CHEM 2211

Chapter 1:

Atomic Structure and Hybridization

Having Trouble? Come to our weekly workshops and get ahead! Workshops are $20 each and last approximately 2 hours. Private tutoring is also available by appointment on our website, www.scienceguyz.com.

Need Help All Semester? Register for the *Semester Plan* which includes **Workshops**, **Exam Reviews Sessions**, **Mock Exams**, a **lab review session,** and **Office Hours**. The Semester Plan price is only $250 for the entire semester.

Current Course Offerings at Science Guyz:

- General Chemistry 1 - CHEM 1211
- General Chemistry 2 - CHEM 1212
- Physics 1 – PHYS 1111
- Physics 2 – PHYS 1112
- Organic Chemistry 1 - CHEM 2211
- Organic Chemistry 2 - CHEM 2212
- Biology 1 – BIOL 1107

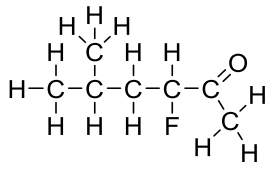
For hours of operation, important dates and other info, check our regularly updated website:

www.scienceguyz.com

Science Guyz, LLC | 250 W Broad St STE 102 Athens, GA 30601 | Phone: 706-723-8436
Email: tutor@scienceguyz.com | Website: www.scienceguyz.com |

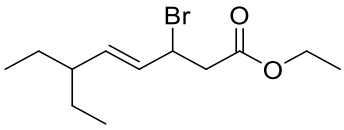
Practice Problems – test your understanding and try these problems out on your own! An answer key will be posted to the Science Guyz website.

1. Convert the following Kekulé structure to condensed structure.



$(CH_3)_2CHCH_2CHFCOCH_3$

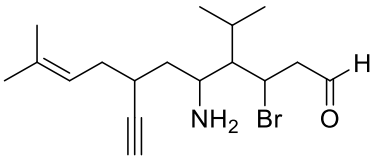
2. Convert the following skeletal structure to condensed structure.



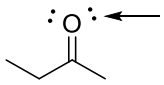
$(CH_3CH_2)_2CHCHCHCHBrCH_2CO_2CH_2CH_3$

3. Convert the following condensed structure to skeletal structure.

$(CH_3)_2CCHCH_2CH(CCH)CH_2CH(NH_2)CH(CH(CH_3)_2)CHBrCH_2CHO$

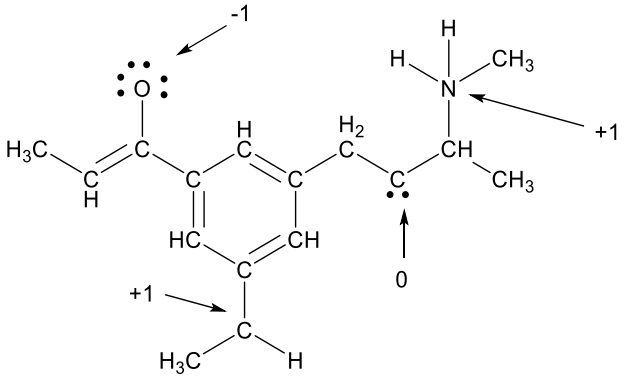


4. Identify the hybridization on the atoms indicated below.

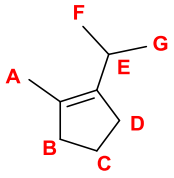


sp	sp	sp	sp
sp^2 X	sp^2 X	sp^2	sp^2
sp^3	sp^3	sp^3 X	sp^3

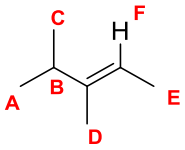
5. Provide the formal charge on the atoms indicated below.



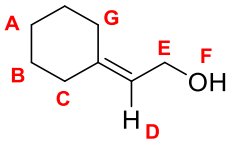
6. Check the boxes to indicate which of the following atoms lay in the same plane as the sp^2 hybridized atoms.



A ☒
B ☒
C ☐
D ☒
E ☒
F ☐
G ☐

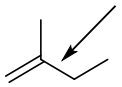


A ☐
B ☒
C ☐
D ☒
E ☒
F ☒

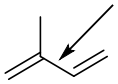


A ☐
B ☐
C ☒
D ☒
E ☒
F ☐
G ☒

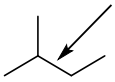
7. Rank the indicated bonds in order of decreasing length (1 = longest).



2



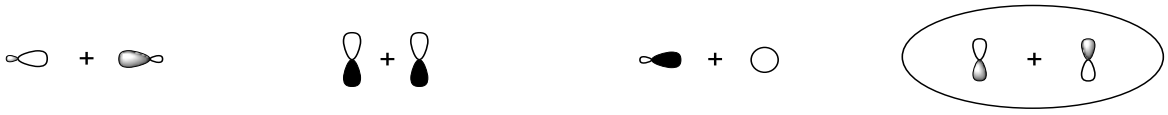
3



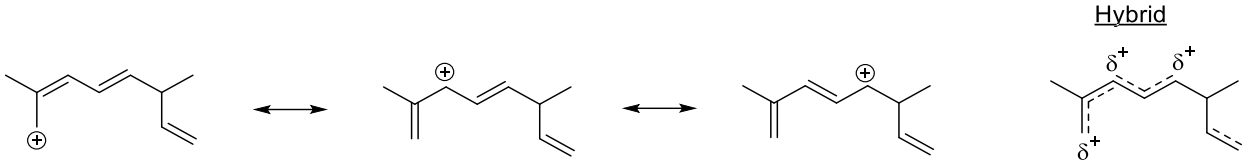
1

8. Which of the atomic orbital combinations shown below will result in a σ molecular orbital?

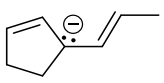
9. Which of the atomic orbital combinations shown below will result in a π* molecular orbital?

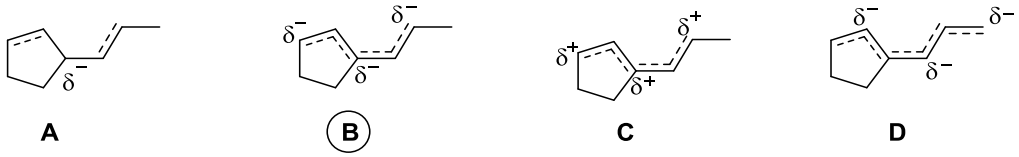


10. Provide all resonance structures and the resonance hybrid for the following compound.

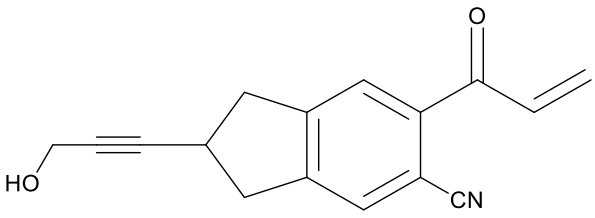


11. Which of the following is the resonance hybrid for the compound below?





12. For the compound given below, provide the molecular formula. Additionally, provide the number of sigma and pi bonds. Finally, determine the number of sp, sp^2 and sp^3 hybridized *atoms.*



$C_{16}H_{13}O_{2}N_{1}$

Sigma Bonds	Pi Bonds	sp hybridized atoms	sp^2 hybridized atoms	sp^3 hybridized atoms
33	9	4	10	5