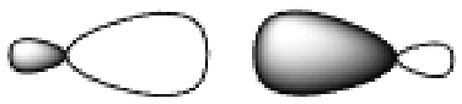
CHEM 343, Quiz 2

1. Which of the following is an accurate depiction of the antibonding orbital in Br_2?

a. 

b.

c.

d.

2. Put the following σ bonds in order of increasing energy (lowest to highest):

CO, CBr, CF, CS

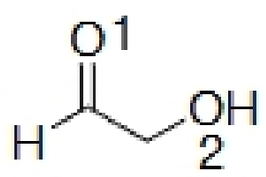
a. CS<CO<CBr<CF b. CF<CO<CS<CBr **c. CF<CO<CBr<CS** d. CBr<CS<CO<CF

3. Consider the bonds shown below, and select the correct statement from the following:

H–O H–N H–Cl H–C

a. HCl would have the lowest energy σ bond, and therefore be hardest to break.
b. HC would have the highest energy σ*, and therefore be hardest to break.
c. HN would have the highest energy σ*, and therefore be hardest to break.
d. HO would have the lowest energy σ*, and therefore be hardest to break.

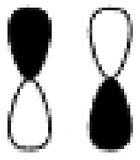
4. Consider the molecule shown below, and select the correct statement from the following:



a. The highest energy non-bonding electrons surround oxygen 2.
b. The highest energy σ bond is the C-C bond.
c. The highest energy antibonding orbital is OH σ*.
d. The lowest energy σ bond is the OH bond.

5. Which of the following is an accurate depiction of the CC π bond in ethene?

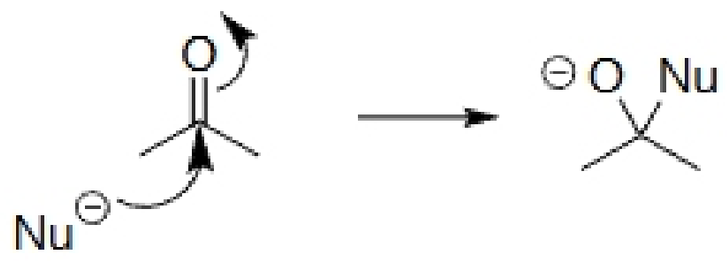
a.

b. 

c.

d.

6. Consider the reaction shown below, and select the correct statement from the following:

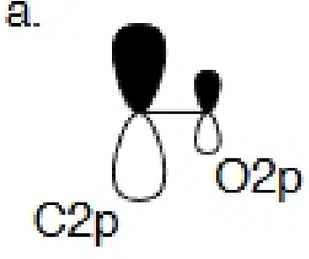


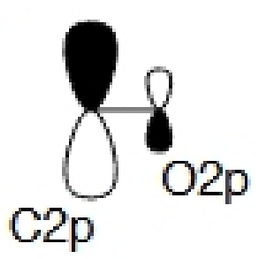
a. The electrons from the nucleophile populate CO σ*, causing the CO σ bond to break.
b. The electrons from the nucleophile populate CO σ*, causing the CO π bond to break.
c. The electrons from the nucleophile populate CO π*, causing the CO π bond to break.
d. The electrons from the nucleophile populate CO π*, causing the CO σ bond to break.

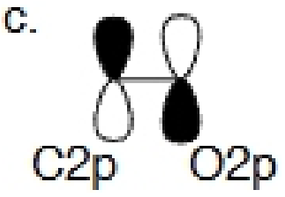
7. How many nodes are present in the highest energy filled π orbital in the molecule shown below?

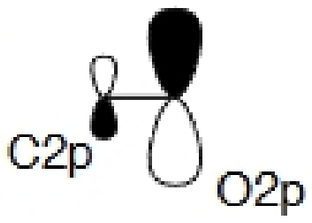
a. 0 **b. 2** c. 3 d. 5

8. Which of the following is an accurate depiction of the CO π* orbital in formaldehyde?

a.


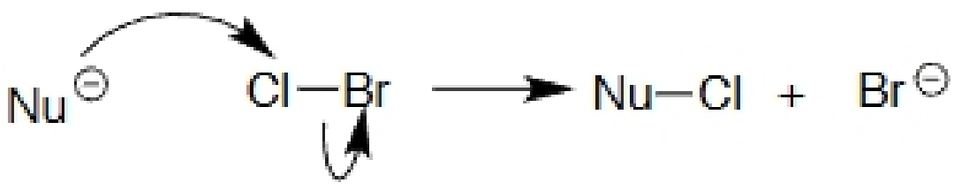
b.


c.


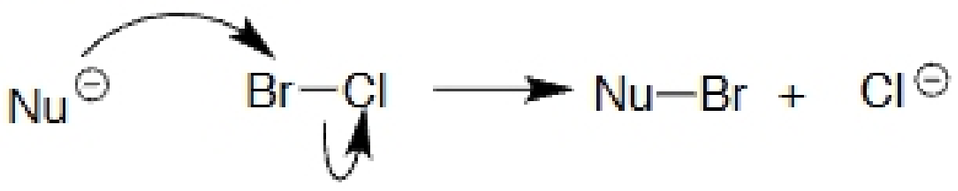
d.


9. Consider the two reaction pathways below, and select the correct statement.

Pathway 1

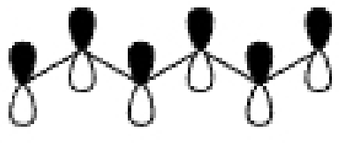


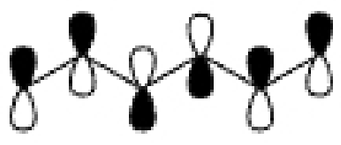
Pathway 2

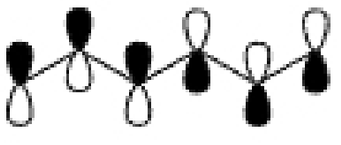
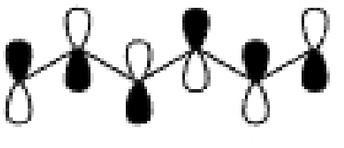


a. Pathway 1 is more likely because σ* is closer in energy to Cl, and the ClBr σ electrons are closer in energy to Br.
b. Pathway 2 is more likely because σ* is closer in energy to Br, and the ClBr σ electrons are closer in energy to Cl.
c. Pathway 1 is more likely because σ* is closer in energy to Br, and the ClBr σ electrons are closer in energy to Cl.
d. Pathway 2 is more likely because σ* is closer in energy to Cl, and the ClBr σ electrons are closer in energy to Br.

10. Which of the orbitals below is highest in energy?

a.


b.


c.


d.