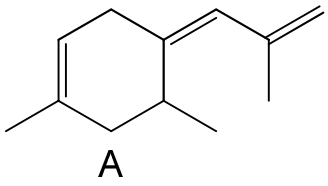
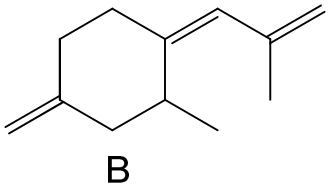
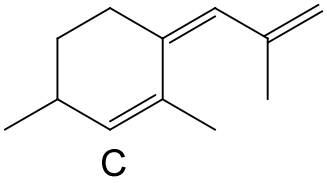
WORKSHEET IV

1. In each set of compounds, identify the most stable

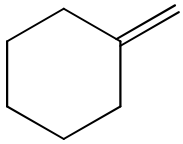
(a)

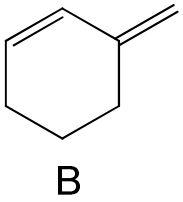


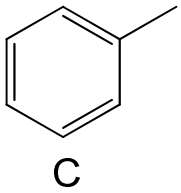




(b)

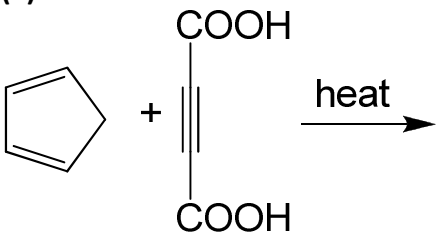




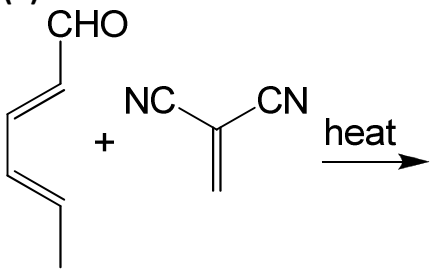


2. What is the product(s) of the following reactions?

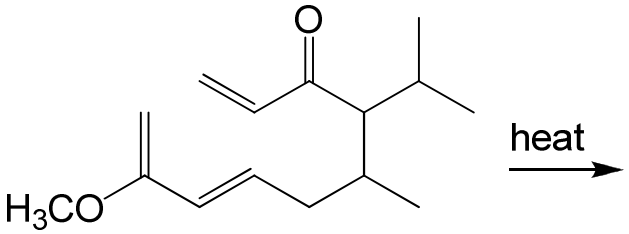
(a)



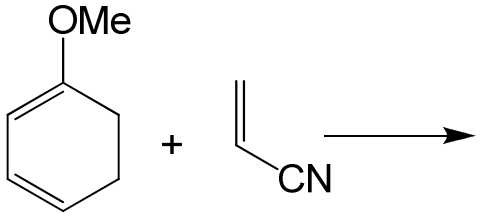
(b)



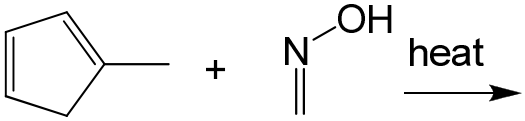
(c)



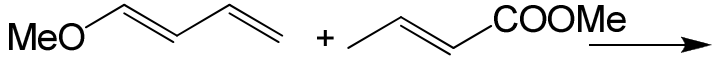
(d)



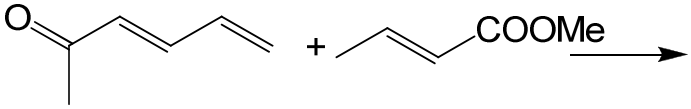
(e)



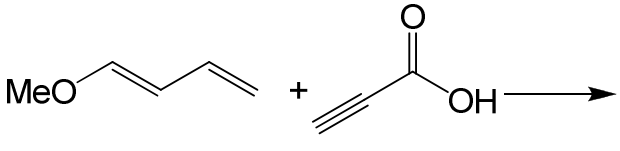
(f)



(g)

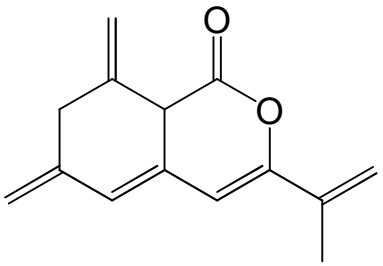


(h)

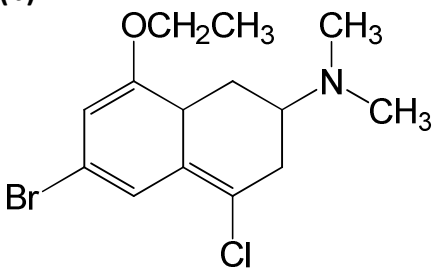


3. Use the Woodward-Fieser rule and the table from your course material to estimate the λ_{max} for the following cross-conjugated systems

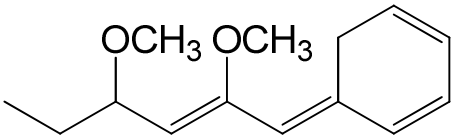
(a)



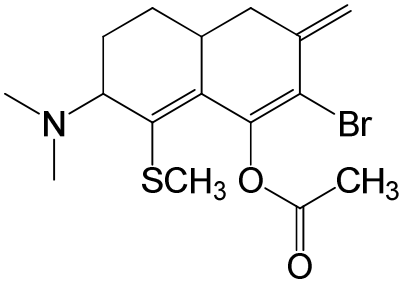
(b)



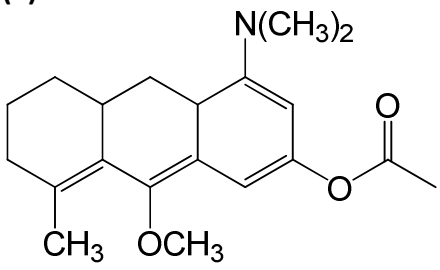
(c)



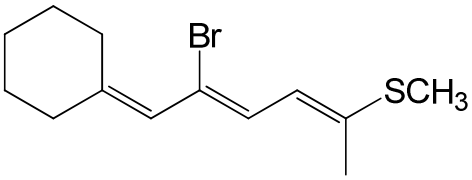
(d)



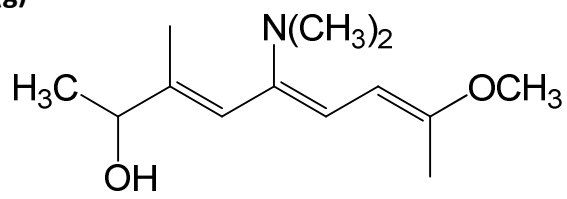
(e)



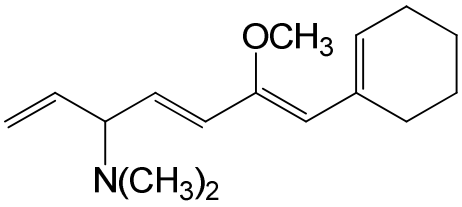
(f)



(g)



(h)



4. Explain why in the IR spectrum the signals are downward, and upward in the UV spectrum.

5. You are hired by a chemical plan to design a new sunscreen that could protect the skin from UVA and UVB radiations. Explain in detail how you will approach such a task.

6. Use the given data to calculate the missing parameter.

(a) A solution of methyl p-aminobenzoate has an absorbance (A) of 0.43 at and $\varepsilon = 1.23 \times 10^4$ $M^{-1}cm^{-1}$. What is the concentration of such a solution? The path length is 2.3 cm.

(b) 4-Hydroxyxanthone has an absorption coefficient of 3.675×10^3 M^{-1} cm^{-1}. What is the concentration of a solution of a solution of 4-hydroxyxanthone having an absorbance (A) of 0.56? The path length is 1.6 cm.

(c) What is the concentration of β-carotene in solution if a solution has an absorbance (A) of 0.91 and a molar absorptivity coefficient of 2.3×10^5 $M^{-1}cm^{-1}$? The path length is 1.3 cm.

7. Explain why saturated systems although they enable σ to σ* transition are not UV active.