1) Arrange the following alkenes in order of increasing stability (least stable → most stable)

\[ \text{A} \quad \text{B} \quad \text{C} \quad \text{D} \]

2) An unknown hydrocarbon was subjected to combustion analysis. A 6.68 mg sample of this compound produced 20.8 mg CO\textsubscript{2} and 8.91 mg H\textsubscript{2}O.

   a) Calculate the mass percentage of carbon and hydrogen in the sample
   b) Calculate the empirical formula of the hydrocarbon
   c) Based on the empirical formula, the hydrocarbon is: (pick one)
      (i) an alkane with no rings
      (ii) an alkene
      (iii) an alkane with a ring
      (iv) either (ii) or (iii)
      (v) none of the above

3) Give the IUPAC name for \(\alpha\)-farnesene, a natural product isolated from the oil of citronella
4) Assign the (Z) or (E) configuration to each of the following compounds.

a) CH₂NH₂C₆H₄CH₃CH₂OH
b) ClH₂CH₂C₆H₄Cl

c) H₃CO

5) Draw all possible structures for a compound that has the molecular formula C₇H₁₄ and contains two 1°, three 2°, and two 3° carbons.

6) The rates of hydration of the following isomeric alkenes differ markedly. Which one reacts faster? Explain.