

Total No. of Printed Pages—8

**2 SEM TDC CHMH (CBCS) C 3**

**2 0 2 2**

( June/July )

**CHEMISTRY**

( Core )

Paper : C-3

( **Organic Chemistry** )

Full Marks : 53

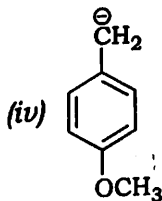
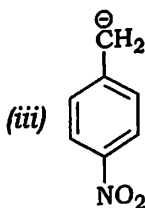
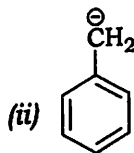
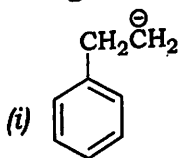
Pass Marks : 21

Time : 3 hours

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

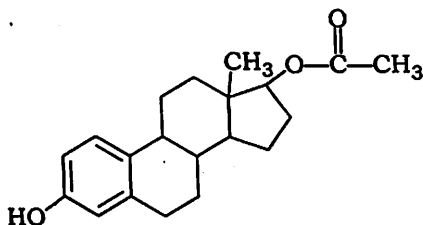
1. Choose the correct answer from the following : 1×5=5

(a) Which is the most stable carbanion among the following?



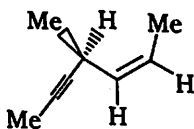
( 2 )

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



- (i) 1
- (ii) 5
- (iii) 3
- (iv) 10

(c) Hydrogenation of the following compound in the presence of poisoned palladium catalyst gives



- (i) an optically active compound
- (ii) an optically inactive compound
- (iii) a racemic mixture
- (iv) a diastereomeric mixture

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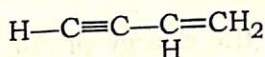
( 3 )

(d) The IUPAC name of the following compound



is

- (i) neononane
  - (ii) tetraethyl carbon
  - (iii) 2-ethyl pentane
  - (iv) 3,3-diethyl pentane
- (e) The hybridization of C atoms in C—C single bond of



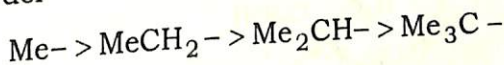
is

- (i)  $sp^3-sp^3$
- (ii)  $sp^2-sp^3$
- (iii)  $sp-sp^2$
- (iv)  $sp^3-sp$

#### UNIT—I

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

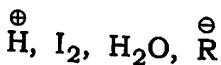
- (a) What do you mean by nucleophilicity and basicity?
- (b) Alkyl groups attached to the benzene ring have electron releasing effect in the order



Explain this observation.

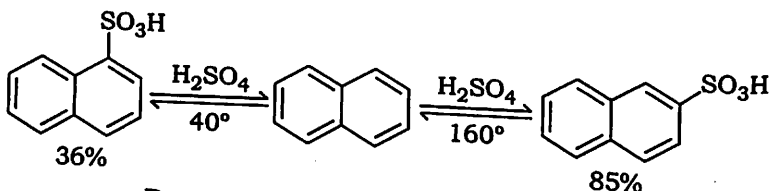
( Turn Over )

- (c) Select soft and hard acids and bases from the following :



Or

Identify the following reactions as kinetically controlled and thermodynamically controlled :



Draw the energy profile diagram for the above reactions.

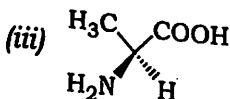
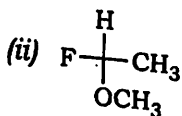
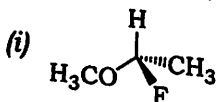
### UNIT—II

3. Answer the following questions :

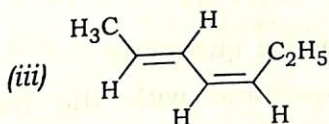
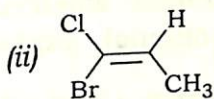
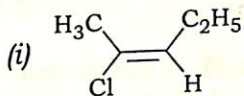
2×6=12

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

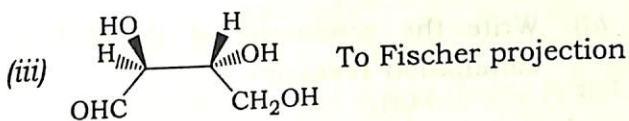
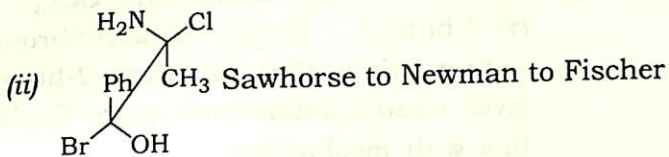
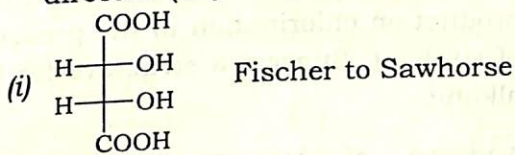
1×2=2



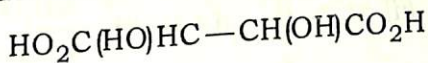
(b) Specify the following geometrical isomers as *E* and *Z* (any two) :  $1 \times 2 = 2$



(c) Interconvert the following projections as directed (any two) :  $1 \times 2 = 2$



(d) Draw all the possible stereoisomers of tartaric acid



- (e) Draw and give the stereochemical designation for the geometrical isomers of 2,4-heptadiene.
- (f) Active 2-benzoyl propanoic acid undergoes racemization when treated with  $\text{NaOC}_2\text{H}_5$  in ethanol. Explain.

## UNIT—III

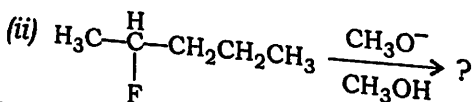
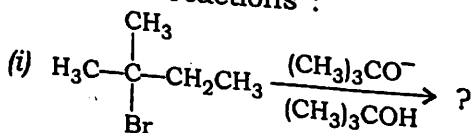
4. Answer the following questions :

(a) Prepare *n*-pentane with the help of Corey-House synthesis. 2

(b) An alkane has a molecular mass of 72. It forms only one monosubstituted product on chlorination in the presence of sunlight. Suggest a structure for the alkane. 1

(c) Addition of bromine in  $\text{CCl}_4$  to *cis*-2-butene gives ( $\pm$ )-2,3-dibromobutane while that for *trans*-2-butene gives *meso*-2,3-dibromobutane. Explain this with mechanism. 3

(d) Write the product(s) of the following elimination reactions :  $1\frac{1}{2} \times 2 = 3$



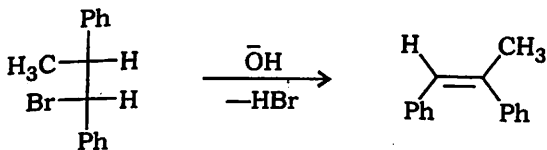
(e) "Markownikov's addition reaction is a regioselective reaction." Justify the statement. 2

(f) What do you mean by stereoselective and stereospecific reactions? Explain by giving examples of each. 2+1=3

(g) Write the mechanism of 1,4-addition of  $\text{Br}_2$  to 1,3-butadiene: 2

Or

What is the stereoelectronic requirement of an  $E2$  process? Why *erythro*-1-bromo-1,2-diphenylpropane on base induced dehydrobromination yields *cis*-1,2-diphenylpropene exclusively?



*erythro*-1-bromo-  
1,2-diphenylpropane

*cis*-1,2-diphenylpropene

#### UNIT—IV

5. (a) Explain why Baeyer strain theory is not applicable to higher ring compounds. 2

(b) Draw the chair- and boat-conformation of cyclohexane in Newman projection. 2

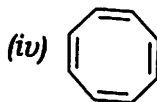
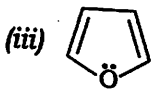
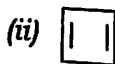
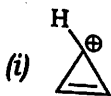
Or

Explain why equatorial methylcyclohexane is more stable than axial methylcyclohexane.

- (c) Discuss the factors responsible for the stability of a conformation. 2
- (d) Draw the energy profile diagram for the conformations of *n*-butane. 2

UNIT—V

6. (a) Which of the following compounds are aromatic, anti-aromatic and non-aromatic? 2



- (b) Write the mechanism of Friedel-Crafts alkylation of benzene. 2
- (c) Discuss the directing influence of  $-\text{OCH}_3$  group towards the electrophilic aromatic substitution reactions. 2

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