

# National Testing Agency

**Question Paper Name:** Organic Chemistry 1 10th November 2019 Shift 1  
**Subject Name:** Organic Chemistry 1  
**Creation Date:** 2019-11-10 13:22:35  
**Duration:** 180  
**Total Marks:** 100  
**Display Marks:** Yes

## Organic Chemistry 1

**Group Number :** 1  
**Group Id :** 709597239  
**Group Maximum Duration :** 0  
**Group Minimum Duration :** 120  
**Revisit allowed for view? :** No  
**Revisit allowed for edit? :** No  
**Break time:** 0  
**Group Marks:** 100

## Organic Chemistry 1

**Section Id :** 709597298  
**Section Number :** 1  
**Section type :** Online  
**Mandatory or Optional:** Mandatory  
**Number of Questions:** 20  
**Number of Questions to be attempted:** 20  
**Section Marks:** 20  
**Display Number Panel:** Yes  
**Group All Questions:** No

**Sub-Section Number:** 1  
**Sub-Section Id:** 709597393  
**Question Shuffling Allowed :** No

**Question Number : 1 Question Id : 70959722040 Question Type : MCQ Option Shuffling : No Display Question Number : Yes**  
**Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

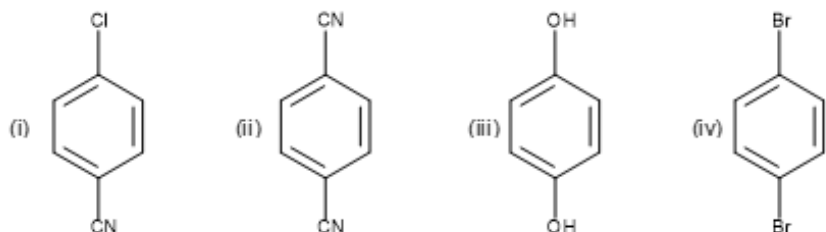
The nucleophilicity changes for  $C_2H_6$ ,  $CH_3NH_2$ ,  $CH_3OH$  and  $CH_3F$  as

1.  $C_2H_6 > CH_3NH_2 > CH_3OH > CH_3F$
2.  $C_2H_6 < CH_3NH_2 < CH_3OH < CH_3F$
3.  $C_2H_6 = CH_3NH_2 > CH_3OH > CH_3F$
4.  $C_2H_6 > CH_3NH_2 = CH_3OH > CH_3F$

**Question Number : 2 Question Id : 70959722041 Question Type : MCQ Option Shuffling : No Display Question Number : Yes**  
**Single Line Question Option : No Option Orientation : Vertical**

Correct Marks : 1 Wrong Marks : 0

For which of the following molecules significant  $\mu \neq 0$

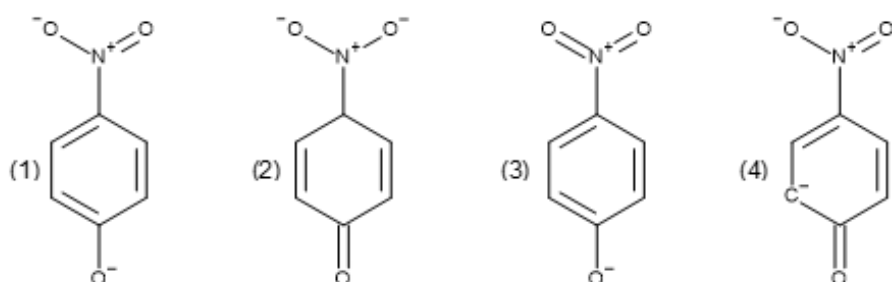


1. Only (i)
2. (i) and (ii)
3. (iii) and (iv)
4. only (iii)

Question Number : 3 Question Id : 70959722042 Question Type : MCQ Option Shuffling : No Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

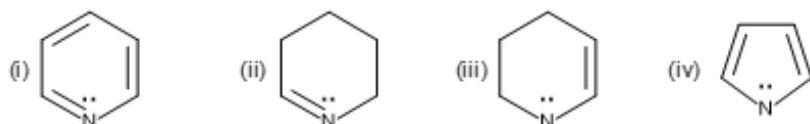
The most unlikely representation of resonance structure of p-nitrophenoxide ion is



Question Number : 4 Question Id : 70959722043 Question Type : MCQ Option Shuffling : No Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In which of the following lone pair indicated is involved in resonance

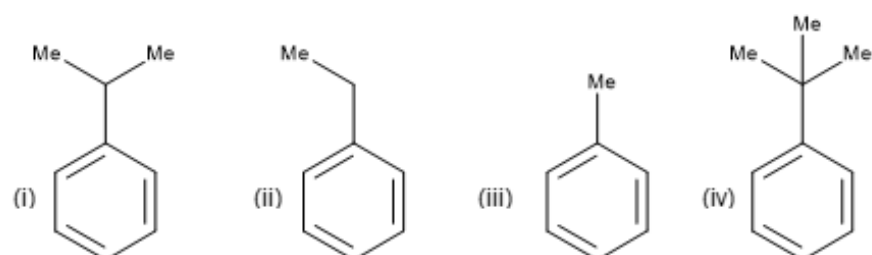


1. (i), (iii) and (iv)
2. (iii) and (iv)
3. (i) and (iv)
4. (ii) and (iii)

Question Number : 5 Question Id : 70959722044 Question Type : MCQ Option Shuffling : No Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Identify the correct sequence for the order of electrophilic substitution for the following compounds

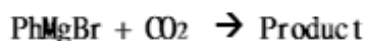


1. iii > ii > i > iv
2. i > ii > iv > iii
3. iv > ii > iii > i
4. iv > i > ii > iii

Question Number : 6 Question Id : 70959722045 Question Type : MCQ Option Shuffling : No Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Identify the product for the following transformation

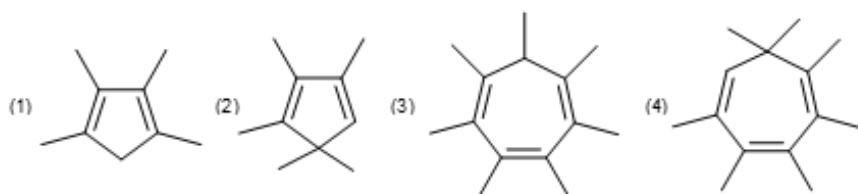


1. Ph-H
2. Ph-OCH<sub>2</sub>CH<sub>3</sub>
3. Ph-COOH
4. Ph-CH<sub>2</sub>CH<sub>3</sub>

Question Number : 7 Question Id : 70959722046 Question Type : MCQ Option Shuffling : No Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

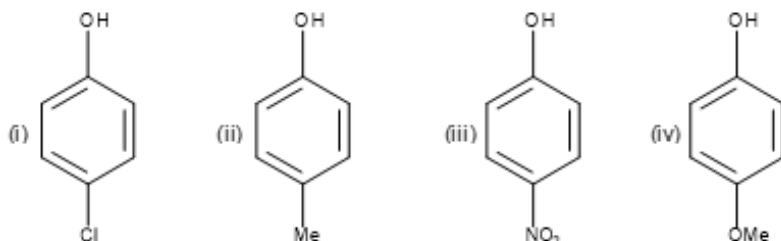
Which one of the following compound is the most acidic



Question Number : 8 Question Id : 70959722047 Question Type : MCQ Option Shuffling : No Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Arrange the compounds in the order of increasing acidity

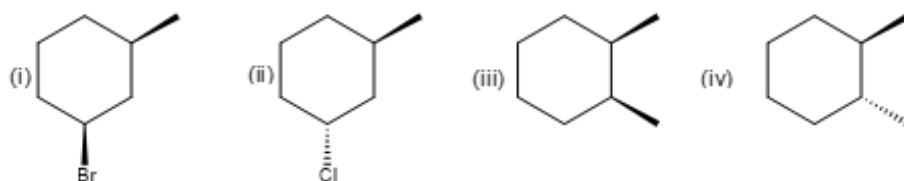


1. (i) < (iii) < (ii) < (iv)
2. (ii) < (iv) < (i) < (iii)
3. (iv) < (ii) < (i) < (iii)
4. (iv) < (iii) < (ii) < (i)

Question Number : 9 Question Id : 70959722048 Question Type : MCQ Option Shuffling : No Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Arrange the compounds in the correct order of increasing stability

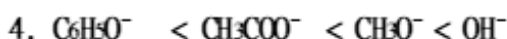
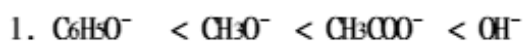


1. (ii) < (i) < (iii) < (iv)
2. (ii) < (i) < (iv) < (iii)
3. (i) < (ii) < (iii) < (iv)
4. (i) < (ii) < (iv) < (iii)

Question Number : 10 Question Id : 70959722049 Question Type : MCQ Option Shuffling : No Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

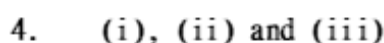
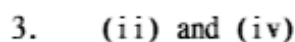
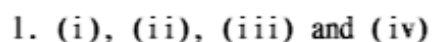
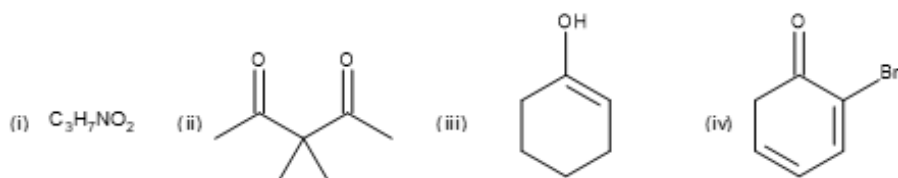
For the following ions, the correct order of nucleophilic strength is



Question Number : 11 Question Id : 70959722050 Question Type : MCQ Option Shuffling : No Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

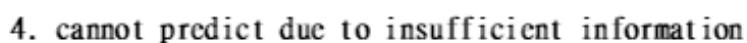
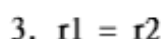
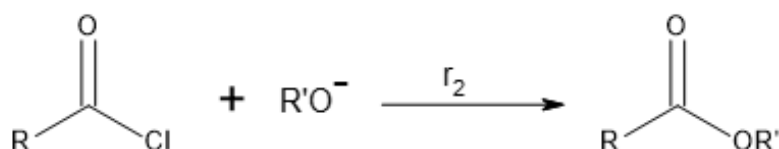
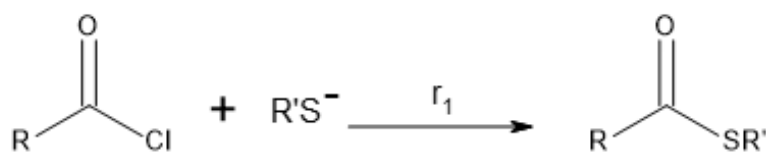
Which of the following compounds show tautomerism



Question Number : 12 Question Id : 70959722051 Question Type : MCQ Option Shuffling : No Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

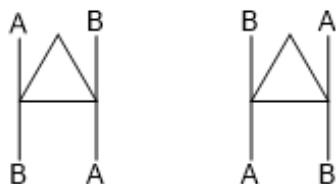
With regards to rate of the reactions which one of the following is correct



Question Number : 13 Question Id : 70959722052 Question Type : MCQ Option Shuffling : No Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The relationship between the following compounds is

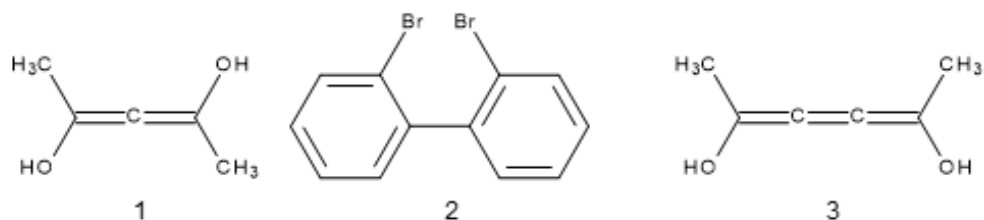


1. Anomers
2. Diastereomers
3. same compound
4. enantiomer

Question Number : 14 Question Id : 70959722053 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following compounds are optically active

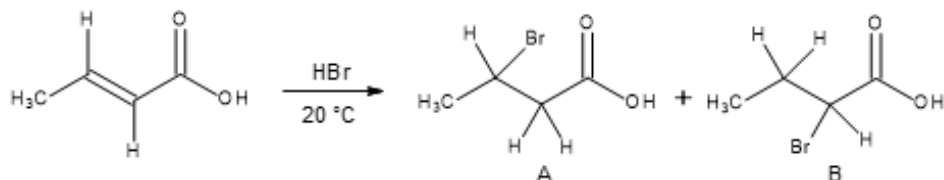


1. 1, 2 and 3
2. 1 and 2 only
3. 1 and 3 only
4. 2 and 3 only

Question Number : 15 Question Id : 70959722054 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Identify the product for the following addition reaction

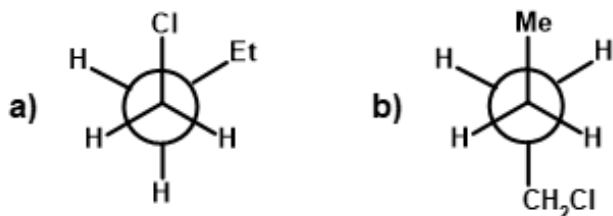


1. No reaction
2. A only
3. B only
4. A and B

Question Number : 16 Question Id : 70959722055 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Identify the relationship between the following two compounds

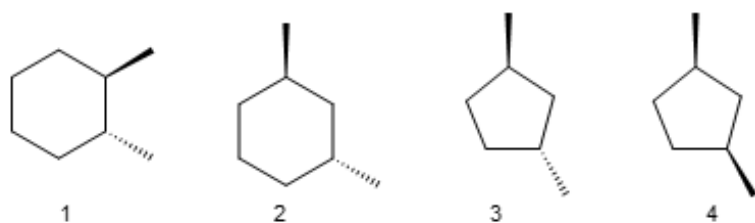


1. Identical compounds
2. Enantiomers
3. Positional isomers
4. Functional isomers

Question Number : 17 Question Id : 70959722056 Question Type : MCQ Option Shuffling : No Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following compound(s) has/have plane of symmetry



1. A, B and C
2. D only
3. B and C
4. A, B, C and D

Question Number : 18 Question Id : 70959722057 Question Type : MCQ Option Shuffling : No Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

18. Identify the correct choice of intermediate with its stereochemistry

Intermediate	Stereochemistry
P. Carbon free radical	I. pyramidal
Q. carbocation	II. planar
R. carbanion	III. tetrahedral

1. P- II, Q-II, R-III
2. P- I or II, Q-I or II, R-III
3. P- I or II, Q-II, R-III
4. P- III, Q-II, R-III

Question Number : 19 Question Id : 70959722058 Question Type : MCQ Option Shuffling : No Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Natural Glucose is termed D-Glucose because

1. It is dextrorotatory
2. It is based on D-Glyceraldehyde Fisher projection
3. It is based on Newman projection
4. It is based on cyclic structure

Question Number : 20 Question Id : 70959722059 Question Type : MCQ Option Shuffling : No Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

An enantiomerically pure acid is treated with racemic mixture of an alcohol having one chiral carbon. The ester formed will be

1. Optically active mixture
2. Enantiomeric compound
3. Optically inactive mixture
4. Difficult to predict due to insufficient information

## Organic Chemistry 2

Section Id :	709597299
Section Number :	2
Section type :	Offline
Mandatory or Optional:	Mandatory
Number of Questions:	10
Number of Questions to be attempted:	10
Section Marks:	30
Display Number Panel:	Yes
Group All Questions:	No

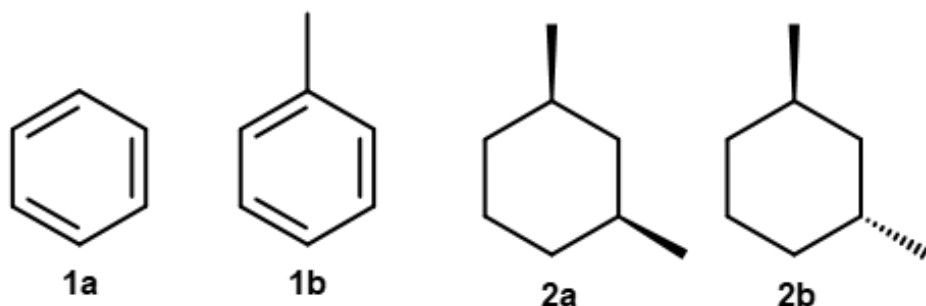
Sub-Section Number:	1
Sub-Section Id:	709597394
Question Shuffling Allowed :	No

Question Number : 21 Question Id : 70959722060 Question Type : SUBJECTIVE Display Question Number : Yes  
Correct Marks : 3

What is torsional strain and torsional energy. Explain with a suitable example.

Question Number : 22 Question Id : 70959722061 Question Type : SUBJECTIVE Display Question Number : Yes  
Correct Marks : 3

It is known that compounds with higher symmetry has higher melting point. Identify which of the compounds within the following two sets, 1a, 1b and 2a, 2b have higher melting point between them. Also identify the symmetry elements present in them.

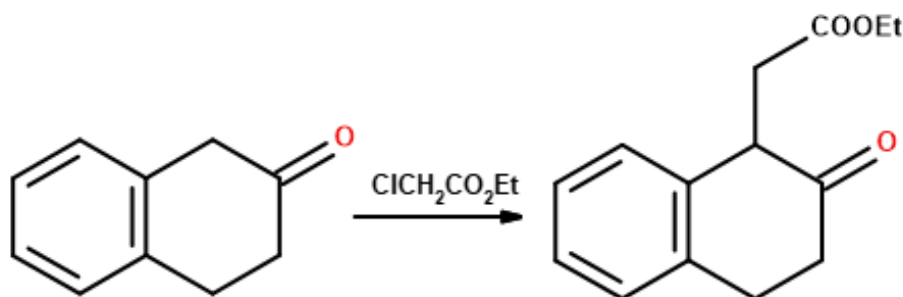


Question Number : 23 Question Id : 70959722062 Question Type : SUBJECTIVE Display Question Number : Yes Correct Marks : 3

Write a short note about homoaromatic compounds with suitable examples.

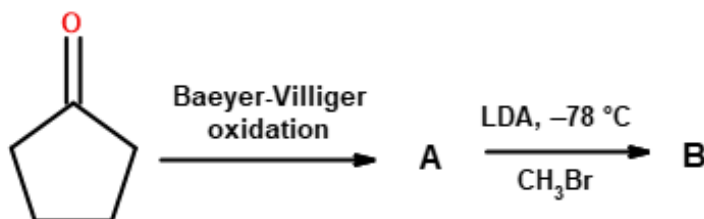
Question Number : 24 Question Id : 70959722063 Question Type : SUBJECTIVE Display Question Number : Yes Correct Marks : 3

Propose a plausible synthetic strategy for the following transformation. You need to use Ethyl chloroacetate as one of the reagents.



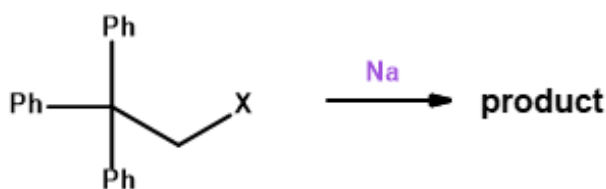
Question Number : 25 Question Id : 70959722064 Question Type : SUBJECTIVE Display Question Number : Yes Correct Marks : 3

Identify products A and B



Question Number : 26 Question Id : 70959722065 Question Type : SUBJECTIVE Display Question Number : Yes Correct Marks : 3

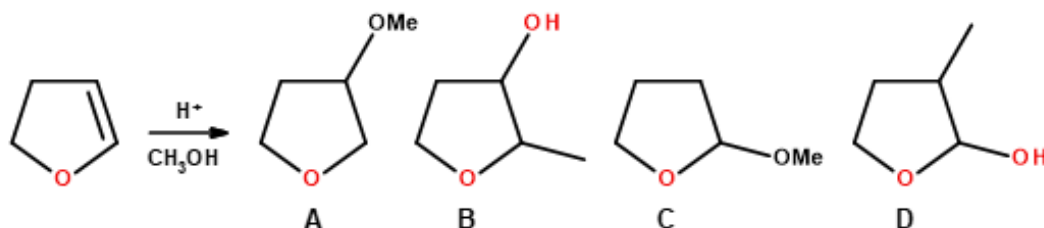
Identify the product and propose a plausible mechanism for the transformation.





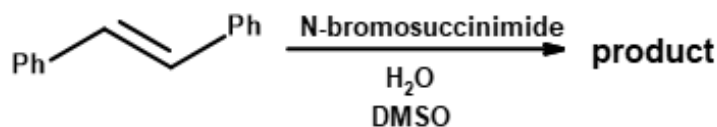
Question Number : 27 Question Id : 70959722066 Question Type : SUBJECTIVE Display Question Number : Yes Correct Marks : 3

From the following possible products (A, B, C and D) identify the correct product that will be formed and propose a mechanism for the same.



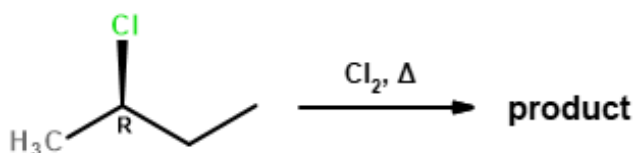
Question Number : 28 Question Id : 70959722067 Question Type : SUBJECTIVE Display Question Number : Yes Correct Marks : 3

Predict the stereochemistry of the product during hydrolysis. Give an explanation for the product obtained through an acceptable mechanism.



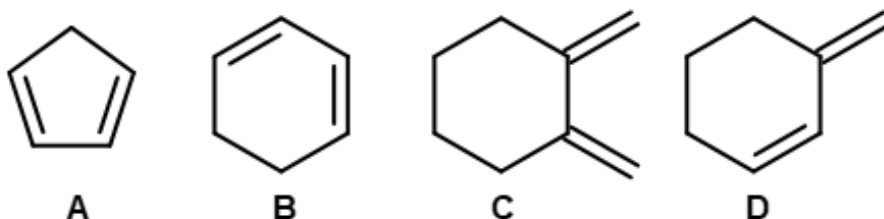
Question Number : 29 Question Id : 70959722068 Question Type : SUBJECTIVE Display Question Number : Yes Correct Marks : 3

What is the product obtained when (R)-2-Chlorobutane undergoes chlorination that does not involve the reaction at the stereogenic center (Cl attack). Give the probable mechanism and explain the product formation.



Question Number : 30 Question Id : 70959722069 Question Type : SUBJECTIVE Display Question Number : Yes Correct Marks : 3

Which of the following diene does not undergo Diels-Alder reaction? Explain with the same with a valid reason.



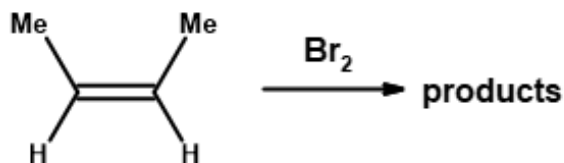
### Organic Chemistry 3

Section Id :	709597300
Section Number :	3
Section type :	Offline
Mandatory or Optional:	Mandatory
Number of Questions:	7
Number of Questions to be attempted:	5
Section Marks:	50
Display Number Panel:	Yes
Group All Questions:	No

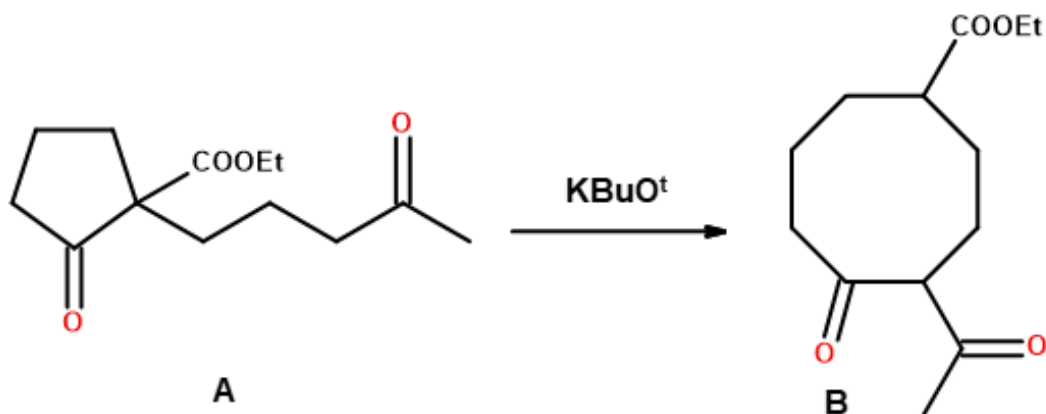
Sub-Section Number: 1  
Sub-Section Id: 709597395  
Question Shuffling Allowed : No

Question Number : 31 Question Id : 70959722070 Question Type : SUBJECTIVE Display Question Number : Yes  
Correct Marks : 10

1a. Identify the products formed in the following transformation. Explain it using suitable reaction mechanism. (5 marks)



1b. Compound A gives product B on reaction with potassium *tert*-butoxide. Propose a plausible mechanism for the product formation. (5 marks)

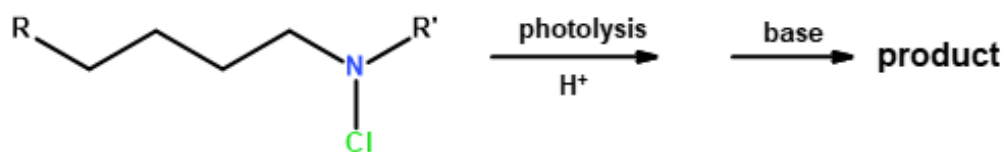


Question Number : 32 Question Id : 70959722071 Question Type : SUBJECTIVE Display Question Number : Yes  
Correct Marks : 10

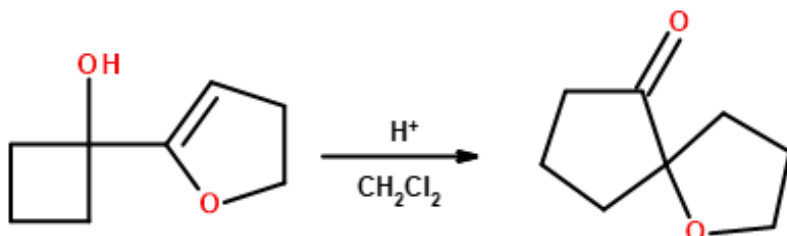
2. With alkyl substituted cyclohexanone as an example explain how octant rule can be used to find out the absolute configuration of the alkyl substituents in alkyl substituted cyclohexanones. (10 marks)

Question Number : 33 Question Id : 70959722072 Question Type : SUBJECTIVE Display Question Number : Yes  
Correct Marks : 10

3a. The following N-chloro amine with a  $\delta$ -CH group is subjected to photolysis under acidic conditions. Then the obtained material was further subjected to treatment with a base. Identify the final product and propose a mechanism for the same. (5 marks)



3b. Give an acceptable mechanism for the following transformation (5 marks).



Question Number : 34 Question Id : 70959722073 Question Type : SUBJECTIVE Display Question Number : Yes Correct Marks : 10

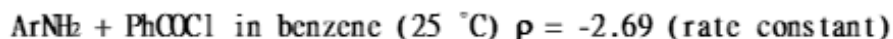
4a. Compare the cyclic  $\pi$  electron systems (3, 4, 5 and 7 membered rings) and identify which species (anions, neutral and cations) are aromatic, non-aromatic and anti-aromatic. (10 marks)

Question Number : 35 Question Id : 70959722074 Question Type : SUBJECTIVE Display Question Number : Yes Correct Marks : 10

5. With suitable reaction energy profile explain how electrophilic aromatic substitution happens in unsubstituted and mono substituted aromatic systems. (10 marks)

Question Number : 36 Question Id : 70959722075 Question Type : SUBJECTIVE Display Question Number : Yes Correct Marks : 10

6. What do you understand by the sign of reaction constant. Using the following two examples explain this



Question Number : 37 Question Id : 70959722076 Question Type : SUBJECTIVE Display Question Number : Yes Correct Marks : 10

Write the complete mechanism for the following transformation. (10 marks)

