cordite</b> by <b>mixing</b> with <b>china clay</b></li> </ul>
Phenol	<ul style="list-style-type: none"> <li>✓ Prep. <b>phenol formaldehyde resin</b>. (Bakelite).</li> <li>✓ <b>starting material</b> for the prep. of →drugs, phenolphthalein, <b>explosive(picric acid)</b>.</li> <li>✓ As <b>antiseptic-carbolic lotion</b> &amp; carbolic soaps.</li> </ul>
DIETHYL ETHER	<ul style="list-style-type: none"> <li>✓ Surgical <b>anaesthetic</b> agent</li> <li>✓ <b>Solvent</b> for organic reactions.</li> <li>✓ <b>Volatile starting fluid</b> for diesel and gasoline engine.</li> <li>✓ As a <b>refrigerant</b></li> </ul>
Anisole	<ul style="list-style-type: none"> <li>✓ As a <b>Precursor</b> → synthesis of perfumes, insecticide pheromones.</li> <li>✓ As a <b>pharmaceutical agent</b>.</li> </ul>
Urotropine (called cyclonite or cyclotri methylene trinitramine)	<ul style="list-style-type: none"> <li>✓ Treating <b>urinary infection</b>.</li> <li>✓ <b>Nitration of Urotropine</b> in controlled condition gives an <b>explosive RDX</b> (Research and development explosive).</li> <li>✓ Acetone reacts with ammonia to form <b>diacetone amine</b>.</li> <li>✓ Benzaldehyde form a <b>complex condensation product</b> with ammonia.</li> </ul>
Formaldehyde	<ul style="list-style-type: none"> <li>✓ <b>40% aqueous solution</b> of formaldehyde is called <b>formalin</b>, ii.preserving biological specimens.</li> <li>✓ <b>Formalin</b> has <b>hardening effect</b>→used for tanning.</li> <li>✓ Formalin→production of thermo setting plastic (Bakelite), obtained by heating phenol with formalin.</li> </ul>
Acetaldehyde	<ul style="list-style-type: none"> <li>✓ <b>silvering</b> of mirrors</li> <li>✓ <b>Paraldehyde</b>→as a <b>hypnotic</b>.</li> <li>✓ commercial prep. of org. comp. → acetic acid, ethyl acetate.</li> </ul>
Acetone	<ul style="list-style-type: none"> <li>✓ solvent, in the manufacture of <b>smokeless gun powder (cordite)</b></li> <li>✓ nail polish remover.</li> <li>✓ prep of → <b>sulphonal, a hypnotic</b>. →<b>thermosoftening plastic</b> Perspex.</li> </ul>
Benzaldehyde	<ul style="list-style-type: none"> <li>✓ flavoring agent, perfumes, dye intermediates</li> <li>✓ <b>starting material</b>→synthesis of several other org. comp. → cinnamaldehyde, cinnamic acid, benzoyl chloride</li> </ul>
Aromatic Ketones	<ul style="list-style-type: none"> <li>✓ Acetophenone→perfumery &amp; hypnotic (hypnone).</li> <li>✓ Benzophenone→ in perfumery &amp; prep. of benzhydrol eye drop.</li> </ul>
Formic acid	<ul style="list-style-type: none"> <li>✓ <b>dehydration of hides</b>.</li> <li>✓ coagulating agent for rubber latex</li> <li>✓ <b>treatment of gout, antiseptic</b> in the <b>preservation</b> of <b>juice</b>.</li> </ul>
Acetic acid	<ul style="list-style-type: none"> <li>✓ table vinegar, <b>coagulating rubber latex</b></li> <li>✓ prep. of <b>cellulose acetate &amp;poly vinylacetate</b></li> </ul>
Benzoic acid	<ul style="list-style-type: none"> <li>✓ food preservative, <b>urinary antiseptic</b>, for manufacture of dyes</li> </ul>
Acetyl Chloride	<ul style="list-style-type: none"> <li>✓ <b>acetylating agent</b> in organic synthesis, <b>detection &amp; estimation</b> of - OH, - NH<sub>2</sub> groups.</li> </ul>
Acetic anhydride	<ul style="list-style-type: none"> <li>✓ acetylating agent, prep of medicine like <b>asprin &amp; phenacetin</b></li> <li>✓ prep. →<b>cellulose acetate &amp;poly vinyl acetate</b></li> </ul>

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Ethyl acetate	<ul style="list-style-type: none"> <li>✓ <b>artificial fruit essences</b>, solvent for <b>lacquers</b>.</li> <li>✓ prep of <b>organic synthetic reagent</b> → <b>ethyl acetoacetate</b>.</li> </ul>
Nitroalkanes	<ul style="list-style-type: none"> <li>✓ <b>Nitromethane</b> → <b>fuel</b> for cars</li> <li>✓ Chloropicrin → insecticide</li> <li>✓ Nitroethane → fuel additive and <b>precursor to explosive</b> → solvents for polymers, cellulose ester, synthetic rubber &amp; dyes</li> <li>✓ <b>4% solution</b> of ethylnitrite in alcohol is known as <b>sweet spirit</b> of nitre and is used as diuretic.</li> </ul>
Nitrobenzene	<ul style="list-style-type: none"> <li>✓ <b>lubricating oils</b> in motors and machinery.</li> <li>✓ dyes, drugs, pesticides, synthetic rubber, aniline &amp; <b>explosives</b> → <b>TNT, TNB</b>.</li> </ul>
Cyanides and Isocyanides	<ul style="list-style-type: none"> <li>✓ <b>Alkyl cyanides</b> → <b>intermediates</b> in the organic synthesis of acids, amides, esters, amines.</li> <li>✓ <b>Nitriles</b> → textile industry → manufacture of nitrile rubber &amp; solvent in perfume industry.</li> </ul>
Bakelites	<ul style="list-style-type: none"> <li>✓ <b>Navolac</b> → paints.</li> <li>✓ <b>Soft bakelites</b> → glue for wooden planks, varinishes</li> <li>✓ <b>Hard bakelites</b> → combs, pens etc.</li> </ul>
Tranquilizers	<ul style="list-style-type: none"> <li>✓ Treatment of stress, anxiety, depression, sleep disorders and <b>severe mental diseases</b> like <b>schizophrenia</b></li> </ul>
Analgesics (Non - narcotic)	<ul style="list-style-type: none"> <li>✓ short-term pain relief</li> <li>✓ headache, muscle strain, <b>bruising</b>, or arthritis.</li> <li>✓ preventing <b>platelet coagulation</b> → prevention of heart attacks</li> <li>✓ <b>Reduces fever (antipyretic)</b> by causing the hypothalamus to override a prostaglandin-induced increase in temperature.</li> </ul>
Opioids (Narcotic Analgesics)	<ul style="list-style-type: none"> <li>✓ Relief of severe pain, <b>post operative pain</b>, pain of <b>terminal cancer</b>.</li> </ul>
Local anaesthetics	<ul style="list-style-type: none"> <li>✓ In minor surgical procedures</li> </ul>
General anaesthetics	<ul style="list-style-type: none"> <li>✓ In major surgical procedures</li> </ul>
Antacids	<ul style="list-style-type: none"> <li>✓ To relieve <b>burning sensation &amp; heart burns</b> caused by <b>acid reflux</b>.</li> </ul>
Antihistamines	<ul style="list-style-type: none"> <li>✓ relief from <b>allergy</b></li> </ul>
Antimicrobials	<ul style="list-style-type: none"> <li>✓ treat skin, dental, ear, respiratory &amp; urinary tract, pneumonia infections and <b>gonorrhoea</b></li> </ul>
Macrolides	<ul style="list-style-type: none"> <li>✓ To treat respiratory tract infections, genital, gastrointestinal tract, skin <b>infections</b></li> </ul>
Fluoroquinolones	<ul style="list-style-type: none"> <li>✓ To treat urinary tract, skin, pulmonary &amp; respiratory <b>infections</b>.</li> </ul>
Tetracyclines	<ul style="list-style-type: none"> <li>✓ treatment of <b>peptic ulcer disease</b>, infections of the respiratory tract, cholera, acne vulgaris.</li> </ul>
Aminoglycosides	<ul style="list-style-type: none"> <li>✓ treat infections <b>by gram-negative</b> bacteria</li> </ul>
Antiseptics	<ul style="list-style-type: none"> <li>✓ To reduce the <b>risk of infection</b> during surgery</li> </ul>
Disinfectants	<ul style="list-style-type: none"> <li>✓ <b>Stop</b> or slow down the <b>growth</b> of microorganisms</li> </ul>
Antifertility drugs	<ul style="list-style-type: none"> <li>✓ <b>birth control</b> pills.</li> </ul>

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