

**B.Sc. Semester-VI
Group A / DSE-4
Organic Synthesis**



II. Pericyclic Reactions

8. [2+2] Cycloaddition Reaction



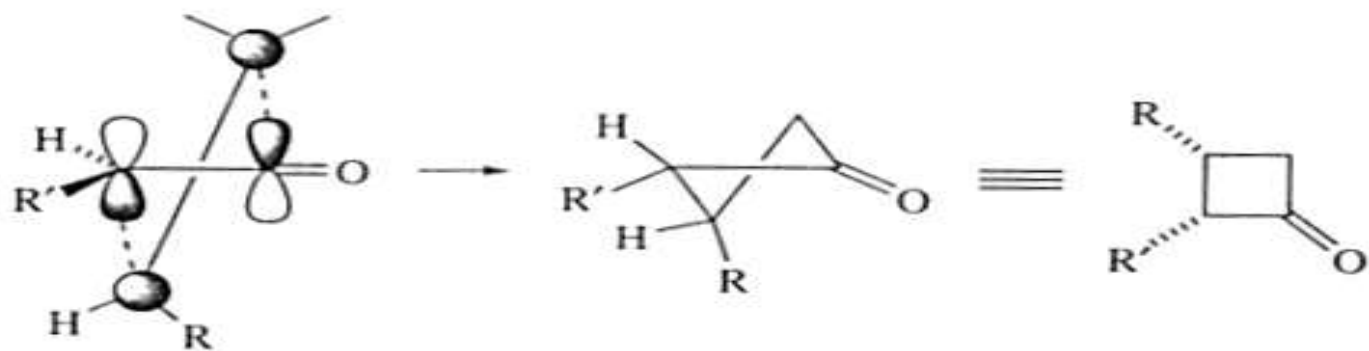
Dr. Rajeev Ranjan
University Department of Chemistry
Dr. Shyama Prasad Mukherjee University, Ranchi

[2+2] Cycloaddition of Ketenes

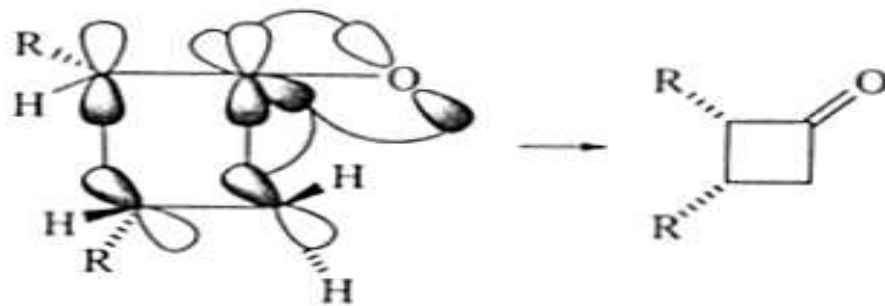
(HOMO-LUMO Approach)



(a)

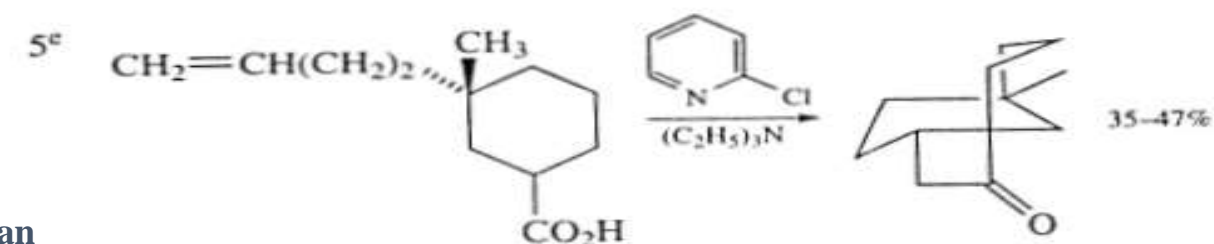
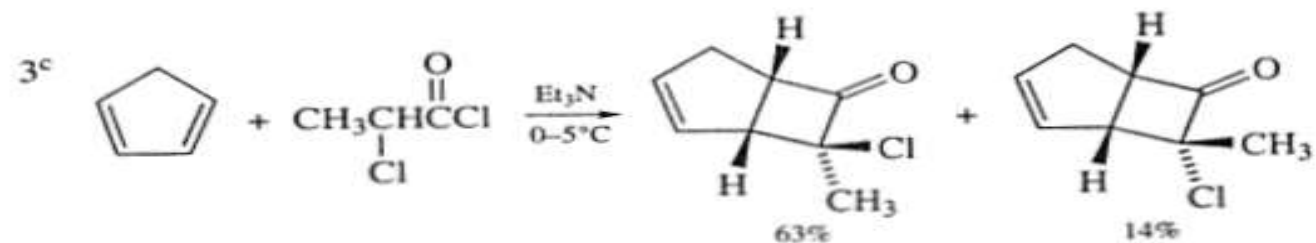
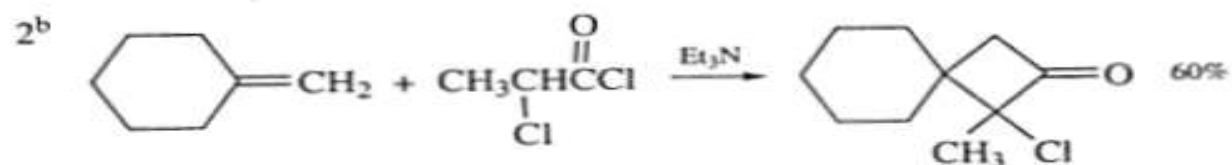
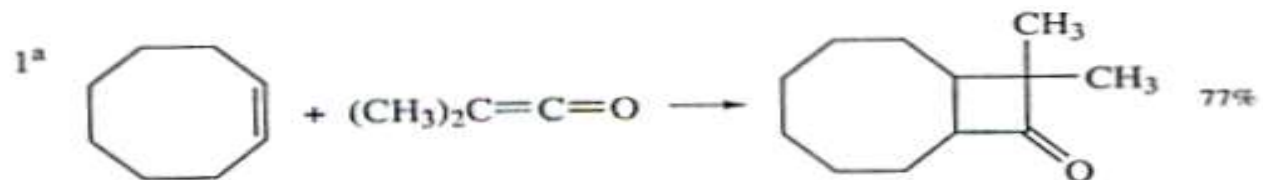


(b)

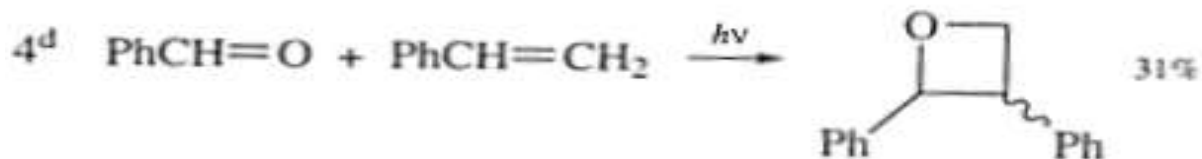
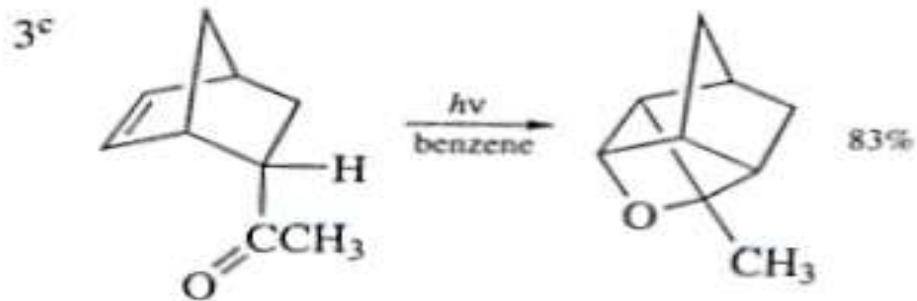
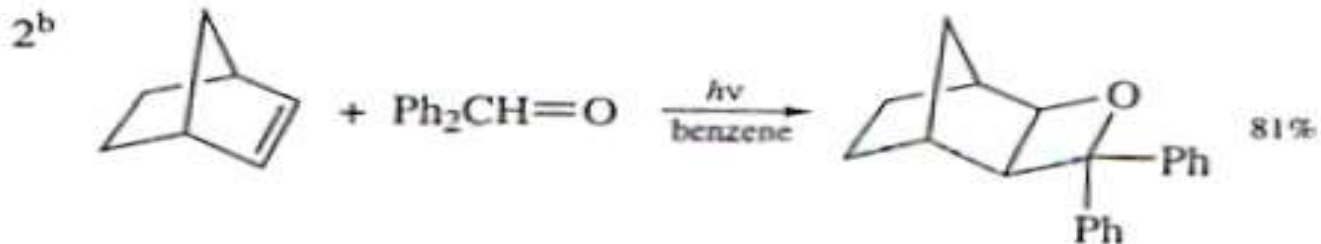
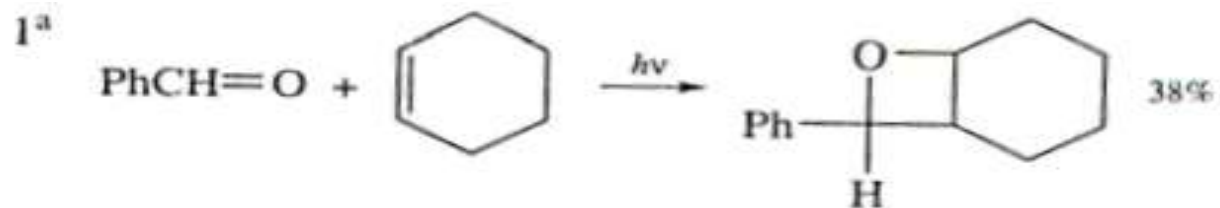


(c)

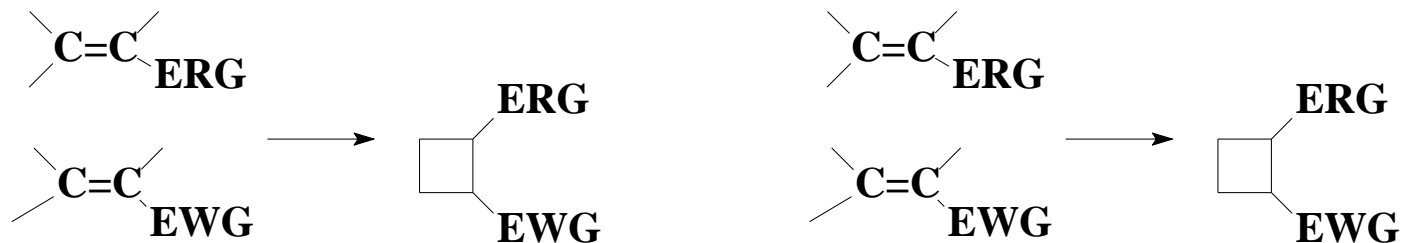
[2+2] Cycloaddition of Ketenes



[2+2] Cycloaddition of Carbonyl Compounds



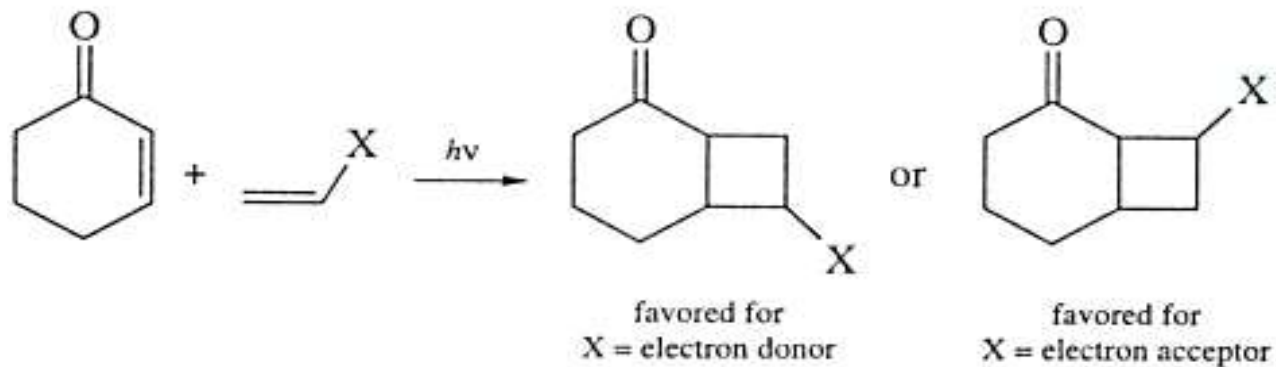
[2+2] Cycloaddition of Alkenes to Form Cyclobutane



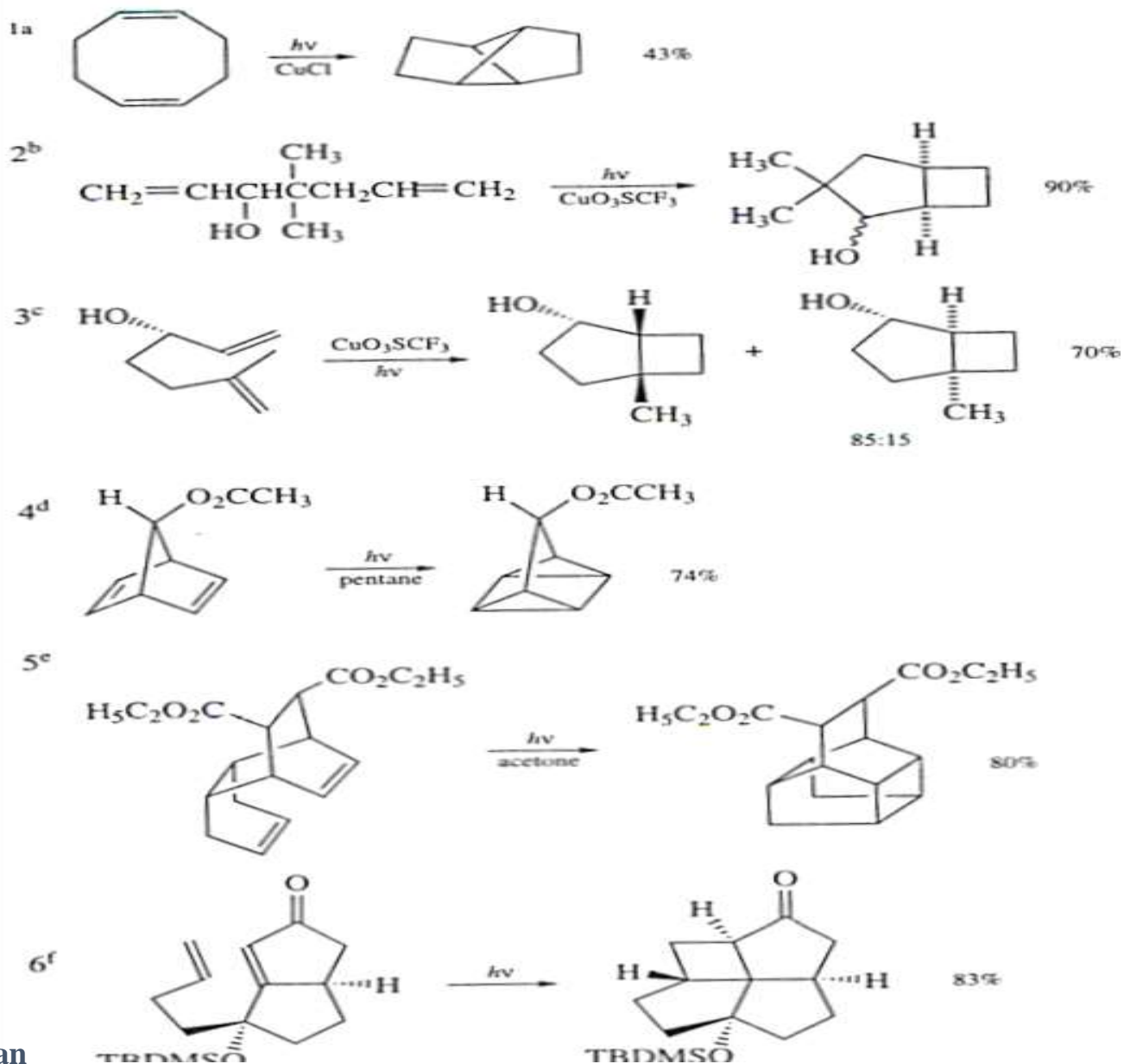
Electron releasing groups = Electron withdrawing groups

Electron releasing groups = -OR, NR₂

Electron withdrawing groups = -NO₂, -CN

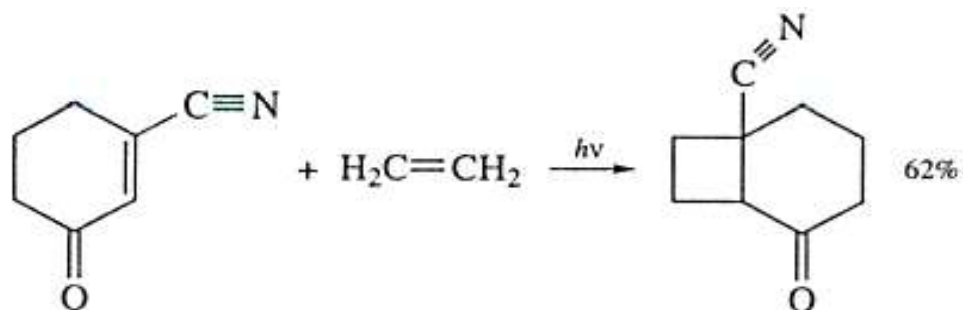


[2+2] Cycloaddition of Alkenes

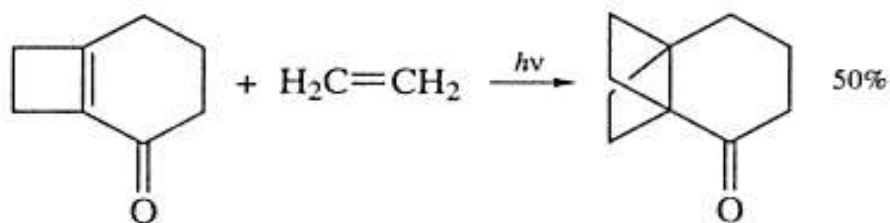


[2+2] Cycloaddition of Alkenes/Alkynes

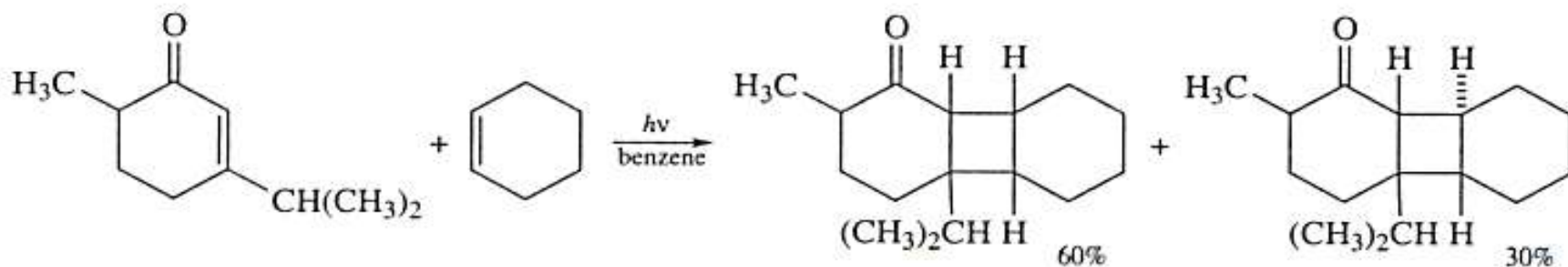
1^a



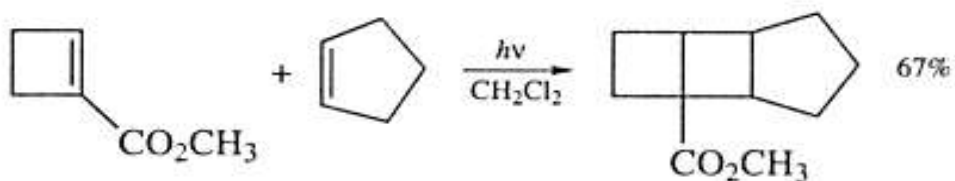
2^b

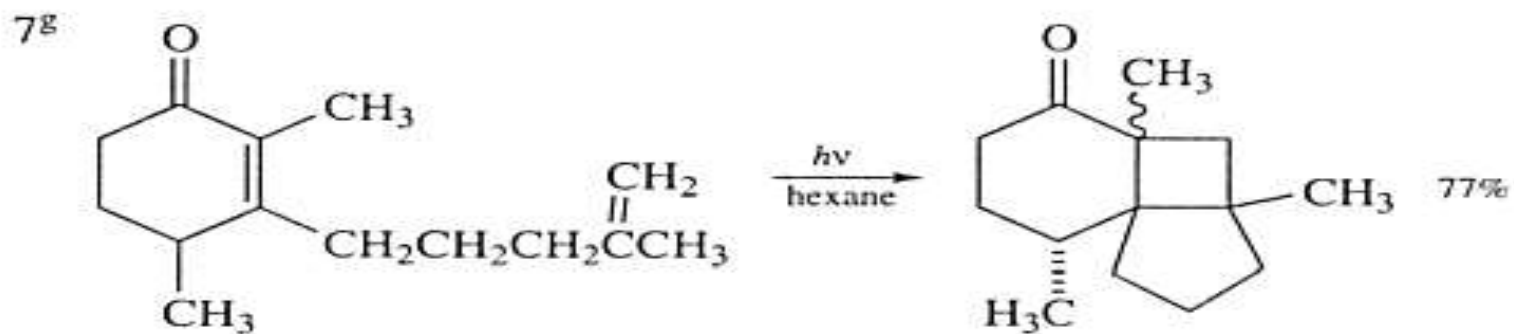
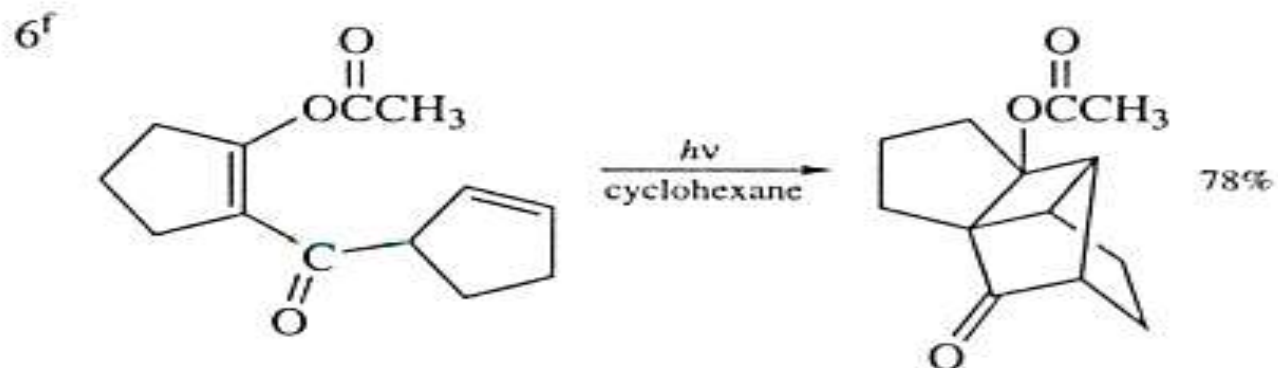
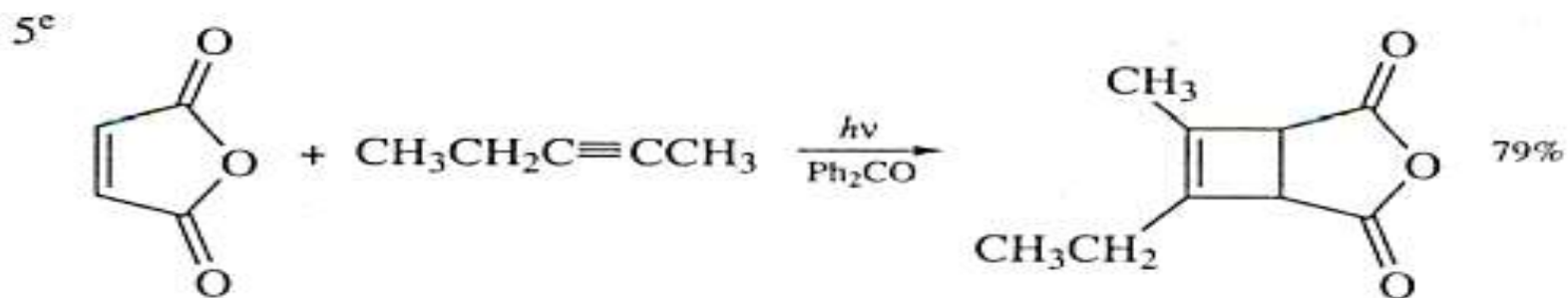


3^c



4^d





Thank You



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