

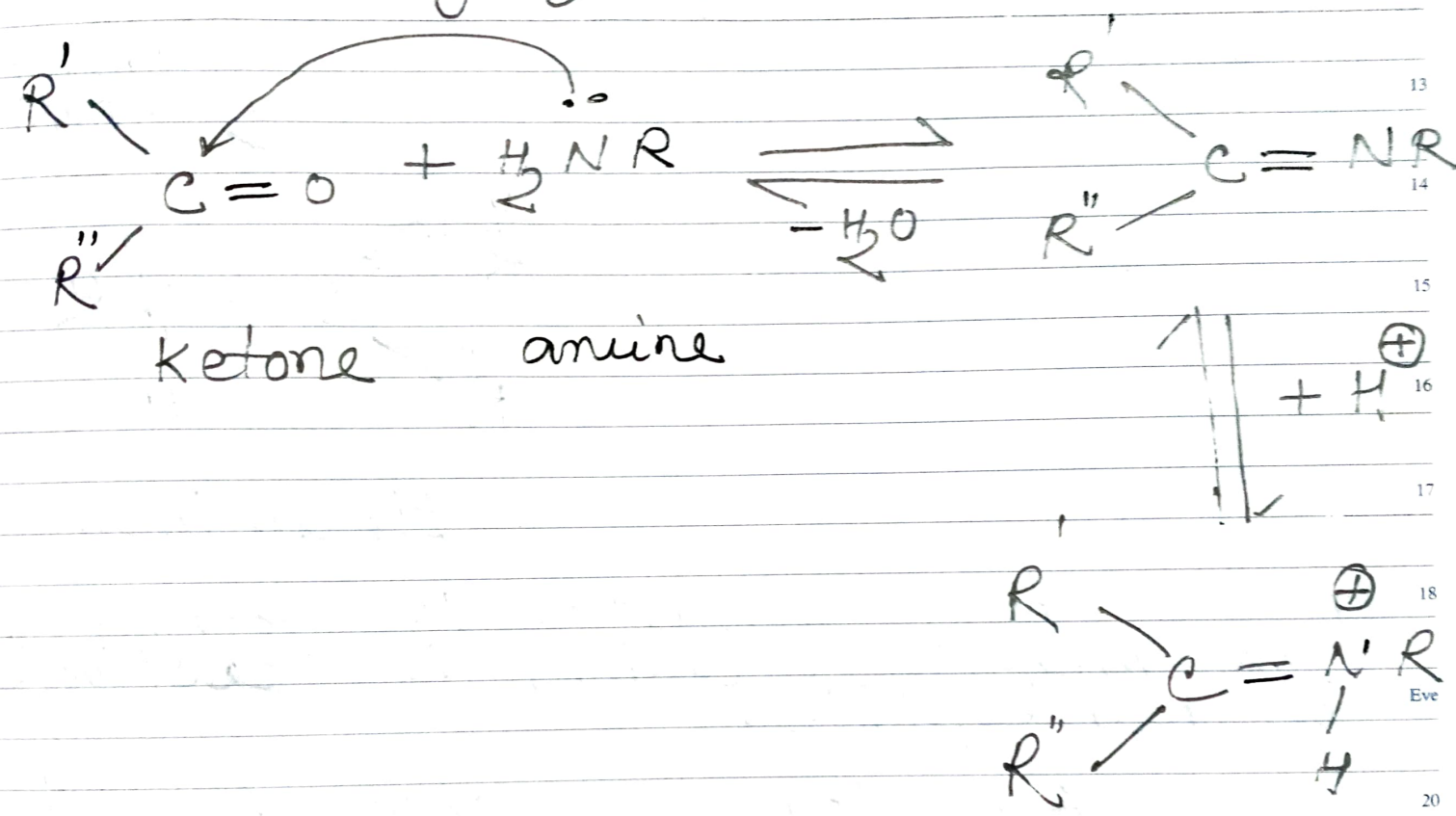
③ CO-VALENT CATALYSIS

A catalyst that adds to substrate through covalent bond is known as covalent catalyst. The phenomenon is known as covalent catalysis.

- e.g
- ① Electrophilic catalysis by Schiff base formation -
 - ② Pyridoxal phosphate - Electrophilic catalysis -
 - ③ Thiamine pyrophosphate (Electrophilic catalysis -
 - ④ Nucleophilic catalysis -

① Electrophillic catalytic - Transient modification of the substrate can be activated it for a chemical reaction

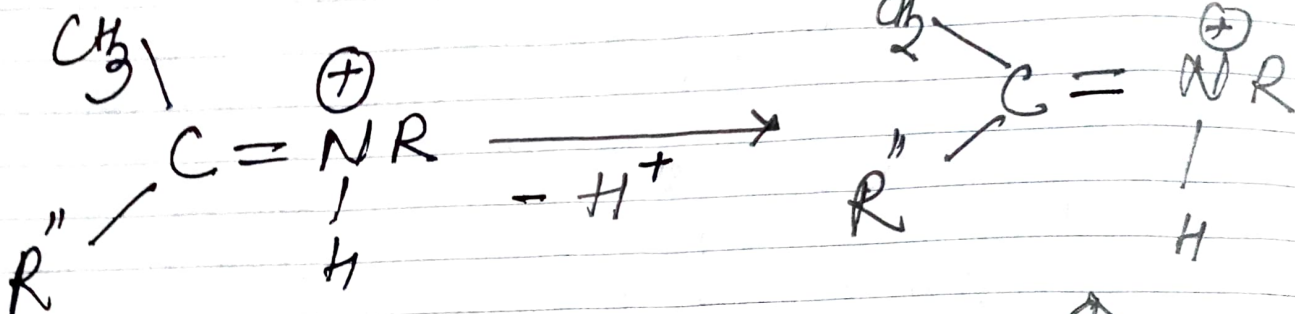
e.g - formation of Schiff's base from the condensation of amine with carbonyl group compound.



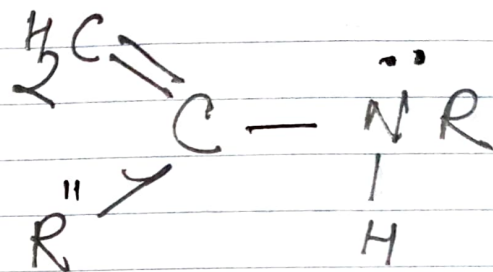
Now Schiff's base gets protonated at neutral pH. This acts known as electron-sink i.e to stabilise the formation of a negative charge on one of the α -Carbon atom

December 2006 Tuesday

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Tautomerisation



Enamines

After tautomerisation to form enamine this methylene carbon is activated as nucleophile.

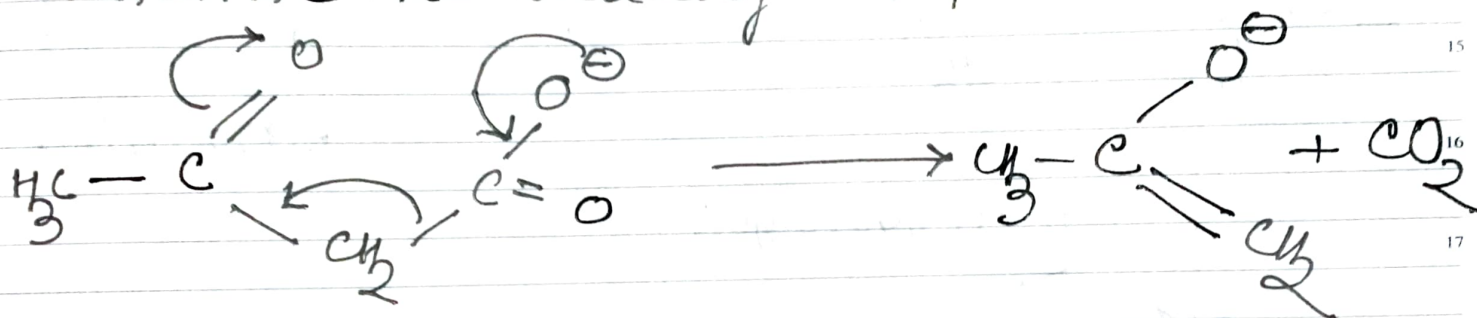
Advantage of Schiff's base formation is that the carbonyl group gets activated ~~to~~ towards nucleophilic attack, because of strong electron withdrawing by protonated Nitrogen.

As for example

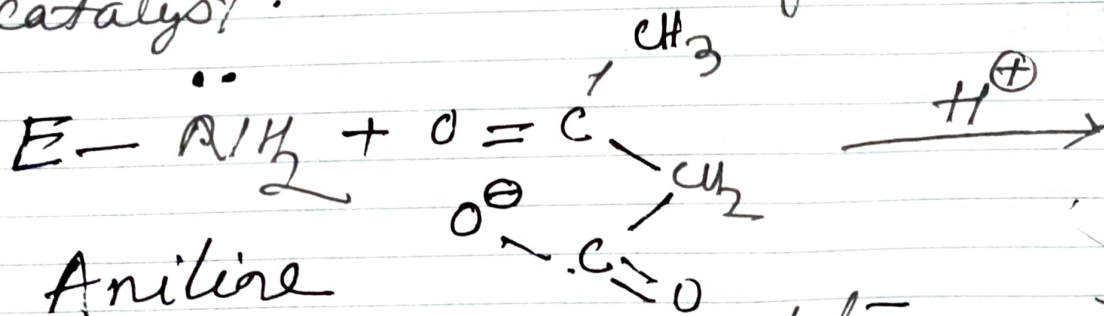
December 2006 Wednesday

Acetoacetate decarboxylase -

The enzyme catalyses decarboxylation reaction of acetoacetate. This is non-enzymatic reaction, which involves expulsion of highly base enolate in at neutral pH. But the enzymatic reaction circumvents this by the formation of a Schiff's base with lysine residue. The protonated imine is readily expelled.

Acetoacetate

This process may be mimicked in a station by using aniline as catalyst.

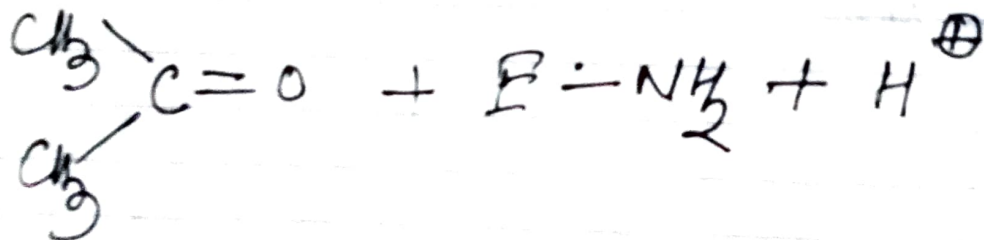
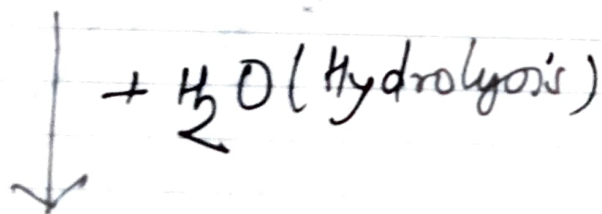
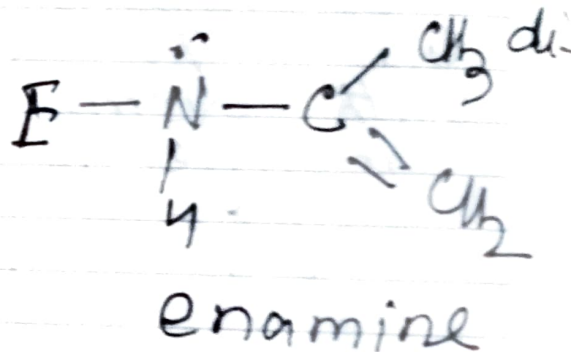
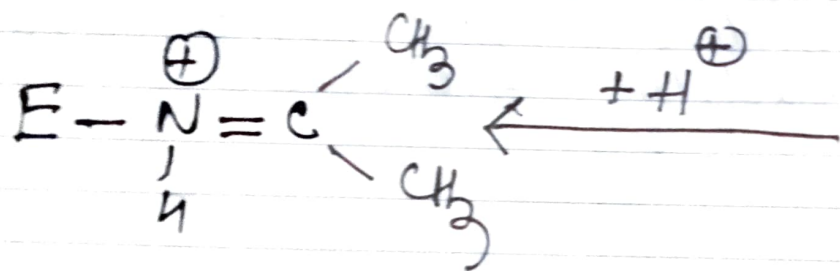
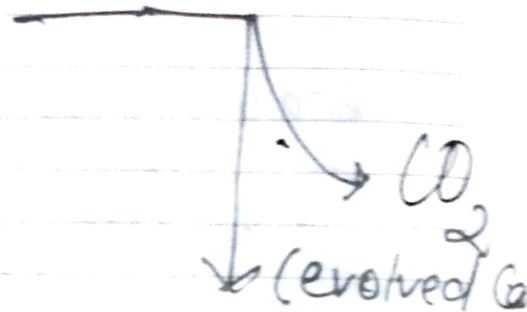
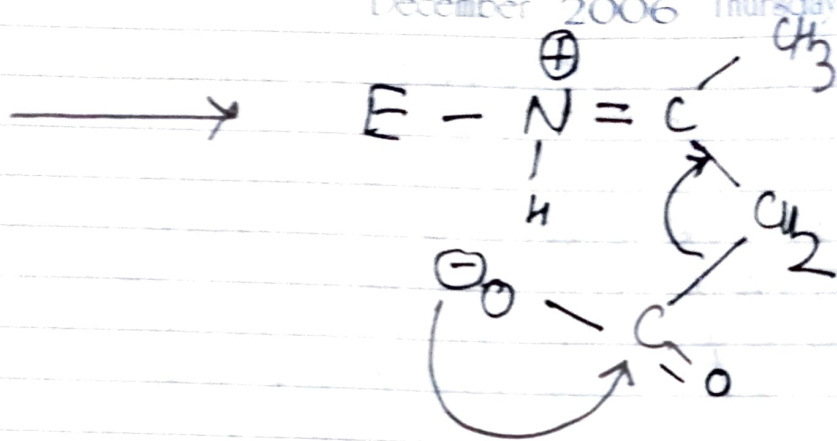


Aniline

Acetoacetate

P.T.O

December 2006 Thursday



Acetone