INTRODUCTION TO CHEMISTRY

CML-101

Tutorial 2

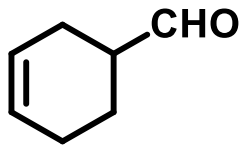
Dr. Chinmoy K. Hazra
Department of Chemistry
IIT Delhi

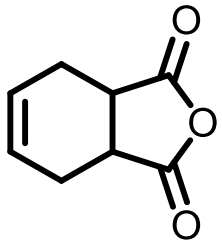
18-12-2020

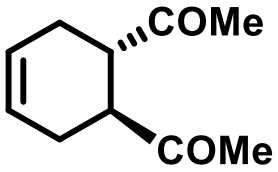
Kinetic versus thermodynamic control: selected examples using MO theory (DAR, 1,3-butadiene addition, enolate alkylation, naphthalene sulfonation)

Q1: What will be the Molecular Orbital description of allylic cation and allylic radical? Define HOMO and LUMO in both the system.

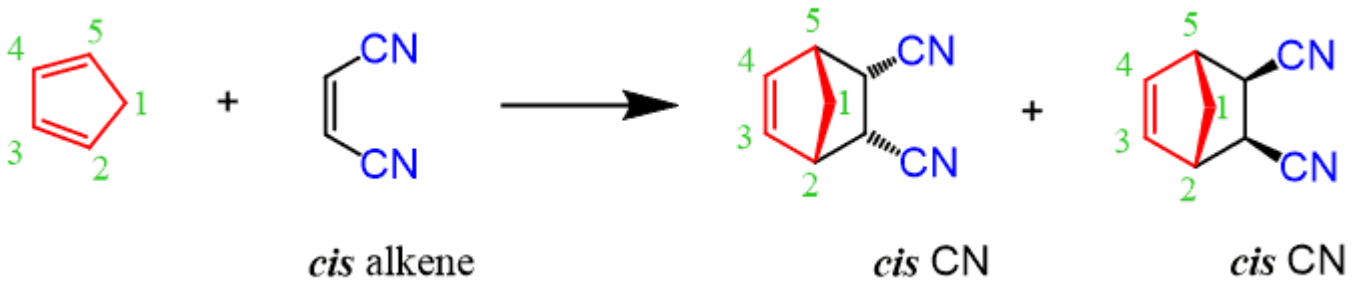
Q2: Identify the Diene and Dienophile with correct stereochemistry for each for the following Diels–Alder Reactions



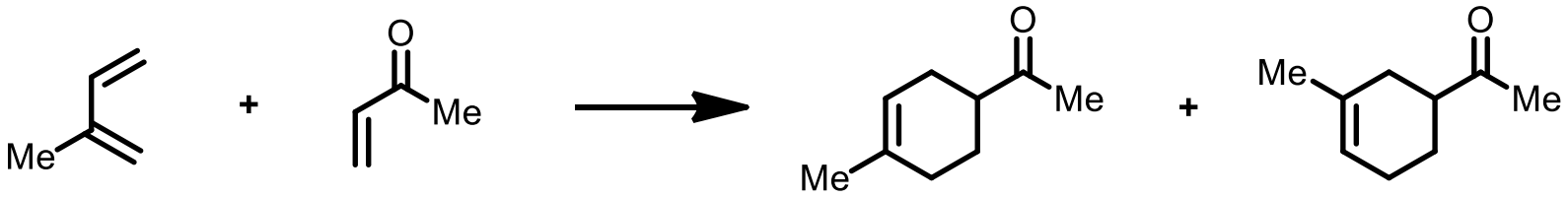




Q3: Explain the following Diels–Alder Reaction with a proper drawing

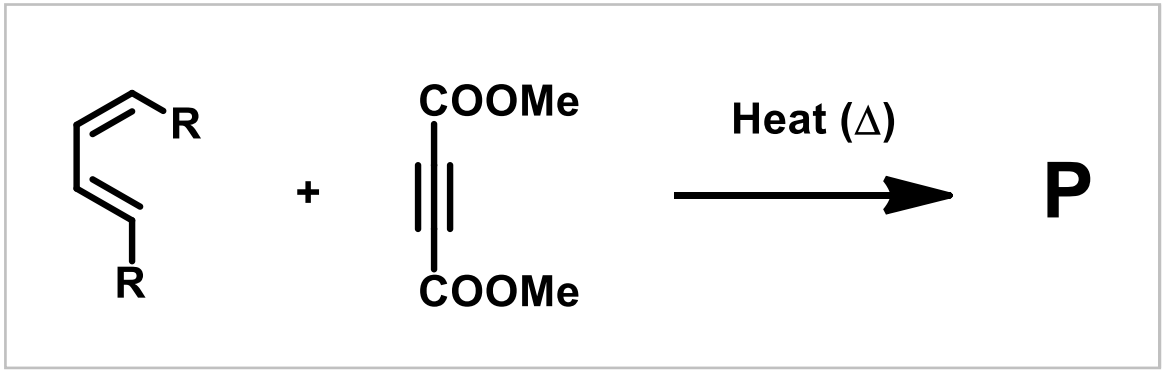


Q4: Explain the following products distribution (regioselectivity) of Diels Alder Reaction.

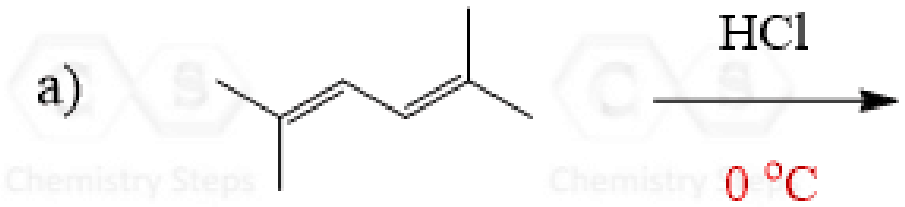


heat in toluene at 120 °C in sealed tube:	**71%**	**:**	**29%**
With $SnCl_4 \bullet 5H_2O$:	**93%**	**:**	**7%**

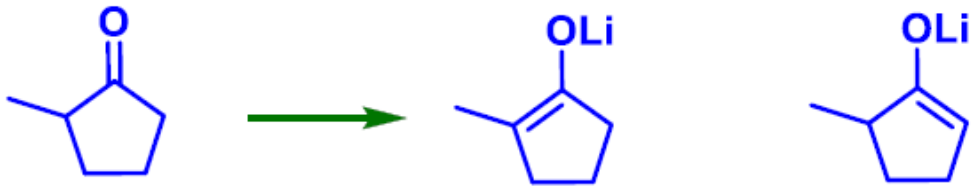
Q5: What will be the product (P) in the following reaction? What will be the stereochemistry of P?



Q6: Predict the kinetic or thermodynamic products of electrophilic addition to conjugated diene. What will be the major product at low temperature?



Q7: Explain the following facts of enolates formation.



Ph_3CLi / DME	28	72
Ph_3CLi / excess ketone	94	6