

Print Name: _____

Instructions

Answer the multiple choice questions on an 882ES or 882E answer form. This is the **Test A** form please write the letter **A** largely on your answer form. Select the best answer and darken the space corresponding to that answer completely with pencil. For the remaining questions answer in the space provided. **Please write clearly. There are no bathroom breaks.** Questions 1-16, 4 points each.

1. A compound that contains C, H and O has a high resolution mass of 214.0994 what is the molecular formula?

a. $C_{15}H_{18}O$
 b. $C_{13}H_{26}O_2$
 c. $C_{14}H_{14}O_2$
 d. $C_{13}H_{10}O_3$
 e. $C_{16}H_6O$

2. The M^+ peak has an isotopic pattern of 3:1 what halogen does the compound contain?

a. F
 b. Cl
 c. Br
 d. I
 e. At

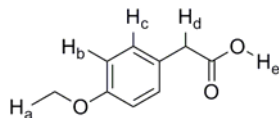
3. Which of the following is not observable by NMR?

a. 1H
 b. ^{13}C
 c. ^{19}F
 d. ^{31}P
 e. ^{12}C

4. Which of the following δ values refers to a 2635 Hz shift on a 500 MHz spectrometer?

a. 5.27
 b. 6.35
 c. 4.21
 d. 7.27
 e. 9.1

5. Which proton would you expect to be the most downfield?



6. What would be the multiplicity of the signal of the proton in bold in a 1H -NMR be?



a. 3
 b. 4
 c. 5
 d. 6
 e. 7

7. Rank the following in increasing chemical shift, left to right.



a



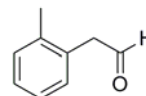
b



c

a. a, b, c
 b. a, c, b
 c. b, a, c
 d. b, c, a
 e. c, a, b

8. How many signals would you expect in the ^{13}C -NMR broadband decoupled spectrum of the compound below

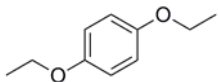


a. 5
 b. 12
 c. 6
 d. 8
 e. 9

9. How many signals would you expect if you ran a DEPT 90 spectrum of the compound above?

a. 1
 b. 2
 c. 3
 d. 4
 e. 5

10. How many signals would be in the ^1H -NMR of the compound below?



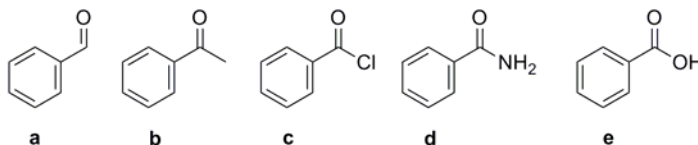
- a. 1
- b. 2
- c. 3
- d. 4
- e. 5

11. Which would be the major fragments in the structure below?

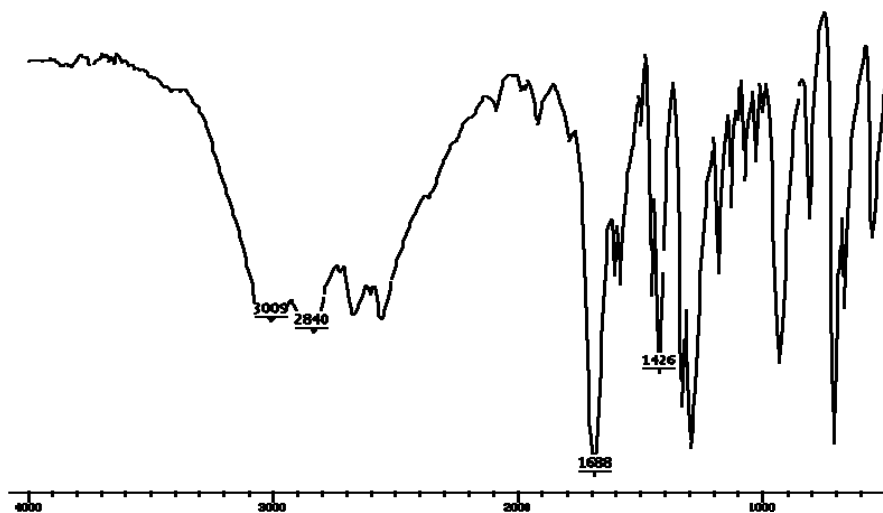


- a. m/z 73 and 59
- b. m/z 70 and 62
- c. m/z 80 and 73
- d. m/z 73 and 52
- e. None of them

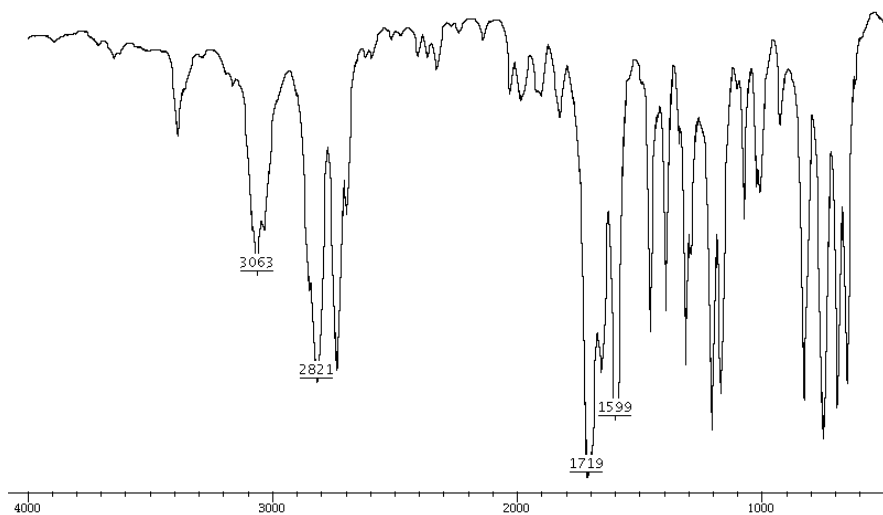
Match the following IR spectra with one of the structures below



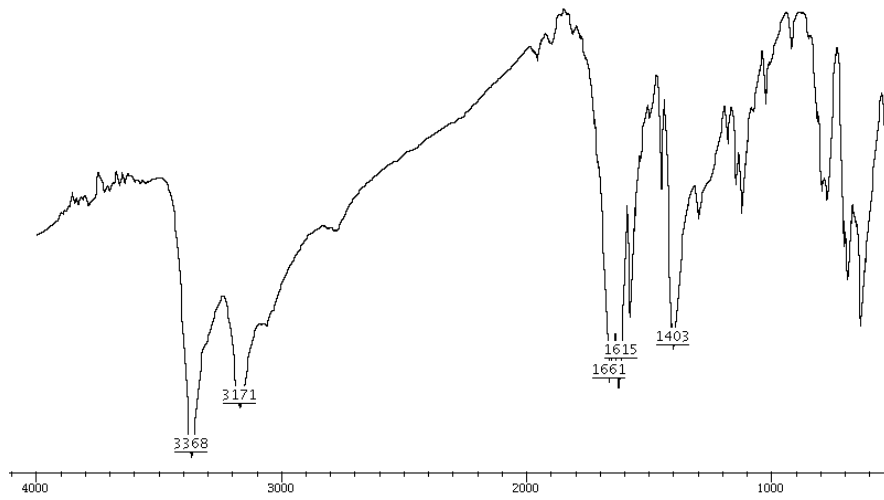
12.



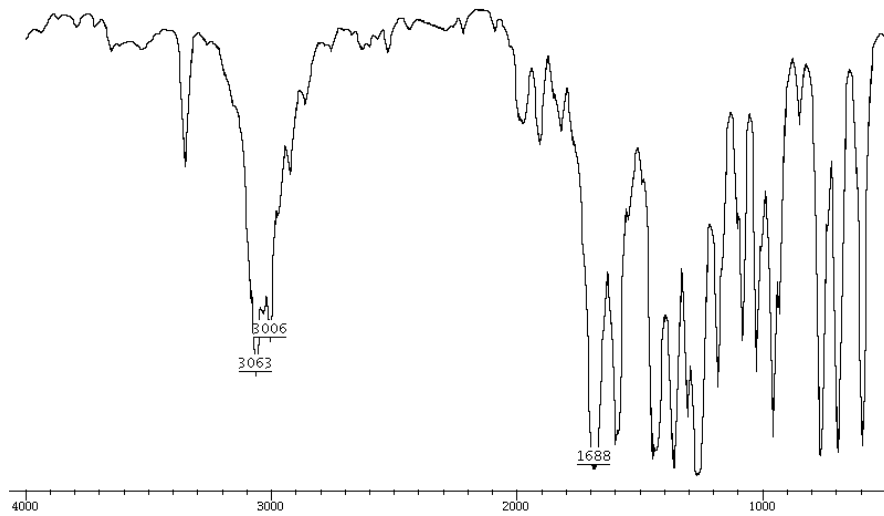
13.



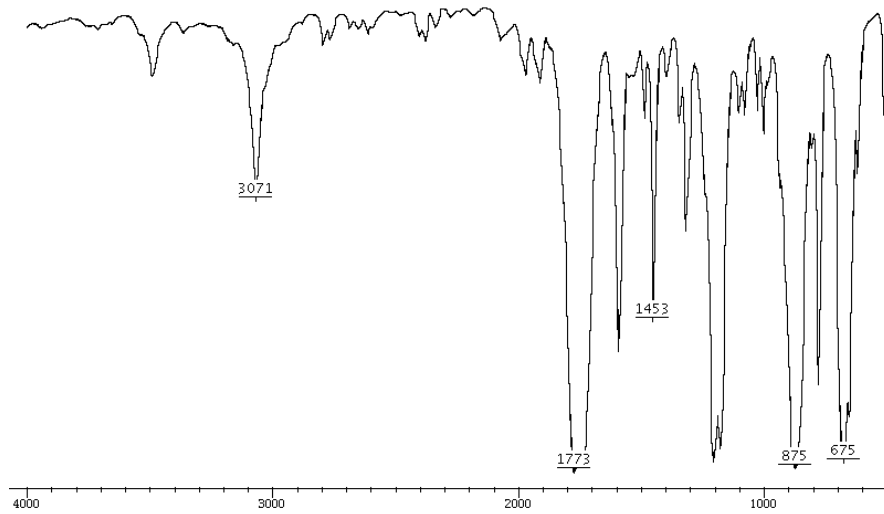
14



15

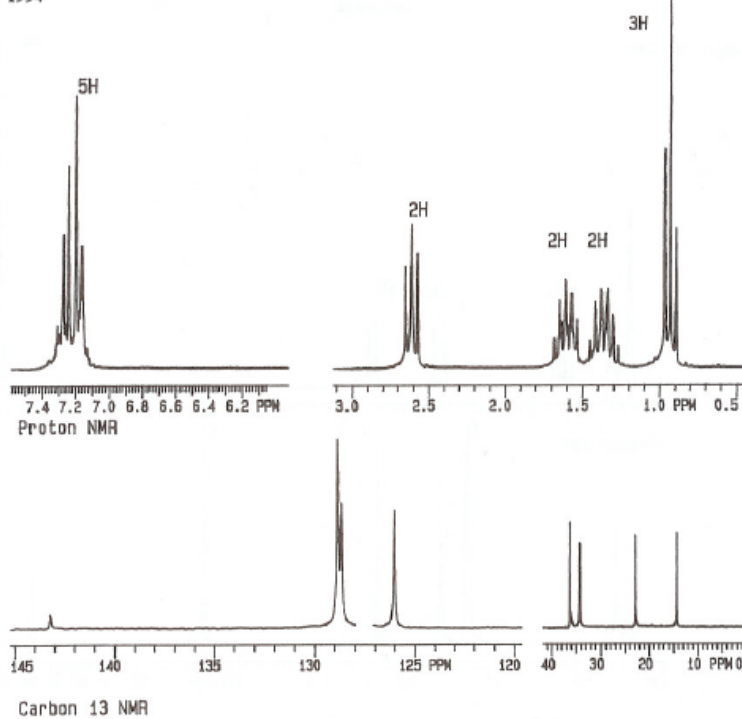
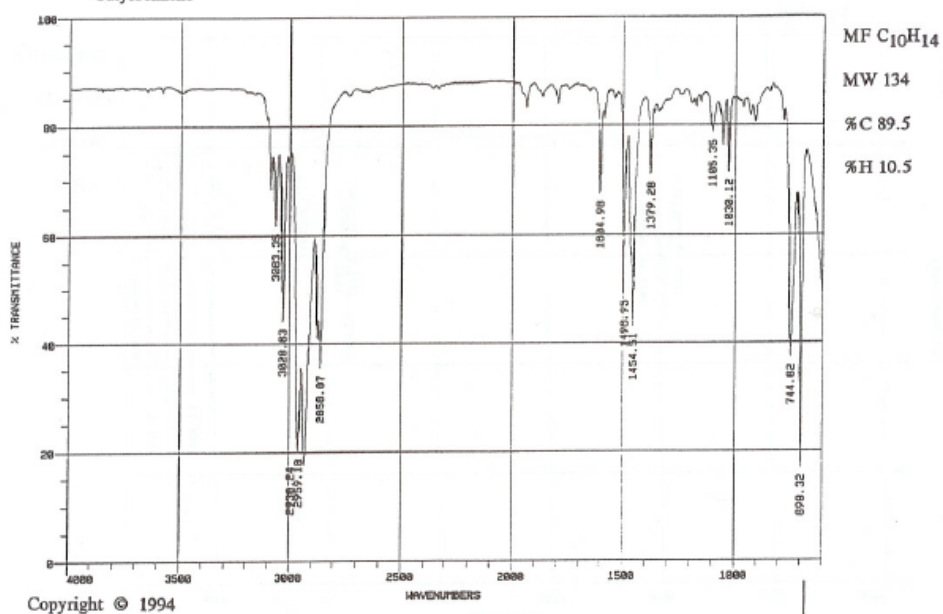


16

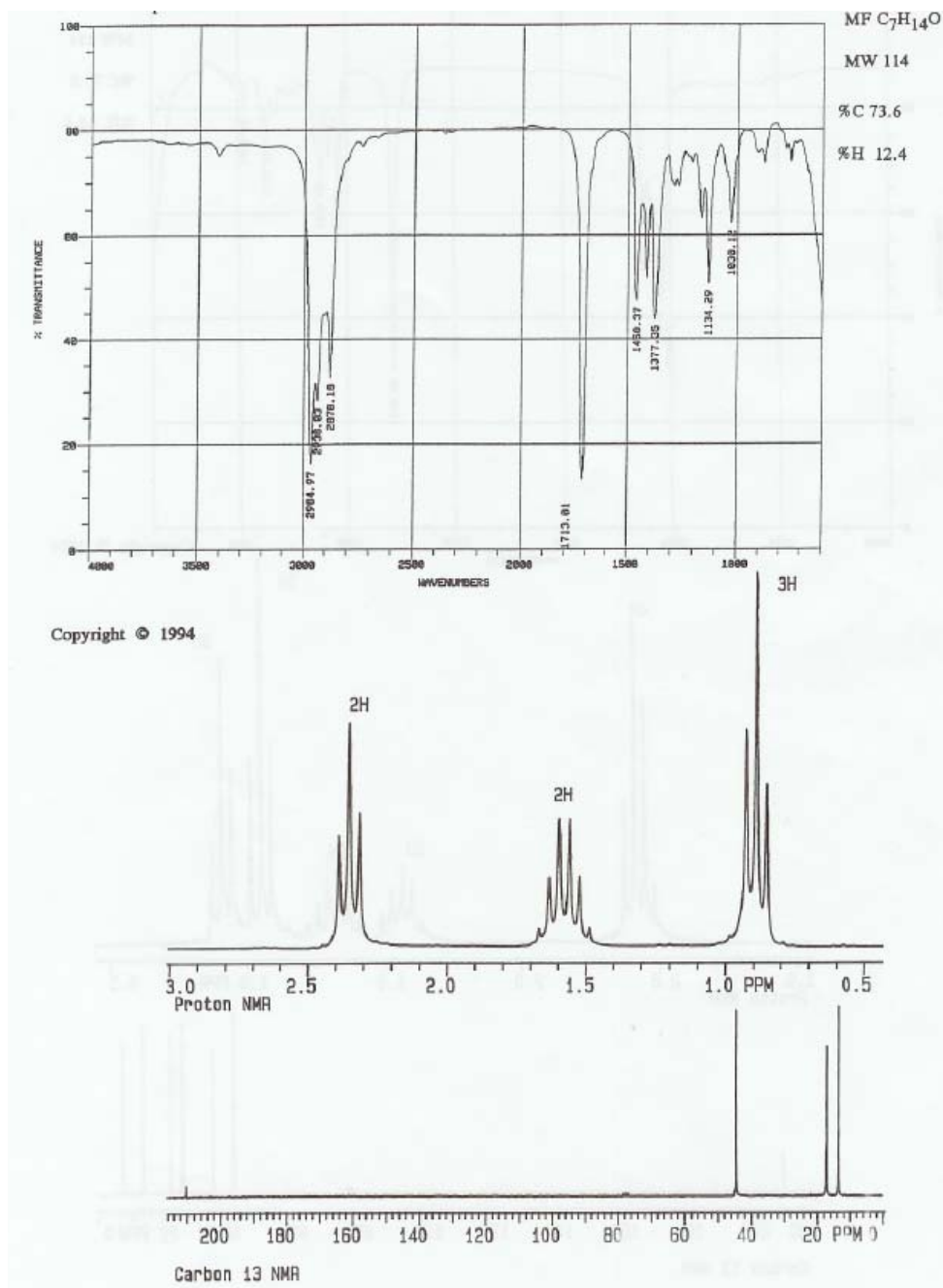


Part 2

17. Determine the structure of the compound from the data provided (9 Points):

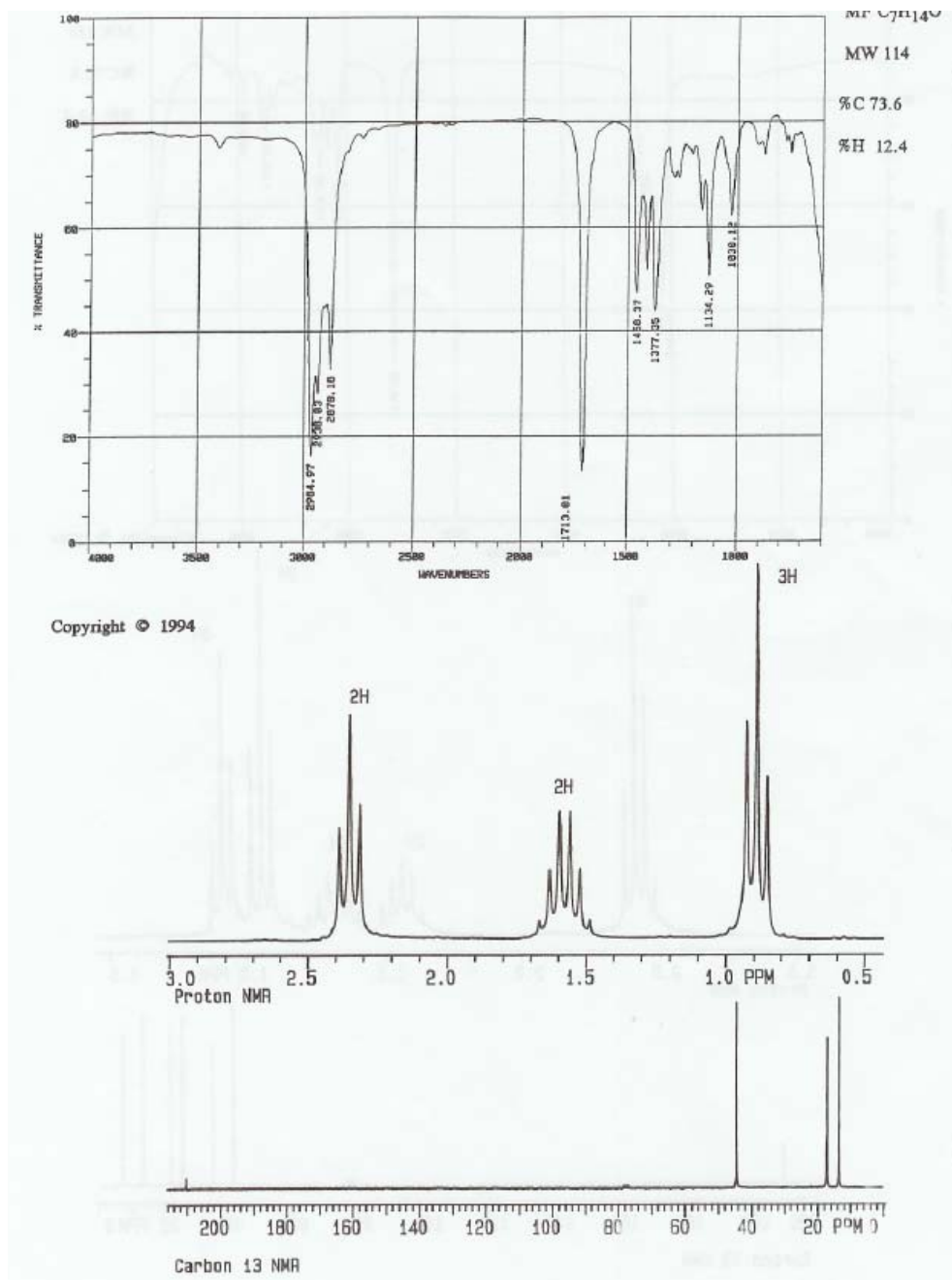
**Structure:**

18. Determine the structure of the compound from the data provided (9 Points):



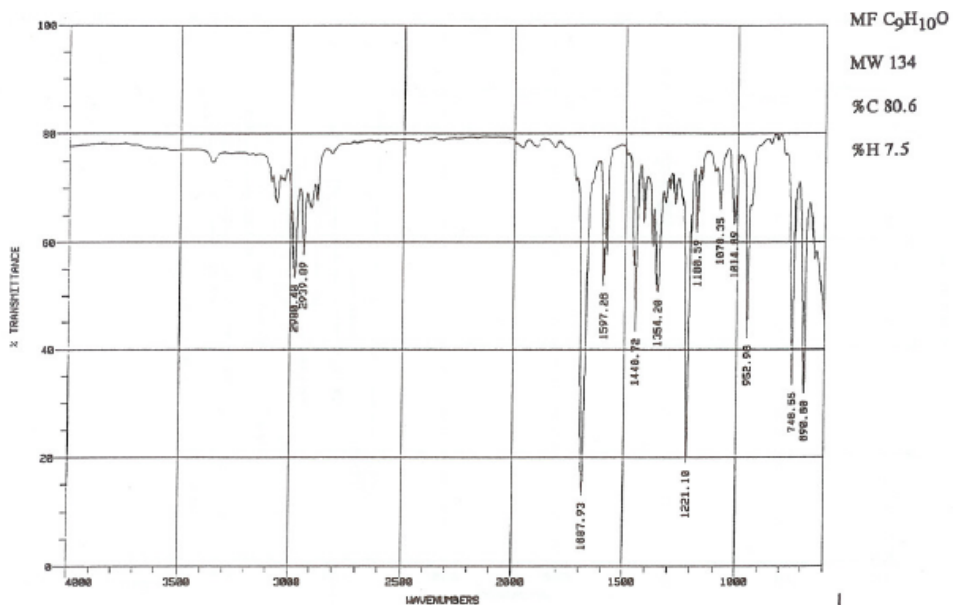
Structure:

19. Determine the structure of the compound from the data provided (9 Points): Formula $C_7H_{14}O$

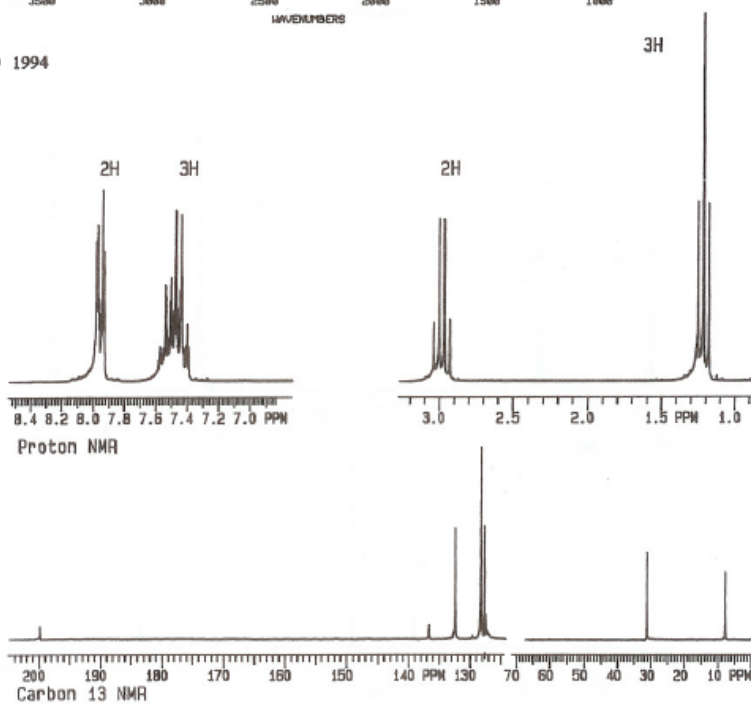


Structure:

20. Determine the structure of the compound from the data provided (9 Points):

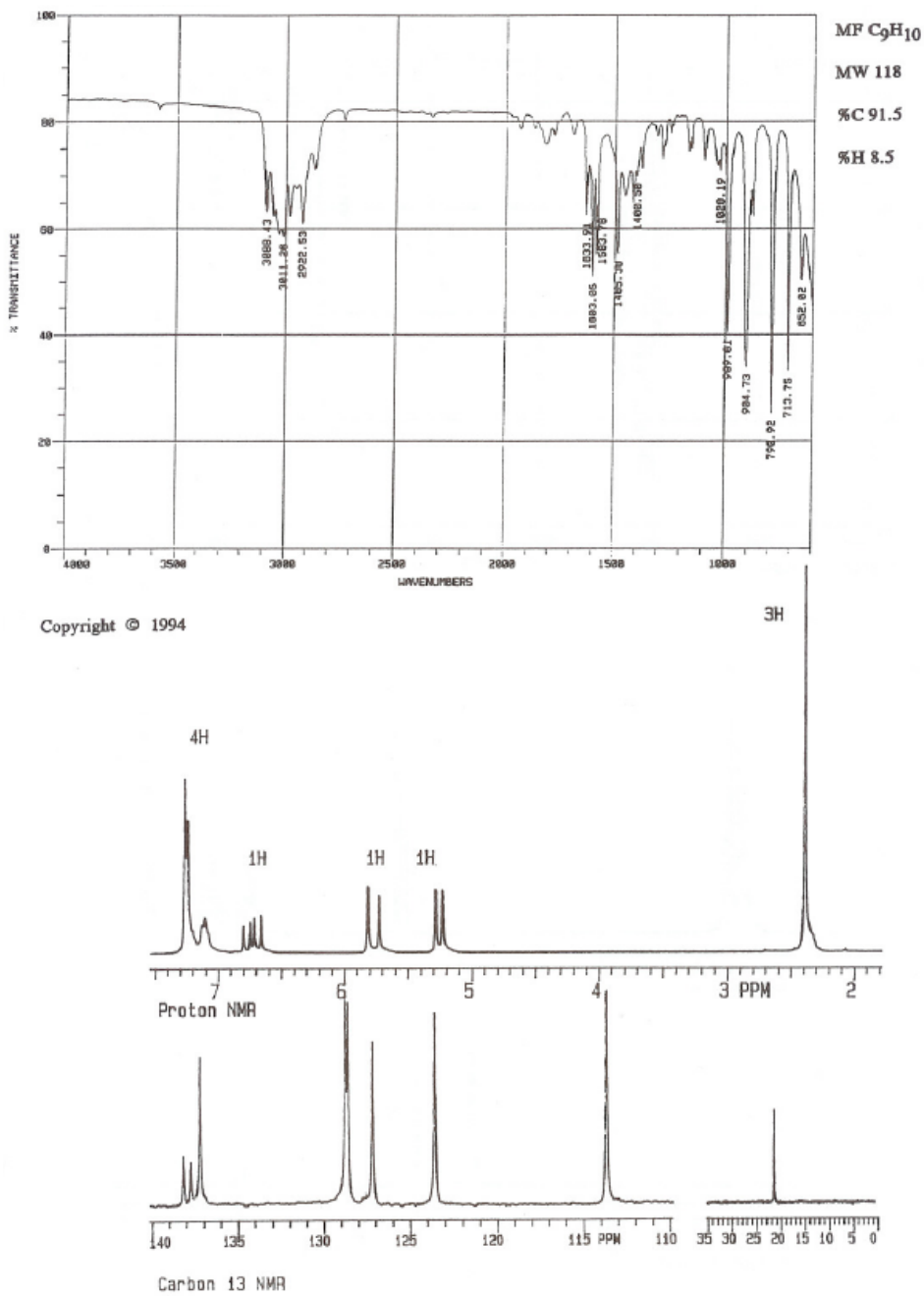


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Structure:

21. **Bonus:** Determine the structure of the compound from the data provided (5 Points):



Structure: