QMC 5222: Química Orgânica A

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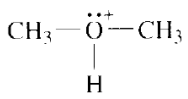
Possíveis respostas para a Lista de exercícios 2 - Tópico 2

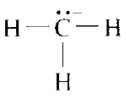
1.

The dipole moment is the magnitude of the charge times the distance between the charges. Because fluorine is more electronegative than Cl, the charge on H and F in HF is larger than the charge on H and Cl in HCl. The larger charge on F compared to the charge on Cl is more than enough to make up for the fact that H—F is a shorter bond than H—Cl.

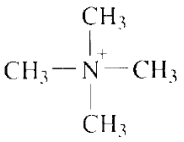
2.

a. 

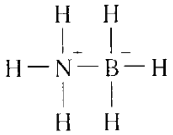
formal charge on O
$6 - (2 + 3) = +1$

b. 

formal charge on C
$4 - (2 + 3) = -1$

c. 

formal charge on N
$5 - (0 + 4) = +1$

d. 

formal charge on
N: $5 - (0 + 4) = +1$
B: $3 - (0 + 4) = -1$

3.

Because the compounds are neutral, a halogen will have three lone pairs, an oxygen will have two, a nitrogen will have one, and carbon or a hydrogen will have no lone pairs.

a. $CH_3CH_2\ddot{N}H_2$ **c.** $CH_3CH_2\ddot{O}H$ **e.** $CH_3CH_2\ddot{C}l:$

b. $CH_3\ddot{N}HCH_3$ **d.** $CH_3\ddot{O}CH_3$ **f.** $H\ddot{O}\ddot{N}H_2$

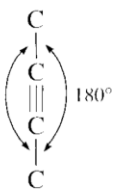
4.

a. 120° **b.** 120°

c. Because the carbon is sp^3 hybridized and it has a lone pair, you can predict that the bond angle is similar to that in NH_3 (107.3°).

5.

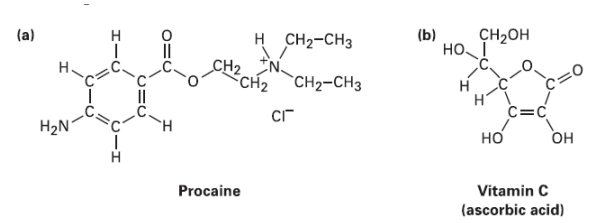
The bond angles at the triple-bonded carbons, when the bonding orbitals overlap maximally, are 180°. A 180° angle cannot fit into the ring structure. Therefore, the overlap between the *sp* orbital and the adjacent sp^3 orbital becomes distorted from the ideal end-on overlap. This poor overlap causes the compound to be unstable. (Compare the structure shown here with Figure 3.8 on page 125 of the text.)

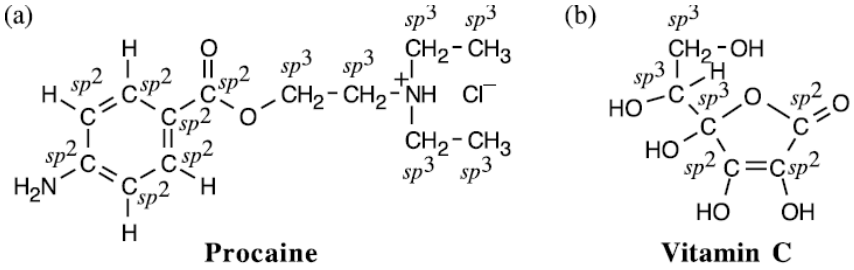


6. O que está errado na seguinte sentença: " O orbital molecular ligante π no etileno resulta da sobreposição lateral de dois orbitais atômicos p" ?

O orbital molecular ligante π no etileno é resultado da combinação de dois orbitais atômicos p com o mesmo sinal algébrico.

7. Que tipo de hibridização você esperaria para cada átomo de carbono nas seguintes moléculas ?

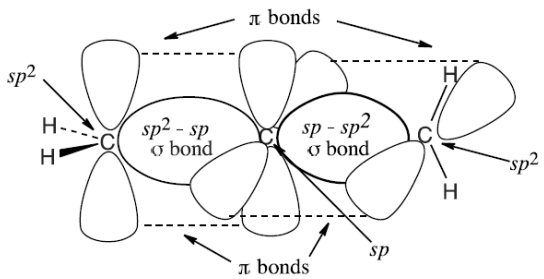




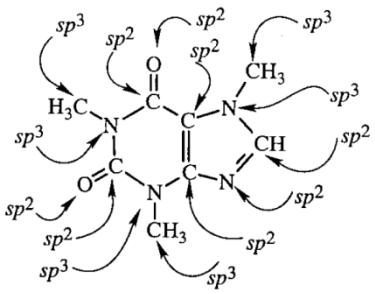
8. Qual a hibridização de cada átomo de carbono na acetonitrila?

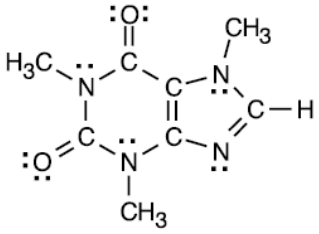
O carbono do H_3C- é hibridizado sp^3 , e o –CN sp.

9. Desenhe os orbitais envolvidos nas ligações σ e π do CO_2 e identifique a hibridização do carbono.

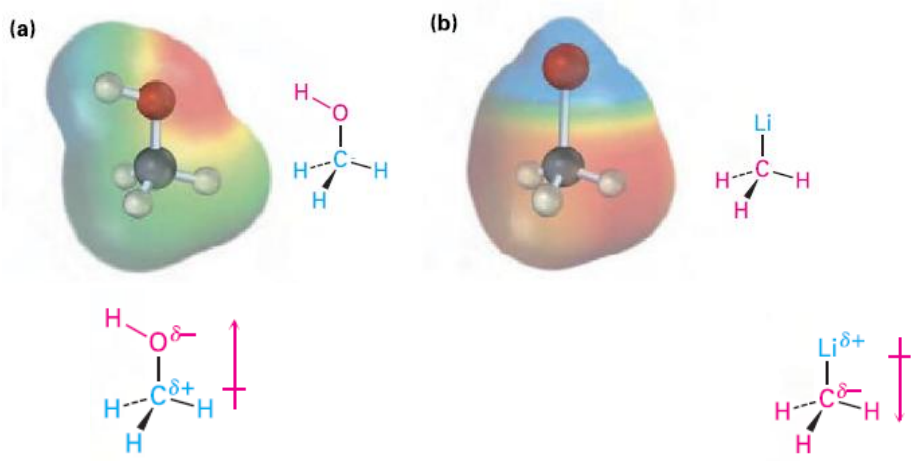


10.





11. Observe o mapa de potencial eletrostático e prediga a direção do dipolo.



12. Faça desenhos tridimensionais das seguintes moléculas e diga se elas possuem ou não momento de dipolo. Se você espera um momento de dipolo, mostre a direção.

(a) $H_2C{=}CH_2$ **(b)** $CHCl_3$ **(c)** CH_2Cl_2 **(d)** $H_2C{=}CCl_2$