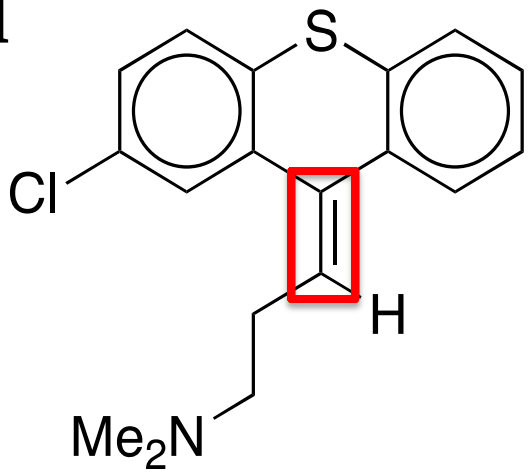
Identify the type of carbon-carbon bond that is boxed in red



1. σ (C2sp^3, C2sp^3) and π (C2sp^3, C2sp^3)
2. σ (C2sp^3, C2sp^3) and σ (C2sp^3, C2sp^3)
3. σ (C2sp^2, C2sp^2) and σ (C2sp^2, C2sp^2)
4. σ (C2sp^2, C2sp^2) and π (C2sp^2, C2sp^2)
5. σ (C2sp^2, C2sp^2) and π (C2p$_y$, C2p$_y$)
6. σ (C2p$_y$, C2p$_y$) and π (C2sp^2, C2sp^2)

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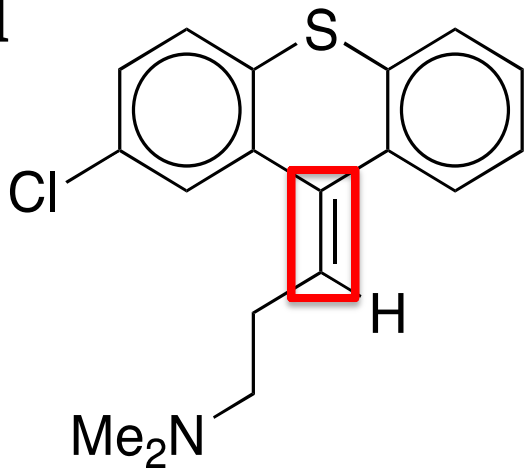

6% 1. σ ($C2sp^3$, $C2sp^3$) and π ($C2sp^3$, $C2sp^3$)

2% 2. σ ($C2sp^3$, $C2sp^3$) and σ ($C2sp^3$, $C2sp^3$)

3% 3. σ ($C2sp^2$, $C2sp^2$) and σ ($C2sp^2$, $C2sp^2$)

24% 4. σ ($C2sp^2$, $C2sp^2$) and π ($C2sp^2$, $C2sp^2$)

64% 5. σ ($C2sp^2$, $C2sp^2$) and π ($C2p_y$, $C2p_y$)

0% 6. σ ($C2p_y$, $C2p_y$) and π ($C2sp^2$, $C2sp^2$)

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What is the hybridization of an atom with exactly 2 hybrid orbitals?

1. sp
2. sp^2
3. sp^3
4. Any of the above, depending on the molecule

What is the hybridization of an atom with exactly 2 hybrid orbitals?

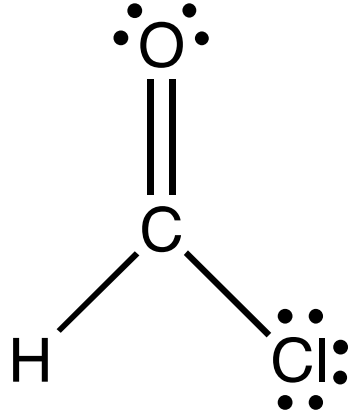
85% 1. sp

7% 2. sp^2

1% 3. sp^3

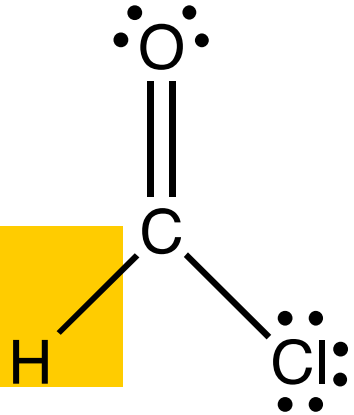
6% 4. Any of the above, depending on the molecule

Which # lists correct bond types for this molecule?



1. $\sigma(C2sp^2, H1s)$, $\sigma(C2sp^2, Cl3sp^3)$
   $\sigma(C2sp^2, O2sp^2)$ $\pi(C2sp^2, O2sp^2)$
2. $\sigma(C2sp^2, H1s)$, $\sigma(C2sp^2, Cl3p_z)$
   $\sigma(C2sp^2, O2sp^2)$, $\pi(C2p_y, O2p_y)$
3. $\sigma(C2sp^2, H1s)$, $\sigma(C2sp^2, Cl3p_z)$
   $\sigma(C2sp^2, O2p_y)$, $\pi(C2p_y, O2p_y)$
4. $\sigma(C2sp^2, H1s)$, $\sigma(C2sp^2, Cl3sp^3)$
   $\sigma(C2sp^2, O2sp^2)$, $\pi(C2p_y, O2p_y)$

Which # lists correct bond types for this molecule?



6% **1.** $\sigma(C2sp^2, H1s)$, $\sigma(C2sp^2, Cl3sp^3)$ $\sigma(C2sp^2, O2sp^2)$ $\pi(C2sp^2, O2sp^2)$

39% **2.** $\sigma(C2sp^2, H1s)$, $\sigma(C2sp^2, Cl3p_z)$ $\sigma(C2sp^2, O2sp^2)$, $\pi(C2p_y, O2p_y)$

9% **3.** $\sigma(C2sp^2, H1s)$, $\sigma(C2sp^2, Cl3p_z)$ $\sigma(C2sp^2, O2p_y)$, $\pi(C2p_y, O2p_y)$

46% **4.** $\sigma(C2sp^2, H1s)$, $\sigma(C2sp^2, Cl3sp^3)$ $\sigma(C2sp^2, O2sp^2)$, $\pi(C2p_y, O2p_y)$

Is vitamin C a polar or non-polar molecule? Select the best answer below:

1. Polar: It is water soluble.
2. Polar: It is fat soluble.
3. Non-polar: It is water soluble.
4. Non-polar: It is fat soluble.

Is vitamin C a polar or non-polar molecule? Select the best answer below:

96% 1. Polar: It is water soluble.

1% 2. Polar: It is fat soluble.

1% 3. Non-polar: It is water soluble.

2% 4. Non-polar: It is fat soluble.

What is the hybridization of $\mathbf{C_a}$?

1. sp
2. sp^2
3. sp^3
4. C_a is not hybridized.

What is the hybridization of $\mathbf{C_a}$?

2% 1. sp

3% 2. sp^2

95% ✓ 3. sp^3

1% 4. C_a is not hybridized.

Identify the bond symmetry and hybrid or atomic orbitals that make up the C_d-O bond in vitamin C.

1. $\sigma(C2sp^3, O2sp^3)$
2. $\sigma(C2sp^3, O2sp^2)$
3. $\sigma(C2sp^2, O2sp^3)$
4. $\sigma(C2sp^2, O2sp^2)$
5. $\sigma(C2sp^3, O2p_z)$

Identify the bond symmetry and hybrid or atomic orbitals that make up the C_d-O bond in vitamin C.

5% 1. $\sigma(C2sp^3, O2sp^3)$

2% 2. $\sigma(C2sp^3, O2sp^2)$

85% 3. $\sigma(C2sp^2, O2sp^3)$

7% 4. $\sigma(C2sp^2, O2sp^2)$

2% 5. $\sigma(C2sp^3, O2p_z)$

If bonds are stronger in the products than in the reactants, ΔH is:

1. negative (exothermic rxn)
2. positive (exothermic rxn)
3. negative (endothermic rxn)
4. positive (endothermic rxn)

If bonds are stronger in the products than in the reactants, ΔH is:

60%  1. negative (exothermic rxn)

20% 2. positive (exothermic rxn)

10% 3. negative (endothermic rxn)

10% 4. positive (endothermic rxn)

5.111 Principles of Chemical Science
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