Condensed Structural formulas: Hydrogen atoms are written directly after the carbons. Faster than dash line formulas. Atoms attached to any given carbon are written immediately after that carbon, & hydrogens go first.

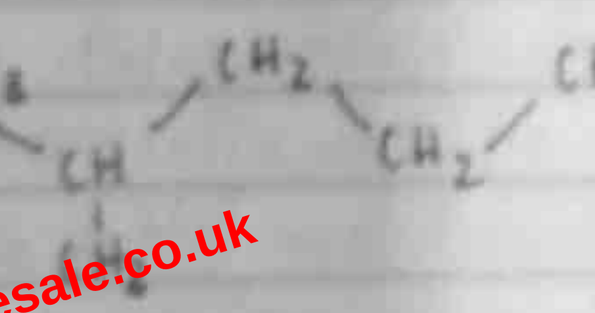
(VERY) PP 1.13: $CH_3CH(CH_3)_2\ CH_3$

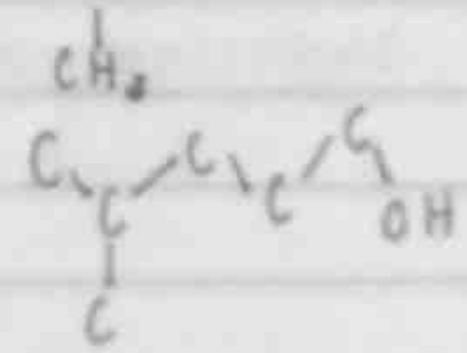
bond-line formulas: can interpret molecular connectivity and compare different molecular formulas quickly.

In bond-line formulas:

- each line represents a bond
- each bend or terminus represents a carbon atom.
- C's are written only for CH_3 groups at the end of a chain.
- no H's are shown unless a 3D perspective is needed, in which case a wedge is used
- the number of hydrogens bonded to each carbon is inffered by assuming that hydrogens fill the valence shell Unless a charge is indicated.
- If another element is present, other than carbon or hydrogen, the symbol is put at the appropriate location
- Hydrogens that bond to elements other than carbon are written explicitly.

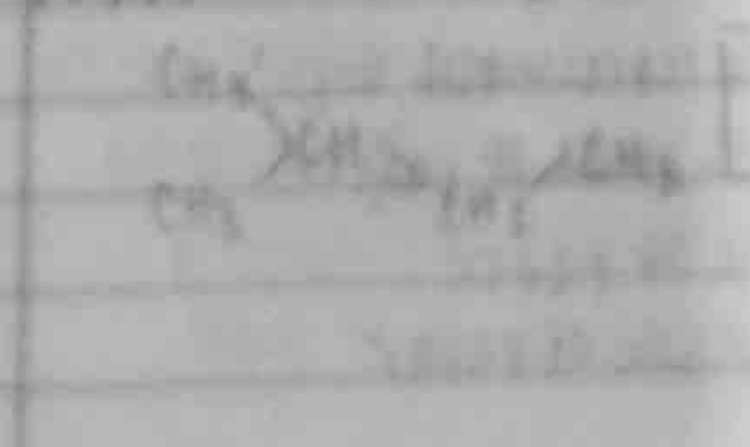
Example: write the bond-line formula for: $CH_3CH(CH_3)CH_2CH_2CH_2OH$

(1) 

(2) 

(3) 

C_6H_{12} C_6H_6O

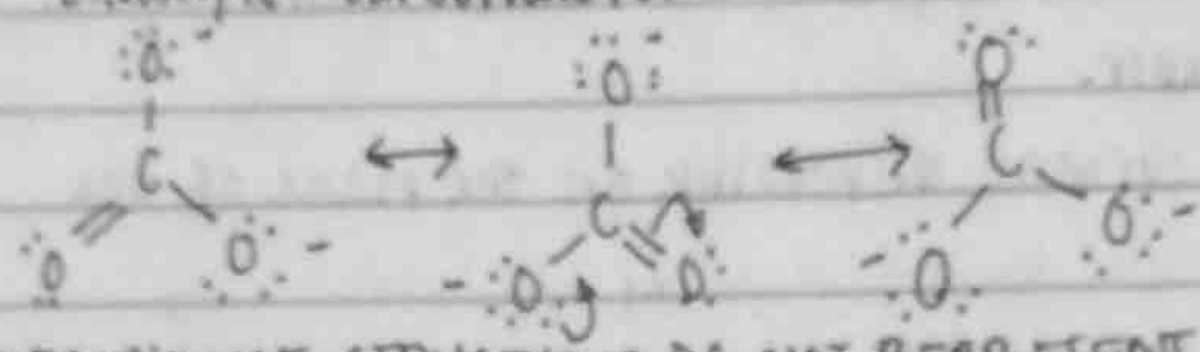
PP 1.14: 

(2) The actual molecule/ion will be better represented by a hybrid (mix/average) of the structures.

* → Resonance structures are not real and only exist on paper
→ can never be isolated
→ purely hypothetical

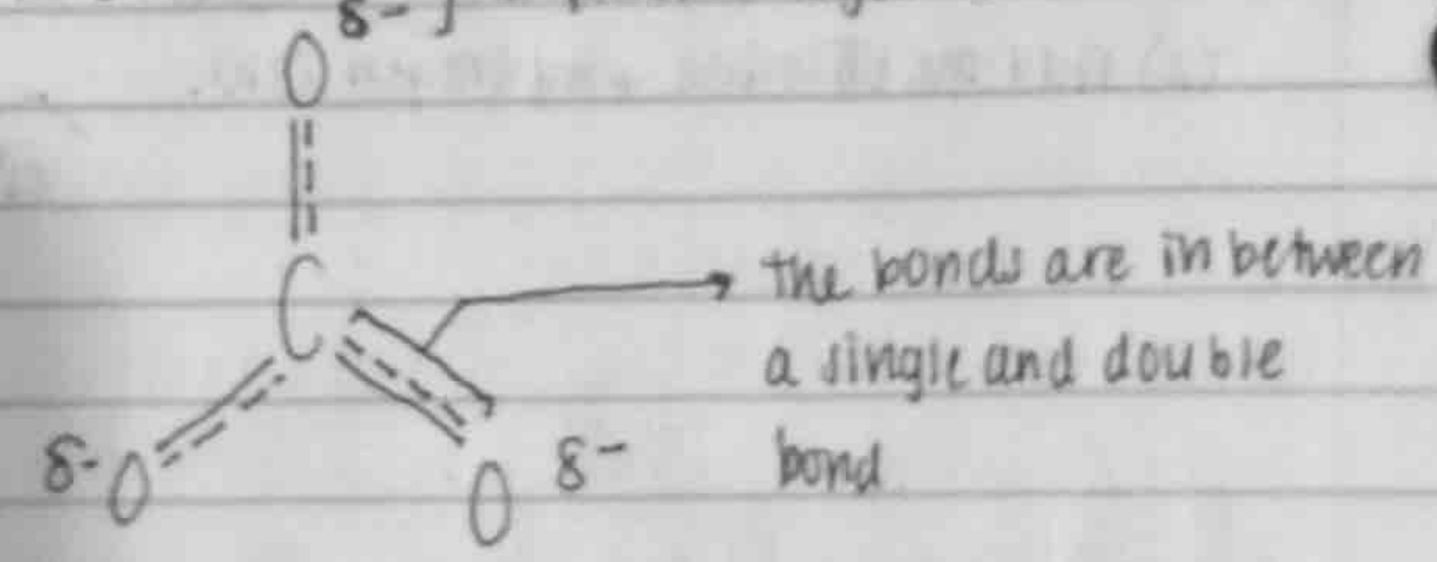
- When drawing resonance structures, connect them w/ double headed arrows to indicate that they are hypothetical, not real.

Example: carbonate ion



RESONANCE STRUCTURES DO NOT REPRESENT EQUILIBRIUM

You can write a non-Lewis structure that represents the hybrid ie (carbonate ion):



* all of the bonds are equal, as verified by the experiment

- electrostatic potential map: regions of higher electronegativity are red, and those lower are trending towards blue. It is used to show ~~electric~~ charge density.
- Write ~~future~~ resonance structures:
  - curved arrows: movement of bonding + unshared electrons
  - double barbed arrow: movement of two electrons
  - originates from the location of relevant electrons to where they will be in the next structure
  - a new formula with the shifts should be drawn.

Rules:

- Resonance structures are useful when one Lewis structure is inadequate
- ONLY electrons can be moved.