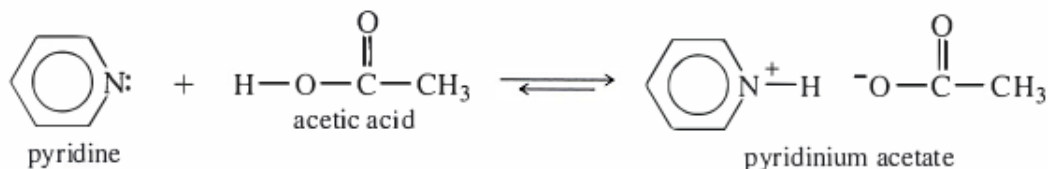
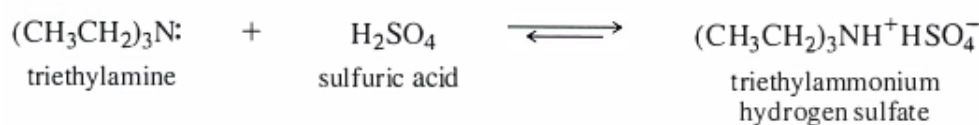
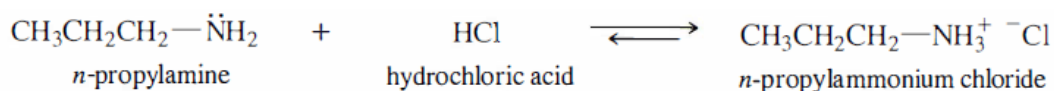


Salts of Amines

Protonation of an amine gives an **amine salt**. The amine salt is composed of two types of ions: the protonated amine cation (an ammonium ion) and the anion derived from the acid. Simple amine salts are named as the substituted **ammonium salts**. Salts of complex amines use the names of the amine and the acid that make up the salt.

Salts of Amines الامينات املاح

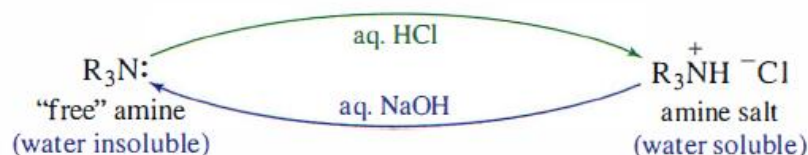
برتنة الامين ليعطي ملح الامين. يتكون ملح الامين من نوعين من الايونات: كاتيون الامين البروتوني (ايون الامونيوم) والانيون المشتق من الحامض. تسمى املاح الامين البسيطة باسم املاح الامونيوم المعوضه. تستخدم املاح الامينات المعقده اسماء الامين والاحماض التي يتكون منها الملح.



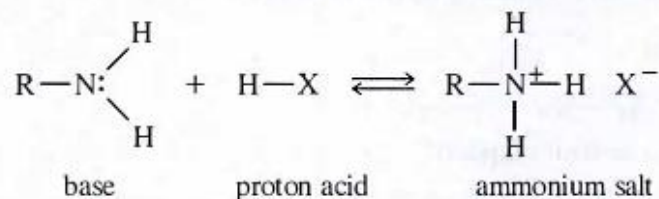
Amine salts are ionic, high-melting, nonvolatile solids. They are much more soluble in water than the parent amines, and they are only slightly soluble in nonpolar organic solvents.

Formation of amine salts can be used to isolate and characterize amines. Most amines containing more than six carbon atoms are relatively insoluble in water. In dilute aqueous acid, these amines form their corresponding ammonium salts, and they dissolve. Formation of a soluble salt is one of the characteristic functional group tests for amines.

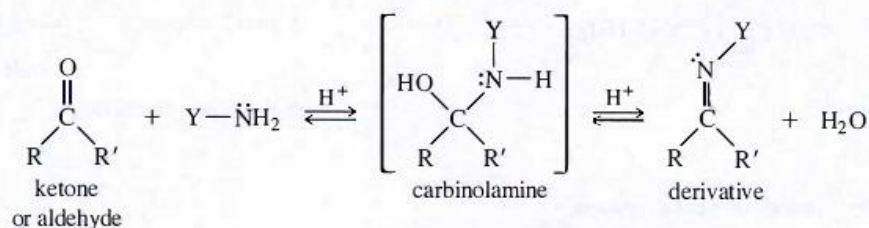
املاح الامين هي مواد صلبة ايونية وذات ذوبان عالية وغير متطايره. وهي اكثر قابلية للذوبان في الماء اكثر من الامينات الام، وهي قابلة للذوبان بشكل طفيف فقط في المذيبات العضوية غير القطبية. يمكن استخدام تكوين املاح الامين لعزل وتوصيف الامينات. معظم الامينات التي تحتوي على اكثر من ست ذرات كربون غير قابلة للذوبان نسبيا في الماء. في الاحماض المائية المخففة، تشكل هذه الامينات املاح الامونيوم المقابلة لها، وتذوب. يعتبر تكوين الملح القابل للذوبان احد اختبارات المجموعة الوظيفية المميزة للامينات.



1. Reaction as a proton base (Section 19-5)



2. Reactions with ketones and aldehydes (Sections 18-16 and 18-17)



Y=H or alkyl gives an imine (Schiff base)

Y=OH gives an oxime

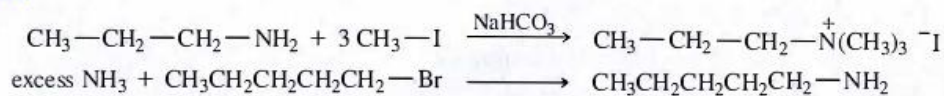
Y=NHR gives a hydrazone

3. Alkylation (Section 19-12)

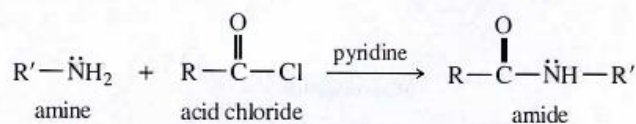


(Overalkylation is common.)

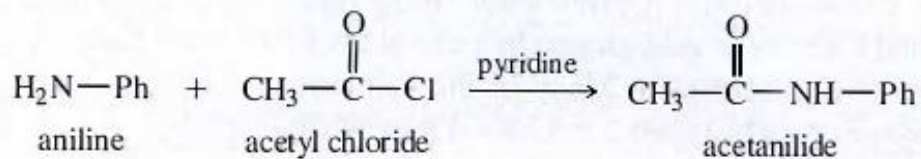
Examples



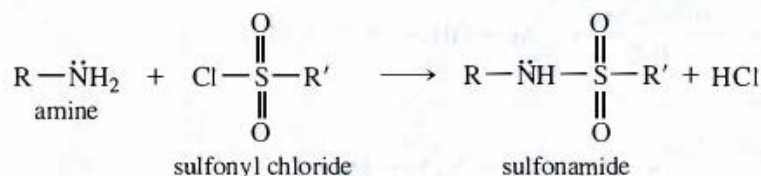
4. Acylation to form amides (Section 19-13)



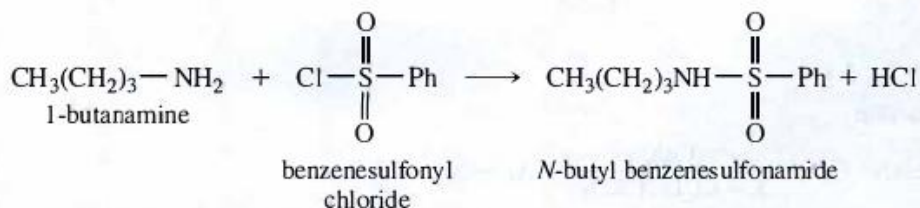
Example



5. Reaction with sulfonyl chlorides to give sulfonamides (Section 19-14)



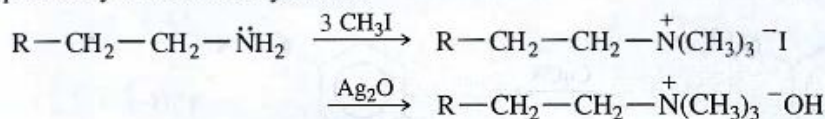
Example



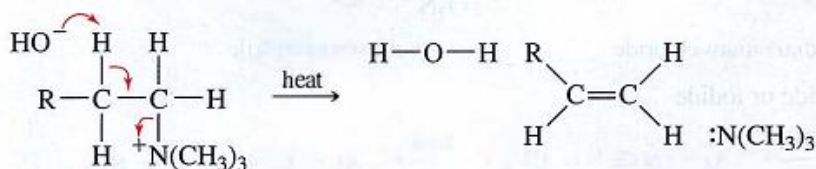
6. Hofmann and Cope eliminations

a. Hofmann elimination (Section 19-15)

Conversion to quaternary ammonium hydroxide

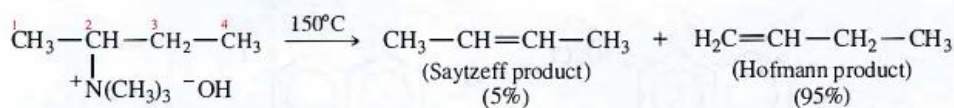


Elimination

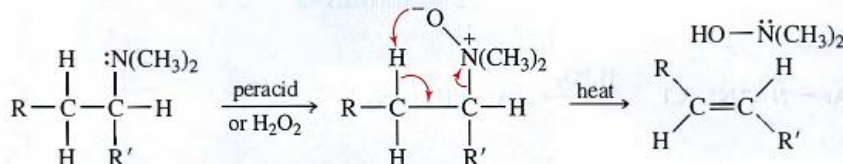


Hofmann elimination usually gives the least substituted alkene.

Example



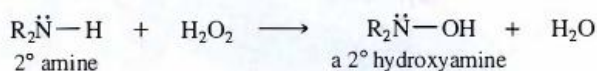
b. Cope elimination of a tertiary amine oxide (Section 19-16)



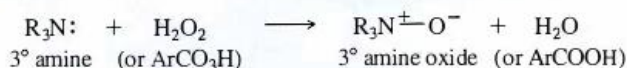
Cope elimination also gives the least highly substituted alkene.

7. Oxidation (Section 19-16)

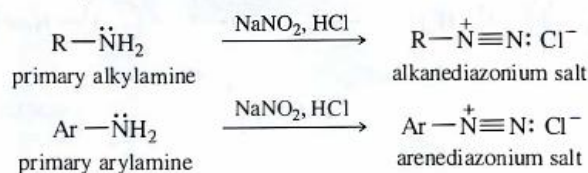
a. Secondary amines



b. Tertiary amines

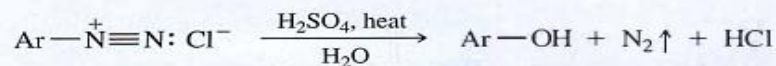


8. Diazotization (Section 19-17)

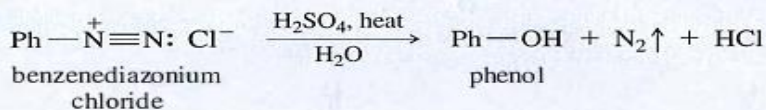


a. Reactions of diazonium salts (Section 19-18)

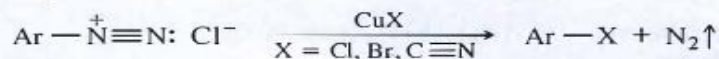
(I) Hydrolysis



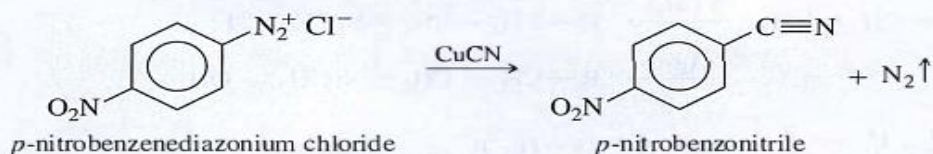
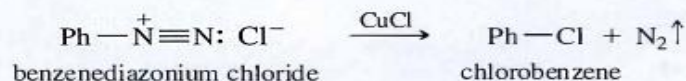
Example



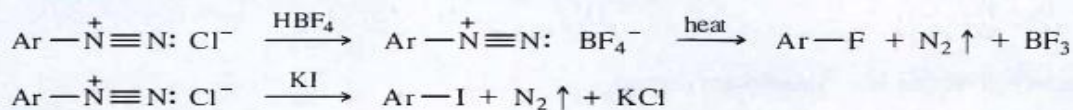
(II) The Sandmeyer reaction



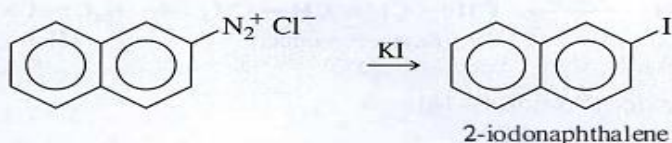
Examples



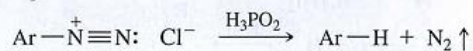
(III) Replacement by fluoride or iodide



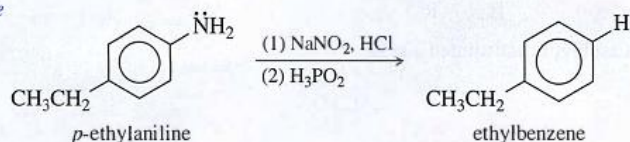
Example



(IV) Reduction to hydrogen



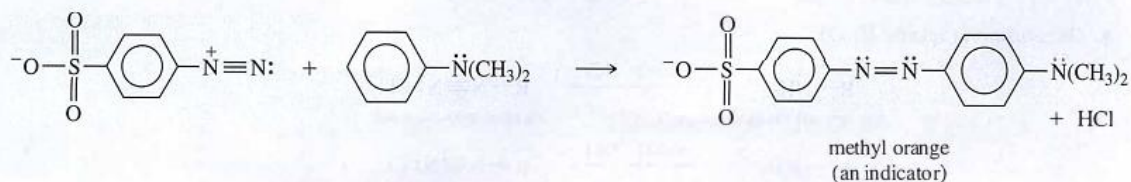
Example



(V) Diazo coupling

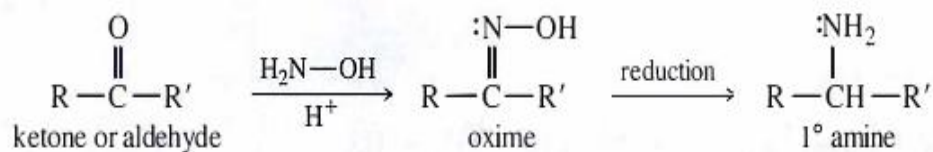


Example

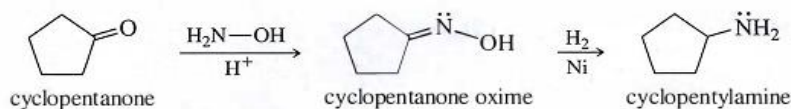


1. Reductive amination (Section 19-19)

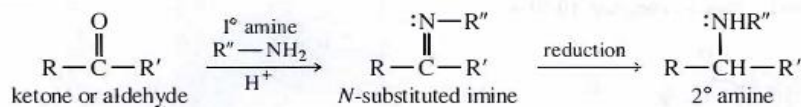
a. Primary amines



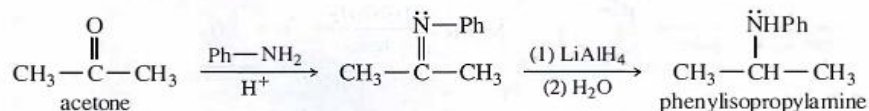
Example



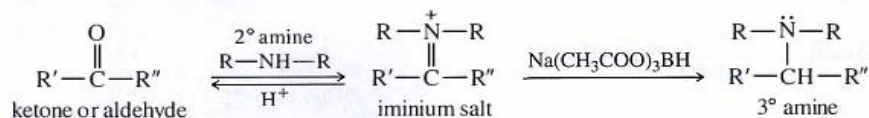
b. Secondary amines



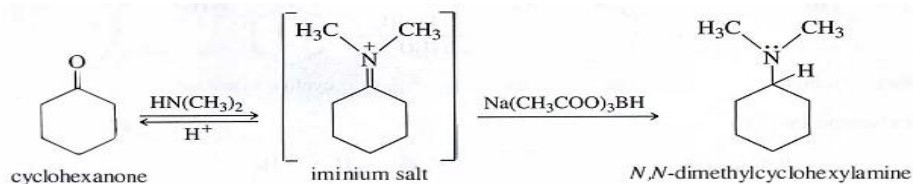
Example



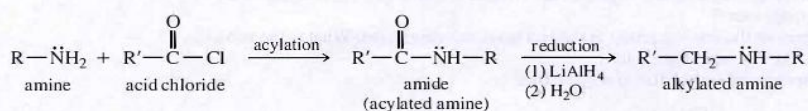
c. Tertiary amines



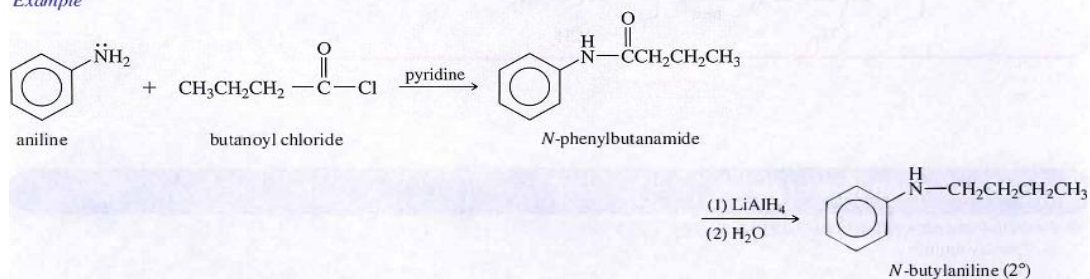
Example



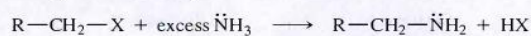
2. Acylation-reduction of amines (Section 19-20)



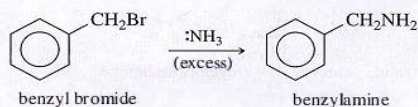
Example



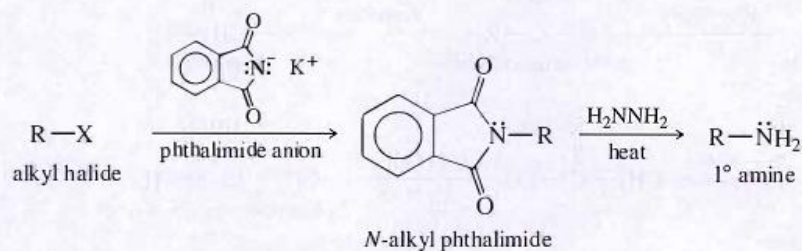
3. Alkylation of ammonia (Section 19-21 A)



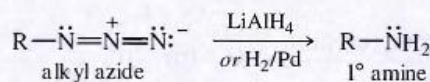
Example



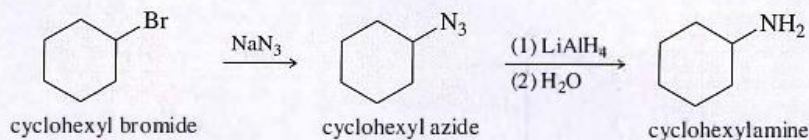
4. The Gabriel synthesis of primary amines (Section 19-21A)



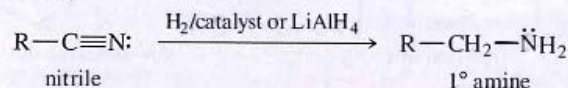
5. Reduction of azides (Section 19-21B)



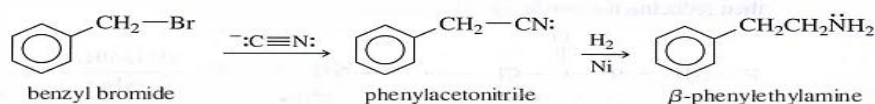
Example



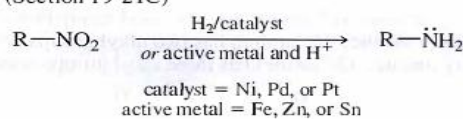
6. Reduction of nitriles (Section 19-21B)



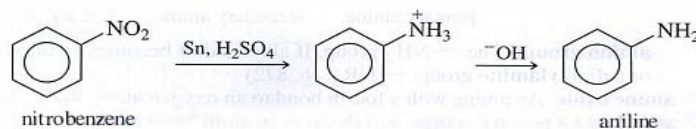
Example



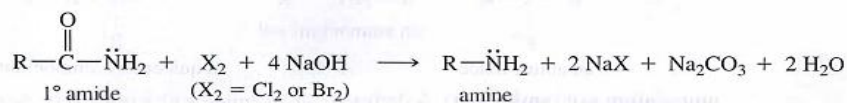
7. Reduction of nitro compounds (Section 19-21C)



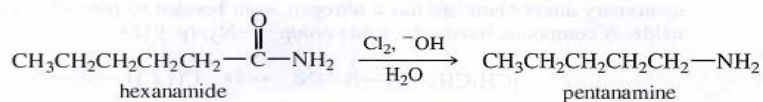
Example



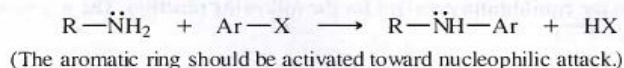
8. The Hofmann rearrangement (Section 19-21D)



Example



9. Nucleophilic aromatic substitution (Section 17-12)



Example

