

2021

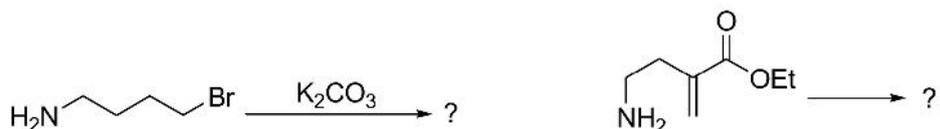
**CHEMISTRY****Paper : CHEM-101****(Organic Chemistry Theory)  
(CBCS)**

Full Marks : 40

Time : Two Hours

*The figures in the margin indicate full marks.*Question No. 1 is compulsory and answer any *three* questions from the rest.1. Answer any *five* questions : 2×5=10

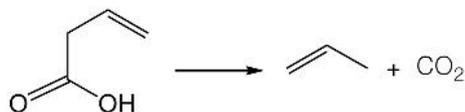
- (a) “All the conformers are conformation but all the conformations are not conformer” — Comment on the statement.
- (b) Draw all the conformations of *meso*-2,3-dibromo butane and explain their stability.
- (c) Write down the correct cyclisation products and designate these with Baldwin’s rule.



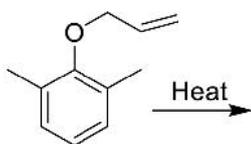
- (d) Find out the feasibility of the following reactions by entropy factor.



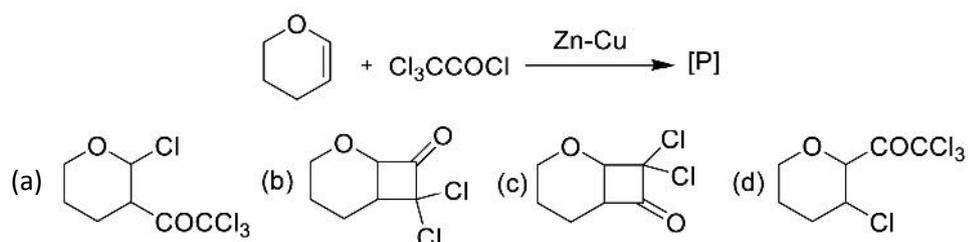
(e) Define the type of pericyclic reaction.



(f) What would be the possible major product in this reaction? What type of pericyclic reaction is this?



(g) In the following reaction, the product [P] is :

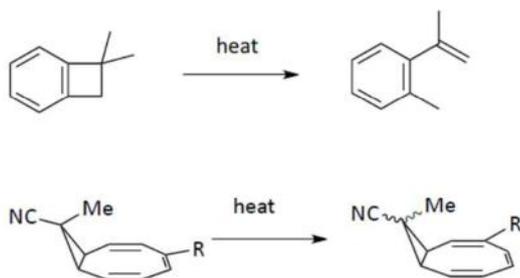


(h) *Cis*-4-hydroxycyclohexane carboxylic acid readily forms lactone, but the *trans*-isomer does not. Explain.

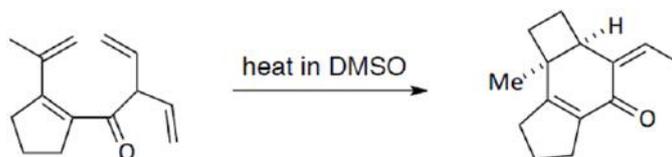
2. (a) According to Bayer strain theory, cyclopentane would have been more stable than cyclohexane but heat of combustion experiment indicates the reverse — Justify.

(b) Draw the conformations of *cis*- and *trans*-1,3-dimethyl cyclohexanes. Comment on their relative stability.

- (c) Discuss the symmetry properties and optical activities of *cis*- as well as *trans*-1,2-dimethyl cyclohexane. 3+4+3=10
3. (a) What are thermodynamically controlled reactions and Kinetically controlled reactions? Give examples.
- (b) For 1-methyl-1-phenylcyclohexane, the conformer with axial phenyl group and equatorial methyl group is preferred. Explain.
- (c) Draw with proper labeling the energy profile diagram for the flipping of chair conformation of cyclohexane.
- (d) What is isotope labeling? Give example.
- (e) Explain Hammond Postulate. 2+2+2+2+2=10
4. How many types of organic reactions are known? Explain the terms nucleophile, nucleofuge, electrophile and electrofuge. Write a brief account on “thermodynamic requirements for reaction” and “kinetic requirements for reaction”. 2+2+3+3=10
5. (a) Explain the product formation in the light of pericyclic reaction :



- (b) Write down the plausible mechanism indicating type of pericyclic reactions in the following transformation : 2½×2+5=10



6. (a) What would be the major product with correct stereochemistry when *trans, cis, trans*-2,4,6-octatriene is subjected to photochemical irradiation. Explain your answer.
- (b) Write a short note on 1, 3-dipolar cycloaddition reactions. 5+5=10
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