

1. WURTZ REACTION :

$$R-X + 2 Na + X-R$$
 dry ether $R-R + 2 NaX$

2. WURTZ-FITTING REACTION

$$R-I + 2Na + I-Ar \xrightarrow{Dry \text{ ether}} R-Ar + 2Nal$$

3. KOLBE'S ELECTROLYSIS

$$\begin{array}{ccc} 2R - C - ONa & \xrightarrow{Electrolysis} & R - R + 2CO_2 + NaOH + H_2 \uparrow \\ O & & \end{array}$$

4. DECARBOXYLATION OF ACID:

$$\begin{array}{c} R - C - O - H \xrightarrow{NaOH} R - H + CO_2 \uparrow \\ O \end{array}$$

5. CLEMMENSEN REDUCTION:

$$Ph - C - CH_3 \xrightarrow{Zn(Hg) \text{ or } Na(Hg)} Ph - CH_2 - CH_3$$

6. WOLF-KISHNER REDUCTION.

$$\begin{array}{c} & & & & \\ & & & \\ & & & \\ & & & \\ & & & \\$$

7. **OXYMERCURATION - DEMERCURATION:**

$$>$$
C = C< + H₂O + Hg (OAc)₂ $\stackrel{\downarrow}{C}$ $\stackrel{$

8. **HYDROBORATION – OXIDATION :**

(Anti-Markownikov orientation)

$$>C = C < + \frac{1}{2} (BH_3)_2$$
 $B > C - C < H$

Tri alkyl borane

9. (DARZEN REACTION):

$$\text{R-OH +SOCl}_2 \xrightarrow{\quad \text{Pyridine} \quad} \text{R-Cl +SO}_2 + \text{HCl}$$

10. FINKELSTEIN REACTION:

$$R-Br or R-Cl+KI$$
 Acetone $R-I+KCl$

11. SWARTS REACTION

R-Br or R-Cl
$$\xrightarrow{\text{AgF}/\Delta}$$
 R-F

12. WILLIAMSON SYNTHESIS

$$RX \xrightarrow{R O^{-} Na^{+}} R - OR$$

$$\xrightarrow{ArO^{-}Na^{+}} R - OAr$$

Yield from RX:
$$CH_3 > 1^{\circ} > 2^{\circ} > 3^{\circ}$$

13 KUCHEROV'S REACTION.

$$CH \equiv CH + HOH \xrightarrow{\text{HgSO}_4/\text{dil.H}_2\text{SO}_4} CH_2 = CH - OH \xrightarrow{\text{tautomerism}} CH_3 - CHO$$

14. ROSENMUND REDUCTION:

15. GATTERMANN REACTION (FORMYLATION)

$$OH \longrightarrow CHO$$

$$+ HCN + HCI \longrightarrow H_1O^+$$

$$OH \longrightarrow CHO$$

16. GATTERMANN REACTION (FORMYLATION)

$$OH \longrightarrow CHO$$

$$+ HCN + HC1 \longrightarrow ZnCl_2 \longrightarrow CHO$$

17. HALOFORM REACTION

$$CH_3COCH_3 + 3X_2 + 4NaOH \longrightarrow CHX_3 + 3NaX + CH_3COONa + 3H_2O$$

18. ALDOL CONDENSATION

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2CH₃CHO
$$\xrightarrow{\overline{O}_{H}/HOH}$$
 CH₃ - CH - CH₂ - CHO $\xrightarrow{\Delta}$ CH₃ - CH = CH - CHO OH

β-hydroxy butyraldehyde (Aldol)

19. CANNIZARO REACTION

$$\begin{array}{ccc}
O & O \\
\parallel & \parallel \\
2 H - C - H & \xrightarrow{KOH} & H - C - O^{\circ} K^{+} + CH_{3}OH
\end{array}$$

20. CLAISEN ESTER CONDENSATION

$$\begin{array}{c|c}
O & O & O \\
\parallel & \parallel & \parallel \\
2Me-C-OR & \xrightarrow{(i) \text{ RONa}} & Me-C-CH_2-C-OR
\end{array}$$
(B-keto ester)

21. ESTERIFICATION:

$$R - C + OH + H + OR' \xrightarrow{Conc. H_2SO_4} R - C - OR' + H_2O$$

22. GATTERMANN-KOCH REACTION

$$\begin{array}{c} \text{CHO} \\ + \text{CO} + \text{HCl} \xrightarrow{\text{AlCl}_3} \end{array} + \text{HCl}$$

23. HOFFMANN BROMAMIDE REACTION

$$R - C - NH_2 \xrightarrow{OH^{-}/Br_2} R - NH_2 + Br^{-} + H_2O + CO_3^{2-}$$

$$O$$

24. CARBYLAMINE REACTION:

$$R - NH_2 \xrightarrow{CHCl_3/OH^-} R - N^+ \equiv C^-$$

25. HELL-VOLHARD-ZELINISKY (HVZ)

 $R-CH_2-COOH+Br_2$ Red P R-CH(Br)-COOH+HBr

26. SANDYMEYER REACTION

27. REIMER-TIEMANN REACTION

28. KOLBE REACTION (CARBONATION)

29. FRIEDEL-CRAFTS ALKYLATION

30. FRIEDEL CRAFT ACYLATION

$$OH O OH O OH COCH_3$$

$$+ CH_3CCI \longrightarrow O-acetylphenol$$

31. STEPHEN REACTION