

# National Testing Agency

<b>Question Paper Name :</b>	Organic Chemistry 1 28th August 2021 Shift 1
<b>Subject Name :</b>	Organic Chemistry 1
<b>Creation Date :</b>	2021-08-28 19:32:17
<b>Duration :</b>	180
<b>Total Marks :</b>	100
<b>Display Marks:</b>	Yes

## Organic Chemistry 1

<b>Group Number :</b>	1
<b>Group Id :</b>	603489201
<b>Group Maximum Duration :</b>	0
<b>Group Minimum Duration :</b>	120
<b>Show Attended Group? :</b>	No
<b>Edit Attended Group? :</b>	No
<b>Break time :</b>	0
<b>Group Marks :</b>	100
<b>Is this Group for Examiner? :</b>	No

## Organic Chemistry 1-1

<b>Section Id :</b>	603489297
<b>Section Number :</b>	1
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory

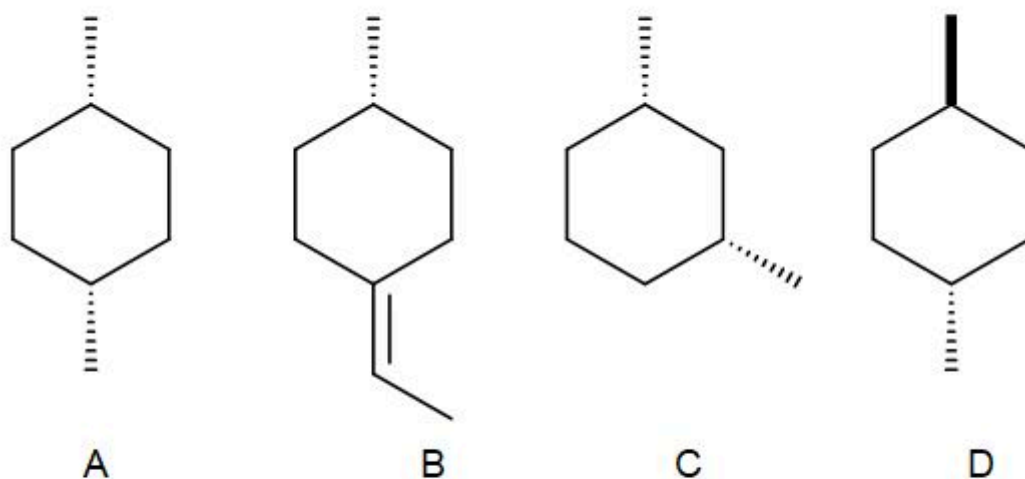
Number of Questions :	20
Number of Questions to be attempted :	20
Section Marks :	20
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Sub-Section Number :	1
Sub-Section Id :	603489535
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 60348914423 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Identify the compound that is optically active but there is no chiral center



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

Options :

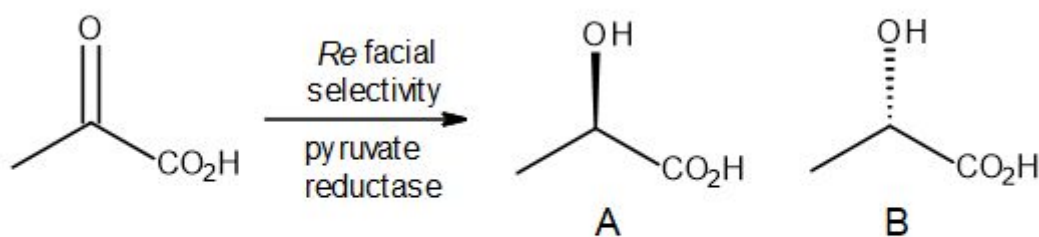
60348954217. 1
60348954218. 2
60348954219. 3
60348954220. 4

Question Number : 2 Question Id : 60348914424 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Identify the product for the following transformation



1. A only
2. B only
3. A : B in 1:1 ratio
4. A : B in 1:2 ratio

Options :

60348954221. 1

60348954222. 2

60348954223. 3

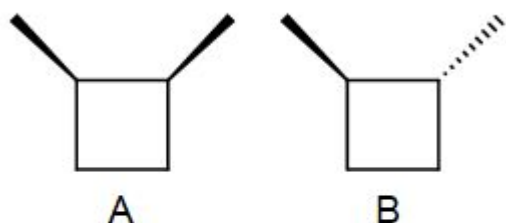
60348954224. 4

Question Number : 3 Question Id : 60348914425 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

How many plane of symmetry are present in the following compounds



1. A zero and B one
2. A zero and B Zero
3. A one and B Zero
4. A one and B one

Options :

60348954225. 1

60348954226. 2

60348954227. 3

60348954228. 4

**Question Number : 4 Question Id : 60348914426 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

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

Stability of the carbocation is maximum for which of the following species

1. Alkyl groups in the beta position
2. Lead (Pb) groups in the beta position
3. Silyl groups in the beta position
4. Stannyl groups in the beta position

**Options :**

60348954229. 1

60348954230. 2

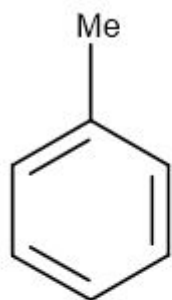
60348954231. 3

60348954232. 4

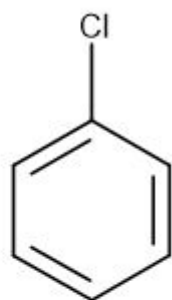
**Question Number : 5 Question Id : 60348914427 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

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

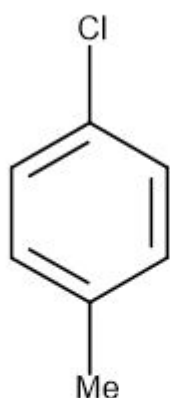
Arrange the compounds in the increasing order of dipole moment



A



B



C

1.  $A < C < B$
2.  $B < A < C$
3.  $A < B < C$
4.  $C < B < A$

**Options :**

60348954233. 1

60348954234. 2

60348954235. 3

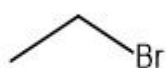
60348954236. 4

**Question Number : 6 Question Id : 60348914428 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

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

For the following reaction of the substrate with different reagents, different products are formed. Identify the correct set

Substrate



Reagent

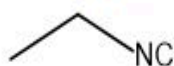
AgCN

A

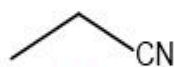
KCN

B

Product



C



D

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

**Options :**

60348954237. 1

60348954238. 2

60348954239. 3

60348954240. 4

**Question Number : 7 Question Id : 60348914429 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No**

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

Which of the following compound does not have six electron on the central atom

1. Ammonia
2. Methane
3. Borane
4. Water

**Options :**

60348954241. 1

60348954242. 2

60348954243. 3

60348954244. 4

**Question Number : 8 Question Id : 60348914430 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No**

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

Which of the following species is having  $sp^2$  hybridisation

1. Acetonitrile
2. Singlet carbene
3. Alkyne
4. Triplet carbene

**Options :**

60348954245. 1

60348954246. 2

60348954247. 3

60348954248. 4

Question Number : 9 Question Id : 60348914431 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

What is the structure of methyl carbocation

1. Pyramidal
2. Linear
3. Planar
4. tetrahedral

Options :

60348954249. 1

60348954250. 2

60348954251. 3

60348954252. 4

Question Number : 10 Question Id : 60348914432 Question Type : MCQ Option Shuffling : No

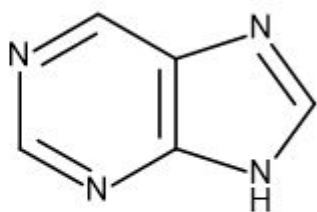
Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

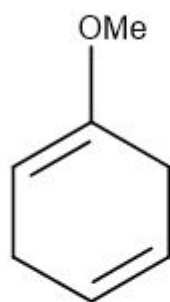
Which of the following is not an aromatic compound



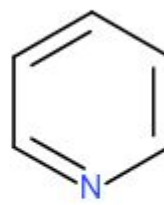
A



B



C



D

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

Options :

60348954253. 1

60348954254. 2

60348954255. 3

60348954256. 4

**Question Number : 11 Question Id : 60348914433 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

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

What is the structure of methyl carbanion

1. Linear
2. Bent
3. Pyramidal
4. tetrahedral

**Options :**

60348954257. 1

60348954258. 2

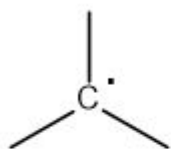
60348954259. 3

60348954260. 4

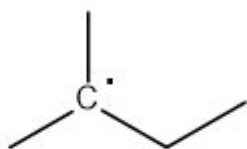
**Question Number : 12 Question Id : 60348914434 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

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

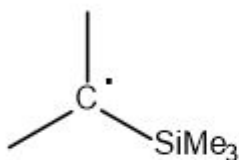
The correct stability order of following free radicals are



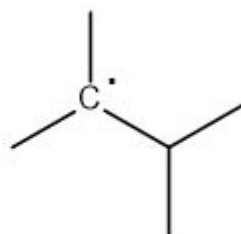
A



B



C



D

1. C > D > B > A
2. D > C > B > A
3. C > D > A > B
4. D > B > A > C



**Options :**

60348954261. 1

60348954262. 2

60348954263. 3

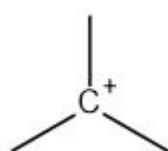
60348954264. 4

**Question Number : 13 Question Id : 60348914435 Question Type : MCQ Option Shuffling : No**

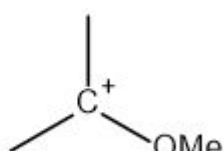
**Is Question Mandatory : No**

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

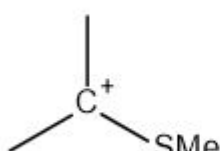
Which is the least stable carbocation(s)



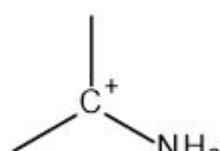
A



B



C



D

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

**Options :**

60348954265. 1

60348954266. 2

60348954267. 3

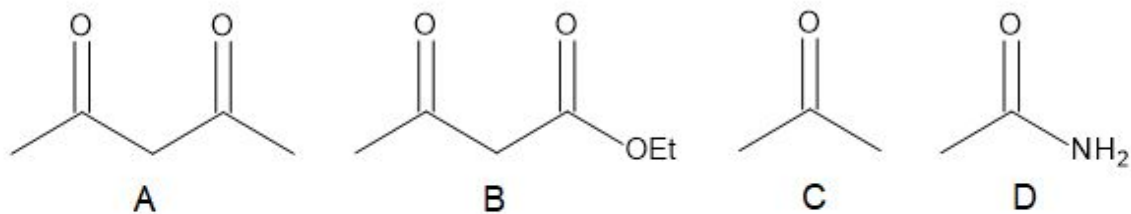
60348954268. 4

**Question Number : 14 Question Id : 60348914436 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

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

Which of the following is having maximum enol content



1. A  $\approx$  B
2. A only
3. C  $\approx$  D
4. B only

**Options :**

60348954269. 1

60348954270. 2

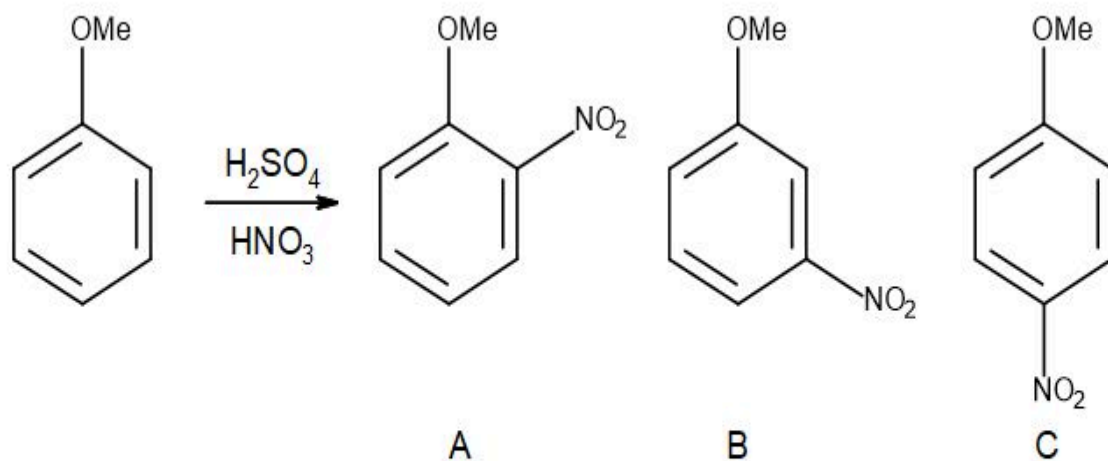
60348954271. 3

60348954272. 4

**Question Number : 15 Question Id : 60348914437 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

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

Identify the major product for the following transformation



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

**Options :**

60348954273. 1

60348954274. 2

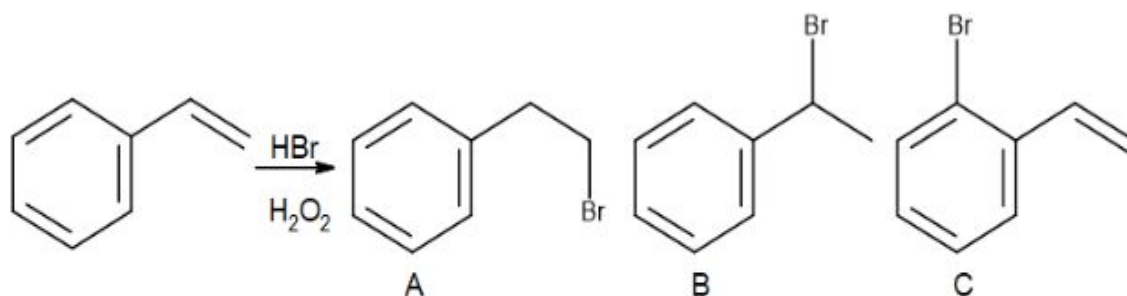
60348954275. 3

60348954276. 4

**Question Number : 16 Question Id : 60348914438 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

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

Identify the product formation for the following reaction



1. A only
2. A as major and C as minor
3. B only
4. C as major and A as minor

**Options :**

60348954277. 1

60348954278. 2

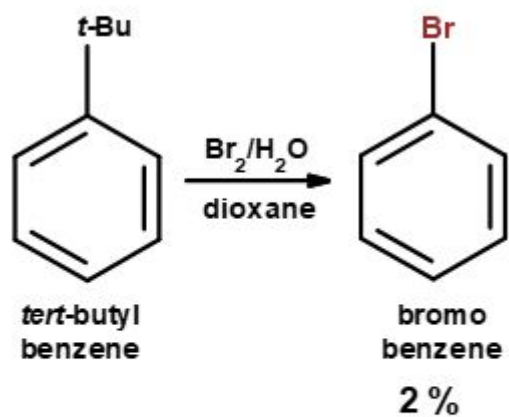
60348954279. 3

60348954280. 4

**Question Number : 17 Question Id : 60348914439 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

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

The following product formation can be explained based on



1. Ipso attack
2. Aromatic electrophilic substitution
3. Aromatic nucleophilic substitution
4. Free radical mechanism

**Options :**

60348954281. 1

60348954282. 2

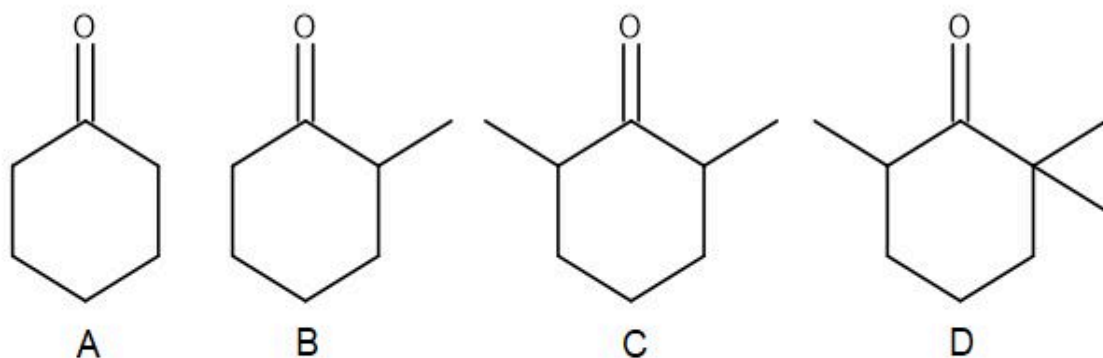
60348954283. 3

60348954284. 4

**Question Number : 18 Question Id : 60348914440 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

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

Identify the order of Grignard reactivity towards Benzyl magnesium bromide



1. A > B > C > D
2. A > B > C ≈ D
3. A ≈ B > C > D
4. D > B > A > C

**Options :**

60348954285. 1

60348954286. 2

60348954287. 3

60348954288. 4

**Question Number : 19 Question Id : 60348914441 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

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

Which of the following compound can undergo ring flip very easily

1. Cis-1,2-dimethylcyclohexane
2. trans-1,2-dimethylcyclohexane
3. Cis-1,3-dimethylcyclohexane
4. trans-1,3-dimethylcyclohexane

**Options :**

60348954289. 1

60348954290. 2

60348954291. 3

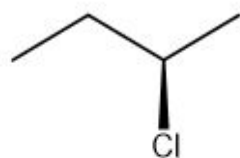
60348954292. 4

**Question Number : 20 Question Id : 60348914442 Question Type : MCQ Option Shuffling : No**

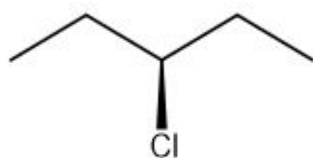
**Is Question Mandatory : No**

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

Identify the chiral compound



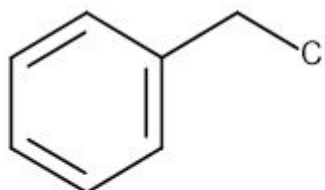
A



B



C



D

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

**Options :**

60348954293. 1

60348954294. 2

60348954295. 3

60348954296. 4

## Organic Chemistry 1-2

<b>Section Id :</b>	603489298
<b>Section Number :</b>	2
<b>Section type :</b>	Offline
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	10
<b>Number of Questions to be attempted :</b>	10
<b>Section Marks :</b>	30
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	603489536
<b>Question Shuffling Allowed :</b>	No

**Question Number : 21 Question Id : 60348914443 Question Type : SUBJECTIVE**

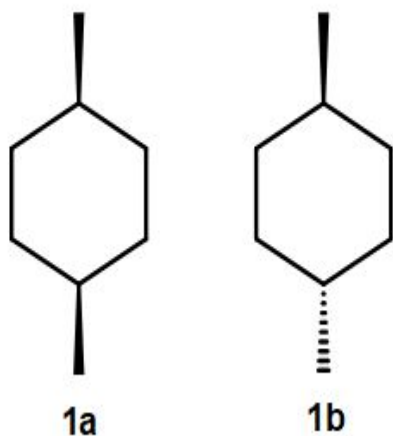
**Correct Marks : 3**

Draw the Newman projection formula for the staggered conformation of 1,2-dichloroethane.  
Is there any chiral conformation? If so, identify it.

**Question Number : 22 Question Id : 60348914444 Question Type : SUBJECTIVE**

**Correct Marks : 3**

Identify which one of the compounds is more stable. Give a reason for the same by drawing the conformational structures.



**Question Number : 23 Question Id : 60348914445 Question Type : SUBJECTIVE**

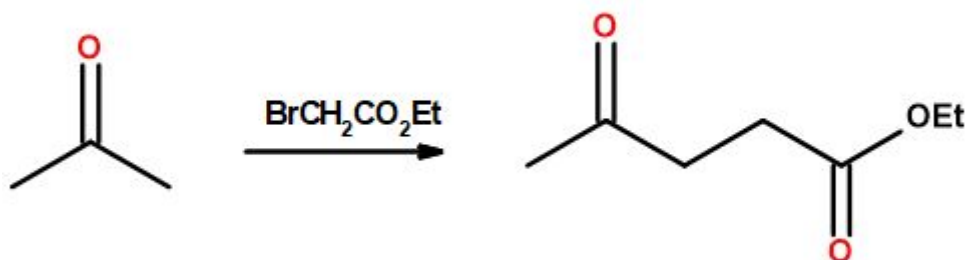
**Correct Marks : 3**

Write a short note about homoaromatic compounds with suitable example.

**Question Number : 24 Question Id : 60348914446 Question Type : SUBJECTIVE**

**Correct Marks : 3**

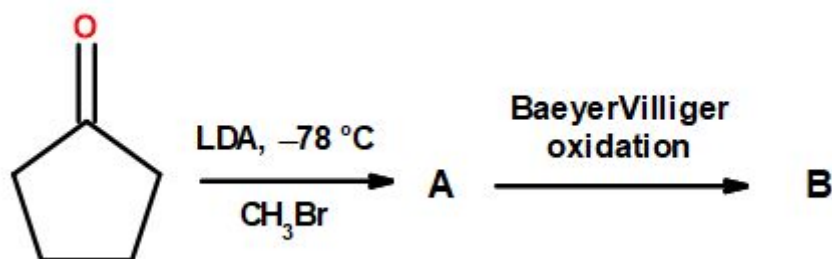
Propose a plausible mechanism for the following transformation.



Question Number : 25 Question Id : 60348914447 Question Type : SUBJECTIVE

Correct Marks : 3

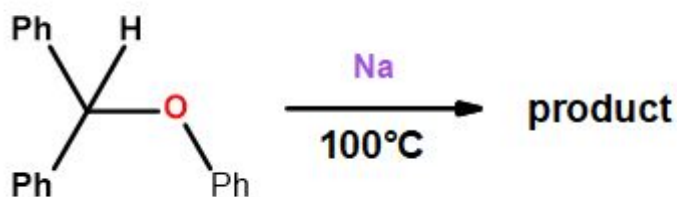
Identify products A and B



Question Number : 26 Question Id : 60348914448 Question Type : SUBJECTIVE

Correct Marks : 3

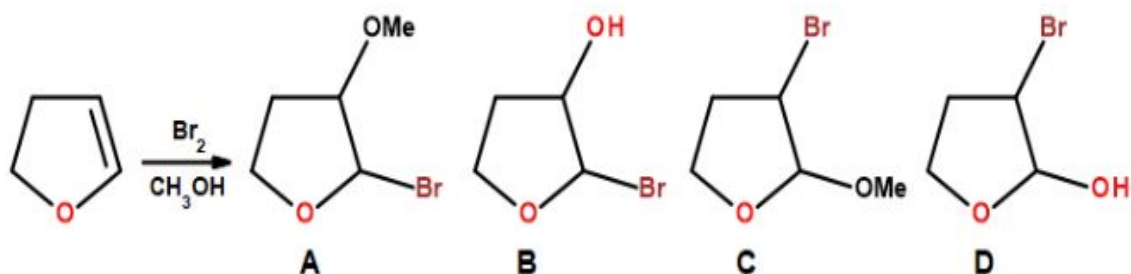
Identify the product and propose a plausible mechanism for the transformation.



Question Number : 27 Question Id : 60348914449 Question Type : SUBJECTIVE

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.

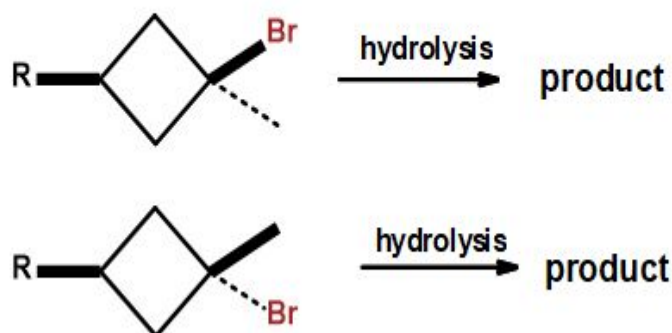


Question Number : 28 Question Id : 60348914450 Question Type : SUBJECTIVE

Correct Marks : 3



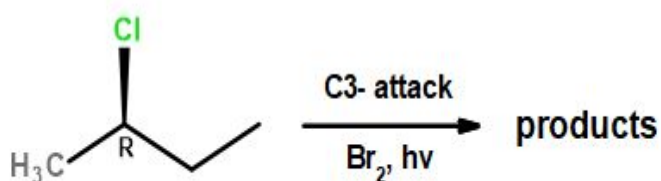
Predict the stereochemistry of the products during hydrolysis. Give an explanation for the product obtained through an acceptable mechanism.



**Question Number : 29 Question Id : 60348914451 Question Type : SUBJECTIVE**

**Correct Marks : 3**

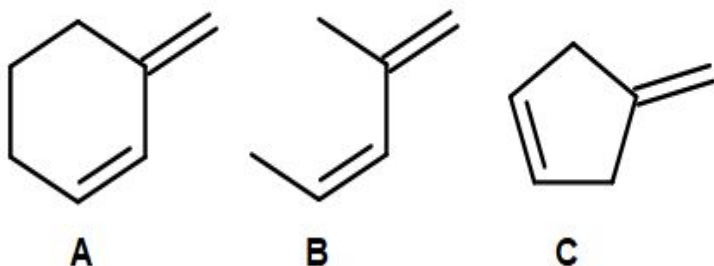
What are the products obtained when (R)-2-Chlorobutane undergoes bromination that produces a new stereogenic center. It is also observed that the products are formed in unequal amounts. Give the probable mechanism and explain the product formation.



**Question Number : 30 Question Id : 60348914452 Question Type : SUBJECTIVE**

**Correct Marks : 3**

Which of the following diene undergoes Diels-Alder reaction? Explain why the other compounds does not undergo Diels-Alder reaction.

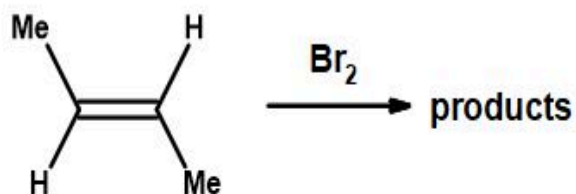


Section Id :	603489299
Section Number :	3
Section type :	Offline
Mandatory or Optional :	Mandatory
Number of Questions :	7
Number of Questions to be attempted :	5
Section Marks :	50
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Sub-Section Number :	1
Sub-Section Id :	603489537
Question Shuffling Allowed :	No

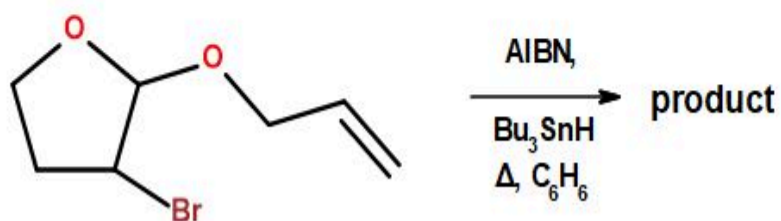
Question Number : 31 Question Id : 60348914453 Question Type : SUBJECTIVE

Correct Marks : 10

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



b. The following bromo compound was subjected to thermolysis in the presence of AIBN and  $\text{Bu}_3\text{SnH}$ . Identify the major product and propose a mechanism for the same. (5 marks)



Question Number : 32 Question Id : 60348914454 Question Type : SUBJECTIVE

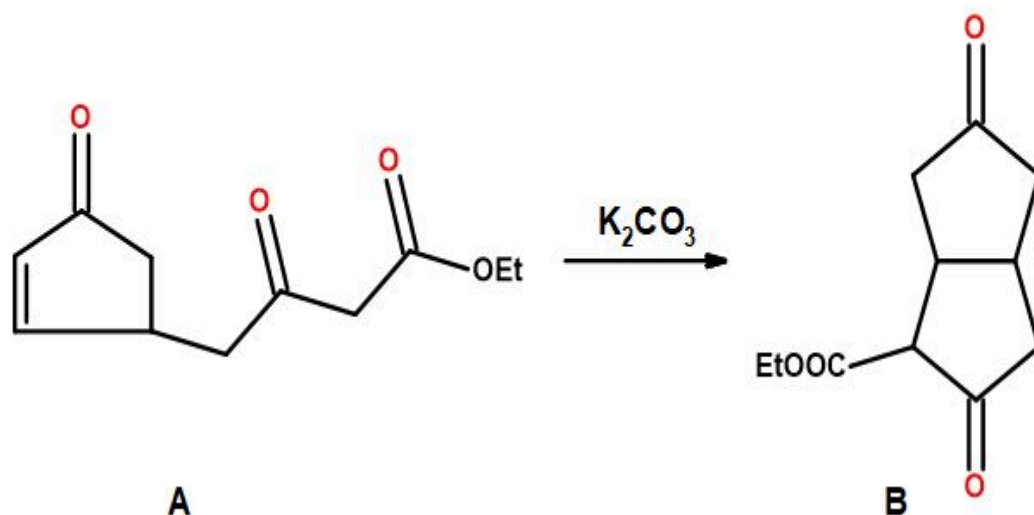
Correct Marks : 10

Write short notes on (a) Linearly polarised light, (b) Circularly polarised light (c) Optical rotatory dispersion (d) Circular dichroism and (e) Cotton effect. (2+2+2+2+2 = 10 marks)

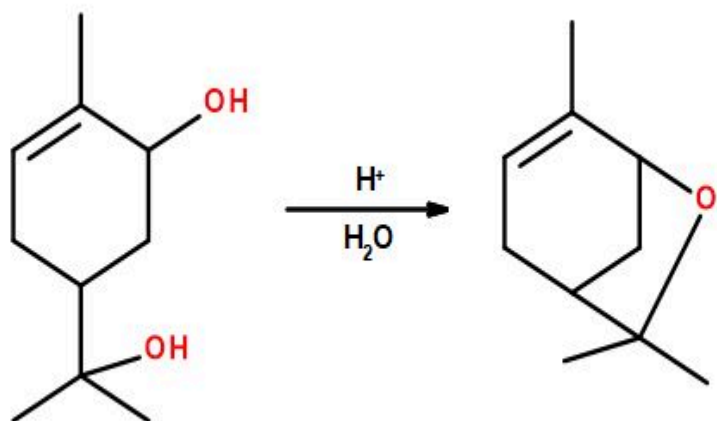
**Question Number : 33 Question Id : 60348914455 Question Type : SUBJECTIVE**

**Correct Marks : 10**

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



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



**Question Number : 34 Question Id : 60348914456 Question Type : SUBJECTIVE**

**Correct Marks : 10**

What is Clar rule? Explain with a suitable example. What are annulenes. Write briefly about 10, 12 and 14 annulenes. (2 + 2+ 2 +4 marks)

**Question Number : 35 Question Id : 60348914457 Question Type : SUBJECTIVE**

**Correct Marks : 10**

a. When isobutane is halogenated, we get different types of products. If it is chlorination we get 1-chloro-2-methylpropane and 2-chloro-2-methylpropane, whereas if it is bromination we get 2-bromo-2-methylpropane as an exclusive product. Explain this with the help of reaction coordinates diagram and also identify the name of the concept/principle. (6 marks)

b. Using reaction coordinate diagram explain how methyl, primary, secondary and tertiary alkyl halides react. (4 marks)

**Question Number : 36 Question Id : 60348914458 Question Type : SUBJECTIVE**

**Correct Marks : 10**

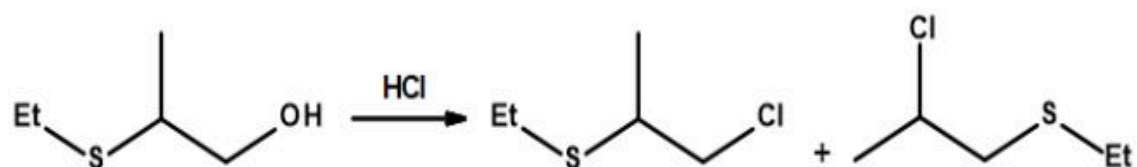
Using the following table explain how the substituents perturb the electron density in the aromatic ring. How this will affect its reactivity.

Group	$\sigma_{para}$	$\sigma_{meta}$	Group	$\sigma_{para}$	$\sigma_{meta}$
NH <sub>2</sub>	-0.66	-0.16	F	0.06	0.34
S <sup>-</sup>	-1.21	-0.36	Cl	0.23	0.39
OMe	-0.27	0.12	Br	0.23	0.37
OH	-0.37	0.12	I	0.18	0.35

**Question Number : 37 Question Id : 60348914459 Question Type : SUBJECTIVE**

**Correct Marks : 10**

Explain with suitable mechanism how the products are formed in the following transformation. (4 marks)



Identify the product through proper mechanism and explain the product formation. (6 marks)

