2,4-Dinitrophenylhydrazine:

Aldehyde → yellow

Ketone → orange / red ppt

Sodium Bisulphite:

- Aldehyde + Small methyl ketones
  ↓
  white ppt

Tollen's test:

- Aliphatic + Aromatic aldehyde
- Silver mirror (fig)

Sodium Nitroprusside:

- Ketone → orange red ppt
- Wine red
- Formic acid also give this test
- Terminal alkyne → white ppt (No mirror)

Fehling test: (Tartrate)

- Aliphatic aldehyde
- Brick Red ppt (Cu_2O)

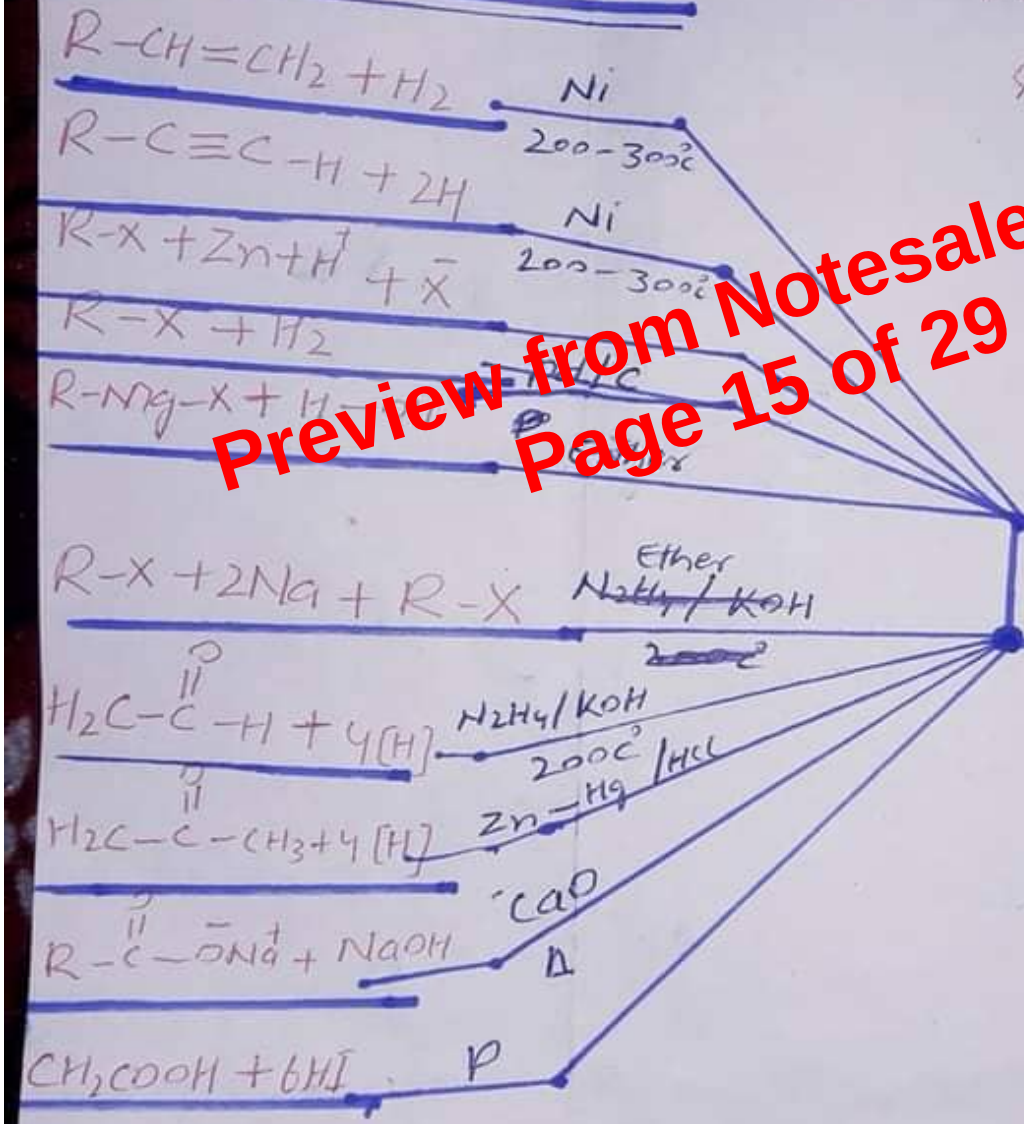
Benedict test: (citrate)

- Aliphatic aldehyde
- Brick Red ppt (Cu_2O)

PREPARATIONS:-

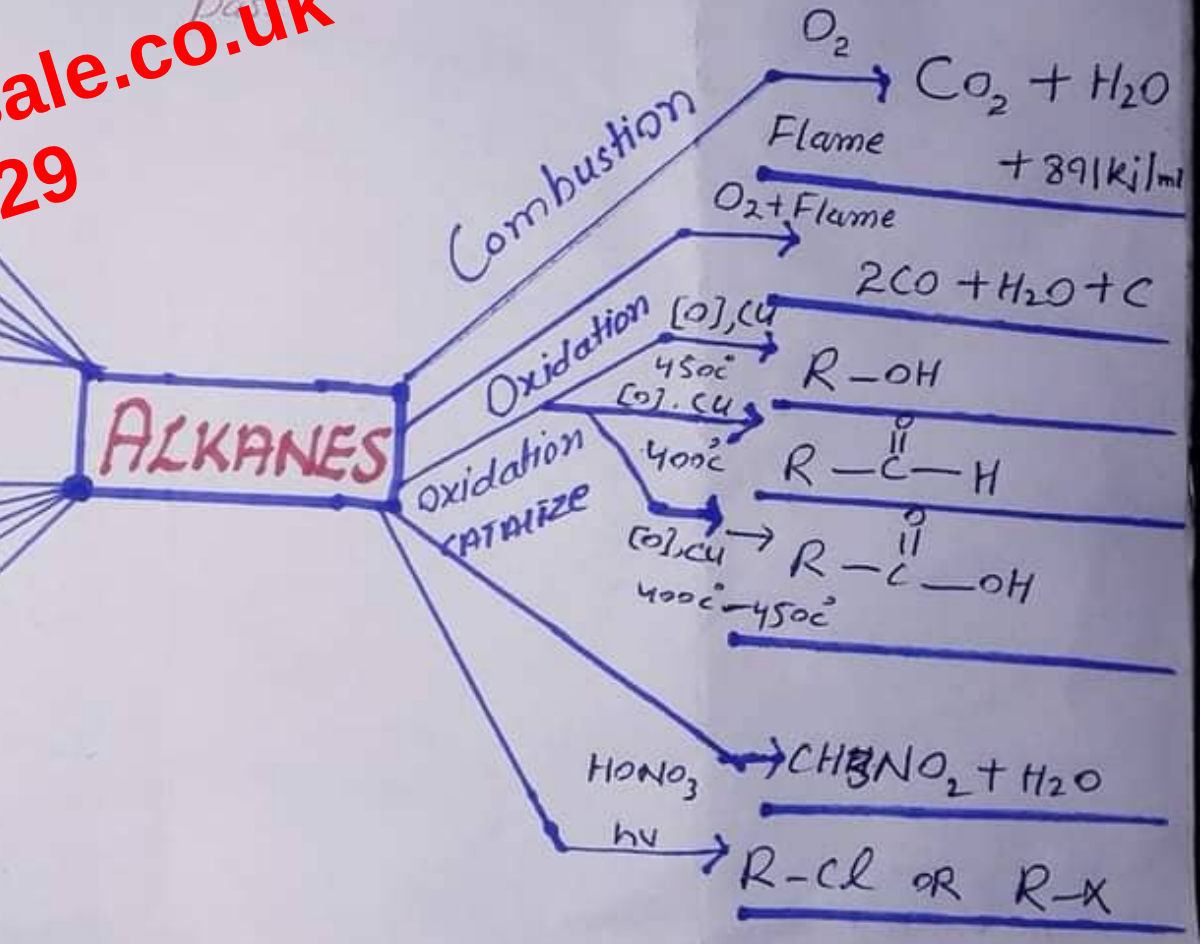
21/2/2021

This too Shall Pass



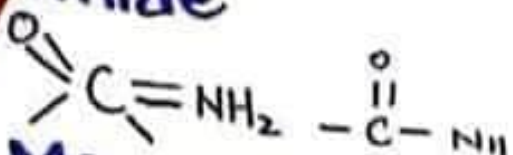
ALKANES

REACTIONS

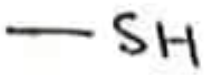


portant Functional Groups:

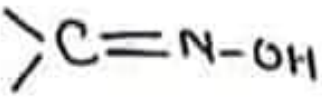
Imide



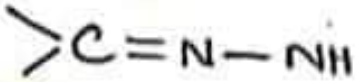
Mercapto



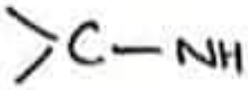
oxime



Hydrazone

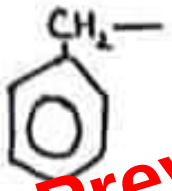


Imino



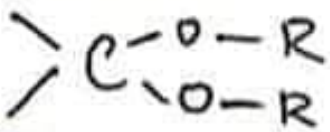
Vinyl

Benzyl



Benzo

Acetal

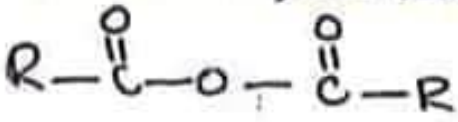


Phenyl/Aryl

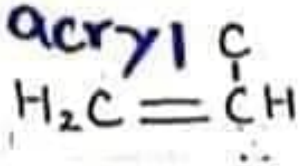
Benzol

Benzyl

Acid anhydride



acryl



Yousaf-Ul-Islam Yousafzai
Dr. Perfect

	Alkane	Alkene	Alkyne	Alkyl halides
General characteristics / Structure	• Saturated HCs. • C-C (single bond) • C_nH_{2n+2} • Tetrahedral • Non planner • sp^3 hybridization • Bond angle 109.5°	• Unsaturated HCs. • C=C (double bond) • C_nH_{2n} • Trigonal • Planner • sp^2 hybridization • Bond angle 120°	• Unsaturated HCs. • C≡C (triple bond). • C_nH_{2n-2} • Linear shape. • Planner. • sp hybridization • Bond angle 180°	• R-X • halogen (Funtional grp) • $C_nH_{2n+1}X$ • Tetrahedral • Non-planner. • sp^3 hybridization • Bond angle 109.5°
Bond length	1.54Å (C-C)	1.34Å (C=C)	1.19Å (C≡C)	1.54Å (C-C).
Preparations	• Hydrogenation of Unsaturated HCs. • catalyst - ~~H_2SO_4~~, Ni • Temp - 200°C - 300°C • Hydrolysis of Grignard reagent. $R\text{-}MgX + H_2O$	• Dehydration of Alcohal. • catalyst - H_2SO_4. • Temp - 170°C - Dehydrohalogenation of Alkyl halides KOH (Alcohlic Sol).	• Dehydrohalogenation of Vicinal Dihalides • KOH/$NaNH_2$ (solution) • Temp - 33°C • Dehalogenation of Tetrahalides • Alcohalic Solution • Zinc dust.	• Halogenation of Alkane. • Temp - 400°C • Hydrohalogenation of Alkene. • FROM ALCOHAL ↳ halogen acid. $R\text{-}OH + HX$ ↳ Phosphorus halides $3R\text{-}OH + PCl_3$ ↳ Thionyl chlorides $R\text{-}OH + SOCl_2$
Reactivity	Less Reactive • Electronegativity diff. • Sigma bond.	Reactive • Reactivity ∝ Polarity • Reactivity ∝ 1/B. length • π bond.	Highly reactive • π bond. • less reactive than Alkene due to s charac.	More Reactive • R-X (highly Polar) ↳ Order of reactivity R-I > R-Br > R-Cl > R-F
Reactions	Substitution Reactions • Halogenation $R\text{-}H + X_2 \rightsquigarrow R\text{-}X + HX$ • Initiation (Free radical) • Propagation (Attacking) • Termination (Removal of s ligut) • Oxidation Reaction catalyst → Cu. Temp → 200-300°C Product → Alcohal.	Addition Reactions • Hydrogenation • Hydrohalogenation • Hydration • catalyst - H_2SO_4 • Temp - 100°C • Halogenation • Halohydration (Cl-OH) Product - Halohydrins • Epioxidation ↳ Ag, Temp → 300°C • Ozonolysis ($Zn+T=100°C$)	Addition Reactions • Hydrogenation • Reduction by Na Metal • Li, NH_3. • Product - Sodium Acetylide. • Hydrohalogenation • Hydration • H_2SO_4, $HgSO_4$, Temp - 80°C • Product → Carbonyl Comp. • halogenation • Ozonolysis - O_3. ↳ Ozonide → Carbonyl Comp.	Nucleophilic Substitution reactions SN^1 — SN^2 1st Order — 2nd Order • T° — • P° • Polar Solvent. — • Non polar. • Two step — • Single step. • Orientation changes 50% — • Orientation changes 100% ↳ E^1, E^2 (Same).