Quiz G – Isolation and characterization of Eugenol

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CHEM 113A
Name ____________________________

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1) Which one of the following is the derivative of eugenol prepared by the reaction of eugenol with chloroacetic acid under strongly basic condition? (2 Points)

Answer: C

2) The compound caryophyllene is another very abundant compound in cloves. Suppose some caryophyllene is co-distilled along with eugenol during co-distillation. Answer: D

Which one of the following extractive separation technique you would use for separating eugenol from caryophyllene? (3 Points)

A. Repeated extractions with dichloromethane followed by repeated washings with water

B. Repeated extraction with dichloromethane followed by repeated washings with NaCl.

C. Repeated extractions with dichloromethane followed by repeated extractions with NaHCO₃ and acidification.

D. Repeated extractions with dichloromethane followed by repeated extractions with NaOH and acidification.
3) A \( \text{C}_2\text{H}_2\text{BrCl} \) compound gives a \(^1\text{H}-\text{NMR} \) spectrum consisting of two equal sized doublets, \( J = 17 \text{Hz} \). What is this compound? (3 Points) Answer: C

4) A \( \text{C}_5\text{H}_{12}\text{O}_2 \) compound has strong IR absorption at 3300 to 3400 cm\(^{-1} \). The \(^1\text{H}-\text{NMR} \) spectrum has three singlets at \( \delta0.9, \delta3.45, \) and \( \delta3.2 \) ppm; relative areas 3:2:1. Addition of \( \text{D}_2\text{O} \) to the sample eliminates the downfield signal. Which of the following compounds best fits this data? (3 Points) Answer: D

   A. 2,4-pentanediol
   B. 1,3-dimethoxypropane
   C. 1,5-Pentanediol
   D. 2,2-dimethyl-1,3-propanediol

5) Which one of the following compounds has two doublets with \( J = 2 \text{ Hz} \) in the aromatic region of the \(^1\text{H}-\text{NMR} \) spectrum? (3 Points) Answer: D

6) Identify the following compounds (Relative integrals are given from left to right across the spectrum). Hint: Use index of hydrogen deficiency for narrowing down the possibilities.

The \(^1\text{H}-\text{NMR} \) spectrum of a compound with molecular formula \( \text{C}_6\text{H}_{10}\text{O}_2 \) has two singlets with an area ratio of 2:3. (3 Points) Answer:

The \(^1\text{H}-\text{NMR} \) spectrum of a compound with molecular formula \( \text{C}_8\text{H}_6\text{O}_2 \) has two singlets with an area ratio of 1:2. (3 Points) Answer: