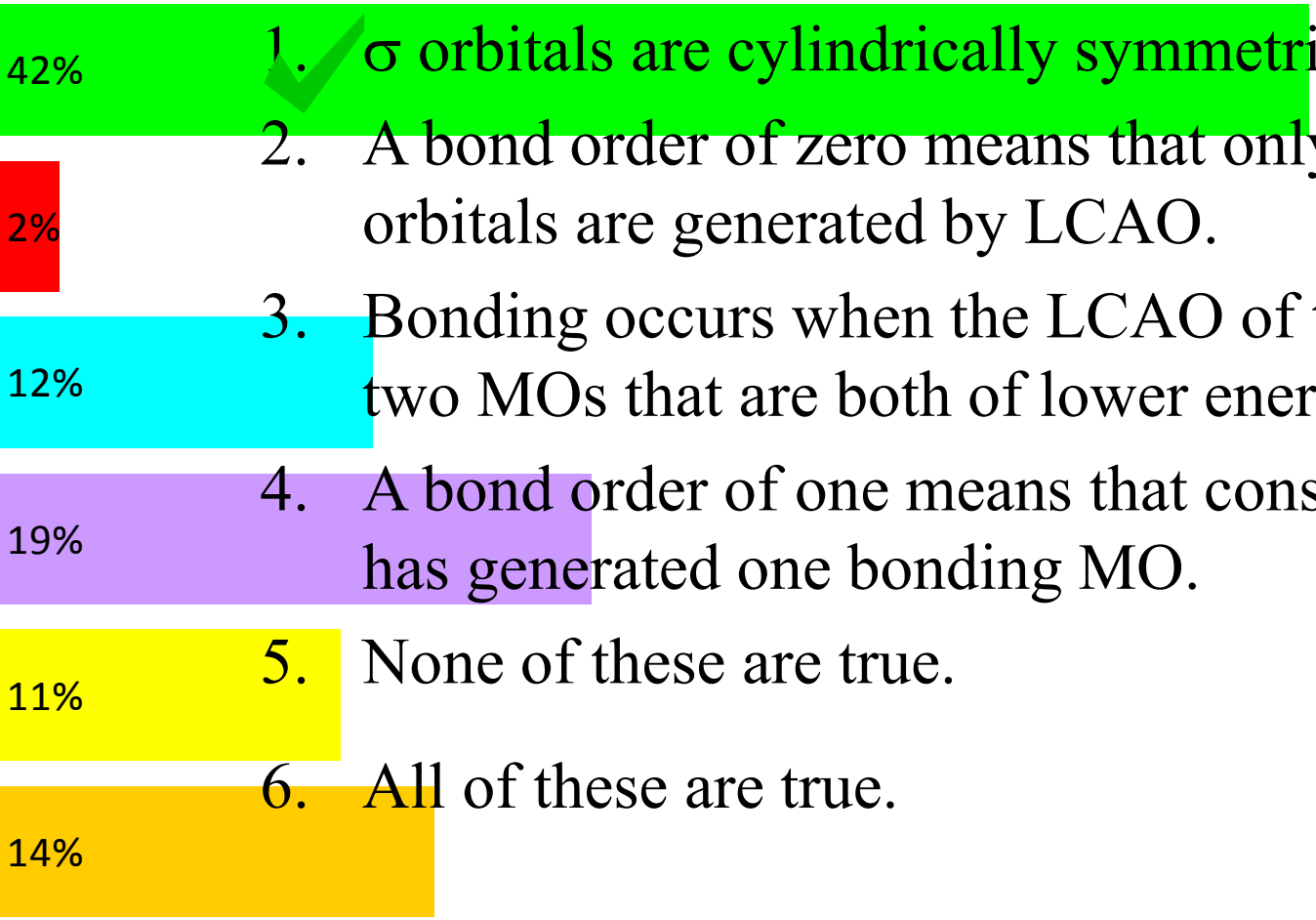
Which of the following statements is true?

1. σ orbitals are cylindrically symmetric.
2. A bond order of zero means that only antibonding orbitals are generated by LCAO.
3. Bonding occurs when the LCAO of two AO generates two MOs that are both of lower energy than the AO.
4. A bond order of one means that constructive interference has generated one bonding MO.
5. None of these are true.
6. All of these are true.

Which of the following statements is true?



1. σ orbitals are cylindrically symmetric. 42%
2. A bond order of zero means that only antibonding orbitals are generated by LCAO. 2%
3. Bonding occurs when the LCAO of two AO generates two MOs that are both of lower energy than the AO. 12%
4. A bond order of one means that constructive interference has generated one bonding MO. 19%
5. None of these are true. 11%
6. All of these are true. 14%

What is the bond order for O_2?

A. 0

B. 1

C. 2

D. 3

E. 4

F. 8

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A. 0

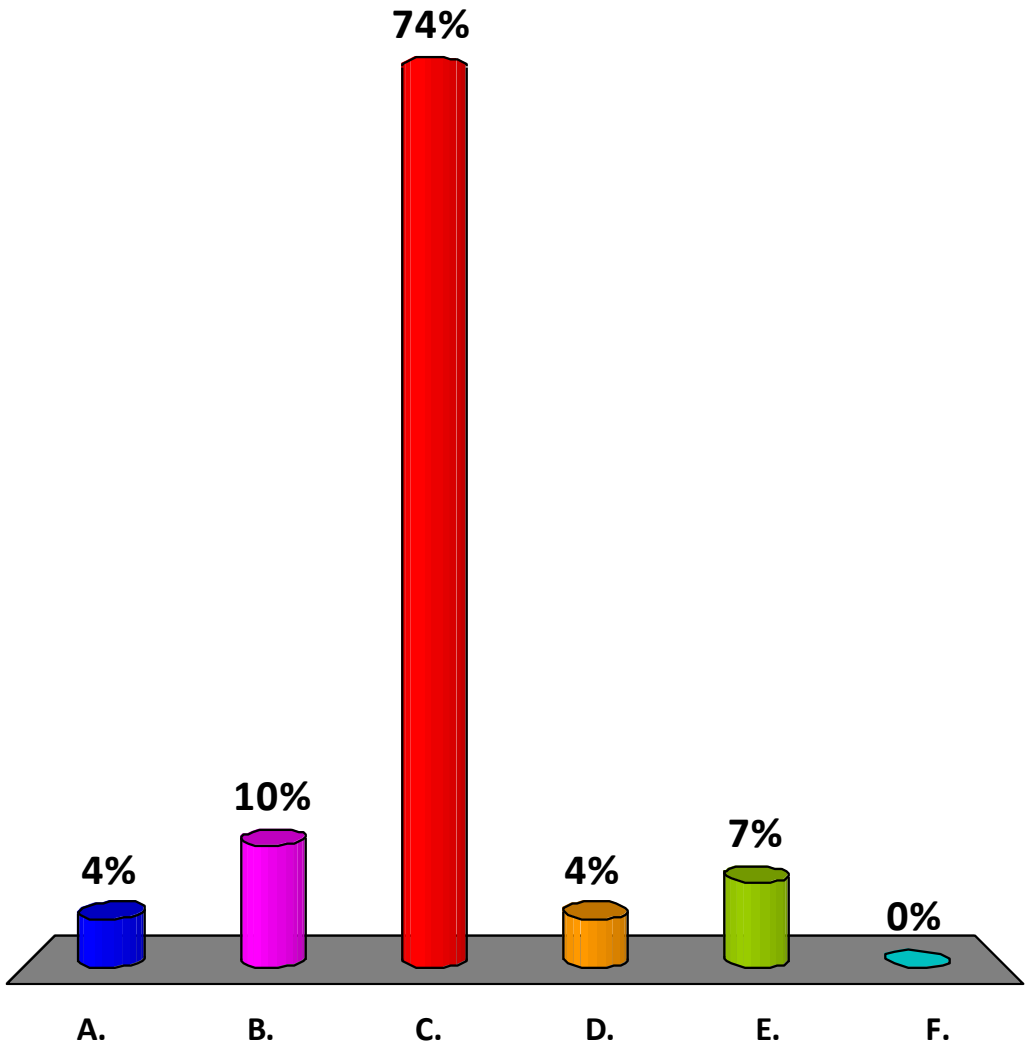
B. 1

C. 2

D. 3

E. 4

F. 8



What is the H-N-H bond angle in NH_3 and the geometry of the molecule?

1. < 120° trigonal pyramidal
2. < 120° trigonal planar
3. < 109.5° tetrahedral
4. < 109.5° trigonal pyramidal
5. < 109.5° trigonal planar

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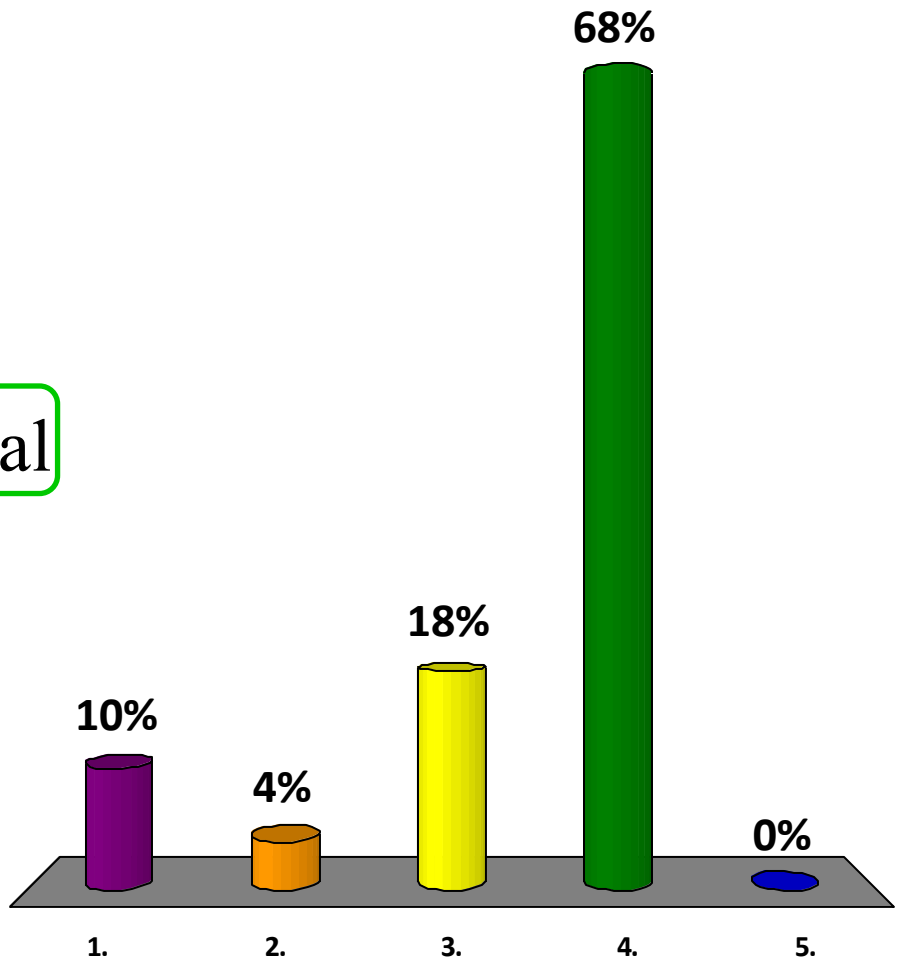

What is the hybridization of an atom with exactly 2 hybrid orbitals?

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?

25% 1. sp

25% 2. sp^2

25% 3. sp^3

25% 4. Any of the above, depending on the molecule

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:

0% 1. Polar: It is water soluble.

0% 2. Polar: It is fat soluble.

0% 3. Non-polar: It is water soluble.

0% 4. Non-polar: It is fat soluble.

10

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

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

10

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

0% 1. sp

0% 2. sp^2

0% ✓ 3. sp^3

0% 4. C_a is not hybridized.

10

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. $\sigma(C2sp^3, O2p_z)$

10

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

0% 1. $\sigma(C2sp^3, O2sp^3)$

0% 2. $\sigma(C2sp^3, O2sp^2)$

0%  3. $\sigma(C2sp^2, O2sp^3)$

0% 4. $\sigma(C2sp^2, O2sp^2)$

0% 5. $\sigma(C2sp^3, O2p_z)$

10

5.111 Principles of Chemical Science
Fall 2014