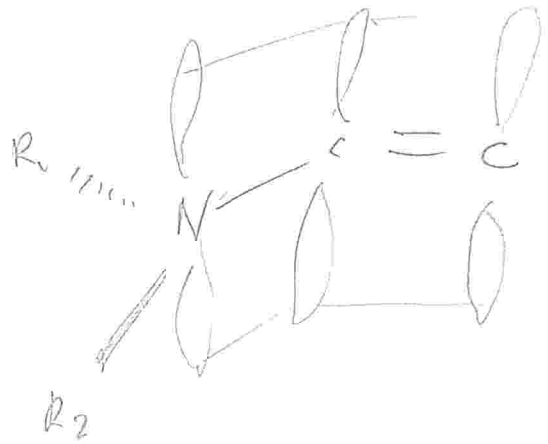
20161007

CHM151:
RESONANCE AND HYBRIDIZATION IN AMIDES

NOTE

THE CONCEPT OF RESONANCE HELPS TO UNDERSTAND THE STRUCTURE AND HYBRIDIZATION THROUGH SIMPLIFIED REPRESENTATION.

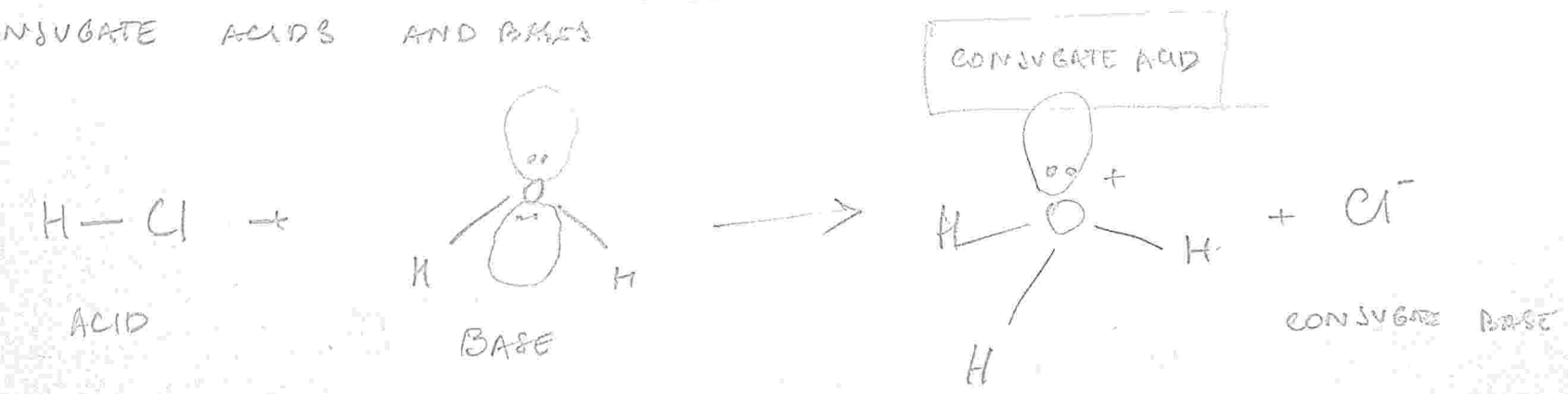
eg.

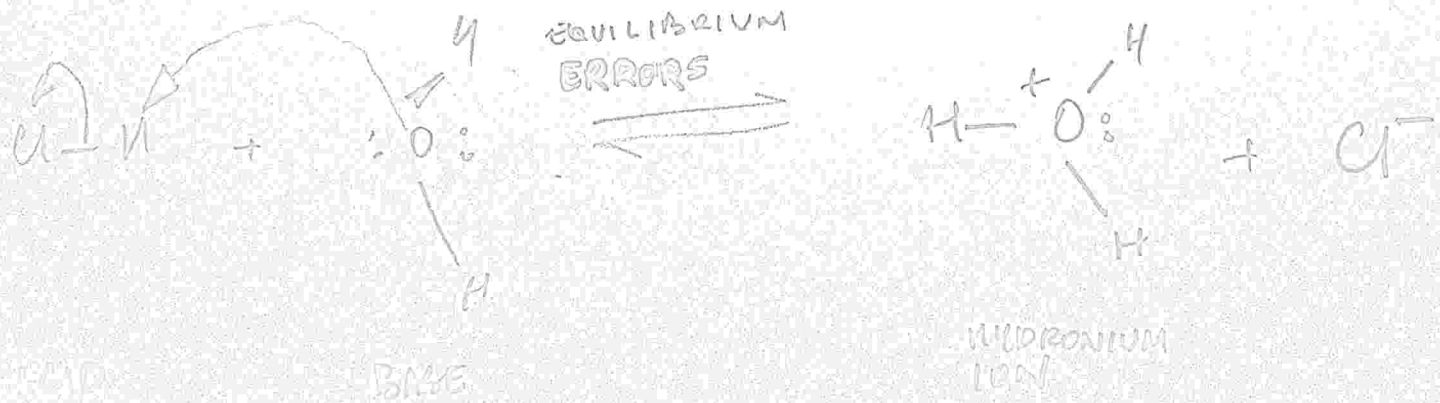


BRONSTED-LOWRY

- ACID — PROTON DONOR
- BASE — PROTON ACCEPTOR

CONJUGATE ACIDS AND BASES





STRENGTH OF ACIDS AND BASES

K_{eq}

$$\frac{[H_3O^+][A^-]}{[HA][H_2O]}$$

K_a

$$\frac{[H_3O^+][A^-]}{[HA]}$$

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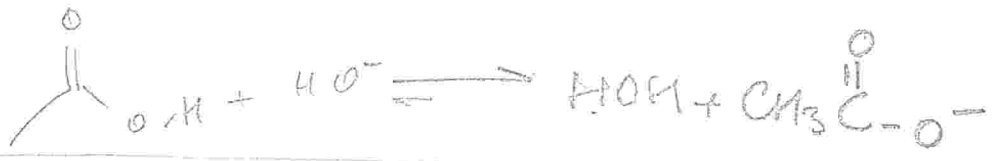
pK_A ↓ | ACID STRENGTH ↑

PREDICTING THE DIRECTION OF PROTON TRANSFER



ORGANIC ACIDS

COMMON ACIDIC ORGANIC FUNCTIONAL GROUPS:

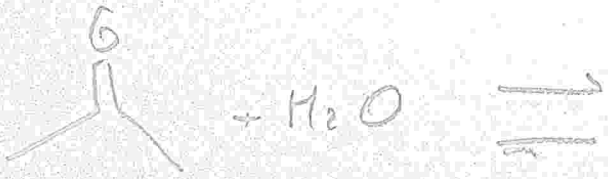
1. O-H · GROUPS (ALCOHOLS, CARBOXYLIC ACIDS)

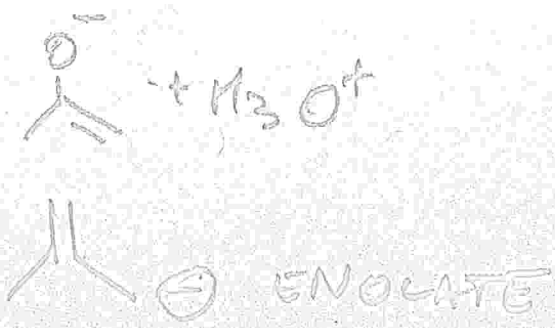
EG.

ETHANOL  $pK_A \sim 16$

ACETIC ACID  pK_A 5

2. C-H BONDS NEXT TO C=O (CARBONYL GROUPS)





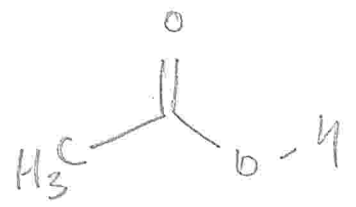
TRENDS IN ACIDITY

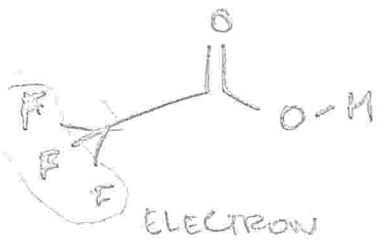
COMPARE THE STABILITY OF THE CHARGED SPECIES TO IDENTIFY THE STRONGER ACID.

STABILISATION OF THE CONJUGATE BASE BY INDUCTION OR RESONANCE FAVOURS DEPROTONATION, LEADING TO A STRONGER ACID:

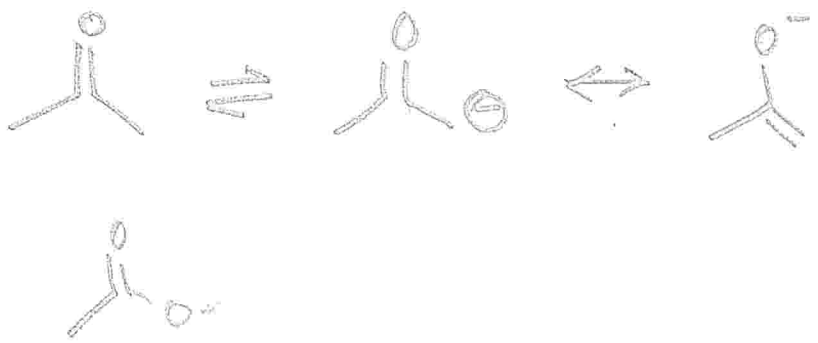
EXAMPLES

1. ACETIC ACID
VS
TRIFLUOROACETIC ACID





2. ACETIC ACID
VS
ACETONE



3.

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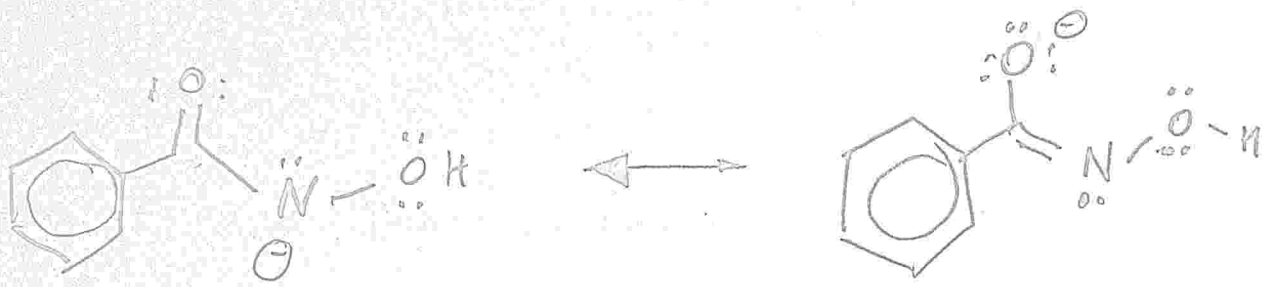
pKa	50	40	24

NOT DUE RESONANCE EFFECTS



IDENTIFYING BASES:

FIND AN AVAILABLE LONE PAIR THAT CAN BIND TO H+