

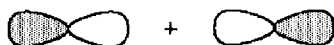
Review Questions

**SHORT ANSWER.** Write the word or phrase that best completes each statement or answers the question.

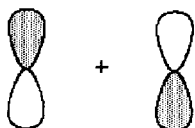
- 1) An orbital can be described by its \_\_\_\_\_, which is the mathematical description of the shape of the electron wave as it vibrates.
- 2) The electron density at any point is proportional to the \_\_\_\_\_ of the electron wave at that point

**ESSAY.** Write your answer in the space provided or on a separate sheet of paper.

- 3) What kind of molecular orbital ( $\sigma$ ,  $\sigma^*$ ,  $\pi$ , or  $\pi^*$ ) results when the two atomic orbitals shown below interact in the manner indicated?



- 4) What kind of molecular orbital ( $\sigma$ ,  $\sigma^*$ ,  $\pi$ , or  $\pi^*$ ) results when the two atomic orbitals shown below interact in the manner indicated?

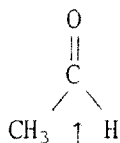


**SHORT ANSWER.** Write the word or phrase that best completes each statement or answers the question.

- 5) A \_\_\_\_\_ bond results when parallel p orbitals overlap sideways.
- 6) The HCN bond angle in hydrogen cyanide (HCN) is \_\_\_\_\_.
- 7) The HCH bond angle in propane ( $\text{CH}_3\text{CH}_2\text{CH}_3$ ) is \_\_\_\_\_.
- 8) Boron trifluoride ( $\text{BF}_3$ ) is a molecule in which the boron atom is \_\_\_\_\_ hybridized and the FBF bond angle is \_\_\_\_\_.

**MULTIPLE CHOICE.** Choose the one alternative that best completes the statement or answers the question.

- 9) Choose the correct hybridization for the atom indicated in the molecule below.



A)  $\text{sp}^2$

B)  $\text{sp}^3$

C)  $\text{sp}$

D) none of the above