

2 0 2 4

(NEP—2020)

(1st Semester)

CHEMISTRY (MAJOR)**(Organic Chemistry—I)***Full Marks : 75**Time : 3 hours**The figures in the margin indicate full marks for the questions***(SECTION : A—OBJECTIVE)**

(Marks : 10)

Tick (✓) the correct answer in the brackets provided :

1×10=10

1. The most reactive halogen in halogenation reaction of alkane is

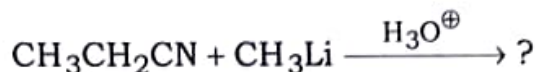
- (a) fluorine ()
- (b) chlorine ()
- (c) bromine ()
- (d) iodine ()

2. Sulphonation of alkane is governed by

- (a) nucleophilic substitution ()
- (b) electrophilic substitution ()
- (c) electrophilic addition ()
- (d) free radical substitution ()

3. Which one of the following is most acidic?
- (a) CH_3OH ()
 - (b) $\text{CH}_3\text{CH}_2\text{OH}$ ()
 - (c) $(\text{CH}_3)_2\text{CHOH}$ ()
 - (d) $(\text{CH}_3)_3\text{COH}$ ()
4. Which of the following is a trihydric alcohol?
- (a) Citric acid ()
 - (b) Glycerol ()
 - (c) Glycine ()
 - (d) Glycol ()
5. With excess HI, glycerol gives
- (a) propene ()
 - (b) allyl iodide ()
 - (c) isopropyl iodide ()
 - (d) 1,2,3-triiodopropane ()
6. In Victor Meyer test, the primary alcohol gives
- (a) blue colour ()
 - (b) white precipitate ()
 - (c) red colour ()
 - (d) purple colour ()
7. The IUPAC name of the compound $\text{CH}_3\text{COCH}_2\text{CH}_2\text{CH}_3$ is
- (a) methyl-*n*-propyl ketone ()
 - (b) 2-pentanone ()
 - (c) 3-pentanone ()
 - (d) *n*-propyl-methyl ketone ()
8. Aldehyde and ketone readily undergo
- (a) electrophilic addition ()
 - (b) electrophilic substitution ()
 - (c) nucleophilic addition ()
 - (d) nucleophilic substitution ()

9. The product obtained from the reaction



is

- (a) carboxylic acid ()
- (b) ketone ()
- (c) amine ()
- (d) alcohol ()

10. Ethers are isomeric with

- (a) aldehydes ()
- (b) vinyl alcohols ()
- (c) alcohols ()
- (d) ketones ()

(SECTION : B—SHORT ANSWERS)

(Marks : 15)

Answer *five* questions, taking at least *one* from each Unit :

3×5=15

UNIT—I

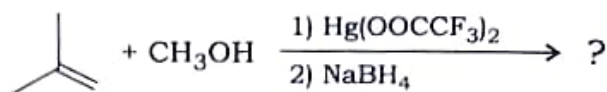
1. How will you prepare *n*-butane from ethyl bromide using Wurtz method?
2. Write a note on halogenation of alkanes with suitable example.

UNIT—II

3. Explain the acidic character of alcohols and also compare the acidic strength of different types of alcohols (primary, secondary and tertiary).
4. Explain esterification reaction with suitable example.

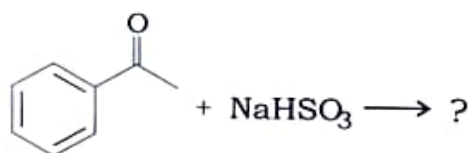
UNIT—III

5. Mention one method of preparation of epoxide. Write down the chemical reaction involved in it.
6. Complete the following reaction with suitable mechanism :



UNIT—IV

7. Write a short note on the polarity of carbonyl compound.
8. Complete the following reaction with suitable mechanism :



(SECTION : C—DESCRIPTIVE)

(Marks : 50)

Answer *five* questions, taking at least *one* from each Unit :

10×5=50

UNIT—I

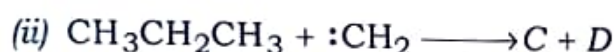
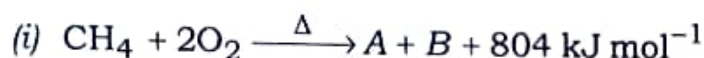
1. (a) How will you synthesize *n*-butane using Corey-House synthesis? Write the chemical equation with suitable mechanism. 1+3=4
- (b) Explain the relative reactivities of different classes of hydrogen in halogenation reaction of alkanes. 3
- (c) Write a note on pyrolysis of alkanes taking suitable example. 3

2. (a) Write a note on Kolbe's electrolytic method for the formation of *n*-ethane. 3

(b) What will happen when *n*-hexane is heated with fuming nitric acid? Write the chemical reactions with suitable mechanism. 1+3=4

(c) What is primary carbon in alkane? Give example. 1

(d) Complete the following chemical reactions (mechanism not required) : 1×2=2

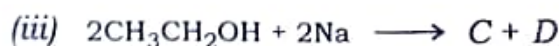
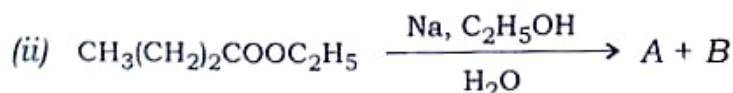
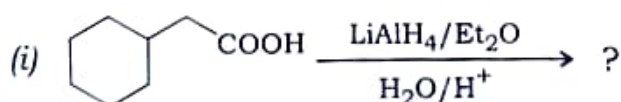


UNIT—II

3. (a) Explain a catalytic dehydrogenation ($\text{Cu}/200\text{--}300^\circ\text{C}$) of primary, secondary and tertiary alcohols giving suitable chemical equations. 4

(b) What is iodoform test? Write its chemical reaction. 3

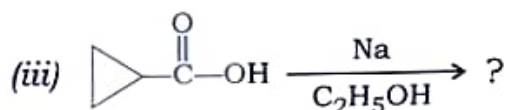
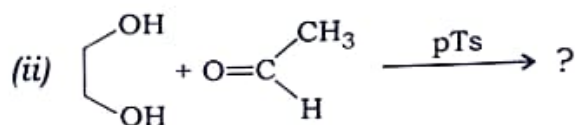
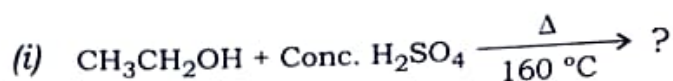
(c) Complete the following chemical reactions (mechanism not required) : 1×3=3



4. (a) How do 1°, 2°- and 3°-alcohols react differently with $\text{HCl}/\text{anhydride ZnCl}_2$ solution? Write the chemical reactions. 3

(b) Complete the following reactions (mechanism not required) :

2×3=6

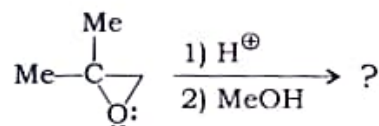


(c) Why is alcohol acidic in nature?

UNIT—III

5. (a) Taking into account the chemical reaction given below, discuss in brief, the orientation of acid catalyzed ring opening in unsymmetrical epoxides. Complete the following reaction with suitable mechanism :

2+3=5

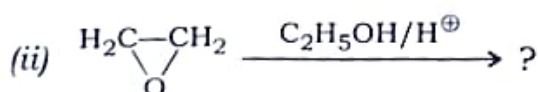
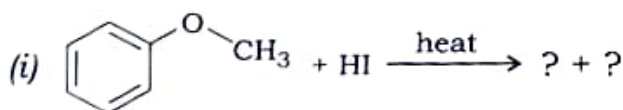


(b) What is Williamson synthesis? Give suitable chemical reactions involved in it.

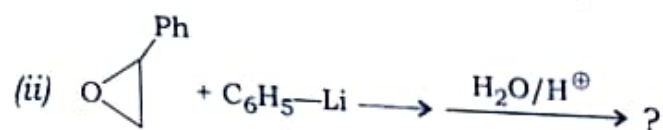
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(c) Complete the following reactions (mechanisms not required) :

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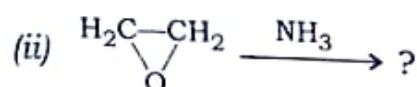
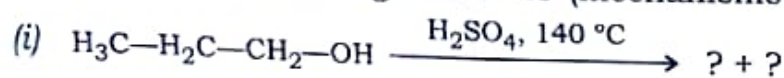


6. (a) Complete the following reactions with suitable mechanisms : 3+2=5
- (i) $\text{H}_3\text{CH}_2\text{C}-\text{O}-\text{CH}_2\text{CH}_3 + \text{O}_2 \longrightarrow ?$ (Autooxidation of ethers)



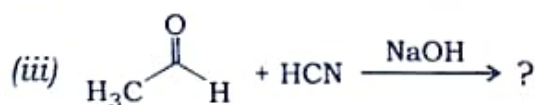
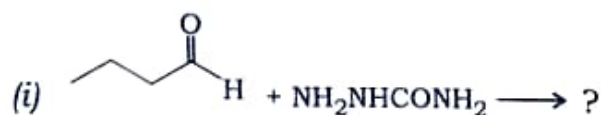
- (b) Write a brief note on Ziesel method for the estimation of alkoxy group (methoxy and ethoxy groups). 3

- (c) Complete the following reactions (mechanisms not required) : 1×2=2

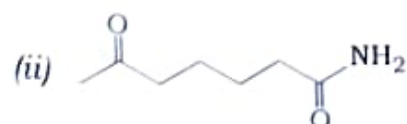
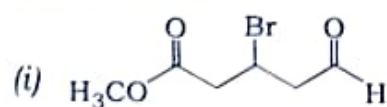


UNIT—IV

7. (a) Complete the following reactions with suitable mechanisms (any two) : 3×2=6



- (b) Write the IUPAC name of the following carbonyl compounds : 1×2=2



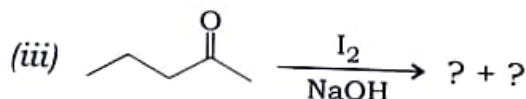
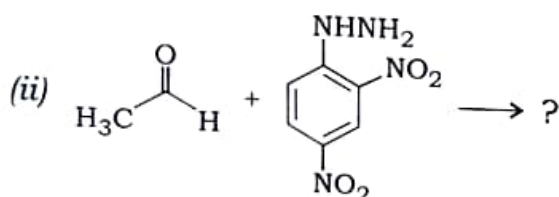
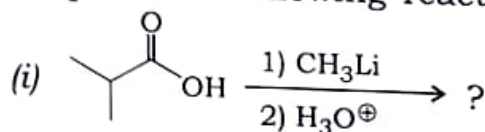
- (c) How will you prepare acetone from acetyl chloride? Write the chemical equation.

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8. (a) What is Tollens' reagent? What will happen when acetaldehyde reacts with Tollens' reagent? Write down the chemical equation involved in it.

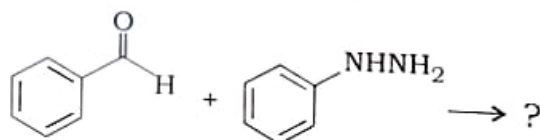
1+3=4

- (b) Complete the following reactions (mechanisms not required) : 1×3=3



- (c) Complete the following reaction with suitable mechanism :

3



2 0 2 4

(NEP—2020)

(1st Semester)

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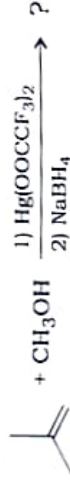
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(SECTION : C—DESCRIPTIVE)

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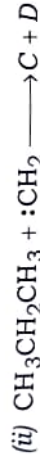
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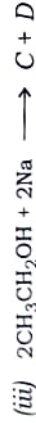
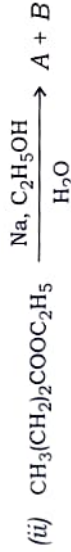
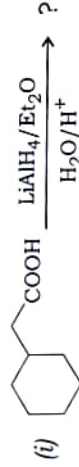


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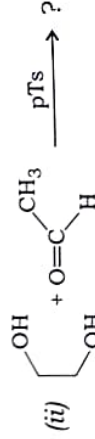
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$$2 \times 3 = 6$$



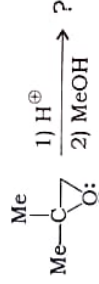
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$$1$$

UNIT—III

5. (a) Taking into account the chemical reaction given below, discuss in brief, the orientation of acid catalyzed ring opening in unsymmetrical epoxides. Complete the following reaction with suitable mechanism :

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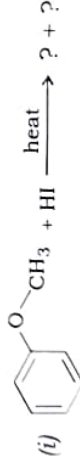


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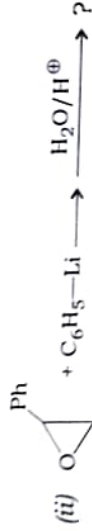
$$1 + 2 = 3$$

(c) Complete the following reactions (mechanisms not required) :

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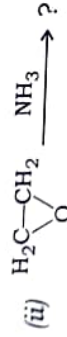
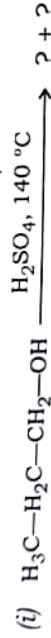


6. (a) Complete the following reactions with suitable mechanisms : $3+2=5$



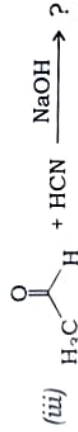
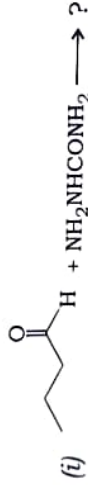
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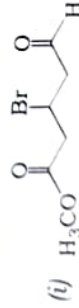


UNIT—IV

7. (a) Complete the following reactions with suitable mechanisms (any two) : $3 \times 2 = 6$



(b) Write the IUPAC name of the following carbonyl compounds : $1 \times 2 = 2$



(c) How will you prepare acetone from acetyl chloride? Write the chemical equation.

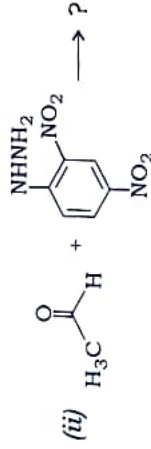
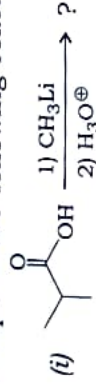
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1+3=4

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