CY 1001 Assignment 4 – Electrocyclic and Cycloaddition Reactions

1. Identify the product(s) including stereochemistry for the following reactions.

(a)



(b)



(c)



(d)



1. Suggest a mechanism for the following reactions.

(a)

(Ring opening followed by Diels-Alder reaction.

What is the stereochemistry of the intermediate and product?)

(b)

 (What is the stereochemistry of the product?)

(c)



(first close the ring and then close it again, double electrocyclic reactions)

1. Considering that the conversion of Dewar benzene to benzene is exothermic by 71 kcal mol-1, its kinetic stability is quite high. It has a half-life of 2 days at 25 oC and the enthalpy of activation for the conversion is 23 kcal mol-1. Explain why Dewar benzene is unexpectedly stable under thermal conditions whereas it readily converts to benzene under photochemical conditions.



Explain why 1,2,4-tri-t-butylbenzene readily photo-isomerizes to the corresponding Dewar benzene?

1. Identify the product(s) of cycloaddition in the following transformations. Pay attention to stereochemistry wherever applicable.

(a)



(b)



(c)



(d)



(e)



(f)



(g)



(h)



END