

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

Boric acid [H ₃ B ₃ O ₃ or B(OH) ₃]:	<ul style="list-style-type: none"> ✓ pottery glasses ✓ enamels & pigments ✓ antiseptic, eye lotion, food preservative
Diborane	<ul style="list-style-type: none"> ✓ high energy fuel for propellant ✓ reducing agent ✓ welding torches
Aluminium chloride:	<ul style="list-style-type: none"> ✓ Anh. AlCl₃ → catalyst in Friedel Crafts rxn. ✓ Manufacture of petrol ✓ Catalyst in the manufacture of dyes, drugs, perfumes
Alum:	<ul style="list-style-type: none"> ✓ Purification, Paper ✓ water proofing, textiles dyeing, leather tanning ✓ As a styptic agent → arrest bleeding
Carbon monoxide	<ul style="list-style-type: none"> ✓ Mixture of → CO & H₂ - water gas → CO & nitrogen - producer gas ✓ Reducing agent ✓ It's ligand → forms carbonyl compound with transition metals
CO ₂	<ul style="list-style-type: none"> ✓ To produce an inert atmosphere for chemical processing ✓ Photosynthesis, fire extinguisher, propellant. ✓ carbonated beverages & foam
Silicon tetrachloride	<ul style="list-style-type: none"> ✓ production of semiconducting silicon ✓ starting material in the synthesis of silica gel, silicic esters. ✓ As a Binder for ceramic materials.
Silicones	<ul style="list-style-type: none"> ✓ low temperature lubrication, water proofing clothes ✓ vacuum pumps, high temperature oil baths ✓ as insulating material ✓ Mixed with paints and enamels to make them more resistant
Nitrogen	<ul style="list-style-type: none"> ✓ Manufacturing → ammonia, nitric acid and calcium cyanamide. ✓ Liquid nitrogen → for producing low temperature required in cryosurgery ✓ In biological preservation
Nitric acid (HNO ₃)	<ul style="list-style-type: none"> ✓ Oxidizing agent and in the preparation of aquaregia ✓ Salts of nitric acid → photography (AgNO₃) → gunpowder for firearms. (NaNO₃)
Phosphorus	<ul style="list-style-type: none"> ✓ Red phosphorus → match boxes ✓ Production of alloys such as phosphor bronze
Phosphine	<ul style="list-style-type: none"> • Producing smoke screen → gives large smoke. ✓ HOLMES SIGNAL: 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 signal to the approaching ships.
Phosphorus Trichloride	<ul style="list-style-type: none"> ✓ Chlorinating agent ✓ Preparation of H₃ PO₃ .
Phosphorus pentachloride	<ul style="list-style-type: none"> ✓ Chlorinating agent ✓ For replacing hydroxyl groups by chlorine atom.
Oxygen	<ul style="list-style-type: none"> ✓ Survival of living organisms. ✓ Welding (oxyacetylene welding) ✓ Liquid oxygen → fuel in rockets
Sulphur dioxide	<ul style="list-style-type: none"> ✓ Bleaching hair, silk, wool. Disinfecting crops and plants

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

Glycerol	<ul style="list-style-type: none"> ✓ Sweetening agent. ✓ Cosmetics & transparent soaps, printing inks, Stamp pad ink ✓ Lubricant for watches & clocks. ✓ Manufacture of explosive like dynamite&cordite by mixing with china clay
Phenol	<ul style="list-style-type: none"> ✓ Prep. phenol formaldehyde resin. (Bakelite). ✓ starting material for the prep. of →drugs, phenolphthalein, explosive(picric acid). ✓ As antiseptic-carbolic lotion & carbolic soaps.
DIETHYL ETHER	<ul style="list-style-type: none"> ✓ Surgical anaesthetic agent ✓ Solvent for organic reactions. ✓ Volatile starting fluid for diesel and gasoline engine. ✓ As a refrigerant
Anisole	<ul style="list-style-type: none"> ✓ As a Precursor → synthesis of perfumes, insecticide pheromones. ✓ As a pharmaceutical agent.
Urotropine (called cyclonite or cyclotri methylene trinitramine)	<ul style="list-style-type: none"> ✓ Treating urinary infection. ✓ Nitration of Urotropine in controlled condition gives an explosive RDX (Research and development explosive). ✓ Acetone reacts with ammonia to form diacetone amine. ✓ Benzaldehyde form a complex condensation product with ammonia.
Formaldehyde	<ul style="list-style-type: none"> ✓ 40% aqueous solution of formaldehyde is called formalin, ii.preserving biological specimens. ✓ Formalin has hardening effect→used for tanning. ✓ Formalin→production of thermo setting plastic (Bakelite), obtained by heating phenol with formalin.
Acetaldehyde	<ul style="list-style-type: none"> ✓ silvering of mirrors ✓ Paraldehyde→as a hypnotic. ✓ commercial prep. of org. comp. → acetic acid, ethyl acetate.
Acetone	<ul style="list-style-type: none"> ✓ solvent, in the manufacture of smokeless gun powder (cordite) ✓ nail polish remover. ✓ prep of → sulphonal, a hypnotic. →thermosoftening plastic Perspex.
Benzaldehyde	<ul style="list-style-type: none"> ✓ flavoring agent, perfumes, dye intermediates ✓ starting material→synthesis of several other org. comp. → cinnamaldehyde, cinnamic acid, benzoyl chloride
Aromatic Ketones	<ul style="list-style-type: none"> ✓ Acetophenone→perfumery & hypnotic (hypnone). ✓ Benzophenone→ in perfumery & prep. of benzhydrol eye drop.
Formic acid	<ul style="list-style-type: none"> ✓ dehydration of hides. ✓ coagulating agent for rubber latex ✓ treatment of gout, antiseptic in the preservation of juice.
Acetic acid	<ul style="list-style-type: none"> ✓ table vinegar, coagulating rubber latex ✓ prep. of cellulose acetate &poly vinylacetate
Benzoic acid	<ul style="list-style-type: none"> ✓ food preservative, urinary antiseptic, for manufacture of dyes
Acetyl Chloride	<ul style="list-style-type: none"> ✓ acetylating agent in organic synthesis, detection & estimation of - OH, - NH₂ groups.
Acetic anhydride	<ul style="list-style-type: none"> ✓ acetylating agent, prep of medicine like asprin & phenacetin ✓ prep. →cellulose acetate &poly vinyl acetate

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

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