

Total No. of Printed Pages—7

2 SEM TDC CHMH (CBCS) C 3

2024

(May)

CHEMISTRY

(Core)

Paper : C-3

(**Organic Chemistry**)

Full Marks : 53

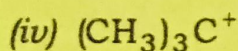
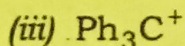
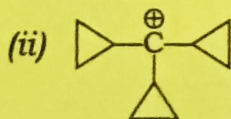
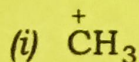
Pass Marks : 21

Time : 3 hours

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

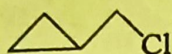
1. Choose the correct answer from the following : 1×5=5

(a) Which of the following is the most stable carbocation?



(2)

- (b) How many chiral carbons are present in the given molecule?



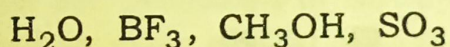
- (i) 1
(ii) 2
(iii) 3
(iv) None of the above
- (c) Which halogen does not react appreciably with methane in a free-radical substitution reaction?
- (i) Chlorine
(ii) Bromine
(iii) Iodine
(iv) Fluorine
- (d) According to Baeyer's strain theory, which is highly stable?
- (i) Cyclobutane
(ii) Cyclopentane
(iii) Cyclohexane
(iv) Cyclopropane

- (e) Which of the following annulenes is aromatic?
- (i) [8] annulene
 - (ii) [10] annulene
 - (iii) [12] annulene
 - (iv) None of the above

UNIT—I

2. Answer the following questions : 2×3=6

- (a) Explain the structure of ethane molecule with the help of hybridization.
- (b) Define electrophilic reagent and nucleophilic reagent. Select the electrophilic and nucleophilic reagents from the following :



Or

Phenol is less acidic than benzoic acid. Explain.

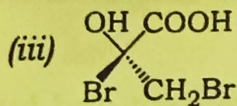
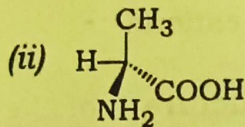
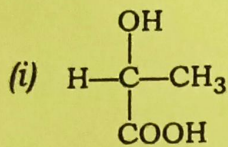
- (c) What is activation energy of a reaction? Draw the energy profile diagram of two-step reactions.

UNIT—II

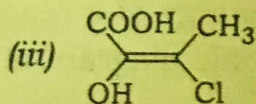
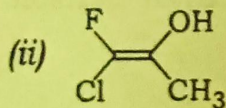
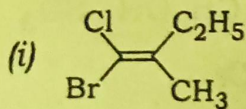
3. Answer the following questions (any six) :

2×6=12

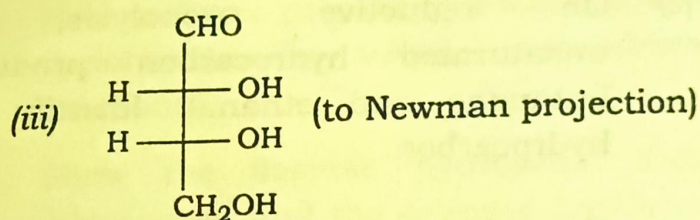
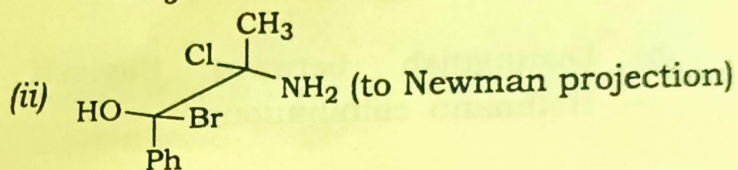
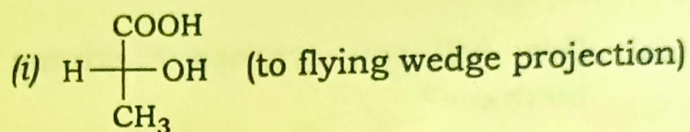
(a) Specify the following stereoisomers as *R* and *S* (any two) :



(b) Specify the following geometrical isomers as *E* and *Z* (any two) :



(c) Interconvert the following projections as directed (any two) :



(d) Define the following terms :

(i) Resolution

(ii) Racemization

(e) Draw the stereoisomers of tartaric acid and mention their optical activities.

(f) Draw the *erythro*- and *threo*-isomer of 3-bromobutan-2-ol.

(g) What is Walden inversion? Explain with suitable example.

UNIT—III

4. Answer the following questions :

- (a) How will you synthesize ethane from methane? 2
- (b) Distinguish between Saytzeff and Hoffmann eliminations. 2
- (c) On reductive ozonolysis, an unsaturated hydrocarbon produced butanone and ethanal. Identify the hydrocarbon. 2
- (d) Explain the relative reactivity of ethylene, propylene and isobutylene towards electrophilic addition with HBr. 3
- (e) Explain Diels-Alder reaction with suitable example. 2
- (f) What happens when pent-1-yne is treated with H_2O in the presence of H_2SO_4 and $HgSO_4$ catalysts? Write down the reaction. 2
- (g) What are the different states of carbene? Explain briefly. 3

Or

Acetylene is acidic in nature. Explain.

UNIT—IV

5. (a) What are the postulates of Baeyer's strain theory? 2
- (b) Cyclopropane is the least stable member of cycloalkanes. How do you justify this in terms of orbital picture of 3-membered rings? 2
- (c) How will you prepare cyclohexane and cyclobutane by using cycloaddition reactions? 2
- (d) Show the flagpole hydrogens, their interactions and the eclipsed bonds on the side of boat conformation from an end view. 2

Or

Why is twist boat form of cyclohexane more stable than boat form?

UNIT—V

6. (a) Why is naphthalene aromatic? 2
- (b) Discuss the mechanism of nitration of benzene. 2
- (c) Alkylation of benzene with *n*-propyl chloride gives isopropyl benzene rather than *n*-propylbenzene. Explain. 2

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