Named Reactions — Class 12 Chemistry

नामित अभिक्रियाएँ — Units 6, 7, 8, 9 (NCERT) · Board-exam list with memory tricks

How to use / कैसे पढ़ें: every named reaction from Haloalkanes, Alcohols, Aldehydes and Amines is listed chapter-wise with reactant → product, reagent and a one-line trick. (Electrochemistry and Biomolecules have no organic named reactions; tests like Tollens', Fehling's, iodoform, Lucas and Hinsberg are listed separately.)

हर अध्याय की सभी नामित अभिक्रियाएँ — अभिकारक → उत्पाद, अभिकर्मक और एक लाइन की ट्रिक के साथ।

Priority marks: ★★★ = asked **by name** in NCERT end-of-chapter exercises and flagged as frequently asked in board-prep sources; ★★ = asked by name in NCERT exercises or examples; ★ = in NCERT text, good for 1–2 mark questions.

Note on CGBSE previous-year papers: I couldn't open the text of the CGBSE question papers (the websites that host them were not reachable from here), so I could not check year by year which reactions were asked. CGBSE follows the NCERT book, and board questions on named reactions usually come straight from NCERT exercises, so the stars above are based on (1) the NCERT exercise questions that name a reaction directly, and (2) board-prep guidance. If you share CGBSE papers (PDF/photos), I can mark exactly which year each reaction came.
CGBSE के प्रश्न-पत्र यहाँ से नहीं खुल सके, इसलिए वर्षवार मिलान नहीं हो सका। स्टार NCERT अभ्यास प्रश्नों और बोर्ड-तैयारी स्रोतों पर आधारित हैं। आप प्रश्न-पत्र भेजें तो वर्षवार निशान लगा दूँगा।

Top 15 to learn first (सबसे पहले ये 15)

#	Reaction	Unit	Why important
1	**Reimer–Tiemann**	7	NCERT 7.17(iv), 7.18(ii)
2	**Kolbe's reaction**	7	NCERT 7.18(i)
3	**Williamson ether synthesis**	7	NCERT 7.18(iii), 7.25 (limitations)
4	**Cannizzaro reaction**	8	NCERT 8.7, 8.10, 8.16(ii)
5	**Aldol / cross aldol**	8	NCERT 8.1(iv), 8.7, 8.9, 8.16(iii)
6	**Hoffmann bromamide**	9	NCERT 9.7(iii), Example 9.3

#	Reaction	Unit	Why important
7	**Carbylamine reaction**	9	NCERT 9.7(i); test for 1° amine
8	**Gabriel phthalimide**	9	NCERT 9.7(vii), 9.5(vii)
9	**Coupling reaction**	9	NCERT 9.7(iv)
10	**Sandmeyer / Gatterman**	6, 9	Very commonly asked; know the difference
11	**Rosenmund reduction**	8	Aldehyde preparation — common 2-mark
12	**Clemmensen & Wolff–Kishner**	8	C=O → CH_2; often asked as a pair
13	**Etard & Gatterman–Koch**	8	Benzaldehyde preparation
14	**HVZ reaction**	8	α-halo acid
15	**Wurtz / Fittig / Wurtz–Fittig, Finkelstein / Swarts**	6	Classic 1–2 mark equations

Mega trick for the Top 15: learn them as **pairs that confuse students** — Reimer (CHO) vs Kolbe (COOH) · Aldol (α-H, dil.) vs Cannizzaro (no α-H, conc.) · Clemmensen (acid) vs Wolff–Kishner (base) · Sandmeyer (Cu salt) vs Gatterman (Cu powder) · Finkelstein (I) vs Swarts (F) · Hoffmann (−1 C) vs nitrile reduction (+1 C) · Etard (CrO_2Cl_2) vs Gatterman–Koch (CO + HCl).
जोड़ियों में याद करो — परीक्षा में यही जोड़ियाँ उलझाती हैं।

Unit 6 — Haloalkanes & Haloarenes (हैलोऐल्केन एवं हैलोऐरीन)

Reaction	Equation (reactant → product)	Reagent / condition	Trick
Finkelstein ★★	R–Cl / R–Br + NaI → **R–I** + NaCl/NaBr↓	NaI, **dry acetone**	"Find I"; NaCl ppt drives it (Le Chatelier)
Swarts ★★	$CH_3Br + AgF \rightarrow \mathbf{CH_3F} + AgBr$	AgF, Hg_2F_2, CoF_2, SbF_3	"Super Fluoride"; also makes freons
Sandmeyer ★★★	$C_6H_5N_2^+X^- \rightarrow \mathbf{C_6H_5Cl/Br} + N_2$	Cu_2Cl_2/HCl or Cu_2Br_2/HBr	"Salt of Cu(I)"
Markovnikov addition ★	$CH_3CH{=}CH_2 + HI \rightarrow \mathbf{CH_3CHICH_3}$ (major)	HX	"Ameer aur ameer" — H to C with more H

Reaction	Equation (reactant → product)	Reagent / condition	Trick
Dehydrohalogenation (Zaitsev rule) ★★	2-Bromopentane → **pent-2-ene** (81%) + pent-1-ene	**Alcoholic** KOH, heat	More substituted alkene wins
Grignard reagent ★★	$C_2H_5Br + Mg \rightarrow$ **C_2H_5MgBr**	Mg, **dry ether**	"Paani se dushmani" ($RMgX + H_2O \rightarrow RH$)
Wurtz ★★★	$2RX + 2Na \rightarrow$ **R–R** + 2NaX	Na, dry ether	"Double the carbons"
Wurtz–Fittig ★★	$ArX + RX + 2Na \rightarrow$ **Ar–R** + 2NaX	Na, dry ether	Aryl + alkyl
Fittig ★★	$2C_6H_5X + 2Na \rightarrow$ **diphenyl** + 2NaX	Na, dry ether	Aryl + aryl
Dow's process (NCERT: replacement by –OH) ★★	$C_6H_5Cl \rightarrow$ **C_6H_5OH**	NaOH, 623 K, 300 atm; H^+	More o/p-NO_2 → milder (443 K, 368 K, warm H_2O)
Friedel–Crafts (on chlorobenzene) ★	$C_6H_5Cl + CH_3Cl$ / $CH_3COCl \rightarrow$ **p-** product major	Anhyd. $AlCl_3$	Cl is o/p-directing
KCN / AgCN, KNO_2 / $AgNO_2$ ★★	$RX \rightarrow RCN$ / **RNC**; R–ONO / **$R–NO_2$**	Ambident nucleophiles	"K = Kuchh normal, Ag = Alag"

Unit 7 — Alcohols, Phenols & Ethers (ऐल्कोहॉल, फ़ीनॉल एवं ईथर)

Reaction	Equation (reactant → product)	Reagent / condition	Trick
Reimer–Tiemann ★★★	Phenol → **salicylaldehyde** (–CHO at ortho)	$CHCl_3$ + aq. NaOH; H^+	"$CHCl_3 \rightarrow CHO$"
Kolbe's reaction ★★★	Sodium phenoxide + CO_2 → **salicylic acid**	NaOH, CO_2, H^+	"Kolbe → CO_2 → COOH"
Williamson synthesis ★★★	$R–X + R'–ONa \rightarrow$ **R–O–R'** + NaX (S_N2)	Halide must be **1°**	"Bhaari part alkoxide mein, halide halka"; 3° halide → only alkene

Reaction	Equation (reactant → product)	Reagent / condition	Trick
Hydroboration–oxidation ★★	Propene → **propan-1-ol** (anti-Markovnikov)	$(BH_3)_2$; H_2O_2/OH^-	"Boron goes to less crowded end"
Acid-catalysed hydration ★	Propene → **propan-2-ol** (Markovnikov)	H_2O / H^+	Protonation → carbocation → H_2O → $-H^+$
Cumene process ★★	Cumene → hydroperoxide → **phenol + acetone**	O_2; dil. H^+	"Cumene ke do bachche"
Lucas test ★★	3° / 2° / 1° alcohol + HCl → RCl (turbidity)	Conc. HCl + $ZnCl_2$	"Teen turant, do der se, ek ekdum nahi"
Esterification / Acetylation ★★	Salicylic acid + $(CH_3CO)_2O$ → **aspirin**	H^+ or pyridine	Pyridine soaks up HCl
Friedel–Crafts on anisole ★★	Anisole + CH_3Cl / CH_3COCl → **para** major	Anhyd. $AlCl_3$	"Anisole ka pyaar para se" (NCERT 7.31)
Ether cleavage by HI ★★	$CH_3OC_2H_5 + HI \rightarrow CH_3I + C_2H_5OH$; anisole → phenol + CH_3I	Conc. HI, heat	"Chhota iodide, bada alcohol"; 3° → 3° iodide
Phenol + Zn dust ★	Phenol → **benzene**	Heat	"Zinc zaps the OH"

Unit 8 — Aldehydes, Ketones & Carboxylic Acids (ऐल्डिहाइड, कीटोन एवं कार्बोक्सिलिक अम्ल)

Reaction	Equation (reactant → product)	Reagent / condition	Trick
Rosenmund reduction ★★★	RCOCl → **RCHO**	H_2, **Pd–$BaSO_4$**	"Rose in Bas"; $BaSO_4$ stops at aldehyde
Stephen reaction ★★	RCN → imine → **RCHO**	$SnCl_2$ + HCl; H_3O^+	"STephen = $SnCl_2$"
Etard reaction ★★★	Toluene → **benzaldehyde**	CrO_2Cl_2 in CS_2; H_3O^+	"Easy chromyl"
Gatterman–Koch ★★★	Benzene → **benzaldehyde**	CO + HCl, anhyd. $AlCl_3/CuCl$	"Koch = CO"
Friedel–Crafts acylation ★★	Benzene + RCOCl → **aryl ketone**	Anhyd. $AlCl_3$	Acyl adds C=O

Reaction	Equation (reactant → product)	Reagent / condition	Trick
Clemmensen reduction ★★★	>C=O → **>CH_2**	Zn–Hg + conc. HCl	"Clay + Chloride = acidic"
Wolff–Kishner reduction ★★★	>C=O → **>CH_2**	NH_2NH_2; KOH/ethylene glycol, heat	"Wolff = wild (basic)"
Aldol condensation ★★★	$2CH_3CHO$ → **3-hydroxybutanal** → but-2-enal	**Dil.** NaOH (needs α-H)	"Alpha-H hai to aldol"
Cross aldol ★★★	Ethanal + propanal → **4 products**	Dil. NaOH	2 self + 2 cross (NCERT 8.9)
Cannizzaro reaction ★★★	$2HCHO$ → **CH_3OH + HCOONa**; $2C_6H_5CHO$ → $C_6H_5CH_2OH + C_6H_5COOK$	**Conc.** NaOH/KOH (no α-H)	"Do bhai — ek neeche, ek upar"
Haloform / Iodoform ★★★	CH_3COR → RCOONa + **CHI_3** (yellow)	NaOI (I_2 + NaOH)	$CH_3CO–$ or $CH_3CH(OH)–$ → yellow
HVZ reaction ★★★	RCH_2COOH → **RCH(X)COOH**	X_2 / red P; H_2O	"Hell mein laal aag — alpha pe halogen"
Decarboxylation ★★	RCOONa → **R–H** + Na_2CO_3	Sodalime (NaOH : CaO = 3 : 1), heat	"One C less" (NCERT 8.16(iv))
Kolbe electrolysis ★★	$2RCOONa$ → **R–R** + $2CO_2$	Electrolysis of aq. salt	"Double R" (≠ Kolbe's reaction of phenol!)
Cyanohydrin / $NaHSO_3$ / acetal formation ★★	RCHO + HCN → cyanohydrin; + 2R'OH → acetal	HCN/OH^-; dry HCl	NCERT 8.1 "what is meant by"
Grignard + CO_2 ★	$RMgX + CO_2$ → **RCOOH**	Dry ice; H_3O^+	"CO_2 adds one C"

Unit 9 — Amines (ऐमीन)

Reaction	Equation (reactant → product)	Reagent / condition	Trick
Hoffmann bromamide degradation ★★★	$RCONH_2$ → **RNH_2** (one C less)	Br_2 + 4NaOH	"Hatao ek Carbon"
Gabriel phthalimide synthesis ★★★	Phthalimide → K-salt → N-alkyl → **pure 1° amine**	Alc. KOH; RX; NaOH(aq)	"Guaranteed primary, not aromatic"
Carbylamine (isocyanide test) ★★★	$RNH_2 + CHCl_3 + 3KOH$ → **R–NC** (foul smell)	Ethanolic KOH, heat	"Pehla + chloroform = badbu" (1° only)
Diazotisation ★★★	$C_6H_5NH_2$ → **$C_6H_5N_2^+Cl^-$**	$NaNO_2$ + HCl, **273–278 K**	"Zero se paanch degree"
Coupling reaction ★★★	ArN_2^+ + phenol → **p-hydroxyazobenzene** (orange); + aniline → **p-aminoazobenzene** (yellow)	OH^- (phenol); H^+ (aniline)	"Phenol = Orange, Aniline = Yellow"
Sandmeyer ★★★	ArN_2^+ → **ArCl, ArBr, ArCN**	Cu_2Cl_2, Cu_2Br_2, CuCN	Cu(I) salt; gives CN too
Gatterman ★★★	ArN_2^+ → **ArCl, ArBr**	Cu powder + HCl/HBr	Cu metal; lower yield than Sandmeyer
Balz–Schiemann (NCERT: replacement by F) ★	ArN_2^+ → ArN_2BF_4 → **ArF**	HBF_4, heat	"HBF_4 → F"
Ammonolysis ★★	RX + NH_3 → 1°, 2°, 3° amines + quaternary salt	Ethanolic NH_3, 373 K, sealed tube	Mixture; excess NH_3 → 1° (NCERT 9.7(v))
Acylation / Benzoylation ★★	$C_6H_5NH_2 + (CH_3CO)_2O$ → **acetanilide**	Pyridine	"N pe H chahiye" (NCERT 9.7(vi))
Hinsberg test ★★	1° → soluble in alkali; 2° → insoluble; 3° → no reaction	$C_6H_5SO_2Cl$	"1 ghulta, 2 girta, 3 ghoorta"
Nitration / bromination of aniline ★	Aniline + Br_2(aq) → **2,4,6-tribromoaniline**; nitration gives 47% meta	Protect by acetylation	"Acid mein anilinium — meta ka mehmaan"

Distinguishing tests (पहचान परीक्षण)

Test	Reagent	Positive for	Observation
Tollens'	Ammoniacal $AgNO_3$	Aldehydes (incl. aromatic)	Silver mirror
Fehling's	$CuSO_4$ + Rochelle salt	Aliphatic aldehydes (not aromatic)	Red-brown Cu_2O ppt
Iodoform	I_2 + NaOH	CH_3CO-, $CH_3CH(OH)-$	Yellow CHI_3
2,4-DNP	2,4-Dinitrophenylhydrazine	Any C=O	Yellow/orange/red ppt
$NaHCO_3$	Sodium bicarbonate	–COOH	CO_2 effervescence
Lucas	Conc. HCl + $ZnCl_2$	1°/2°/3° alcohols	Turbidity: 3° at once, 2° later, 1° none
Br_2 water	Bromine water	Phenol / aniline / C=C	White ppt (tribromo) / colour discharged
Carbylamine	$CHCl_3$ + alc. KOH	1° amines	Foul smell
Hinsberg	$C_6H_5SO_2Cl$ + KOH	1°/2°/3° amines	Soluble / insoluble / no reaction

Confusing look-alikes (एक जैसे नाम — सावधान!)

Pair	Difference
Kolbe's reaction vs Kolbe electrolysis	Phenoxide + CO_2 → salicylic acid (Unit 7) vs RCOONa electrolysis → R–R (Unit 8)
Gatterman vs Gatterman–Koch	Diazonium + Cu/HX → ArX (Unit 9) vs benzene + CO/HCl → benzaldehyde (Unit 8)
Reimer–Tiemann vs Carbylamine	Both use $CHCl_3$ + KOH/NaOH: with **phenol** → salicylaldehyde; with **1° amine** → isocyanide
Wurtz vs Wurtz–Fittig vs Fittig	R+R / Ar+R / Ar+Ar — all Na + dry ether
Hoffmann bromamide vs nitrile reduction	–1 C vs +1 C (from RX via RCN)
Aldol vs Cannizzaro	α-H + dilute base vs no α-H + concentrated base
Clemmensen vs Wolff–Kishner	Both C=O → CH_2: acidic (Zn-Hg/HCl) vs basic (NH_2NH_2/KOH)
Finkelstein vs Swarts	Halide → iodide (NaI/acetone) vs halide → fluoride (AgF etc.)

Pair	Difference
Rosenmund vs Stephen	Acid chloride → aldehyde (H_2/Pd-$BaSO_4$) vs nitrile → aldehyde ($SnCl_2$/HCl)

Exam answer format (2 marks): write the **name**, a **balanced equation** with an example (e.g. CH_3CHO, C_6H_5OH), the **reagent/condition over the arrow**, and **name the product**. That gets full marks.
2 अंक के उत्तर में: नाम + उदाहरण सहित संतुलित समीकरण + तीर पर अभिकर्मक/परिस्थिति + उत्पाद का नाम।

All the best! शुभकामनाएँ!