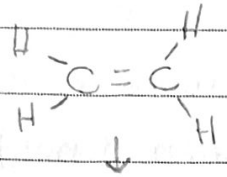
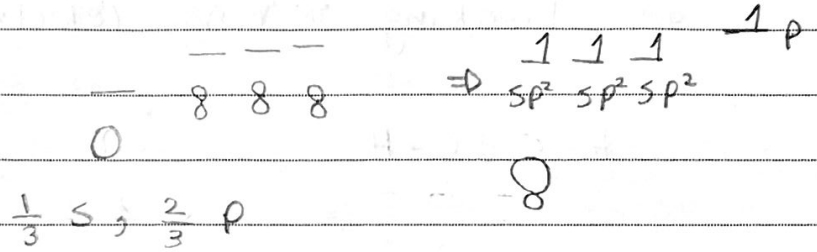
No.



3 groups around each C → sp^2

trigonal planner



O

$\frac{1}{3}$ s , $\frac{2}{3}$ p

* the s character increases ⇒ the shape of hybridized orbitals becomes shorter and thicker (the shape of s is spherical)

⇒ this affects the length and bond energy.

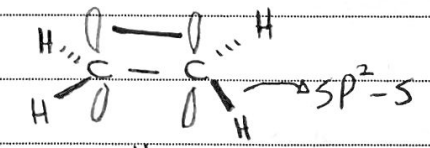
(shorter bond, higher bond energy (stronger) , more stability).

* which is stronger ; $sp^3 - s$ / $sp^2 - s$?

(H)

$sp^2 - sp^2$ / $sp^2 - s$?

* the difference in energy between p orbital and sp^2 in the previous example is not too high, so it's more stable to put the 4th electron in p than pairing it with sp^2 which will cause repulsion.



⇓

σ $sp^2 - sp^2$

π p-p

Lec 3

No.

* π is weak bond, much more reactive than σ (electron rich system / electron donor)

* most reactions of alkenes involve Forming and breaking π bonds (electron transfer reactions)

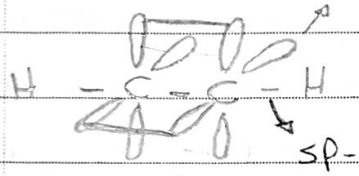
$H-C\equiv C-H$

$s \quad p_x \; p_y \; p_z$

$sp \; sp$

$\frac{1}{2}s + \frac{1}{2}p$

shorter and thicker than sp^2 (s character increases)

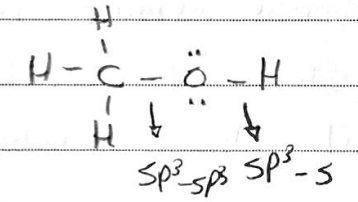


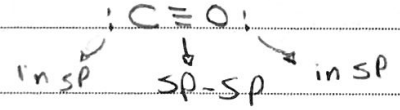
$\pi \; p_y - p_y$

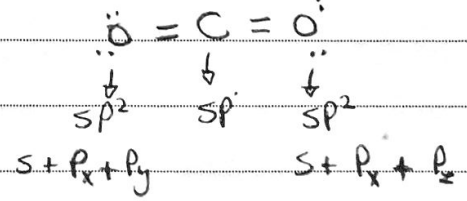
$\sigma \; sp - sp$

$\pi \; p_z - p_z$

* we deal with lone pairs as σ bonds







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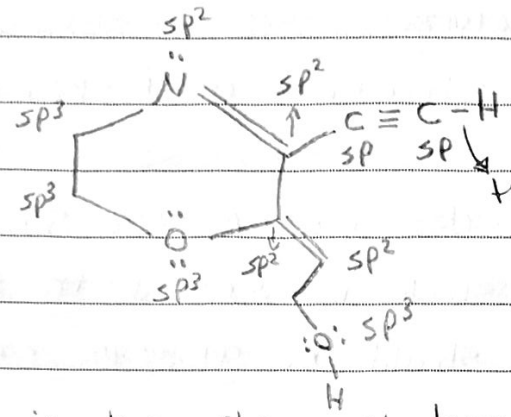
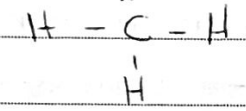


what is the strongest bond ? sp-s

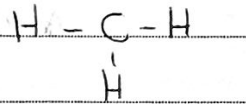
Functional groups Table 1.6 page 30.



Hybridization : sp^3

Formal charge = -1 (carbanion)

Shape: Trigonal pyramidal



Hybridization: sp^2

FC = +1 (carbcation)

Shape: Trigonal planar

(existed as intermediate in the reactions)

unstable

Hybridization: prefers sp^2

FC = 0

Highly unstable, very dangerous

↓ odd electron existed in p orbital (doesn't reach octet)

Free radical

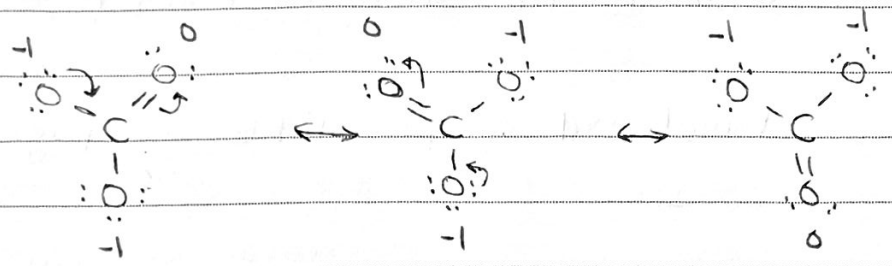
when colliding with a compound it breaks its bonds.

No.

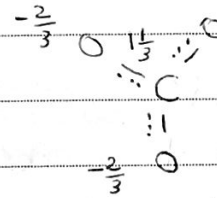
* Resonance Structures

- Resonance structures don't change σ bonds (as structural isomers)
- It just relocates the electrons through p orbitals.
- Lone pairs should be existed in p orbitals
- p orbitals should be along the same axis

CO_3^{-2}



* Charges must be written in resonance structures.



$-\frac{2}{3}$ $-\frac{2}{3}$ (total is -2)

bond length is between single and double

hybrid structure

* In order to write resonance structure we need p orbital ⇒ so hybridization is sp^2 (more stable)

* here two electrons are distributed between 3 atoms

* Resonance structure cannot be explained by valence bond theory