

2024

## CHEMISTRY — HONOURS

Paper : CC-12

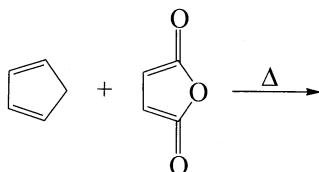
(Organic Chemistry)

Full Marks : 50

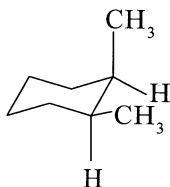
*The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.*Answer **question no. 1** (compulsory) and **any eight** questions from the rest. (**question nos. 2 to 12**).1. Answer **any ten** questions :

1×10

- Pyrrole is less basic than pyridine. Explain.
- D-Fructose responds positively to Tollens' reagent. Explain.
- Give an example of [3, 3] sigmatropic reaction.
- Draw the structure of Uracil.
- Which reagent is used to protect the amino group of amino acids in solid phase peptide synthesis? Give the structure of the reagent.
- Draw 4-epimer of D-glucose.
- Identify the product of the following reaction :



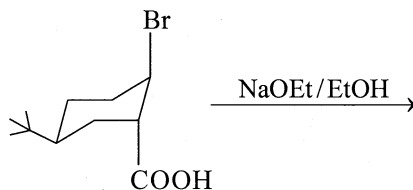
- Phenanthrene gives typical reactions of olefinic double bond but anthracene does not. Why?
- Draw the preferred conformation of *trans*-1-methyl-3-isopropylcyclohexane (structure only).
- C-1 of naphthalene is more reactive than its C-2 position regarding electrophilic monosubstitution reaction. Explain in brief.
- Choose the correct option to fill in the blank as follows :  
Mutarotation of an aldose is exhibited in \_\_\_\_\_. (acidic/basic/amphoteric solvent).
- How many tripeptides are possible from Gly, Ala, Val?
- Mention the number of gauche-butane interactions in the following compound (Number only) :



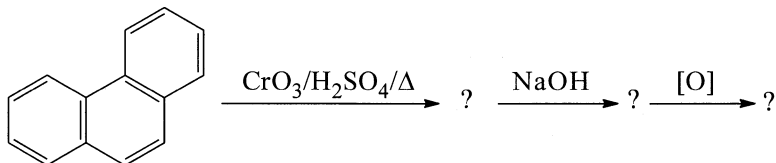
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(0639)

2. (a) *trans*-4-tertiarybutylcyclohexyl tosylate undergoes bimolecular elimination reaction with bromide ion rather than the stronger base ethoxide anion. Explain with mechanism.
- (b) Comment on the optical activity of (1*R*, 3*R*)-1,3-Dimethyl-cyclohexane. 3+2
3. (a) D-Glucose, D-mannose and D-fructose give the same osazone. Explain with mechanism.
- (b) Predict the product with plausible mechanism of the following reaction with mechanism. 3+2

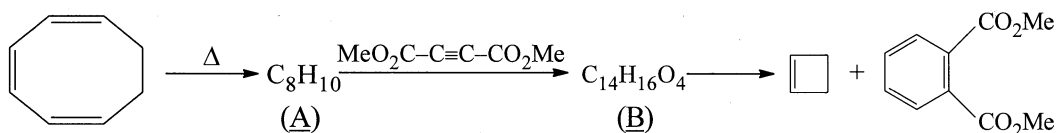


4. (a) Complete the following :

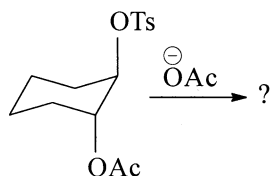


- (b) How would you synthesise anthracene by Diels-Alder reaction? 3+2

5. (a) Write the structures of (A) and (B) giving the mechanism of formation of (B) from (A).



- (b) Write the product of the following reaction with plausible mechanism. 3+2

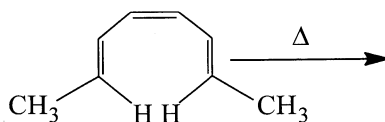


6. (a) Bromine water ( $\text{Br}_2/\text{H}_2\text{O}$ ) oxidation of  $\alpha$ -anomer of D-glucopyranose is 250 times slower than the  $\beta$ -anomer of the same compound. Explain with mechanism.
- (b) Why does D-fructose reduce Fehling's solution although it is a ketohexose? 3+2
7. (a) Show the mechanism of mutarotation of glucose in 2-pyridone as solvent.
- (b) What is DCC? How is it used in peptide synthesis? 3+2

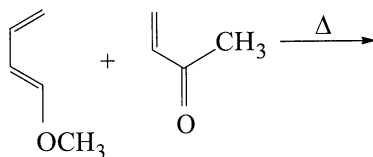
(3)

B(5th Sm.)-Chemistry-H/CC-12/CBCS

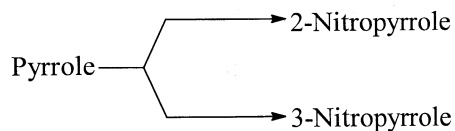
8. (a) Write a brief account on the double helical structure of DNA proposed by Watson and Crick.  
(b) Write down the structure of the nucleoside adenosine taking D-ribose as the pentose sugar. 3+2
9. (a) Synthesise phenylalanine through azlactone.  
(b) Give a chemical method to determine the C-terminal residue of a tripeptide. 3+2
10. (a) Predict the products with stereochemistry showing the FMO interaction of the following :



- (b) Predict the products and discuss the regioselectivity of the following reaction : 3+2



11. (a) Convert :



- (b) Convert pyridine to 4-nitropyridine. 3+2

12. (a) Convert :

- (i) D-Glucose to D-glucuronic acid  
(ii) D-Glucose to D-glucose pentaacetate
- (b) Which conformation is preferred by *trans*-1,3-ditertiarybutyl-cyclohexane? Explain. 3+2