

[6]

3. Discuss and compare S_E^1 and S_E^2 reactions under following heads :

- (i) Mechanism,
- (ii) Kinetics and stereochemistry,
- (iii) Effect of substrate structure and solvent polarity.

Or

Explain with suitable example arenium ion mechanism for electrophilic substitution reaction and give evidence which show that electrophilic aromatic substitution is a two step process, also give energy profile diagram.

4. (a) Discuss conformation of cyclohexane and explain which conformer is more stable and why ? Give potential energy relationship among conformations of cyclohexane.
- (b) Discuss effect of conformation on reactivity.

Or

Discuss in detail stereochemistry of allenes and biphenyls.

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Roll No.....

M.Sc. I Semester Examination, April-2021

CHEMISTRY

Paper II

(Organic Chemistry)

Time : 3 Hours]

[Maximum Marks : 80

Note : All questions are compulsory. Question Paper comprises of 3 sections. **Section A** is objective type/Multiple Choice questions with no internal choice. **Section B** is short answer type with internal choice. **Section C** is long answer type with internal choice.

SECTION 'A'

1×8=8

(Objective Type Questions)

Choose the correct answer :

1. Which of the following will not show aromaticity :
- (a) Cyclopentadienyl anion
 - (b) Azulene
 - (c) Cycloheptatriene
 - (d) [18] Annulene

[4]

- (i) Conjugation and cross conjugation,
- (ii) Alternant and non-alternant hydrocarbons

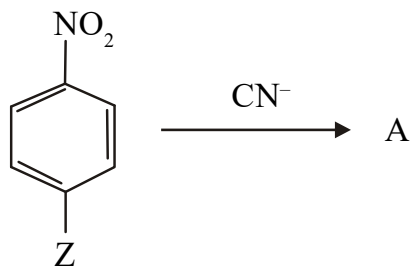
Or

What are carbenes ? Discuss generation and stability of carbenes. Give structure of singlet and triplet methylene.

2. Discuss Hammond's postulate with suitable example.

Or

Complete the following reaction giving name and mechanism :



3. Discuss orientation and reactivity of monosubstituted benzene for electrophilic substitution reaction giving suitable examples.

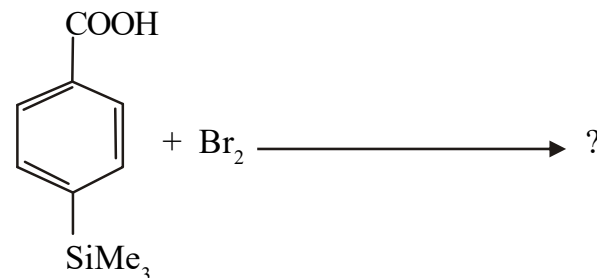
Or

Explain the mechanism of Gattermann Koch reaction.

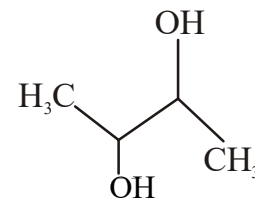
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[3]

6. Complete the following reaction :



7. How many optical isomers are possible for the following compound :



- (a) 2
 - (b) 4
 - (c) 3
 - (d) 8
8. Spiranes exhibit optical isomerism because of restricted rotation :
 - (a) True
 - (b) False

SECTION 'B'

6×4=24

(Short Answer Type Questions)

Note : Answer the following questions in 250 words.

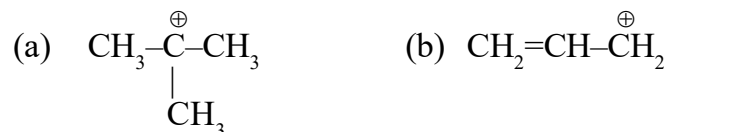
1. Differentiate the following giving examples :

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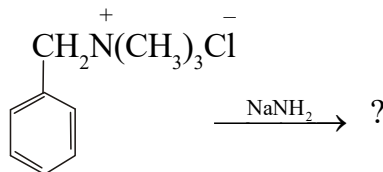
2. Which one of the following carbocations is most stable in gaseous state :



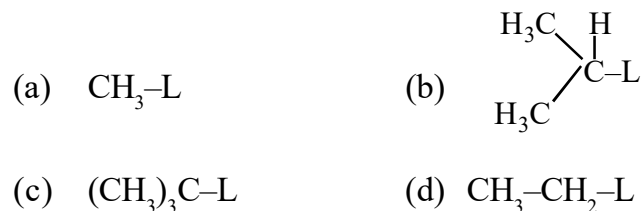
3. $\text{S}_{\text{N}}1$ reaction involves formation of :

- (a) Carbanion (b) Free radical
(c) Carbocation (d) Transition complex

4. Complete the following reaction and give name of the reaction :



5. Which one among the following will be least reactive in $\text{S}_{\text{E}}2$ (back) reaction (L = leaving group).



[5]

4. Explain what are enantiomers and distereomers ? Give examples. Draw Fischer projection formula of threo and erythroisomers of 2, 3 dihydroxy butanoic acid.

Or

Discuss various methods of resolution of racemic mixture.

SECTION 'C' 12×4=48

(Long Answer Type Questions)

Note : Answer the following questions in 500 words.

1. What are non-benzenoid compounds ? Discuss in detail aromaticity of azulene and annulenes.

Or

Discuss Hammett equation and its relation with linear free energy.

2. Explain the mechanism of $\text{S}_{\text{N}}2$ reaction. Give its rate constant. Explain the importance of anchimeric assistance in neighbouring group mechanism.

Or

Discuss $\text{S}_{\text{N}}\text{Ar}$ and Benzyne mechanism for aromatic nucleophilic substitution reaction. Discuss effect of leaving group and attacking nucleophile an aromatic nucleophilic substitution reaction.