

Chemistry 210 NMR Quiz
November 5, 2008

Name: _____

This quiz is due back on November 5, 2008 during lab.

Answers:

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

11. _____

12. _____

13. _____

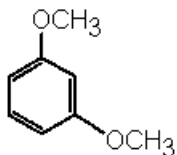
14. _____

15. _____

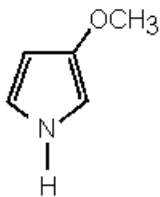
NOTE: Sometimes the Greek lettering does not always convert over to a pdf document, so I inserted the names for the appropriate Greek letters throughout the quiz. Good luck.

November 5, 2008

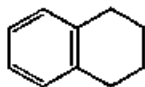
1. What does the integral trace on an NMR spectrum indicate?
 - a. the total number of protons in the compound
 - b. the relative number of protons coupled to adjacent nuclei
 - c. the size of the magnetic field
 - d. the absolute number of protons in each magnetic environment
 - e. the relative number of protons in each magnetic environment
2. Why do the protons on an aromatic ring occur downfield in an NMR spectrum?
 - a. a shielding effect by the σ -electrons
 - b. a deshielding effect by the σ -electrons
 - c. ring current shielding
 - d. a deshielding effect by the π -electrons
 - e. an anisotropy of the π -electrons
3. What does the (n + 1) rule state?
 - a. a multiplet containing n peaks implied n + 1 equivalent protons on the adjacent atom
 - b. a proton with n + 1 equivalent neighbors will have its resonance split into n peaks.
 - c. for n protons in a compound the number of different chemical shifts will be n + 1
 - d. spin-spin coupling between n protons can only occur through up to n + 1 bonds
 - e. a proton with n equivalent neighbors will have its resonance split into n + 1 peaks
4. What is the number of chemical shift equivalent groups of hydrogen atoms on this substance?
 - a. 3
 - b. 4
 - c. 2
 - d. 6
 - e. 5



5. What is the number of chemical shift equivalent groups of hydrogen atoms on this substance?
- 3
 - 2
 - 5
 - 4
 - 6



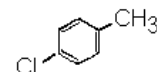
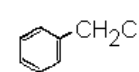
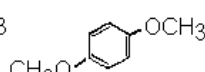
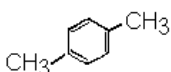
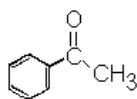
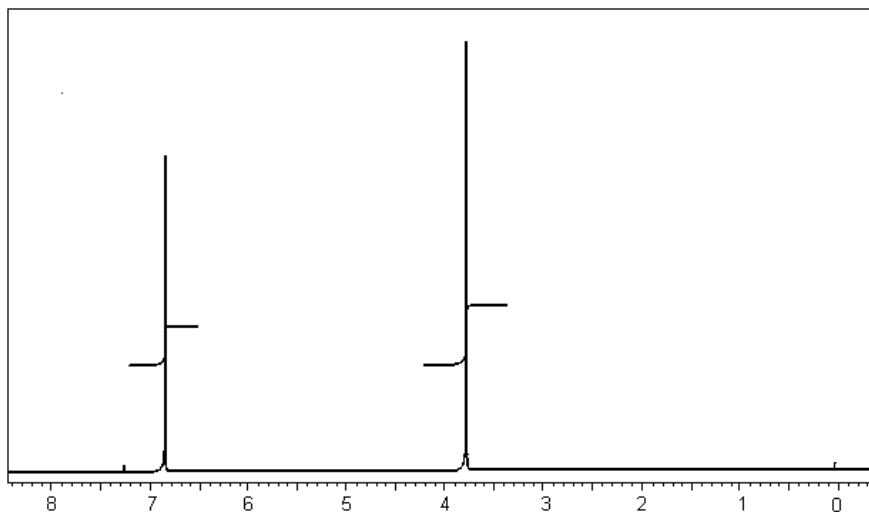
6. What is the number of chemical shift equivalent groups of hydrogen atoms on this substance?
- 2
 - 3
 - 6
 - 5
 - 4



7. The ¹H-NMR spectrum of 1-bromo-2,2-dimethyl propane ((CH₃)₃CCH₂Br) contains which of these sets of resonances?
- singlet, quartet, triplet
 - quartet, triplet
 - singlet, doublet, quartet
 - triplet, decet
 - singlet, singlet
8. The ¹H-NMR spectrum of 1,3-dichloro-2-methyl propane ((ClCH₂)₂CHCH₃) contains which of these sets of resonances?
- doublet, pentet, quartet
 - doublet, octet, doublet
 - octet, pentet, doublet
 - triplet, doublet, quartet
 - quartet, octet, doublet

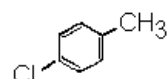
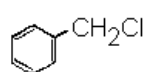
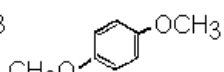
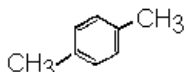
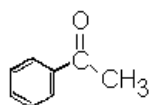
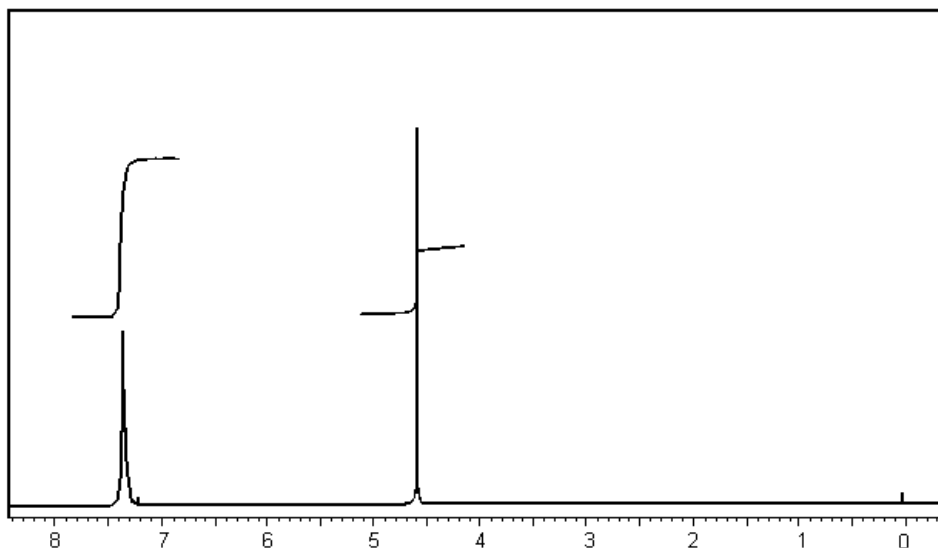
9. To which of these substances does the following $^1\text{H-NMR}$ spectrum correspond?

- a. see graph a
- b. see graph b
- c. see graph c
- d. see graph d
- e. see graph e



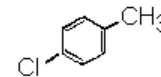
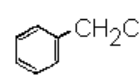
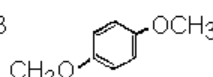
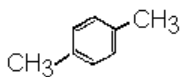
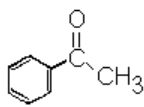
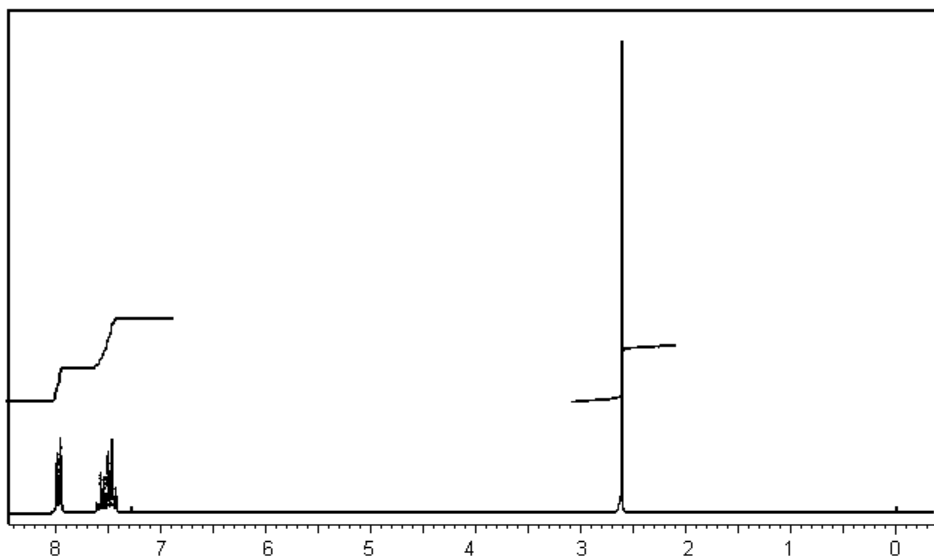
10. To which of these substances does the following $^1\text{H-NMR}$ spectrum correspond?

- a. see graph a
- b. see graph b
- c. see graph c
- d. see graph d
- e. see graph e



11. To which of these substances does the following $^1\text{H-NMR}$ spectrum correspond?

- a. see graph a
- b. see graph b
- c. see graph c
- d. see graph d
- e. see graph e



a.

b.

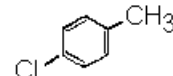
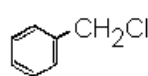
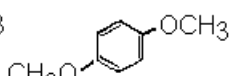
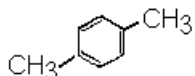
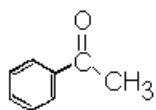
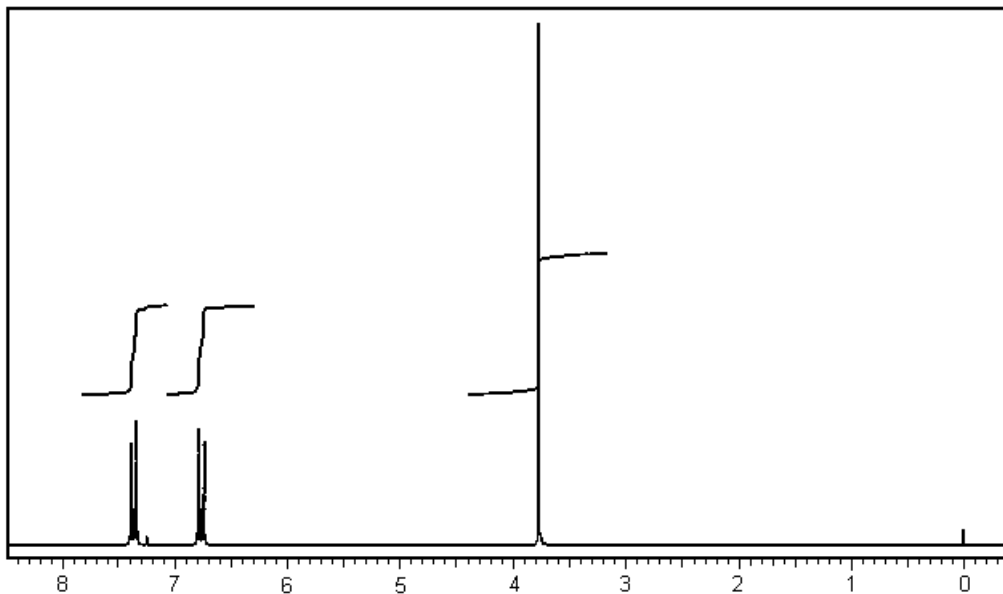
c.

d.

e.

12. To which of these substances does the following $^1\text{H-NMR}$ spectrum correspond?

- a. see graph a
- b. see graph b
- c. see graph c
- d. see graph d
- e. see graph e



a.

b.

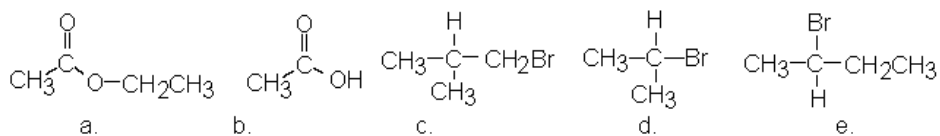
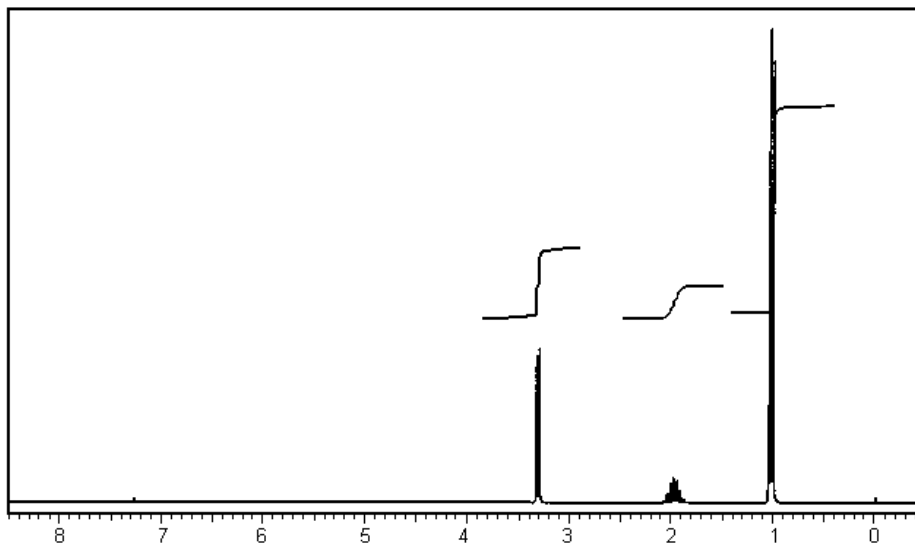
c.

d.

e.

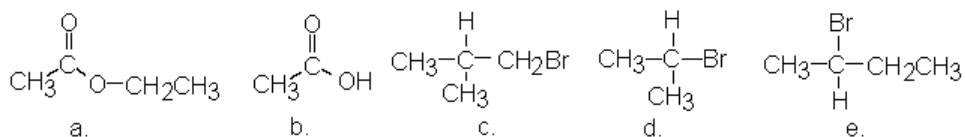
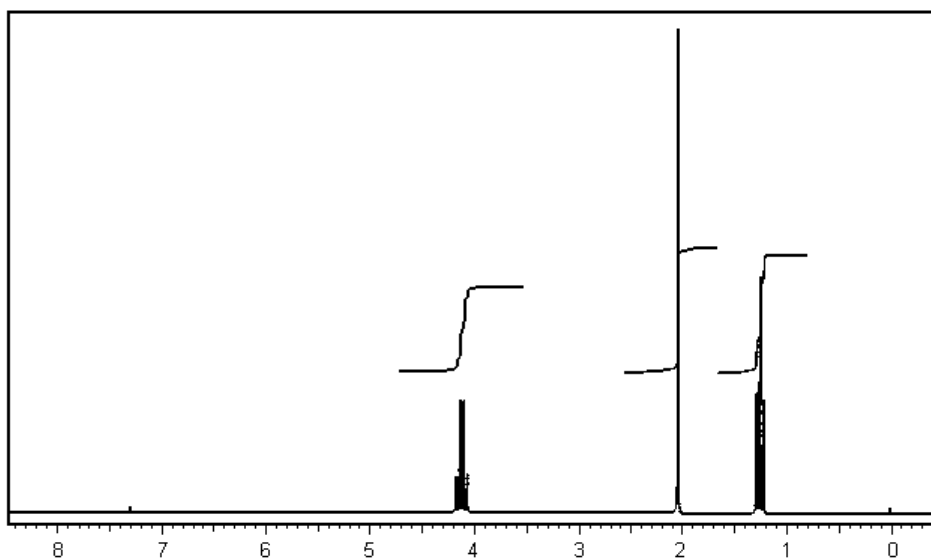
13. To which of these substances does the following $^1\text{H-NMR}$ spectrum correspond?

- a. see graph a
- b. see graph b
- c. see graph c
- d. see graph d
- e. see graph e



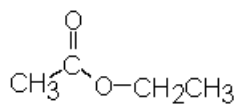
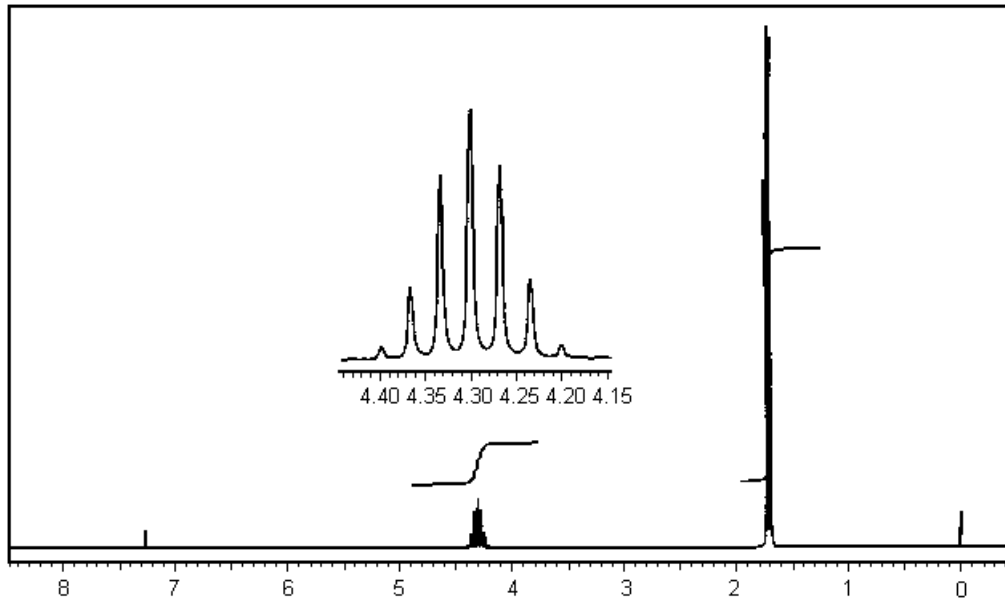
14. To which of these substances does the following $^1\text{H-NMR}$ spectrum correspond?

- a. see graph a
- b. see graph b
- c. see graph c
- d. see graph d
- e. see graph e

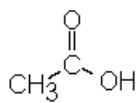


15. To which of these substances does the following $^1\text{H-NMR}$ spectrum correspond?

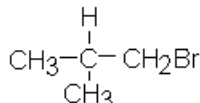
- a. see graph a
- b. see graph b
- c. see graph c
- d. see graph d
- e. see graph e



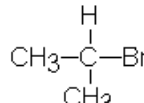
a.



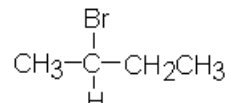
b.



c.



d.



e.