

Bs/CHEM.M-2(T)

2026

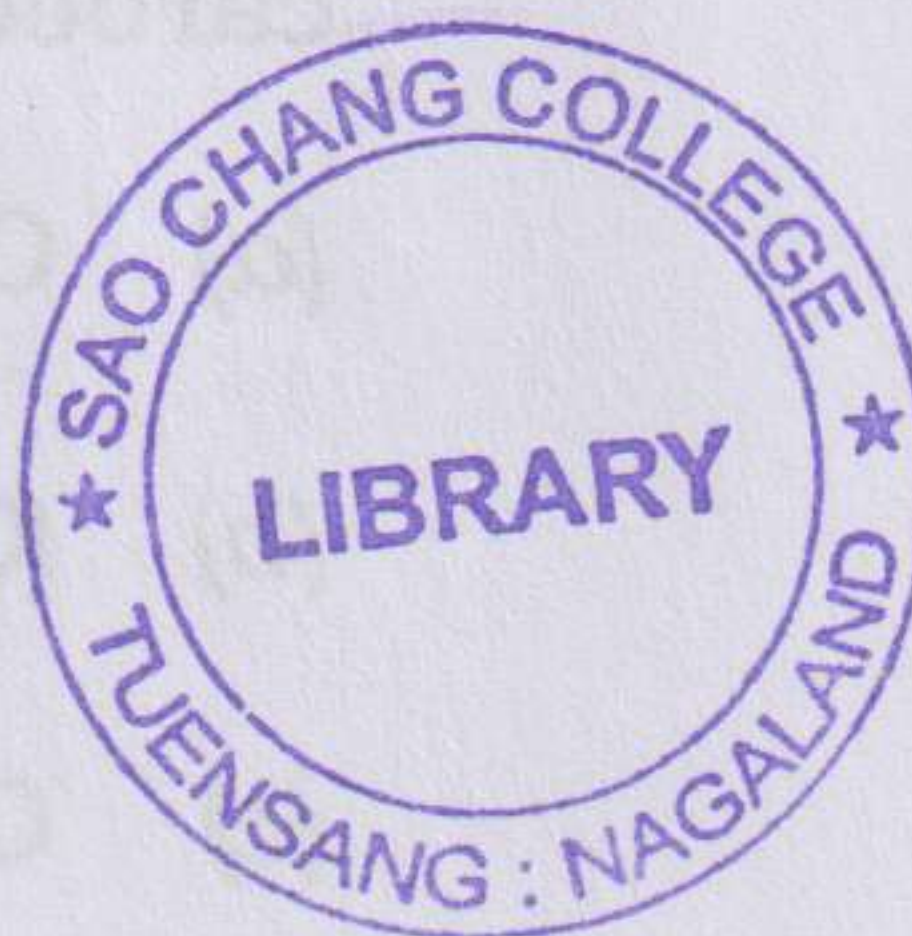
(FYUGP)

(2nd Semester)

CHEMISTRY

(MINOR)

Paper : CHEM.M-2(T)



(Organic Chemistry I : Basics and Hydrocarbons)

Full Marks : 75

Pass Marks : 40%

Time : 3 hours

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

(PART : A—OBJECTIVE)

(Marks : 25)

SECTION—I

(Marks : 15)

Choose the correct option :

1×15=15

1. Which of the following is not a nucleophile?

(a) CN^-

(b) OH^-

(c) NH_3

(d) AlCl_3

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(Turn Over)

(2)

2. Which of the following is the most stable carbocation?
- (a) CH_3CH_2^+
 - (b) $(\text{CH}_3)_2\text{CH}^+$
 - (c) $\text{CH}_3\text{CH}_2\text{CH}_2^+$
 - (d) $(\text{CH}_3)_3\text{C}^+$
3. $-I$ effect is shown by
- (a) $-\text{COOH}$
 - (b) $-\text{NH}_2$
 - (c) $-\text{CH}_3$
 - (d) $-\text{CH}_2\text{CH}_3$
4. Which of the following is a temporary effect?
- (a) Electromeric effect
 - (b) Inductive effect
 - (c) Mesomeric effect
 - (d) None of the above
5. Optically active isomers but not the mirror images of each other are called
- (a) enantiomers
 - (b) diastereomers
 - (c) anomers
 - (d) mesomers

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(3)

6. How many optical isomers are possible for D-glucose?
- (a) 2
 - (b) 8
 - (c) 16
 - (d) 32
7. Wurtz reaction involving bromoethane produces
- (a) methane
 - (b) ethane
 - (c) propane
 - (d) *n*-butane
8. In alkanes, the bond angle is
- (a) 109.5°
 - (b) 109°
 - (c) 120°
 - (d) 180°
9. Presence of peroxide affects the addition of
- (a) HF
 - (b) HCl
 - (c) HBr
 - (d) HI

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(4)

10. Which of the following will produce acetone on ozonolysis?
- (a) But-1-ene
 - (b) Propene
 - (c) But-2-ene
 - (d) 2-Methyl-1-propene
11. How many bonds are present in 1,3-butadiene?
- (a) 3
 - (b) 6
 - (c) 11
 - (d) 12
12. In cyclohexane, which form is most stable?
- (a) Chair
 - (b) Boat
 - (c) Twist
 - (d) Half chair
13. Which of the following explains the stability of lower cycloalkanes?
- (a) Baeyer's strain theory
 - (b) MO theory
 - (c) VB theory
 - (d) None of the above

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(Continued)

(5)

14. Which form of *n*-butane is most stable?
- (a) Gauche
 - (b) Eclipsed
 - (c) Anti
 - (d) Fully eclipsed
15. Which of the following groups is *ortho*- and *para*-directing and also acts as deactivating group?
- (a) $-\text{CH}_3$
 - (b) $-\text{OH}$
 - (c) $-\text{Cl}$
 - (d) $-\text{OCH}_3$

SECTION—II

(Marks : 10)

Explain the following :

2×5=10

1. Directive effects of different groups
2. Curly-arrow rules
3. Organic acids and bases
4. Resonance effect
5. Ozonolysis

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(6)

(PART : B—DESCRIPTIVE)

(Marks : 50)

1. (a) What are carbocations? Explain their stability order. 1+2=3

- (b) Define homolytic and heterolytic fissions with suitable examples. 3

- (c) Define the following (any two) : 2×2=4

- (i) Dipole moment
(ii) Inductive effect
(iii) Hyperconjugation

Or

2. (a) Write the differences between inductive effect and mesomeric effect. 3

- (b) What are free radicals? Explain their stability order. 3

- (c) Explain the following : 2×2=4

- (i) Phenol is weaker acid than alcohol.
(ii) Alkyl amine is more basic than arylamines.

3. (a) Explain Newman and Sawhorse projections of ethane. 4

- (b) Explain CIP rules. 3

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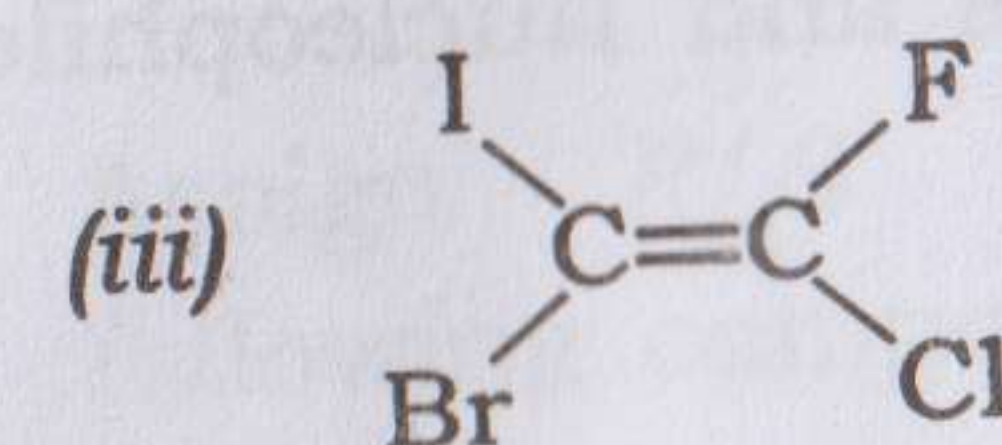
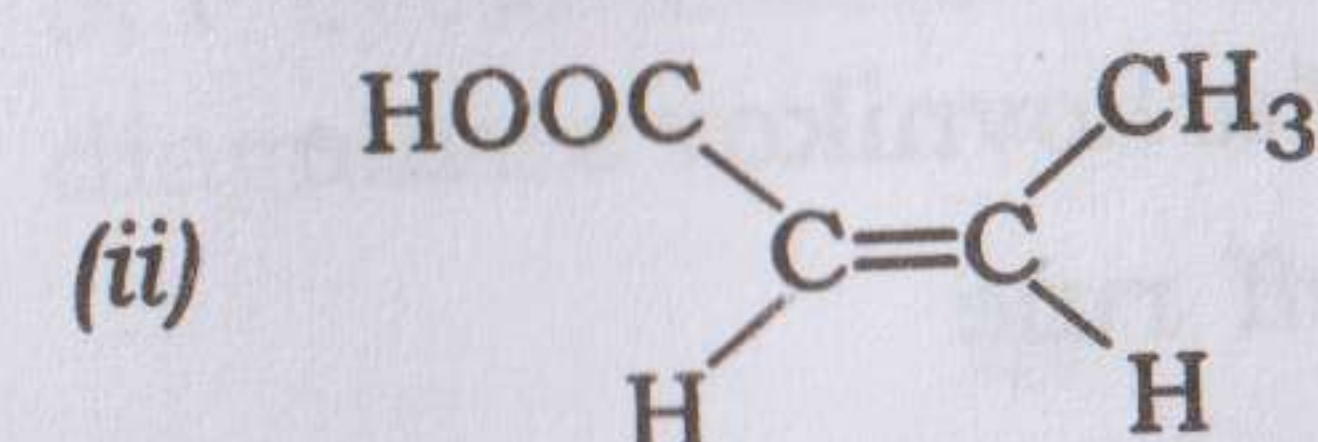
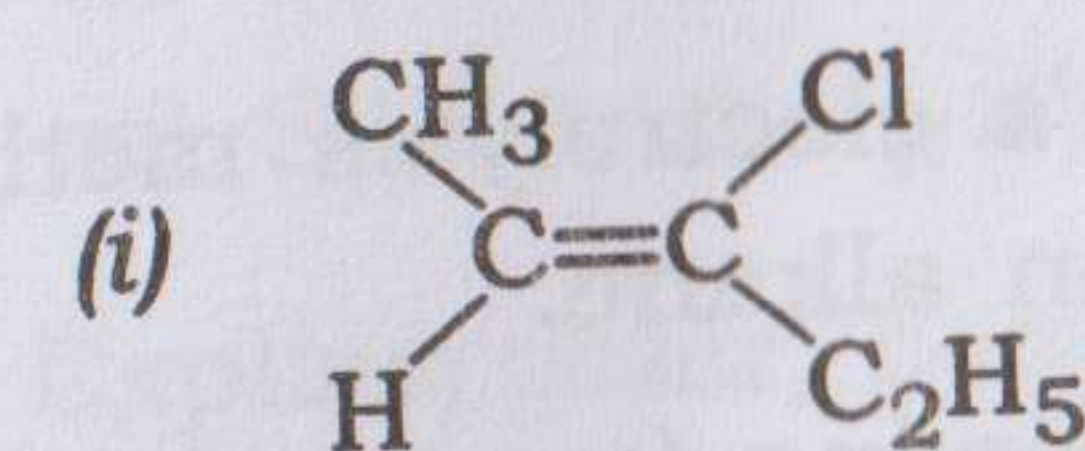
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- (c) Define the following : 1×3=3

- (i) Enantiomer
(ii) Diastereomer
(iii) Optical activity

Or

4. (a) Assign E- or Z-configuration to the following compounds : 1×3=3



- (b) What do you mean by racemization and resolution? Explain with suitable examples. 3

- (c) Explain Fisher, Sawhorse and Newman projection formulae of a compound. Give one example of each. 4

5. (a) Discuss Baeyer's strain theory to explain the stabilities of different cycloalkanes. 4

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(8)

- (b) What do you mean by the term 'endo rule'? Give an example. 3
- (c) Explain Saytzeff and Hofmann elimination with example. 3

Or

6. (a) Explain conformational analysis of cyclohexane with its different structures. 4
- (b) Explain Kolbe's electrolysis method for synthesis of an alkane. 3
- (c) Define the following (any two) : $1\frac{1}{2} \times 2 = 3$
- (i) Anti-Markovnikov's rule
 - (ii) Saytzeff rule
 - (iii) Electrophiles and Nucleophiles

7. (a) Explain Hückel rule with example. 3
- (b) Explain the mechanism of Friedel-Crafts acetylation reaction with example. 3
- (c) What do you mean by *o,p*-directing and *m*-directing groups? Give examples. $2+2=4$

Or

8. (a) Explain the mechanism of nitration of benzene. 3
- (b) Explain the aromatic character of pyridine. 2

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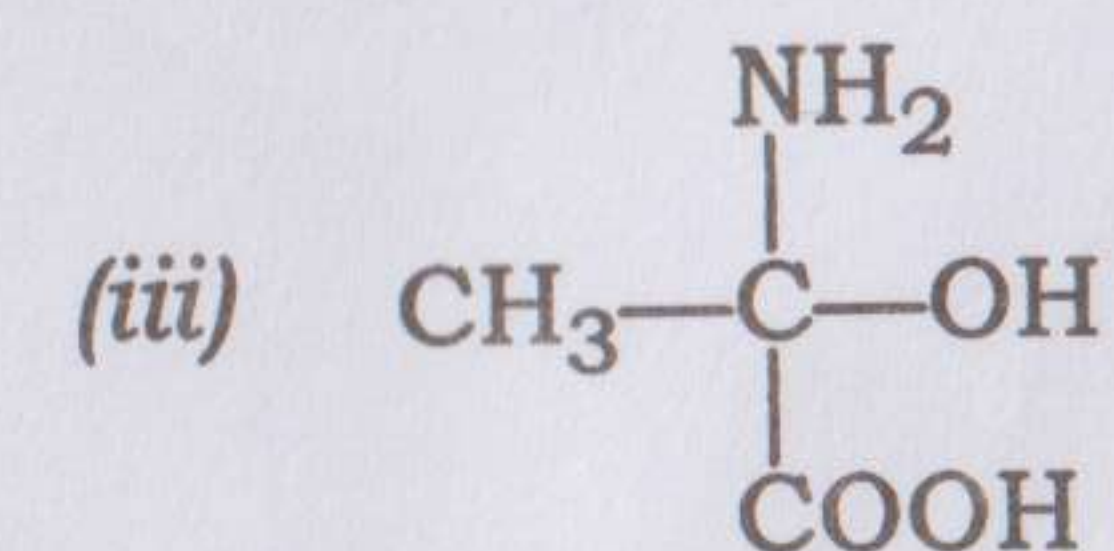
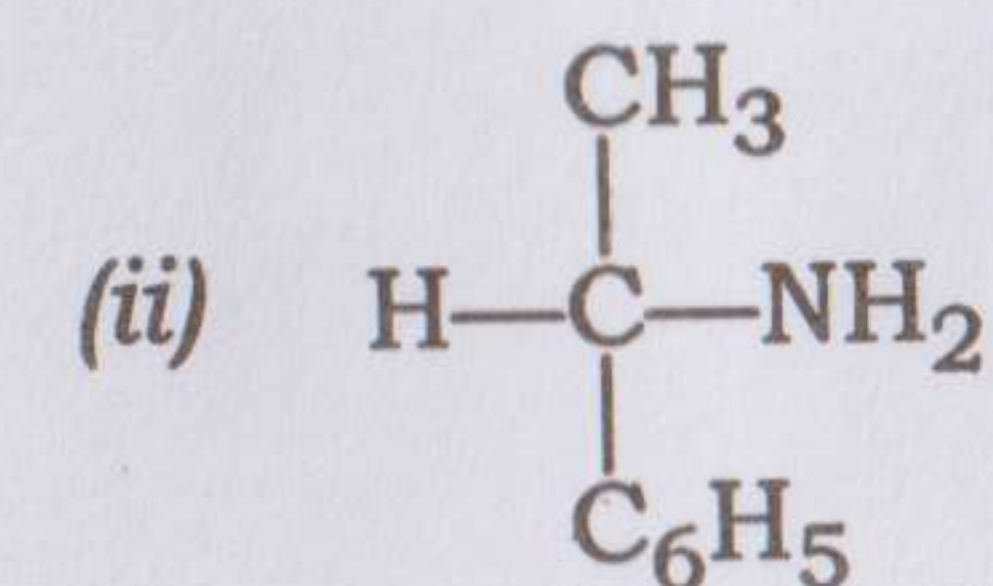
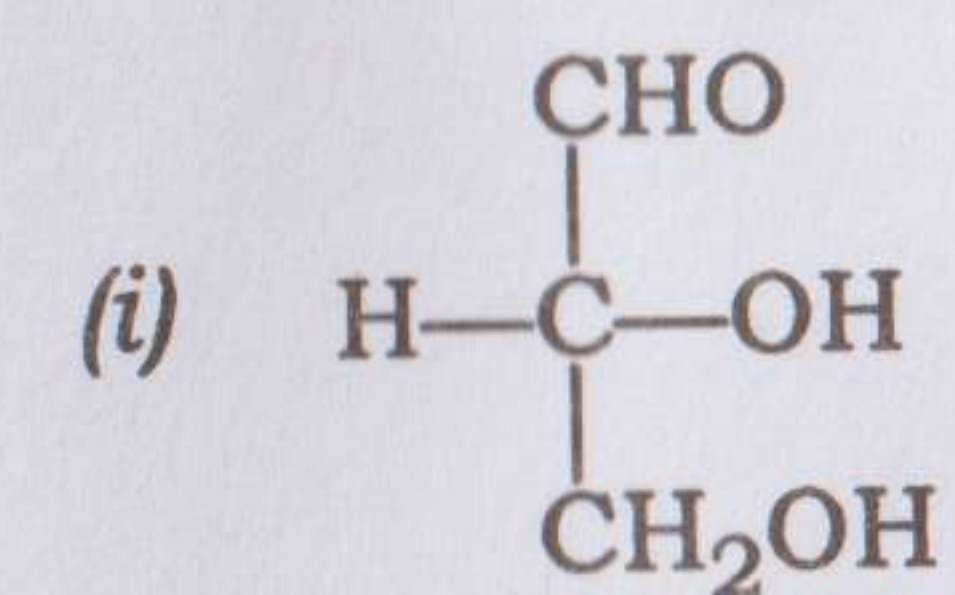
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- (c) Discuss electrophilic aromatic substitution reactions with example. 3
- (d) What do you mean by directing effects of groups? 2

9. (a) Define the following : $2 \times 3 = 6$
- (i) Diels-Alder reaction
 - (ii) *R/S* designations
 - (iii) S_N1 and S_N2 mechanisms
- (b) Explain chair, boat and twist boat forms of cyclohexane with their energy diagrams. 4

Or

10. (a) Assign *R/S* configuration to the following compounds : $2 \times 3 = 6$



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