Last Name	First Name	MI

Student ID Number:	*Total Score*
Circle the name of your TA: MIKE ROB	**35**
Discussion Section – Day: Time:	**/ 30**

Chem 30B Spring 2004

QUIZ #2 KEY

(15 Min)

Weds May 12th

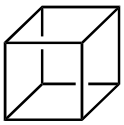
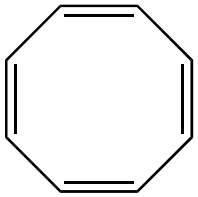
INTERPRETATION OF THE QUESTIONS IS PART OF THE EXAM – DO NOT ASK FOR THE QUESTIONS TO BE EXPLAINED TO YOU

USE CAPITAL LETTERS WHEN FILLING IN THE BOXES AND BE CLEAR – IF WE CAN'T FIGURE OUT WHAT A LETTER IS, IT WILL AUTOMATICALLY BE GRADED AS INCORRECT

****DO NOT OPEN THIS EXAM UNTIL INSTRUCTED TO DO SO****

Q	1	2	3	4	5	6	7	8	9	10	Total
X	C	A	D	B	B	E	D	A	B	D	30

ANSWER TO BONUS QUESTION

 or 

+5

Teachers open the door. You enter by yourself. – Chinese Proverb

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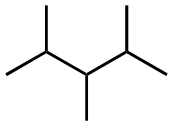
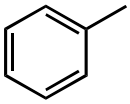
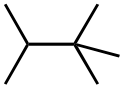
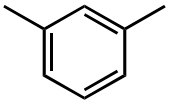
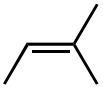
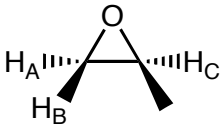
Questions 1–10 are worth **3** points each. The bonus is worth **5** points.

1. Which compound shown below does NOT have five signals in its (^{1}H-decoupled) ^{13}C-NMR spectrum?

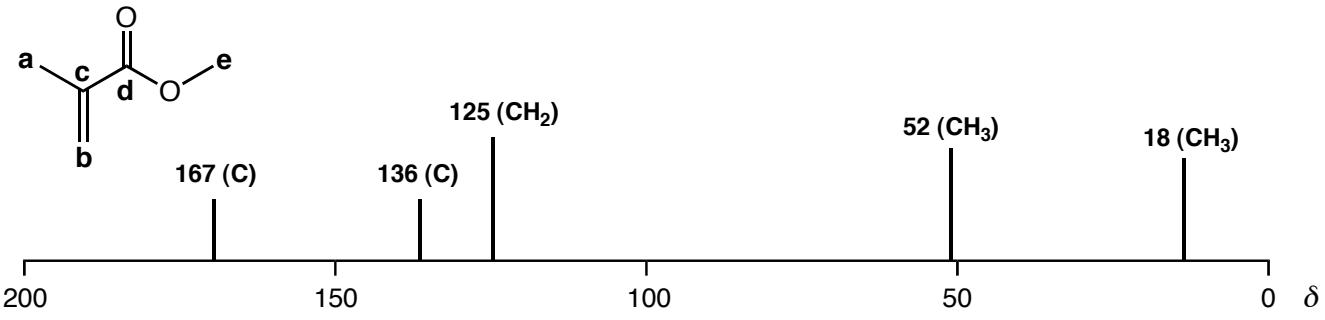
A  **B**  **C**  **D**  **E** 

2. Protons H_A and H_B in propylene oxide (shown below) are best described as –



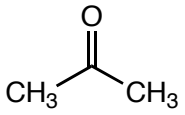
A Diastereotopic **B** Homotopic **C** Constitutionally Heterotopic **D** The Same **E** Enantiotopic

3. The (^{1}H-decoupled) ^{13}C-NMR spectrum of methyl methacrylate is shown below. The δ values are shown above each peak with the corresponding assignment from the DEPT spectrum. From left to right (low field to high field), what is the correct assignment of the signals using the labels (**a** thru **e**) as shown on the structure?



A d, c, b, a, e **B** d, b, c, a, e **C** d, b, c, e, a **D** d, c, b, e, a **E** d, e, b, c, a

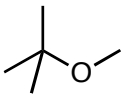
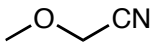
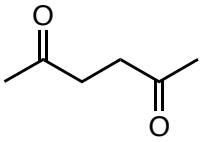
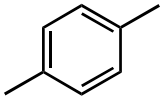
4. The methyl group signal of which compound shown below resonates furthest downfield from that observed for tetramethylsilane {$(CH_3)_4Si$} in the ^{1}H-NMR spectrum?

A CH_3-OH **B** CH_3-F **C** CH_3-Li **D** CH_3-Cl **E** 

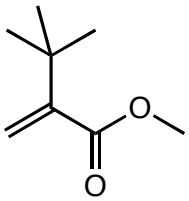
5. The natural isotopic abundance of carbon-13 is approximately –

A 0.1% **B** 1% **C** 10% **D** 99% **E** 100%

6. Which compound shown below gives rise to something other than just singlets (peaks with no splitting) in its ^{1}H-NMR spectrum?

A  **B**  **C**  **D**  **E** 

7. The ^{1}H-NMR spectrum of methyl *t*-butacrylate (shown below) contains what combination of signals?

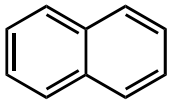
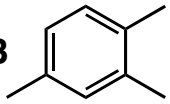
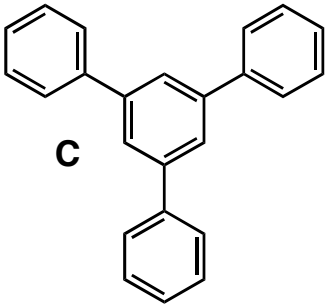
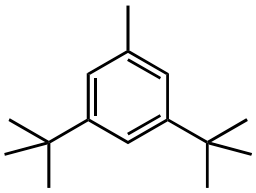


A 3 singlets
B 2 singlets, 1 doublet
C 4 singlets
D 2 singlets, 2 doublets
E 2 singlets, 1 triplet

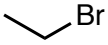
8. The magnitude of the coupling constant (*J*) between two interacting nuclei is NOT dependent on what factor –

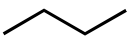
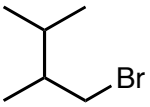
A The applied magnetic field
B The angle between the interacting nuclei
C The type of interacting nuclei
D The number of bonds between the interacting nuclei
E The type of bonds (*i.e.*, σ or π) between the interacting nuclei

9. Which compound shown below gives rise to the most signals in its (^{1}H-decoupled) ^{13}C-NMR spectrum?

A  **B**  **C**  **D**  **E** 

10. Which compound shown below does NOT have a triplet in its ^{1}H-NMR spectrum?

A 

B  **C**  **D** 

E 

BONUS. Propose a reasonable molecular structure for a compound that has the formula C_8H_8 and has only ONE PEAK in its ^{1}H-NMR spectrum, and only ONE peak in its (^{1}H-decoupled) ^{13}C-NMR spectrum – DRAW YOUR ANSWER IN THE BOX PROVIDED ON THE COVER SHEET.