

B.Sc. 5th Semester (Honours) Examination, 2023 (CBCS)

Subject : Chemistry

Course : CC-XII

(Organic Chemistry)

Time: 2 Hours

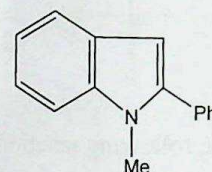
Full Marks: 40

*The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.*

2×5=10

1. Answer *any five* questions from the following:

- Draw the HOMO and LUMO of cyclopentadiene.
- What happens when naphthalene is subjected to ozonolysis? Give necessary reaction(s).
- Write down the product when pyrrole is treated with I_2 in aqueous KI?
- Ephedrine is lesser basic than ψ -ephedrine—Explain.
- Why are D-mannose and D-galactose not epimeric hexoses? Explain.
- Draw the structure of BOC-derivative of alanine.
- Mention the starting compounds for the synthesis of the following compound by Fischer-Indole synthesis.

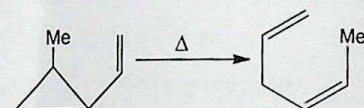


- What is Sanger's reagent? Mention its use in protein chemistry.

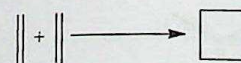
2. Answer *any two* questions from the following:

5×2=10

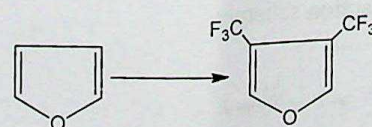
- (i) Account for the following observation:



- (ii) Using FMO approach explain how the following conversion can be carried out? 2+3



- (i) Convert:

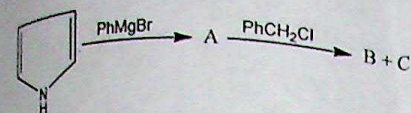


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(ii) Identify A to C in the following reaction scheme:



3+2

- (c) (i) An aldohexose, $C_6H_{12}O_6$ on reduction with Na/Hg gives D-Sorbitol which on reaction with excess phenyl hydrazine forms an osazone which is different from the osazone of D-glucose. Write down the structure of the aldohexose explaining the reactions.
- (ii) 'The rate of oxidation of β -D-glucose by Br_2/H_2O is faster than that of α -D-glucose' — Explain.
- (d) (i) What kind of stereoisomerism do you find in α -terpineol? How many stereoisomers are possible when Br_2 adds to the double bond of α -terpineol?
- (ii) How phenanthrene can be converted to phenanthrene-9-carboxylic acid?
- (iii) What is the difference between 'nucleoside' and 'nucleotide'?

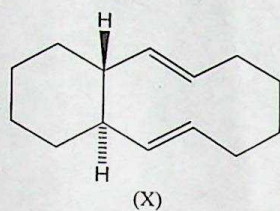
3+2

2+2+1

3. Answer any two questions from the following:

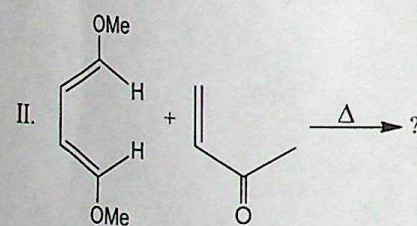
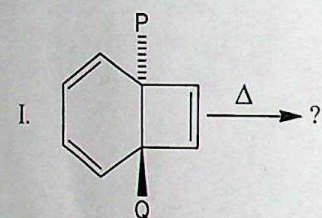
10×2=20

- (a) (i) Optically active 'X' racemises on heating at $50^\circ C$ with a half life of 24 hours. Rationalise the observation.

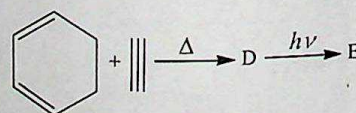


(X)

(ii) Predict the product of the following reactions:

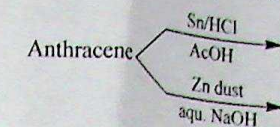


(iii) Identify D and E in the following reaction scheme:

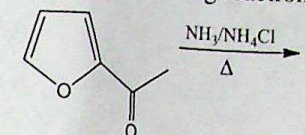


(iv) Write down the products of the following reactions:

2+(2+2)+2+2



- (b) (i) Write down a scheme for the synthesis of Gly-Ala using DCC promoted peptide bond formation.
- (ii) Briefly discuss one important method for determining N-terminal residue in peptide chain.
- (iii) What happens when alanine is heated with acetic anhydride in pyridine solvent? Give the mechanism involved.
- (iv) Identify the product of hydramine fission on (–)-ephedrine.
- (c) (i) Write down the product of the following reaction with proper mechanism:



(ii) Carry out the following conversions:

(I) Indole \rightarrow Quinoline

(II) Pyridine \rightarrow 4-Bromo pyridine

(iii) Show what happens when α -tetralone is heated with 1 : 1 mixture of NaOH–KOH at $220^\circ C$.

3+5+2

- (d) (i) Suggest a scheme for stepping up of an aldose by two additional carbon atoms using Wittig reaction in one of the steps involved.
- (ii) How periodic acid (HIO_4) oxidation be used to distinguish between D-arabinose and D-glucose?
- (iii) How the following conversion can be carried out?
- (I) Methyl D-glucopyranoside \rightarrow Methyl D-glucofuranoside
- (II) D-glucose \rightarrow 3-deoxy-D-glucose
- (iv) Identify the product of the following reaction:

3+2+4+1

