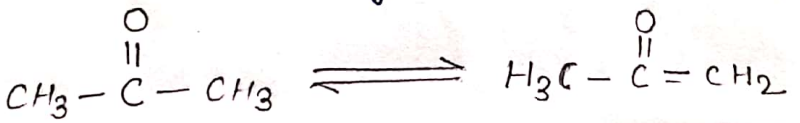
SUBJECT- CHEMISTRY
CLASS – B.Sc(Hons) PART- II
PAPER – IV GROUP-B
TOPIC – Tautomerism

Dr Hasi Mohan prasad Singh
Department of Chemistry
Dr.L.K.V.D College Tajpur Samastipur

Q Explain tautomerism or keto-enol isomerism, Show that tautomerism is a special case of structural or functional group isomerism.

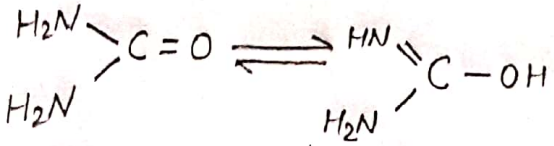
Ans Tautomerism is the phenomenon in which a mobile H-atom oscillates like a pendulum between two polyvalent atom within a molecule. This leads to the existence of two isomers in dynamic equilibrium with each other differing in functional groups. At equilibrium these two isomers are called tautomers. They are structurally different molecules having the same molecular formula, hence tautomerism is a structural or functional group isomerism. e.g acetone exists in keto and enol tautomeric forms-



(Ketoform) (enol form)

The former has the functional group, keto ($>C=O$) whereas latter has The functional group enol ($-C=\overset{OH}{\overset{|}{C}}-$), So they have different functional groups and hence they are functional group isomers. The 'ene' means a double bond = and 'ol' means alcohol ($-OH$), hence ene+ol = enol. one isomer is continuously changing into the other and vice-versa.

(1) Urea exists in tautomeric forms



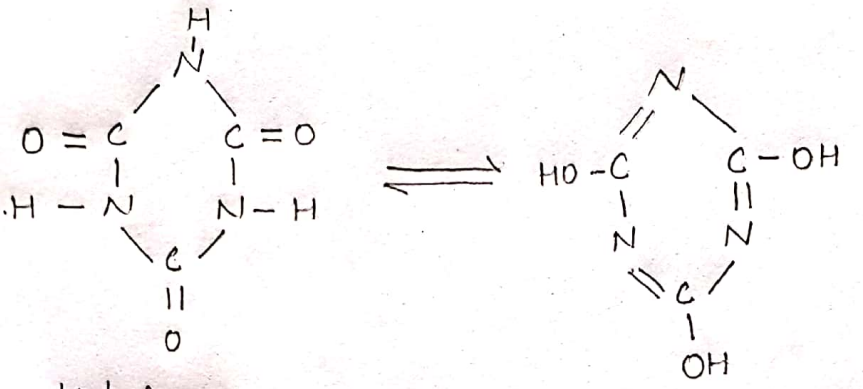
amide imidol

we see that H-atom of NH_2 and OH groups is continuously interchanging its position in amide and imidol tautomeric forms

(ii) Cyanic acid exists in following two tautomeric forms:

$$H-N=C=O \rightleftharpoons H-O-C\equiv N$$

(iii) Cyanuric exists in two tautomeric forms:

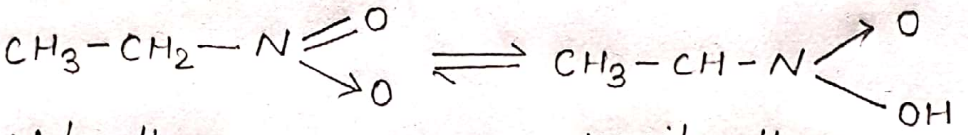


Keto form

enol (en+ol) form

It Contains both double bond (ene) and alcoholic (ol) groups

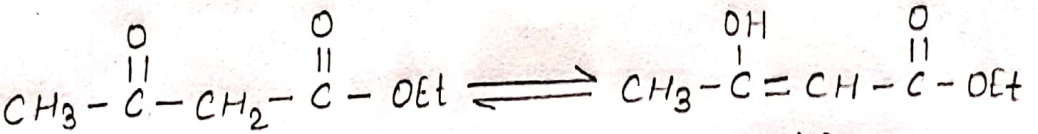
(iv) Nitroethane and isonitroethane are tautomers:



Nitroethane

Isonitroethane

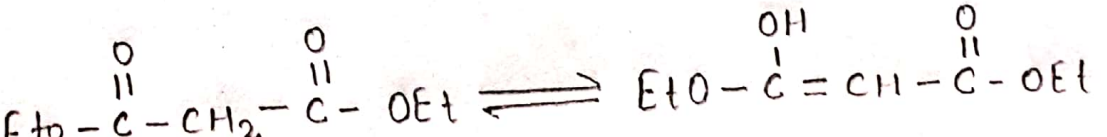
(v) Ethyl acetoacetate shows keto-enol isomerism



Keto form

enol form

(vi) Diethyl malonate shows keto-enol isomerism:



Keto form

enol form