

IB Chemistry HL Notes
Core and Further Organic Chemistry
Carbonyls
Isaac D. Lim

This content is retailed on the condition that **it is not redistributed without the author's consent**. No part of this document is to be removed from the rest of the content, and be redistributed without the knowledge of the author.

For any queries, please contact the author at isaacimdc@gmail.com.

Visit <http://thequantumbyte.com/ibnotes> for more information.

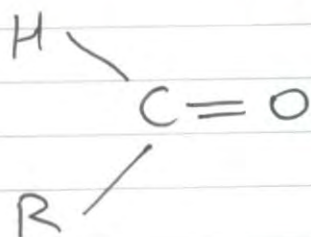
Content © 2009 Isaac D. Lim.

CARBONYL COMPOUNDS

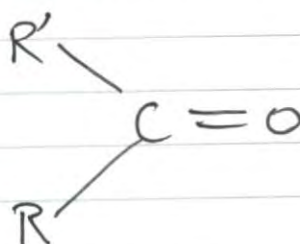
Date

No.

Alkanal (aldehyde)



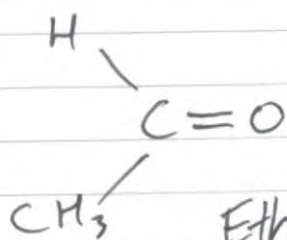
Alkanone (ketone)



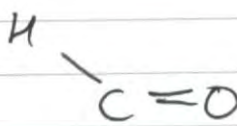
- R-C ← must be terminal alkyl group.

- C ^{can} ~~does~~ not ~~have~~ to be terminal alkyl
- R/R' can be benzene ring.

Nomenclature example:

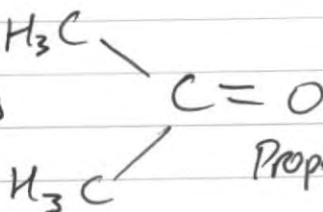


Ethanal
~~(Ethanal)~~

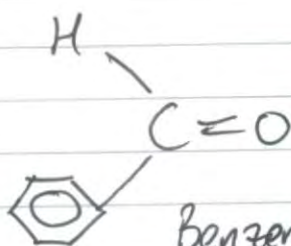


Propanal
~~(Propanal)~~

ISOMERIC
(C₃H₆O)



Propanone



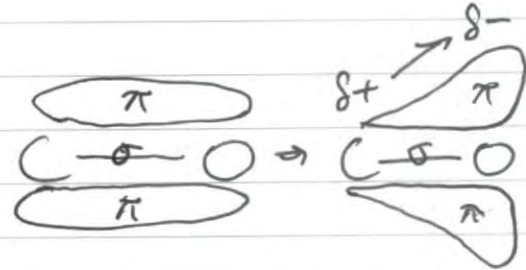
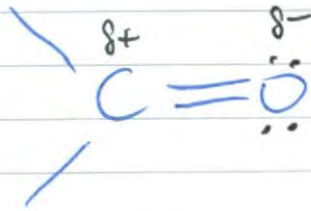
Benzene carbaldehyde

- As long as the alkanal has short carbon chain, $\overset{\delta+}{\text{C}}=\overset{\delta-}{\text{O}}$ is polar, so can H-bond with water, and is miscible.
- Carbonyls cannot H-bond with each other.

CARBONALS (aldehydes, alkanal)

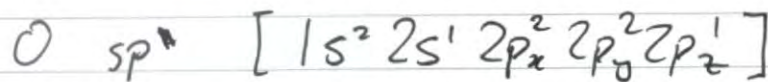
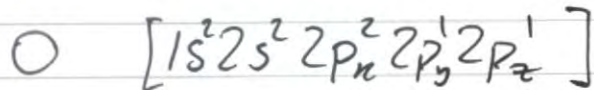
Date

No.

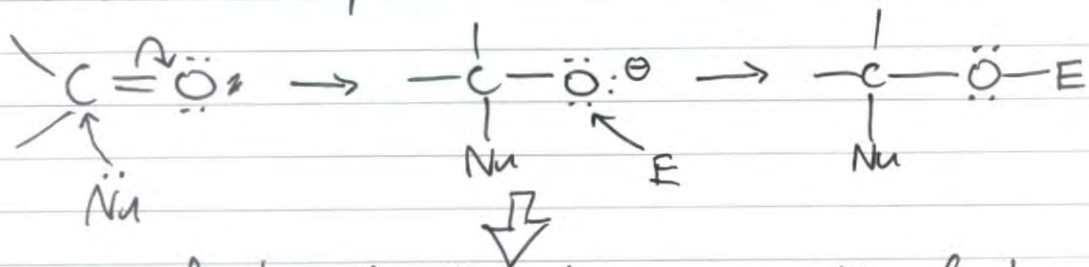


* B/c of π bond electron density, electron ~~at~~ reaction sites ~~and~~ are highly exposed, so reacts with many reagents at room temperature.

* B/c of E.N. difference, $\overset{\delta+}{C} \rightarrow \overset{\delta-}{O}$ are polar and have permanent dipole moments.



* B/c of $C=O$ heterolytic bond fission, electron-deficient C will react with nucleophiles, and electron-rich O reacts with electrophiles.



- * formation of charged intermediate: unstable final product.
- * the electrophile E is often H^+ .

Nucleophilic Addition

* reaction characteristic of carbonyl compounds.

* Nucleophilic addition elimination: also in carbonyl compounds
- a molecule is eliminated to form more stable final product.