Aldehydes & Ketones - 07

Properties 2: Nucleophilic Addition - elimination

Addition of Ammonia & it's derivatives:

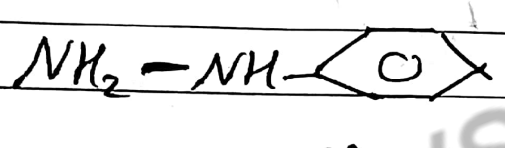
Ammonia : NH_3

Ammonia derivatives:

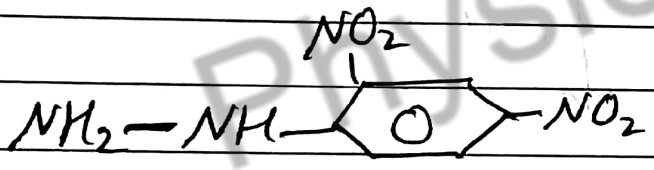
$NH_2 - Z$

$NH_2 - OH$ Hydroxyl amine

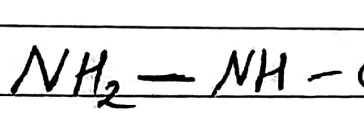
$NH_2 - NH_2$ Hydrazine



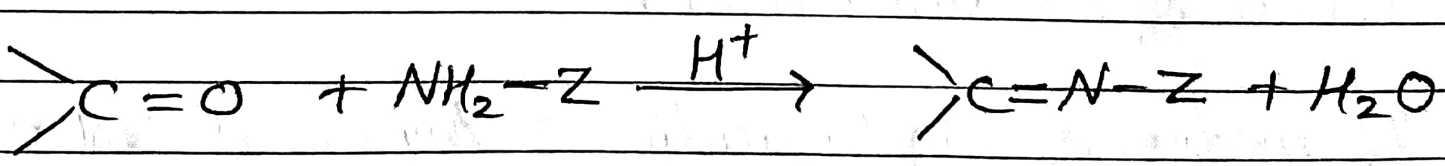
Phenyl hydrazine



2,4-dinitrophenyl hydrazine

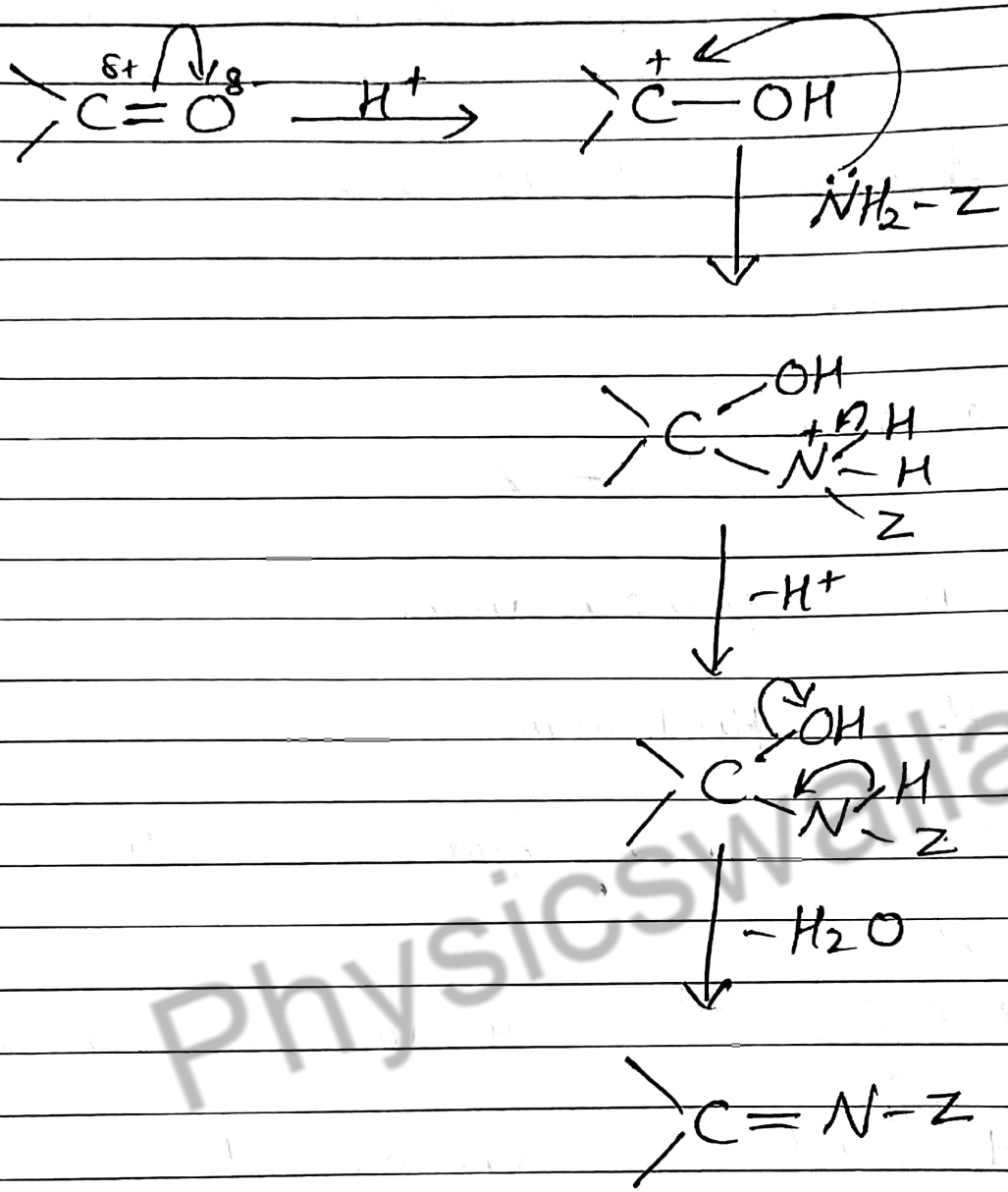


Semicarbazide



The reaction is acid catalysted.

Mechanism:



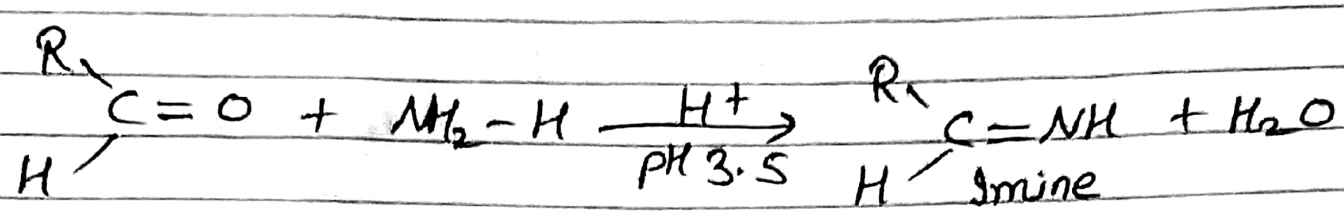
Control of pH during Reaction:

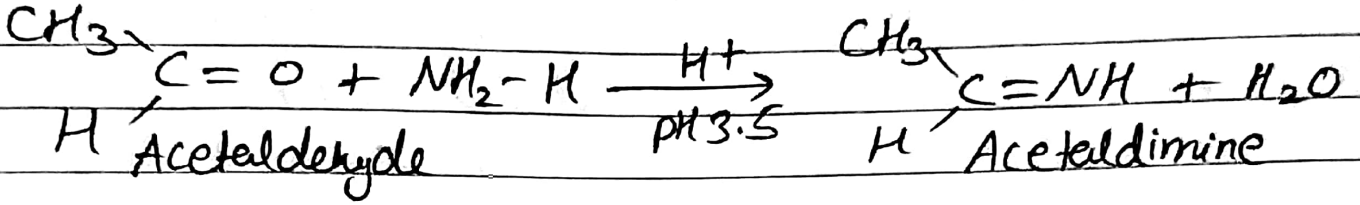
If medium is highly acidic → Ammonia derivatives react with medium & form ammonium salts

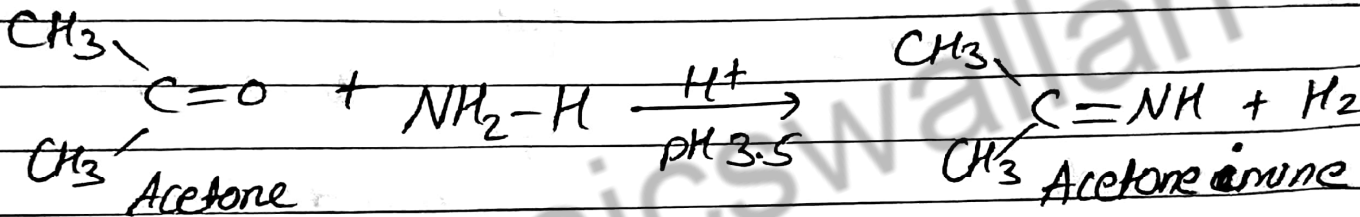
If medium is basic → Protonation of C=O won't happen

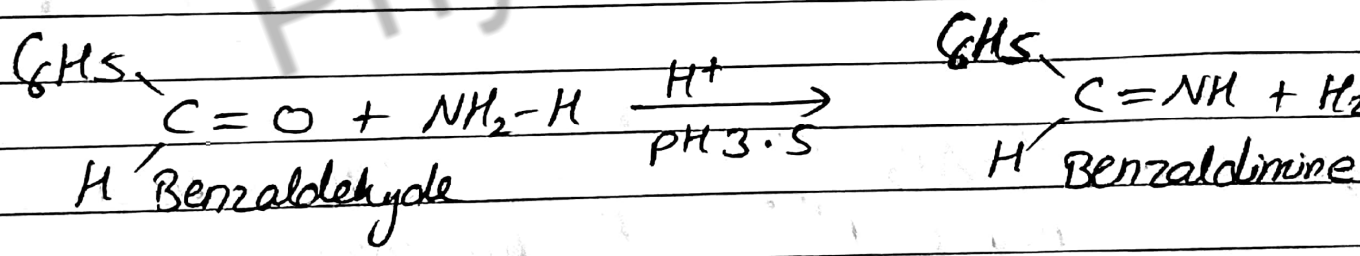
So optimum pH 3.5 is set.

(i) Reaction with Ammonia → Formation of Imine

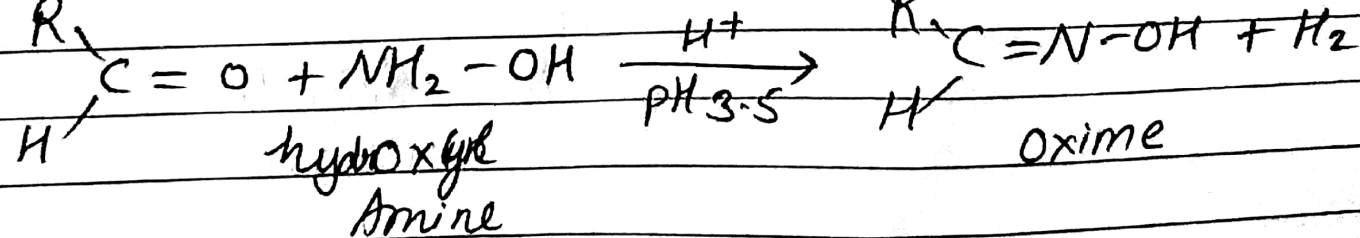


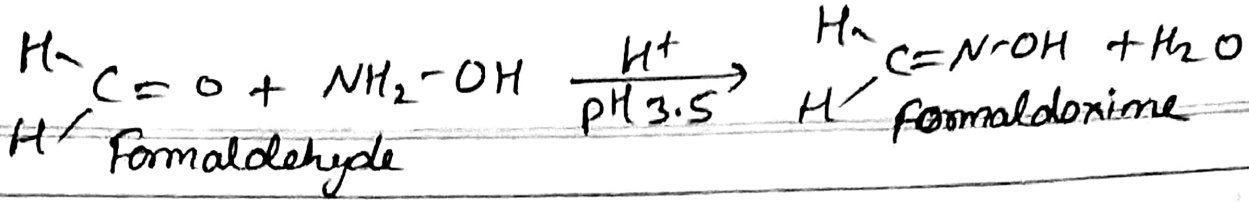




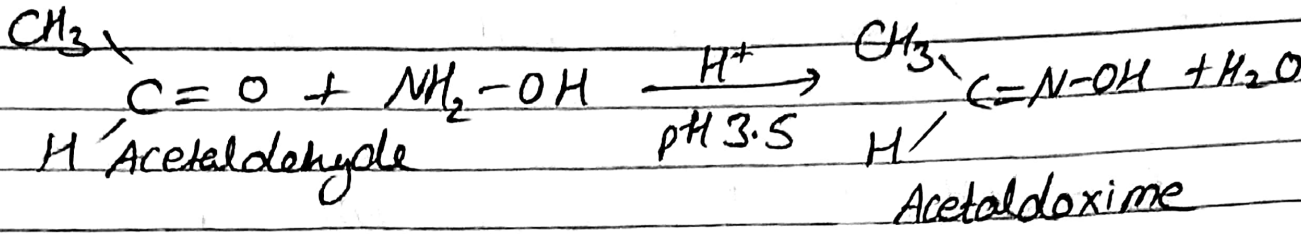


(ii) Reaction with Hydroxyl Amine → Formation of Oxime

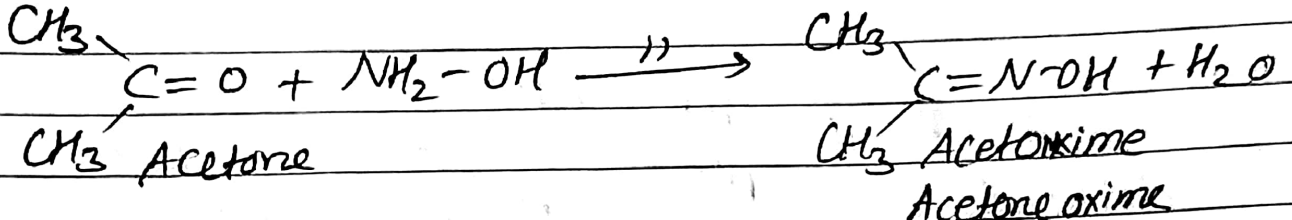




Formaldehyde — Formaldoxime



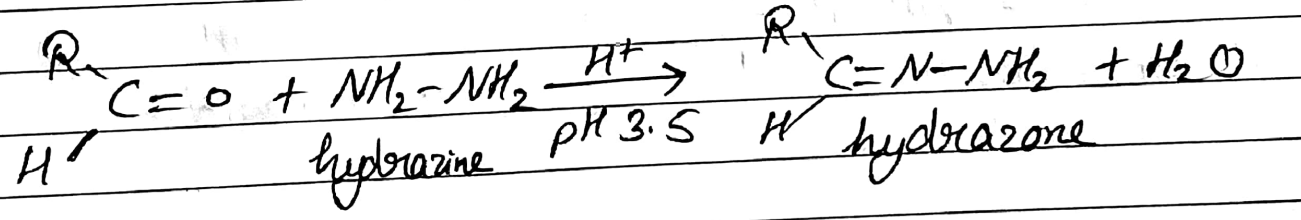
Acetaldehyde — Acetaldoxime

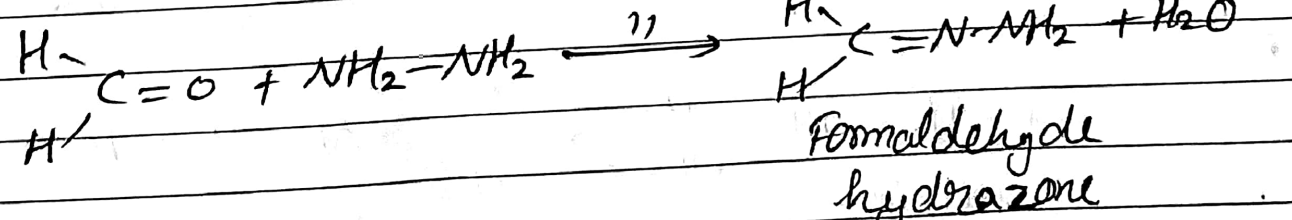


Acetone — Acetoxime / Acetone oxime

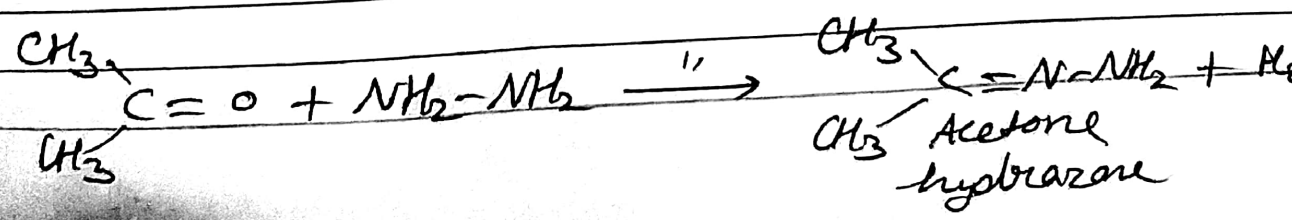
Benzaldehyde — Benzaldoxime

ii) Reaction with hydrazine → formation of hydrazone



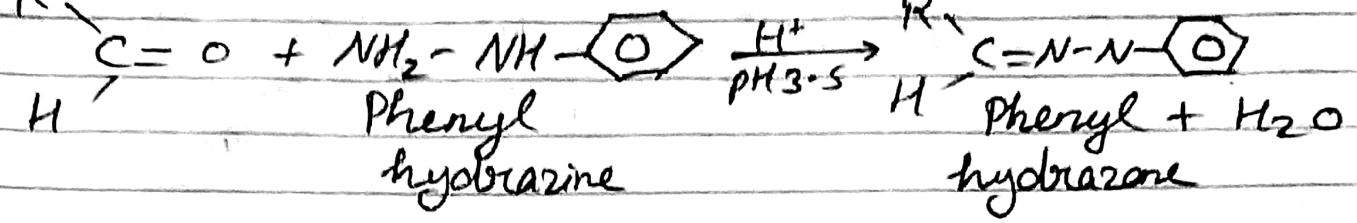


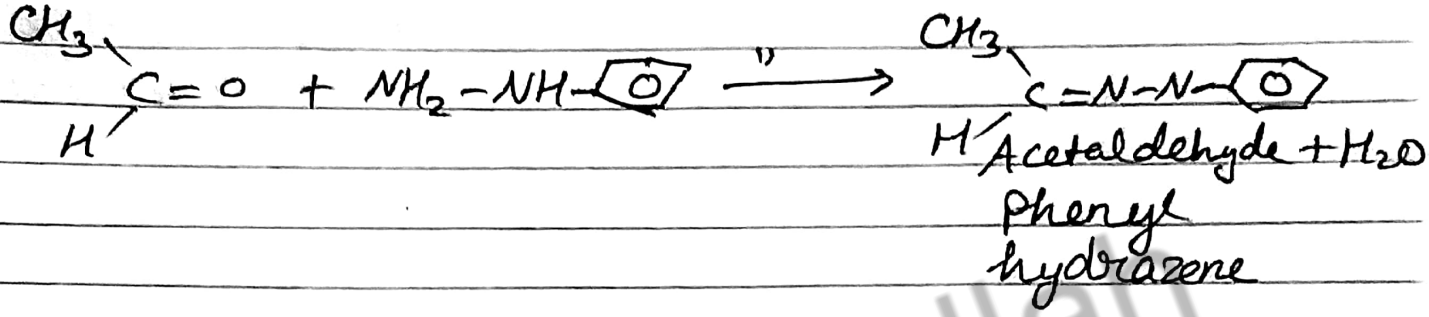
Formaldehyde hydrazone



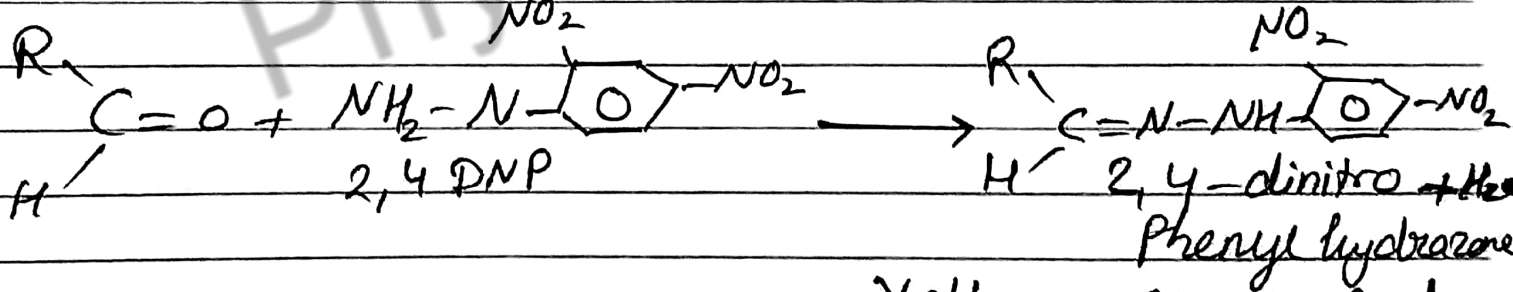
Acetone hydrazone

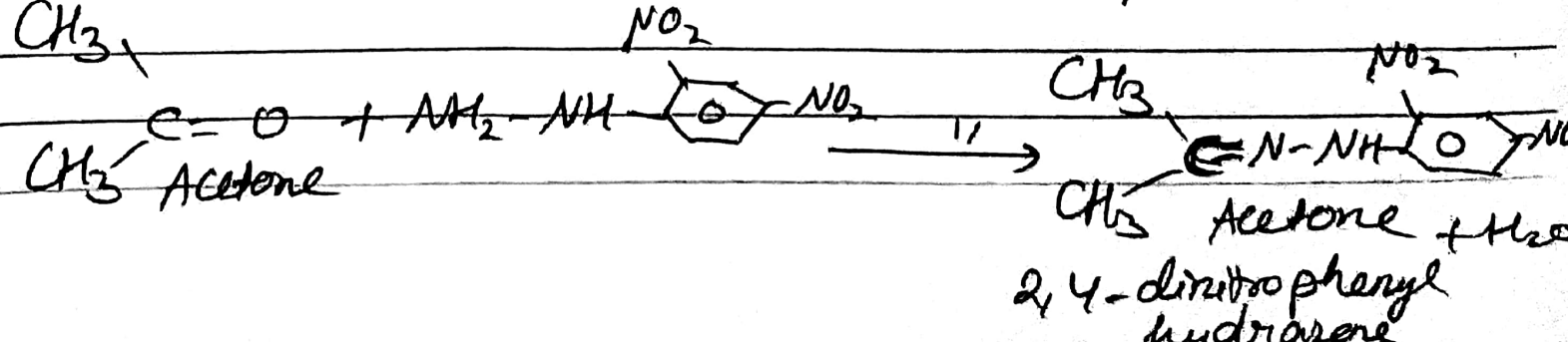
iv) Reaction with phenyl hydrazine → Formation of Phenyl hydrazone





v) Reaction with 2, 4 dinitro Phenyl hydrazine (2,4-DNP) → Formation of 2,4 dinitro Phenyl hydrazone





ii) Reaction with Semicarbazide ⟶
Formation of Semicarbazone