

Subject Code—6787

Creative Study

B. Sc. EXAMINATION

(Batch 2018 Onwards)

(First Semester)

CHEMISTRY

CCL-105

Organic Chemistry-I

(General Organic Chemistry and Aliphatic

Time : 3 Hours

Maximum Marks : 80 **Creative Study**

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory.

1. All parts are compulsory and carry equal marks :

(a) What are the no. of electrons around central metal atom in carbocation and carbanion ?

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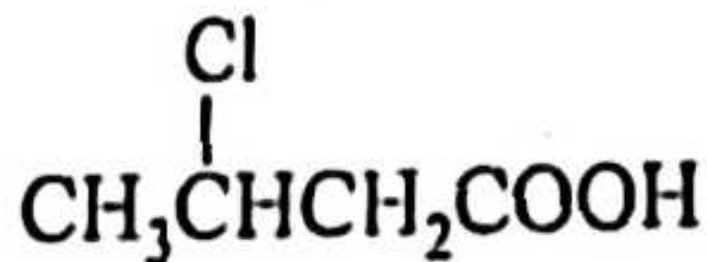
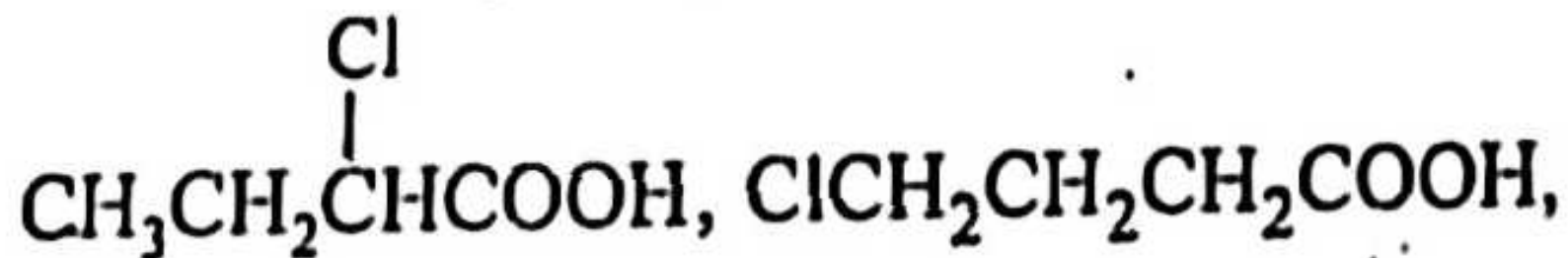
- (b) Why alkanes are less reactive towards majority of organic reagents ?
- (c) How many hyperconjugative structure are formed in $(\text{CH}_3)\overset{+}{\text{C}}$, $(\text{CH}_3)\overset{+}{\text{C}}\text{H}$ and $\overset{+}{\text{C}}\text{H}_3$.
- (d) Explain Saytzeff's rule with example.
- (e) Draw the structure of meso form of 2,3-dichlorobutane.
- (f) Define enantiomers and diastereomers.

- (g) Why alkynes do not show geometrical isomerism ?
- (h) Explain the hybridisation and structure of alkynes. $8 \times 2 = 16$

Unit I

Unit I

2. (a) Arrange the following in decreasing order of acidic strength with reason : 3



(b) Why vinyl and aryl halides are less reactive towards nucleophilic substitution reactions ? 3

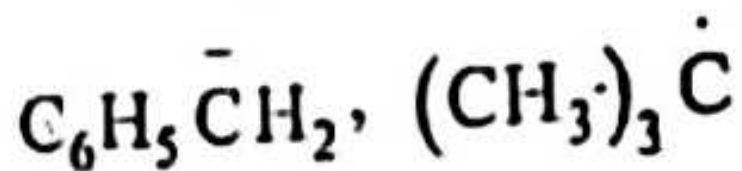
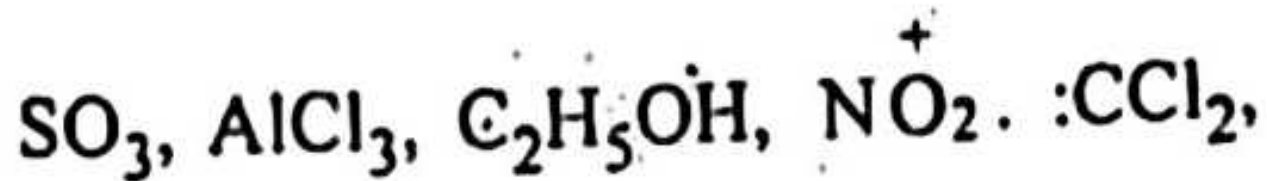
(c) What is electromeric effect ? Discuss its types with example. 3

(d) What are carbocations ? Pick up the most stable and least stable carbocations from the following : 4



(c). What are electrophiles and nucleophiles?

Classify the following as electrophile and nucleophiles :



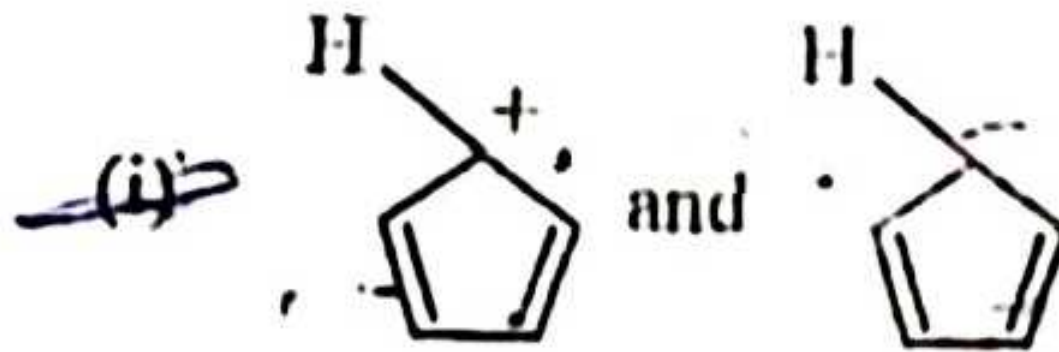
3. (a) Out of aliphatic and aromatic amines, which is more basic and why ? 4
- (b) Define hyperconjugation. How does it explain the relative stabilities of alkenes ? 4

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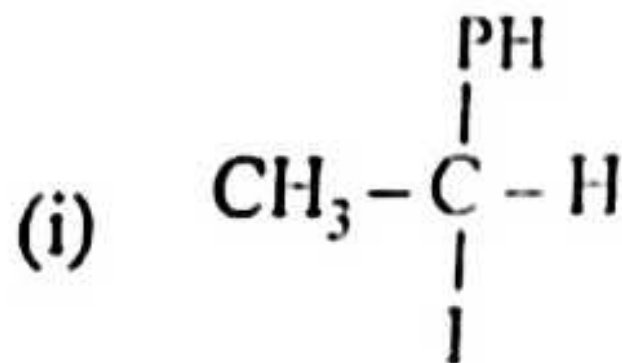
- (c) Which one of the following pairs are aromatic in nature and why ?

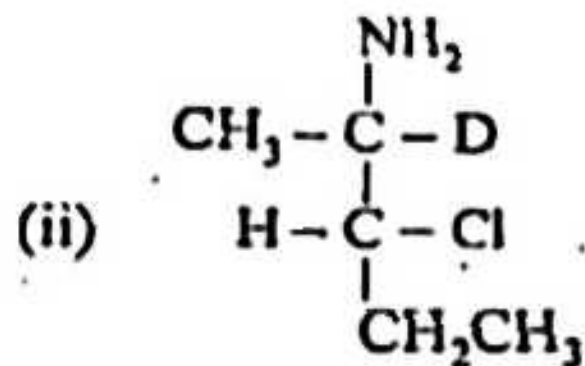


- ~~(ii)~~ Cycloheptatriene and cycloheptatrienyl cation

- (d) What is inductive effect ? Discuss its types and characteristics with examples.

4. (a) Differentiate between configuration and conformation. 3
- (b) Draw various Sawhorse, Newman, Fischer, flying-wedge representation of 3-chloro-2-butanol. 4
- (c) Assign R-S nomenclature to the following : 3





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- (d) Discuss the relative stability of chair and boat conformation of cyclohexane. 4
- (c) What is plane of symmetry ? Give example. 2

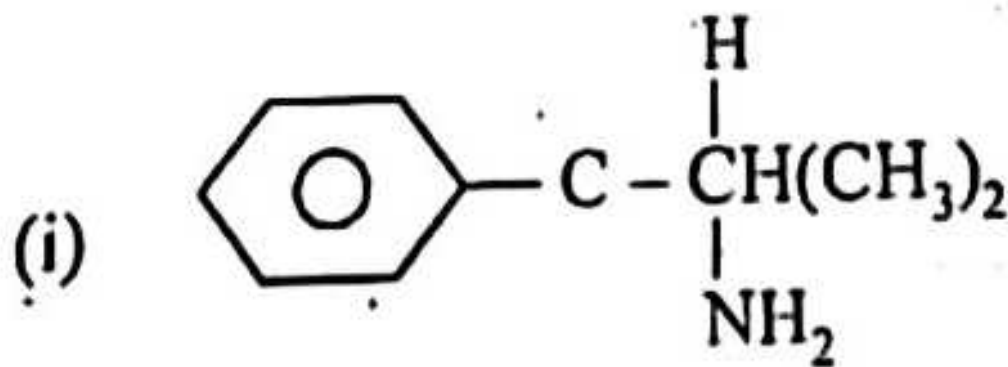
5. (a) Draw all the conformational isomers of butane. Discuss their energy profile diagram. 4

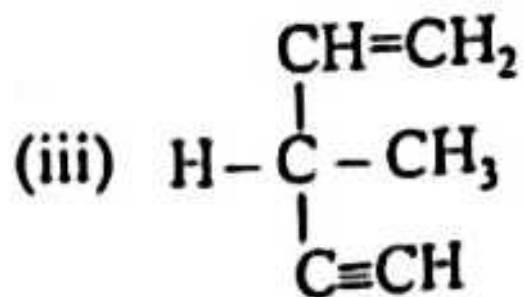
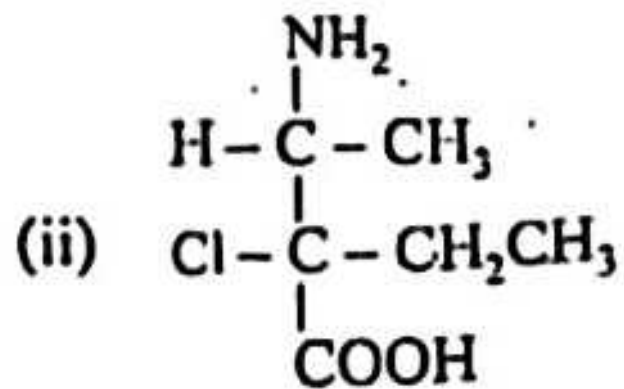
(b) Define the following terms :

(i) Centre of symmetry

(ii) Specific rotation. 3

(c) Assign R, S nomenclature to the following compounds : 4



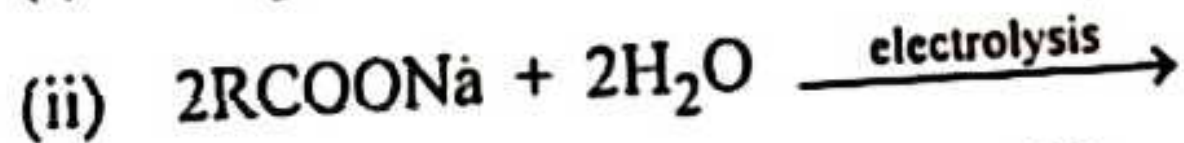
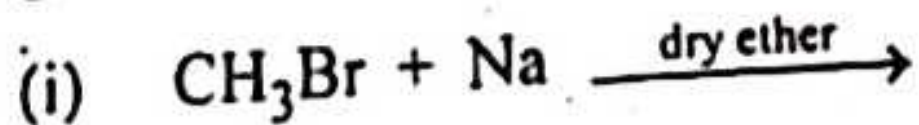


(d) What is optical activity ? What are the essential conditions for optical activity ? 3

(c) Draw the erythro and threo isomers of 3-bromo-2-butanol. 2

Unit III

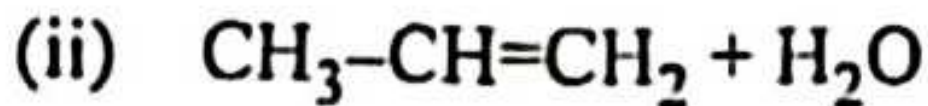
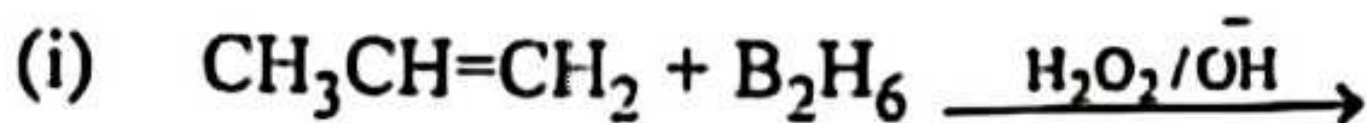
6. (a) Complete the following reactions. Also give their names and mechanism : 4



- (b) Discuss the order of reactivity of different halogens in halogenation of alkanes. 3

- (c) Discuss ozonolysis of alkanes with mechanism. 3
- (d) Discuss Markownikoff's rule with examples. 3
- (e) Write all the possible isomers for the alkane having formula C_4H_{10} . 3
7. (a) What is Grignard's Reagent ? How you can prepare butane from Grignard's reagent ? 3
- (b) Complete the following reactions with mechanism : 4

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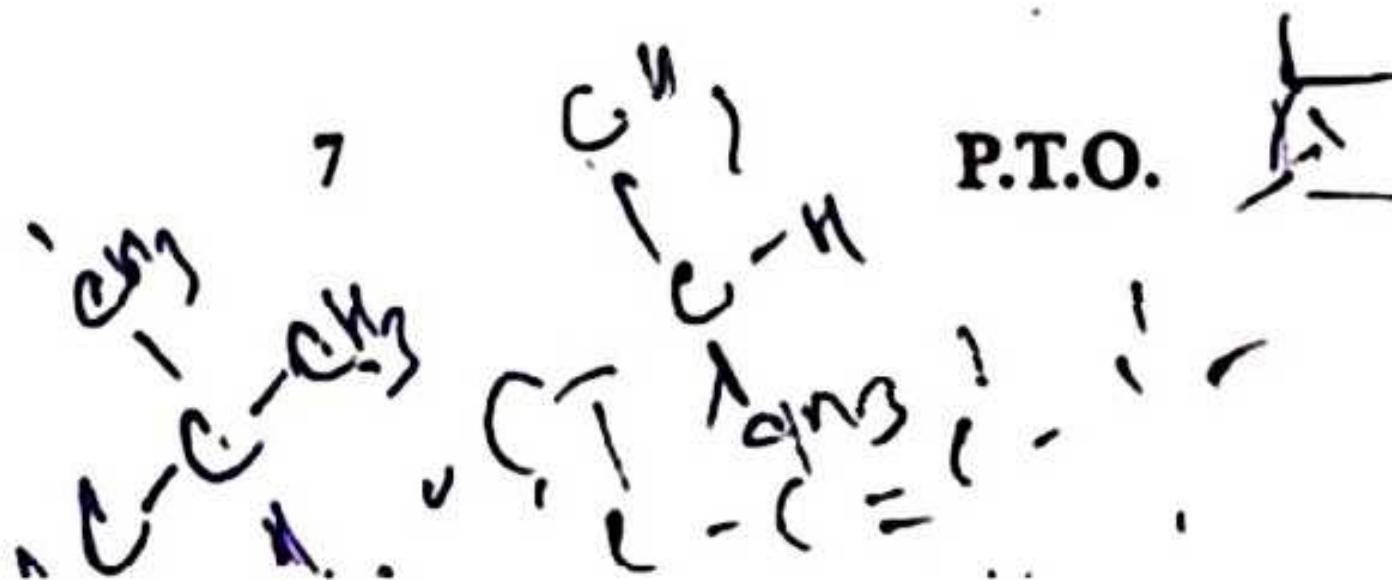


- (c) What is 1, 2-hydride shift ? Explain with suitable example from dehydration of alcohols. 4

- (d) Explain the factors on which orientation of halogenation of alkenes depends. 3
- (e) What is peroxide effect ? 2

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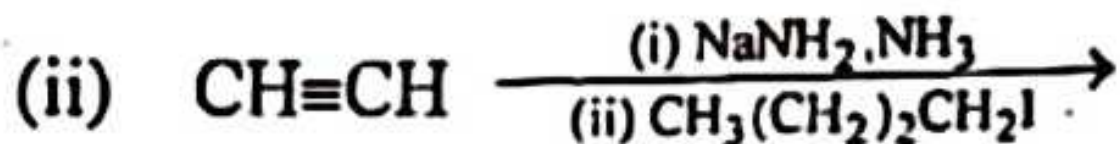
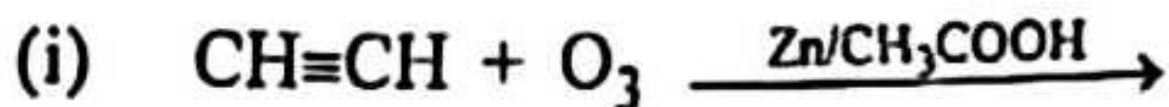


8. (a) Explain why :

(i) Alkynes undergo nucleophilic addition

(ii) Terminal alkynes are acidic in nature. 4

(b) Complete the following reactions : 4



(c) How can you prepare cis and trans alkenes from $\text{R}-\text{C}\equiv\text{C}-\text{R}$? 4

Creative Study

(d) Give a special method for the synthesis of acetylene. 2

(e) Acetylene forms metal acetylides, why ? 2

9. (a) What happens when :

(i) Ethyne reacts with hydrogen in presence of Lindlar's catalyst

(ii) Acetylene reacts with O_3 . 4

- (b) How you can convert :
- (i) $\text{CH}_3-\text{C}\equiv\text{CH}$ into trans-2-heptene
 - (ii) Acetylene into 3-octyne. 4
- (c) Why alkynes are less reactive than alkenes towards electrophilic addition reactions ? 3
- (d) Discuss the oxidation of acetylene with potassium permanganate at room temperature 3

**(e) What are terminal and non-terminal
alkynes ?**

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