

Total number of printed pages-11

2 SEM PG CHM (CBCS) OC-II 202

2026

(June)

CHEMISTRY

Paper : Core 202

(Organic Chemistry-II)

Full Marks : 60

Time : Three hours

***The figures in the margin indicate
full marks for the questions.***

*Write the answer of **UNIT-I** and **II** in one book
and **UNIT-III** and **IV** in a separate book.*

UNIT-I

(Marks : 15)

1. Answer the following questions : 7
 - (a) Discuss the structure elucidation of atropine. 3

- (b) Explain Hofmann's exhaustive methylation method with example. 2
- (c) Explain the synthesis of piperine starting from catechol. 2

Or

Write the products when papaverine is oxidized with $KMnO_4$ in neutral medium.

2. Answer the following questions : **(any two)**
3×2=6

- (a) Discuss the structure elucidation of linalool.
- (b) Explain the structure elucidation of camphor.
- (c) Write the steps involved in the total synthesis of pinene.
- (d) Write down the steps involved in the synthesis of Menthol from m-cresol.

3. Answer the following questions : **(any one)**

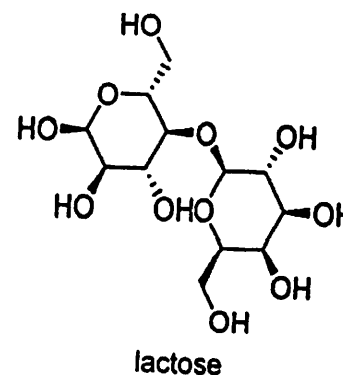
- (a) Discuss the significance of isoprene rule. 2
- (b) How many stereoisomers are possible for borneol? Write their structures. 2
- (c) State the special isoprene rule and explain with example. 2

UNIT-II

(Marks :15)

4. Answer **any five** of the following : 3×5=15

- (a) "Lactose is a galactoside and not a glucoside." Justify this statement with proper explanation.



(b) Justify the sentences with proper structural elucidation: 1+2=3

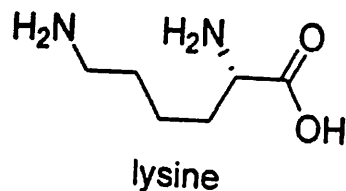
(i) Starch is called a non-reducing sugar.

(ii) Amylopectin is more soluble than amylase.

(c) Write equations for the sequence of oxidation, methylation and hydrolysis as applied to (+)-cellobiose.

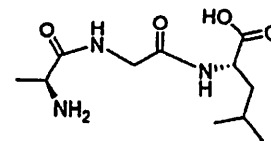
1+1+1=3

(d) Carry out the synthesis of Lysine in either solution phase or solid phase peptide synthesis process (with proper reagents and reaction condition). 3



(e) For the given tripeptide
Ala → Gly → Leu,

1½×2=3



(i) Write the reaction for the determination of C-terminal amino acid.

(ii) write the reaction for the determination of N-terminal amino acid.

(f) Write notes on : **(any two)** 1½×2=3

(i) Reactions of cellulose

(ii) Denaturation of proteins

(iii) Cyclodextrins

UNIT-III

(Marks: 15)

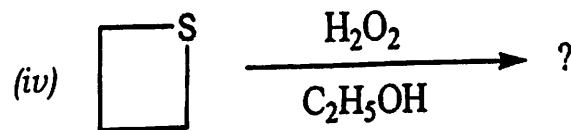
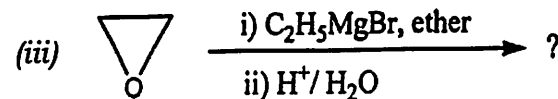
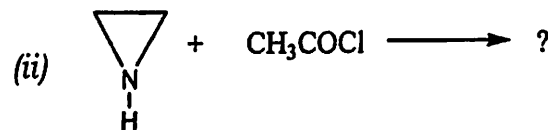
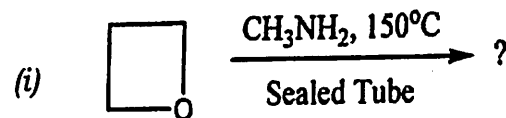
5. Answer **any three** of the following : $3 \times 3 = 9$

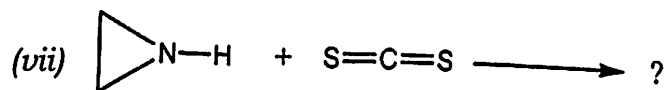
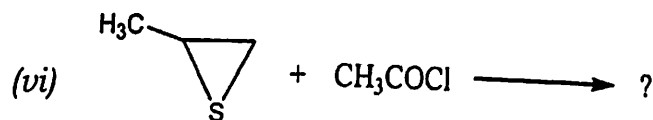
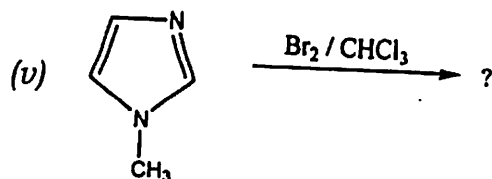
- (a) (i) Write down *one* synthetic method for the preparation of aziridine derivatives by intramolecular nucleophilic substitution. 2
- (ii) Why is aziridine a weak base as compared to the open chain partner dimethyl amine? 1
- (b) (i) Write the general method of synthesis of imidazole from α -haloketone. $1\frac{1}{2}$
- (ii) Why electrophilic substitution does not occur at C-2 position of imidazole? $1\frac{1}{2}$
- (c) (i) Describe a method for isoxazole synthesis. 2
- (ii) Why is the strain energy of thiirane (9 kcal/mol) smaller than the strain energy of oxirane (13 kcal/mol) and aziridine (14 kcal/mol) 1

(d) How will you synthesize pyrazole from a dicarbonyl compound? Write down the mechanism of the reaction.

1+2=3

6. Write down the major products of the following reactions : (**any six**) $1 \times 6 = 6$





UNIT-IV

(Marks: 15)

7. Answer **any two** of the following: $2 \times 2 = 4$

(a) What are metastable peaks? Write the characteristic of these peaks.

(b) Using McLafferty rearrangement show the mass fragmentation of butylbenzene and 6-methylhept-2-ene.

(c) In the mass spectrum of 1-bromo-2-chlorobenzene, what will be relative intensity ratio of peaks at m/z values 190, 192 and 194.

8. Determine the structure of the compound having the following data: (**any three**)

$3 \times 3 = 9$

(a) Molecular formula: $C_8H_{12}O_4$
 IR (cm^{-1}): 3030, 2900, 1740, 1660
 1H -NMR (δ ppm): 6.5 (s, 1H),
 4.15 (q, 2H), 1.25 (t, 3H)
 ^{13}C -NMR (δ ppm): 14, 60, 136, 170

(b) Molecular weight: 116
 IR (cm^{-1}): 3000-2500, 1715, 1340
 1H -NMR (δ ppm): 2.2 (s, 3H), 2.6 (t, 2H),
 2.25 (t, 2H), 11.1 (s, 1H)

(c) Molecular formula: $C_{15}H_{14}O$
 1H -NMR: δ 2.4 (s), 7.2 (d), 7.7 (d)
 ^{13}C -NMR: δ 21, 129, 130, 136, 141, 190

- (d) Molecular formula : $C_{10}H_{12}O_2$
IR (cm^{-1}) : 2900, 1711
 1H -NMR (δ ppm) : 2.1 (s, 3H),
3.6 (s, 2H), 3.8 (s, 3H), 6.9 (d, 2H),
7.2 (d, 2H);
 ^{13}C -NMR (δ ppm) : 29, 50, 55, 114, 126,
130, 159, 207

9. Answer the following questions : 1×2=2

- (a) In the IR spectrum, the absorption band due to carbonyl group in p-nitrobenzoic acid appears at

(i) 1670 cm^{-1}

(ii) 1702 cm^{-1}

(iii) 1740 cm^{-1}

(iv) 2000 cm^{-1}

- (b) The number of ^{13}C NMR signals for anthracene and phenanthrene are respectively _____ and _____.