ALCHEMIST SCIENCE ACADEMY

Assignments

With Previous Years Questions CSIR-NET Dec 2018 , TIFR- 2018 & GATE 2019

Organic Chemistry

Volume-1

for

CSIR NET/JRF, GATE, TIFR, JNU, Ph.D

ASSIGNMENT

ORGANIC CHEMISTRY

Volume - 01

ALCHEMIST SCIENCE ACADEMY

Website: www.csirnetalchemist.com

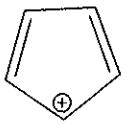
E-mail: alchemistscienceacademy@gmail.com

Head Office: 28-A Jia Sarai, Hauz Khas New Delhi – 16
Ph. 011-26511021, 8285787633, 9582285416, 9953942156

Contents

Aromaticity

Q1. Which Molecule is aromatic?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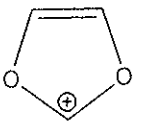
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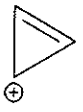
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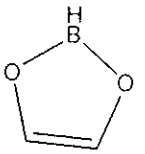
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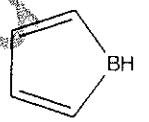
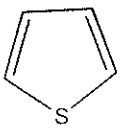
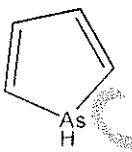
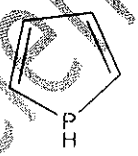
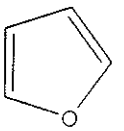
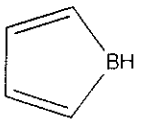
a) 1, 2 and 3 b) 2, 3 and4 c) 3 and 4 d) 3

Q2. Which Molecule is aromatic?

1)  2)  3)  4)  5) 

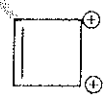
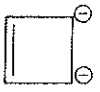
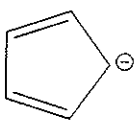
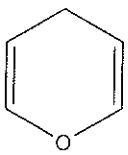
a) 1,2,3 and 4 b) 1 and 4 c) 3, 4, 5 d) 1, 2 , 4 and 5

Q3. Which Molecule is aromatic?

1)  2)  3)  4)  5) 

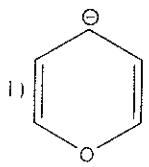
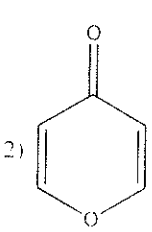
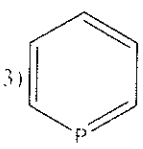
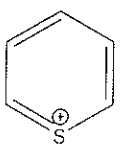
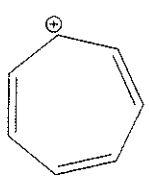
a) 1,2,3, 4 and 5 b) 1, 2, 3 and 4 c) 2, 3, 4, 5 d) 1, 2 , 4 and 5

Q4. Which Molecule is aromatic?

1)  2)  3)  4)  5) 

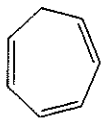
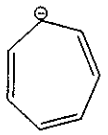
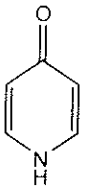
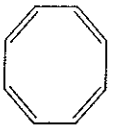
a) 3, 4 and 5 b)1, 2, 3 and 4 c) 2, 3, and 4 d) 2 , 4 and 5

Q5. Which Molecule is aromatic?

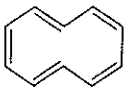
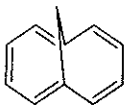
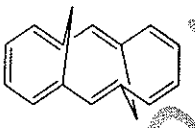
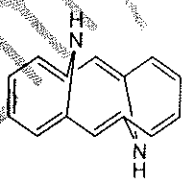
1)  2)  3)  4)  5) 

a) 3, 4 and 5 b) 3 and 4 c) 2, 3, 4 and 5 d) 1, 4 and 5

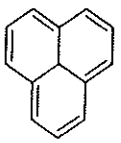
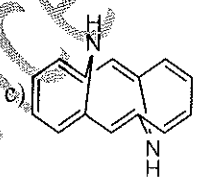
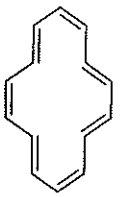
Q6. Which Molecule is aromatic?

a)  b)  c)  d) 

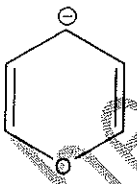
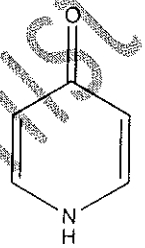
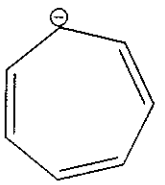
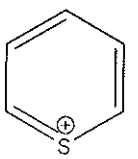
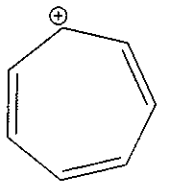
Q7. Which Molecule is aromatic?

a)  b)  c)  d) 

Q8. Which Molecule is aromatic?

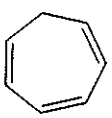
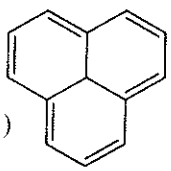
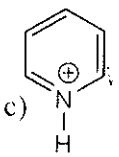
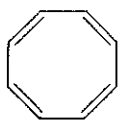
a)  b)  c)  d) 

Q9. Which Molecule is Anti aromatic.

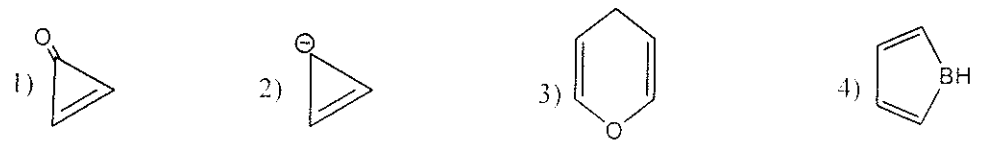
1)  2)  3)  4)  5) 

a) 3, 4 and 5 b) 1 and 3 c) 1, 3 and 4 d) 1, 3 and 5

Q10. Which Molecule is Anti aromatic.

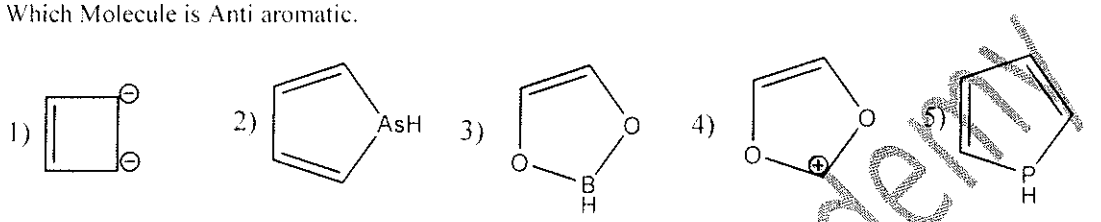
a)  b)  c)  d) 

Q11. Which Molecule is Anti aromatic.



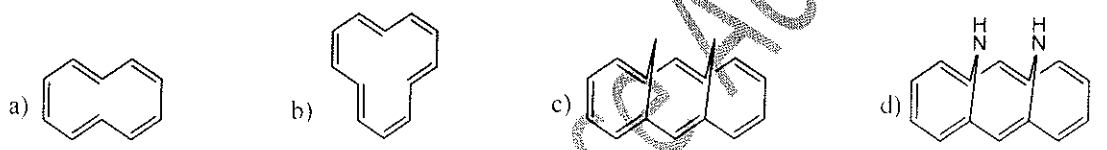
a) 1, 3 and 4 b) 2 and 4 c) 2, 3 and 4 d) 1 and 3

Q12. Which Molecule is Anti aromatic.

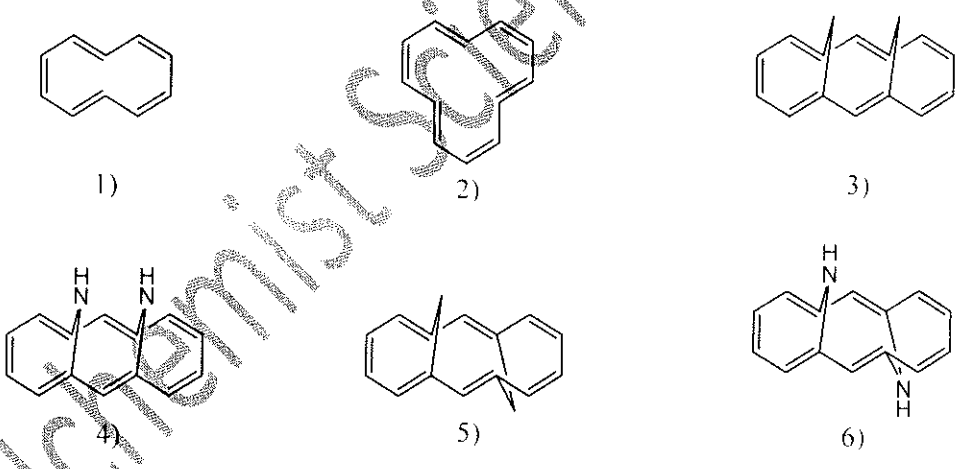


a) 1, 3 and 4 b) 2 and 4 c) 2, 3 and 4 d) None of these

Q13. Which Molecule is Anti aromatic.

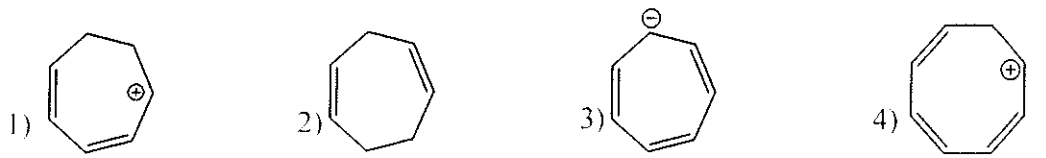


Q14. Which Molecule is aromatic.



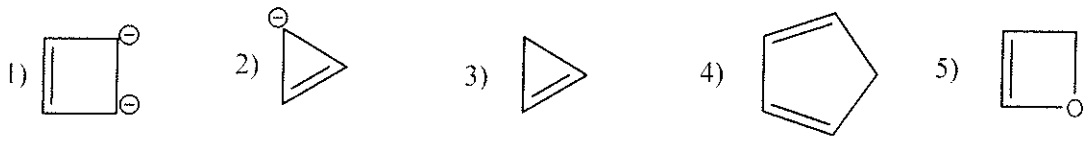
a) 3, 4, 5 and 6 b) 3 and 4 c) 5 and 6 d) 1 and 2

Q15. Which Molecule is NON aromatic?



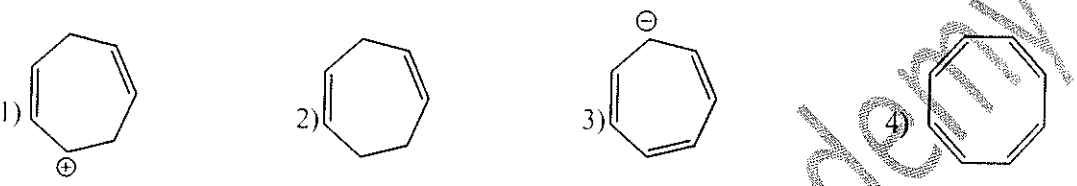
a) 3 and 4 b) 1 and 4 c) 2 and 3 d) 1 and 2

Q16. Which Molecule is NON aromatic?



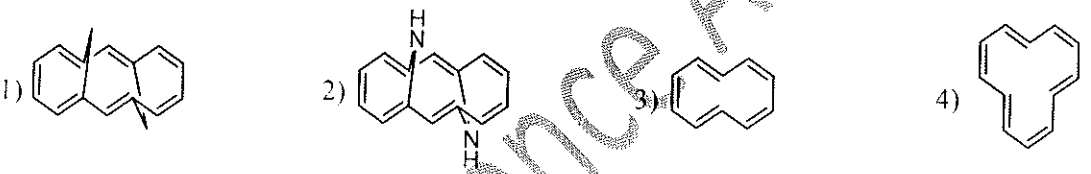
a) 1, 4 and 5 b) 3 and 4 c) 4 and 5 d) 3, 4 and 5

Q17. Which Molecule is NON aromatic?



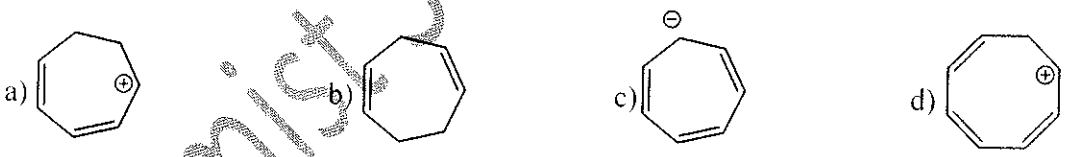
a) 1 and 4 b) 3 and 4 c) 2 and 4 d) 1, 2 and 4

Q18. Which Molecule is NON aromatic?

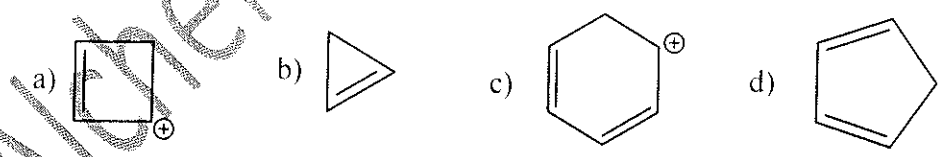


a) 1 and 4 b) 1 and 2 c) 2 and 3 d) 1, 2 and 3

Q19. Which Molecule is HOMO aromatic?



Q20. Which Molecule is HOMO aromatic?

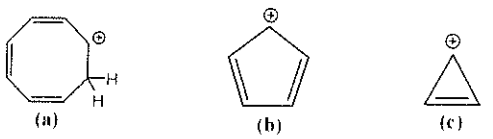


Answer Key

1.(b)	2. (b)	3.(b)	4. (c)	5. (c)	6.(c)	7.(b)
8.(d)	9.(b)	10.(b)	11. (b)	12. (d)	13. (b)	14.(b)
15. (d)	16. (d)	17.(d)	18.(d)	19. (d)	20. (a)	

Aromaticity
NET /GATE Previous Year's Question

Q1. Among the carbocations given below **[NET June 2011]**



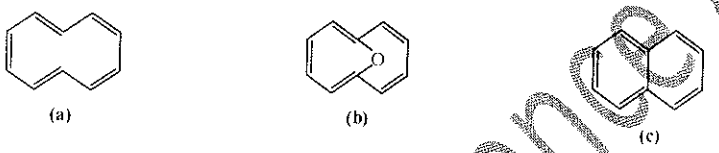
(a) A is homoaromatic, B is antiaromatic and C is aromatic

(b) A is aromatic, B is antiaromatic and C is homoaromatic.

(c) A is antiaromatic, B is aromatic and C is homoaromtic .

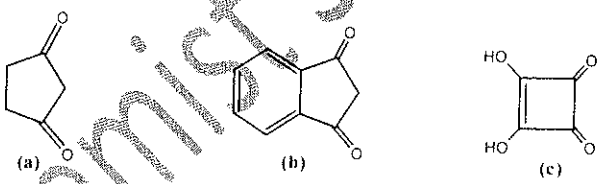
(d) A is homoaromatic, B is aromatic and C is antiaromatic.

Q2. Among A-C, the aromatic compound are **[NET Dec. 2011]**



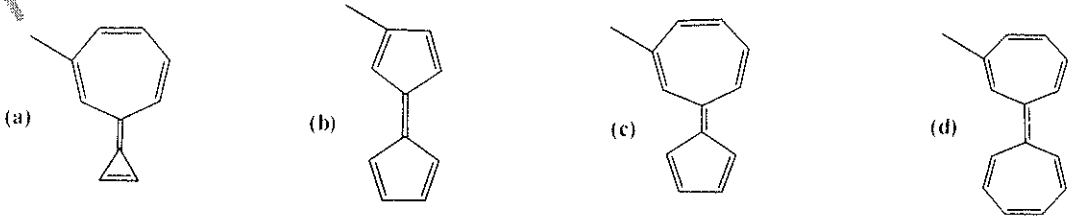
(a) A,B and C (b) A and B (c) B and C (d) A and C

Q3. The correct order of acidity of the compounds A-C is **[NET Dec. 2012]**

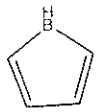


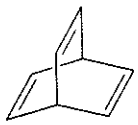
(a) A > B > C (b) B > C > A (c) C > A > B (d) A > A > C

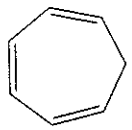
Q4. Among the following, the compounds which has the lowest energy barrier of the cis-trance isomerisation is: **[NET Dec. 2013]**

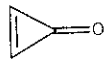


Q5. The compound that is antiaromatic is **[NET Dec. 2014]**


(I)

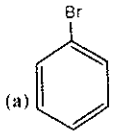

(II)

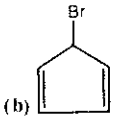

(III)

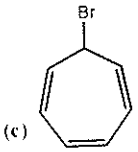

(IV)

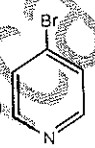
(a) I (b) II (c) III (d) IV

Q6. The compounds that gives precipitate on warming with aqueous $AgNO_3$ is **[NET June 2015]**

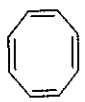

(a)

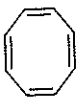

(b)

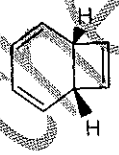

(c)

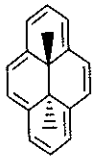

(d)

Q7. Correct match for the product of the reaction in Column-A with the properties in Column-B is **[NET Dec 2016]**

(i)  $+ 2K \longrightarrow$ (P) aromatic

(ii)  $+ H_2SO_4 \longrightarrow$ (Q) aromatic

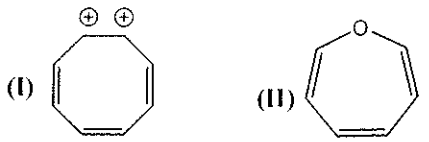
(iii)  $+$ heat $\longrightarrow$ (R) nonaromatic

(iv)  $+ 2K \xrightarrow{\text{heat}}$ (S) homoaromatic

(a) (i)-P, (ii)-S, (iii)-R, (iv)-Q 2. (i)-P, (ii)-R, (iii)-Q, (iv)-S

(c) (i)-Q, (ii)-R, (iii)-S, (iv)-P 3. (i)-S, (ii)-Q, (iii)-R, (iv)-P

Q8. The correct statements about following species is **[NET June 2018]**



(a) Both A and B are aromatic

(b) A is aromatic and B is antiaromatic

(c) A is nonaromatic and B is antiaromatic

(d) A is aromatic and B is homoaromatic

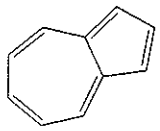
Answer Key

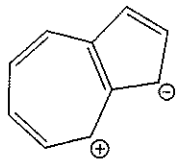
1.(a)	2.(c)	3.(c)	4.(c)	5.(a)	6.(c)	7.(a)

8.(b)

GATE Previous Year's Question

Q1. The following hydrocarbon has a dipole moment of 0.8 D because **[GATE 2000]**



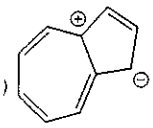
(a) It exist as  in which both the rings exhibit aromaticity

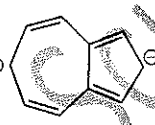
(b) Change separation permits conformation stability

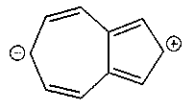
(c) The two rings are of different size

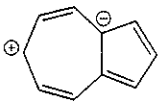
(d) The molecule obeys 4n + 2 Huckel rule

Q2. Among the resonance forms given below, the one which contributes must be the stability of azulene is **[GATE 2004]**

(a) 

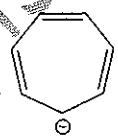
(b) 

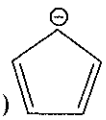
(c) 

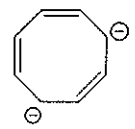
(d) 

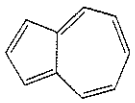
Q3. The compound that is NOT aromatic is **[GATE 2008]**

(a) 

(b) 

(c) 

(d) 

Q4. The compound  is **[GATE 2009]**

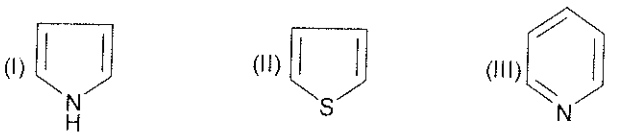
(a) aromatic and has high dipole moment

(b) aromatic and has no dipole moment

(c) non-aromatic and has high dipole moment

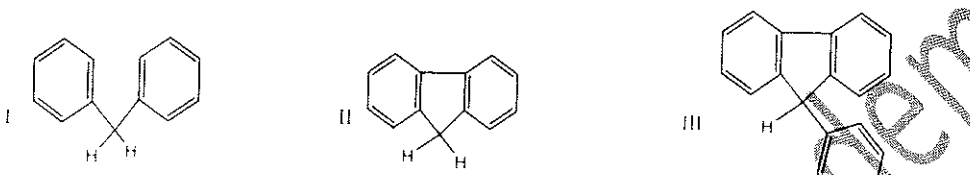
(d) anti-aromatic and has no dipole moment.

Q5. The decreasing order of the reactivity of the following compounds towards electrophiles is **[GATE 2010]**



(a) II > I > III (b) II > III > I (c) III > I > II (d) I > II > III

Q6. The decreasing order of acidity of the marked H of the following molecules **[GATE 2010]**



(a) I > II > III (b) III > I > II (c) III > II > I (d) II > I > III

Q7. Among the following compounds, the one that is non-aromatic, is

Answer Key

1.(a)	2. (d)	3.(b)	4.(a)	5.(d)	6.(c)	7.(a)

TIFR Pervious Year's Question

Q1. Cyclooctatetraene is **[TIFR2017]**

(a) aromatic, because it is planar and it follows Huckel's rule

(b) antiaromatic, because it is planar and it does not follow Huclkel's rule

(c)antiaromatic, because it is planar and it does not follow Huckel's rule

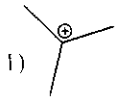
(d) nonaromatic, because it is not planar and it does not follow Huckel's rule

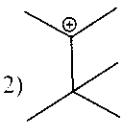
Answer Key

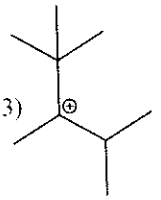
1.(d)

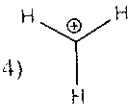
General Organic Chemistry

Q1. The decreasing order of stability of carbocations

1) 

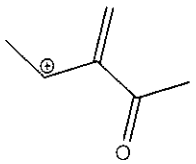
2) 

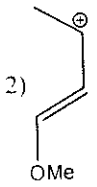
3) 

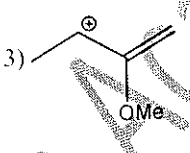
4) 

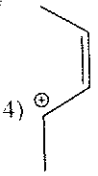
a) 3>2>1>4 b) 1>2>3>4 c) 1>3>2>4 b) 2>3>1>4

Q2. The decreasing order of stability of carbocation is more stable

1) 

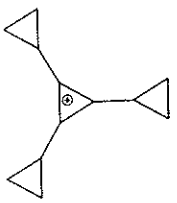
2) 

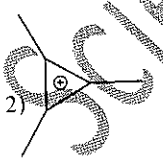
3) 

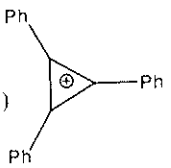
4) 

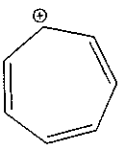
a) 4>2>1>3 b) 1>2>3>4 c) 2>4>3>1 b) 2>3>1>4

Q3. The decreasing order of stability of carbocation is more stable

1) 

2) 

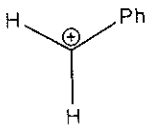
3) 

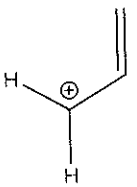
4) 

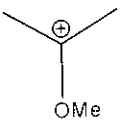
a) 4>3>2>1 b) 1>2>3>4 c) 1>4>3>2 b) 1>3>2>4

Q4. The decreasing order of stability of carbocation is more stable

1) 

2) 

3) 

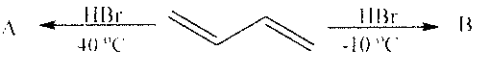
4) 

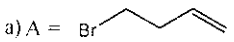
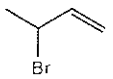
a) 4>2>3>1 b) 4>2>1>3 c) 2>3>4>1 d) 4>1>2>3

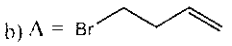
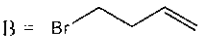
Q5. which Carbene is more stable

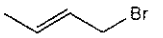
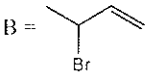
a) $\ddot{C}F_2$ b) $\ddot{C}Cl_2$ c) $\ddot{C}Br_2$ d) $\ddot{C}I_2$

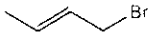
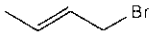
Q6. The major product formed in the reaction given below is



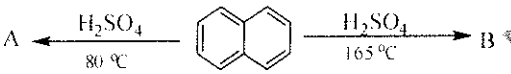
a) A = 
B = 

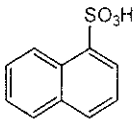
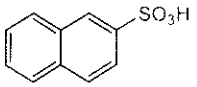
b) A = 
B = 

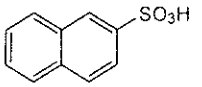
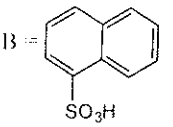
c) A = 
B = 

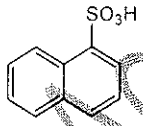
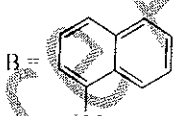
d) A = 
B = 

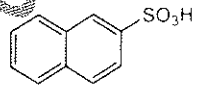
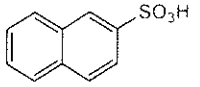
Q7. The major product formed in the reaction given below is



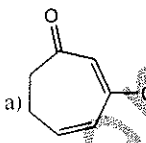
a) A = 
B = 

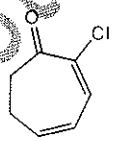
b) A = 
B = 

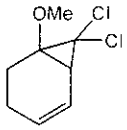
c) A = 
B = 

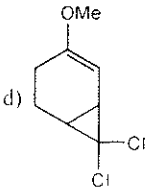
d) A = 
B = 

Q8. The major product formed in the reaction given below is

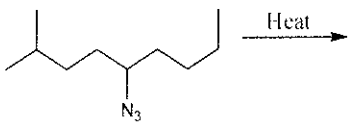
a) 

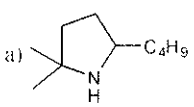
b) 

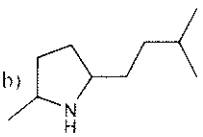
c) 

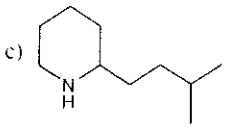
d) 

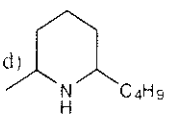
Q9. The major product formed in the reaction given below is



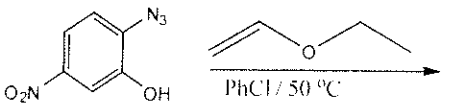
a) 

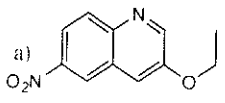
b) 

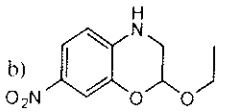
c) 

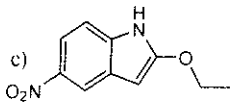
d) 

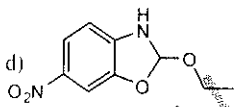
Q10. The major product formed in the reaction given below is



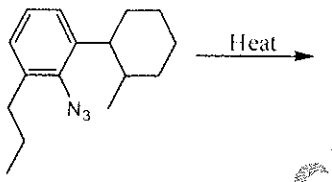
a) 

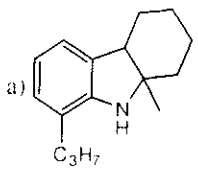
b) 

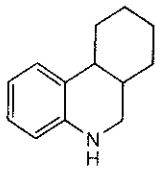
c) 

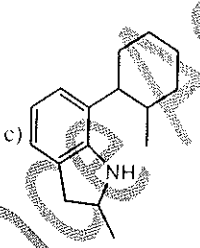
d) 

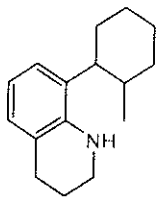
Q11. The major product formed in the reaction given below is



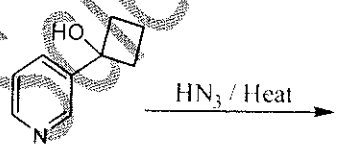
a) 

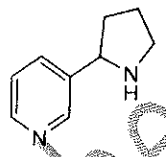
b) 

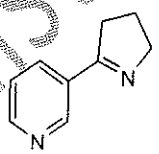
c) 

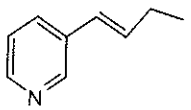
4) 

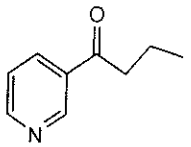
Q12. The major product formed in the reaction given below is



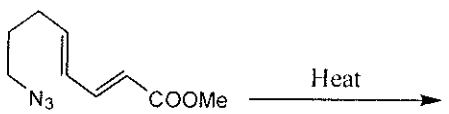
a) 

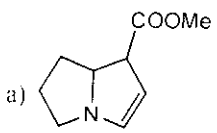
b) 

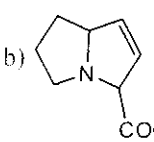
c) 

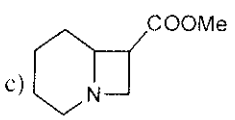
d) 

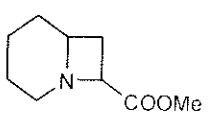
Q13. The major product formed in the reaction given below is



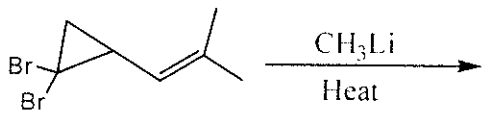
a) 

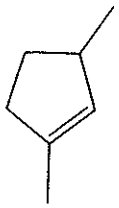
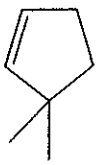
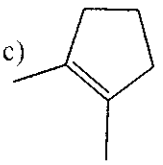
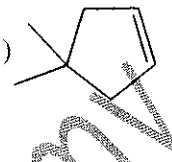
b) 

c) 

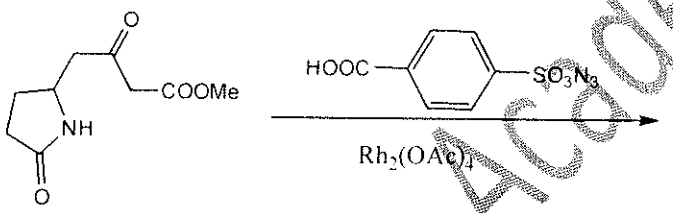
d) 

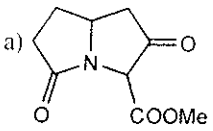
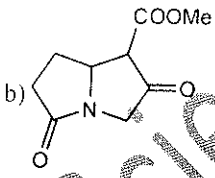
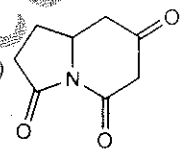
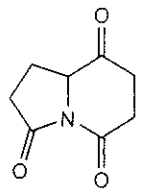
Q14. The major product formed in the reaction given below is



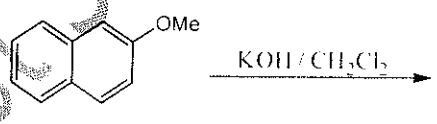
a)  b)  c)  d) 

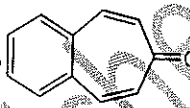
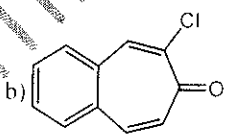
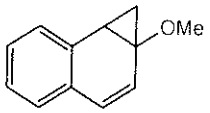
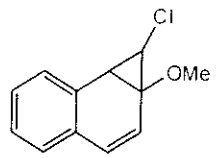
Q15. The major product formed in the reaction given below is



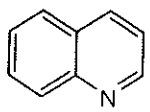
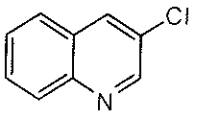
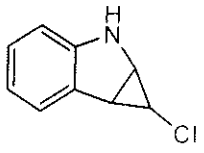
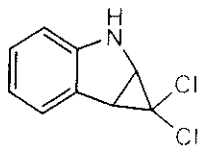
a)  b)  c)  d) 

Q16. The major product formed in the reaction given below is

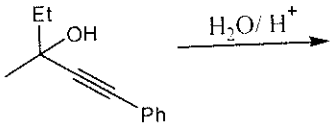


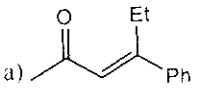
a)  b)  c)  d) 

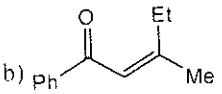
Q17. The major product formed in the reaction given below is

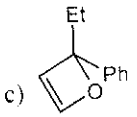
a)  b)  c)  d) 

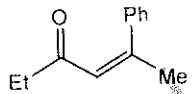
Q18. The major product formed in the reaction given below is



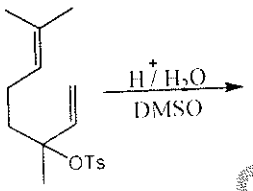
a) 

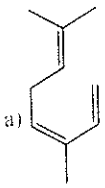
b) 

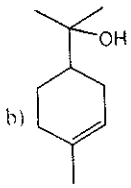
c) 

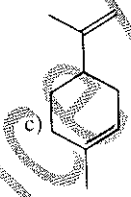
d) 

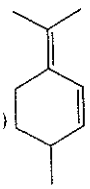
Q19. The major product formed in the reaction given below is



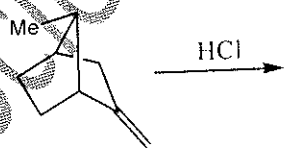
a) 

b) 

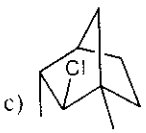
c) 

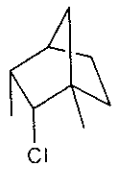
d) 

Q20. The major product formed in the reaction given below is

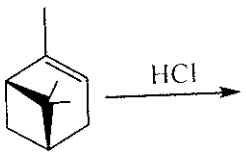


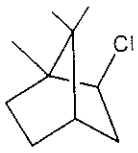
a) 

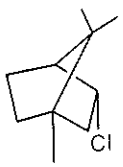
c) 

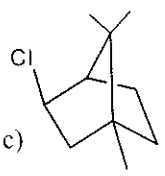
d) 

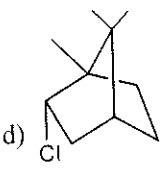
Q21. The major product formed in the reaction given below is



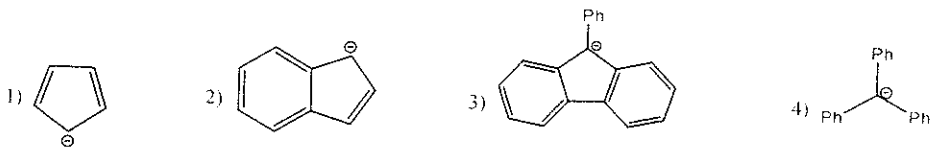
a) 

b) 

c) 

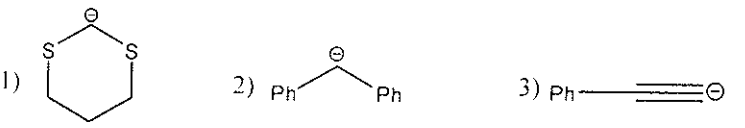
d) 

Q22. The decreasing order of stability of carbanions



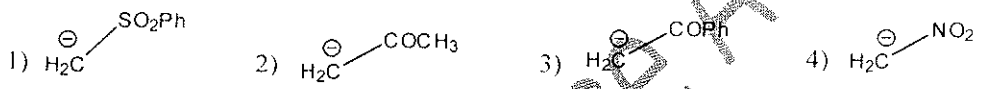
a) 3>1>2>4 b) 3>2>1>4 c) 2>3>1>4 b) 4>3>2>1

Q23. The decreasing order of stability of carbanions



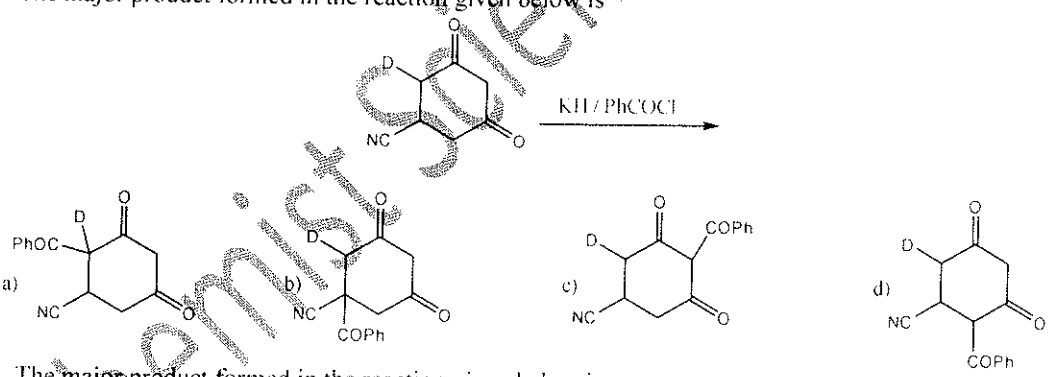
a) 3>2>1 b) 1>3>2 c) 2>3>1 b) 2>1>3

Q24. The decreasing order of stability of carbanions

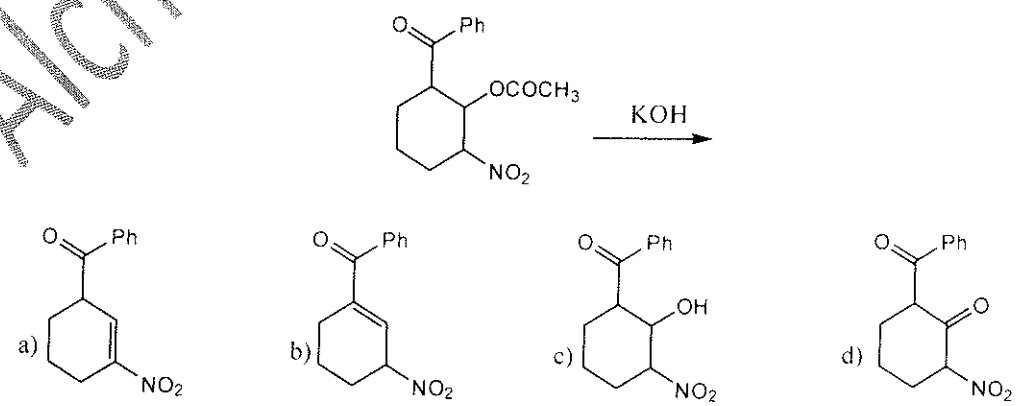


a) 1>2>3>4 b) 4>3>2>1 c) 4>1>3>2 b) 4>1>2>3

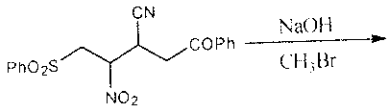
Q25. The major product formed in the reaction given below is

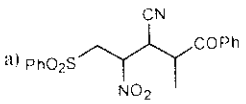


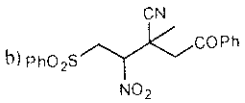
Q26. The major product formed in the reaction given below is

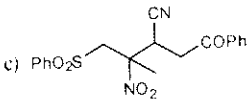


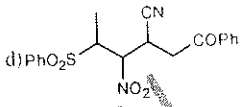
Q27. The major product formed in the reaction given below is



a) 

b) 

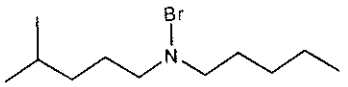
c) 

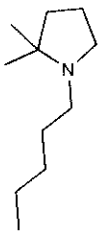
d) 

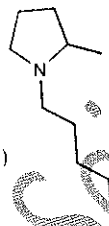
Q28. Which Free radical is more stable

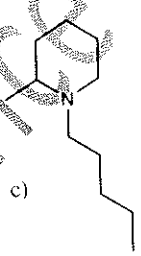
a) $\overset{\bullet}{F}$ b) $\overset{\bullet}{N}H_2$ c) $\overset{\bullet}{O}H$ d) $\overset{\bullet}{C}H_3$

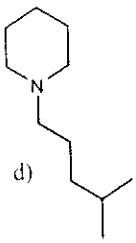
Q29. The major product formed in the reaction given below is



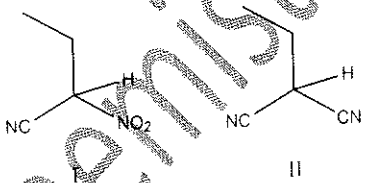
a) 

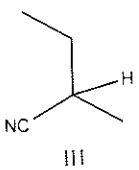
b) 

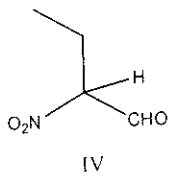
c) 

d) 

Q30. The decreasing order of stability of acidic proton these molecules







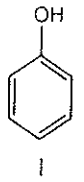
a) I>IV>II>III b) I>IV>III>II c) IV>I>II>III d) IV>I>III>II

Answer Key

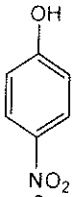
1. (b)	2. (c)	3. (b)	4. (d)	5. (a)	6. (c)	7. (a)
8. (b)	9. (a)	10. (b)	11. (a)	12. (b)	13. (a)	14. (b)
15. (a)	16.(a)	17. (a)	18. (b)	19. (b)	20. (c)	21. (d)
22. (a)	23. (a)	24. (b)	25. (c)	26. (a)	27. (c)	28. (d)
29. (a)	30. (c)					

Acidity, Basicity and Nucleophilicity

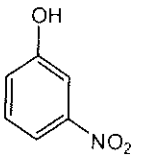
Q1. The decreasing order of acidity of these molecules



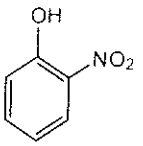
1



2



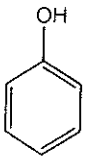
3



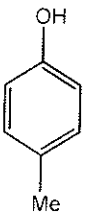
4

a) 3>2>4>1 b) 1>2>3>4 c) 4>2>3>1 d) 2>4>3>1

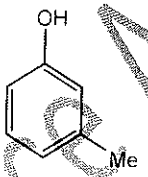
Q2. The decreasing order of acidity of these molecules



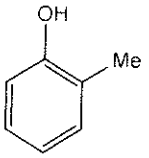
1



2



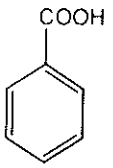
3



4

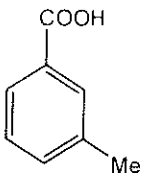
a) 4>2>3>1 b) 1>3>4>2 c) 4>2>3>1 d) 2>4>3>1

Q3. The decreasing order of acidity of these molecules

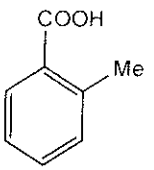


1

2



3

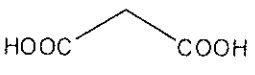


4

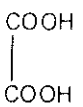
a) 4>1>3>2 b) 1>3>2>4 c) 4>2>3>1 d) 4>1>3>2

Q4. The decreasing order of acidity of these molecules

1



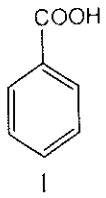
2



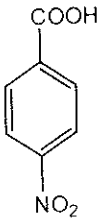
3

a) 1>3>2 b) 3>2>1 c) 2>3>1 d) 1>2>3

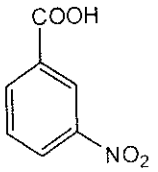
Q5. The decreasing order of acidity of these molecules



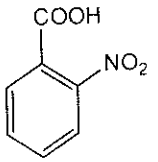
1



2



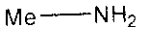
3



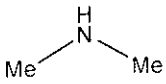
4

a) 1>3>2>4 b) 4>2>3>1 c) 2>4>3>1 d) 1>4>3>2

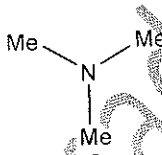
Q6. The decreasing order of basicity in solution



1



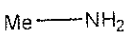
2



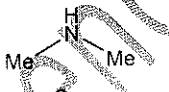
3

a) 1>3>2 b) 2>1>3 c) 3>2>1 d) 1>2>3

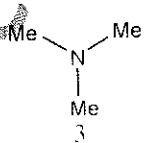
Q7. The decreasing order of basicity in gases phase



1



2

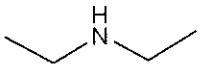


3

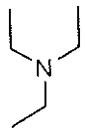
a) 1>3>2 b) 2>1>3 c) 3>2>1 d) 1>2>3

Q8. The decreasing order of basicity in a solution

1



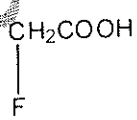
2



3

a) 1>3>2 b) 2>3>1 c) 3>2>1 d) 1>2>3

Q9. The decreasing order of acidity of these molecules



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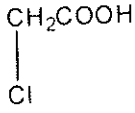

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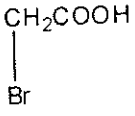
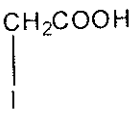


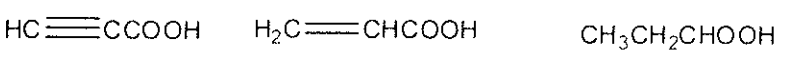
3



4

a) 1>2>3>4 b) 2>1>3>4 c) 3>2>1>4 d) 1>3>2>4

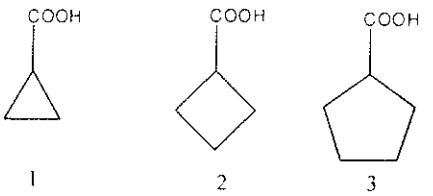
Q10. The decreasing order of acidity



1 2 3

a) 1>3>2 b) 2>3>1 c) 3>2>1 d)1>2>3

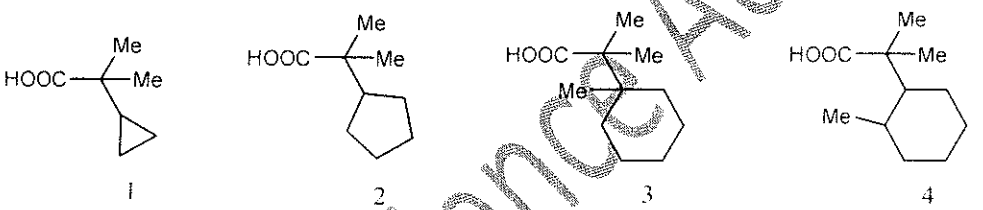
Q11. The decreasing order of acidity



1 2 3

a) 1>3>2 b) 2>3>1 c) 3>2>1 d)1>2>3

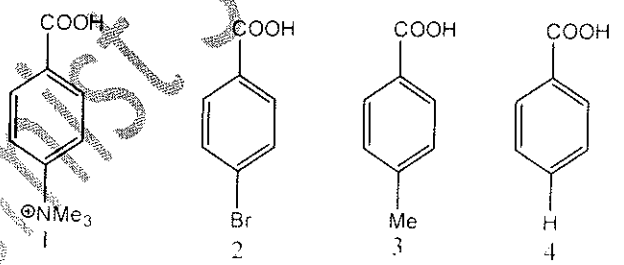
Q12. The decreasing order of acidic species



1 2 3 4

a)1>2>3>4 b) 2>3>1>4 c) 1>2>4>3 d) 1>3>2>4

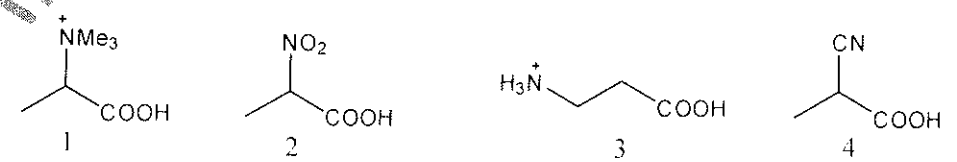
Q13. The decreasing order of acidity



1 2 3 4

a) 1>2>3>4 b) 2>3>1>4 c)1>2>4>3 d) 1>3>2>4

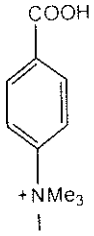
Q14. The decreasing order of acidity



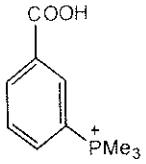
1 2 3 4

a) 1>2>3>4 b) 2>3>1>4 c)1>3>2>4 d)1>2>4>3

Q15. The decreasing order of acidity of these molecules

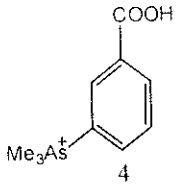


1



2

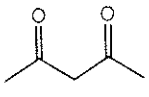
3

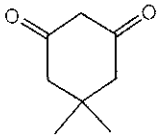


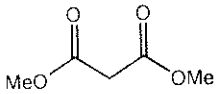
4

a) 1>2>4>3 b) 2>4>1>3 c) 3>4>2>1 d) 1>2>3>4

Q16. The decreasing order of acidity of these molecules


1


2



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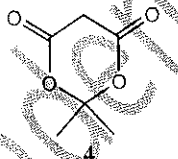
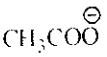

4

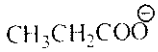
a) 1>2>4>3 b) 2>4>1>3 c) 4>2>1>3 d) 1>2>3>4

Q17. The decreasing order of acidic species


1

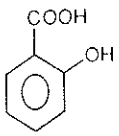

2


3

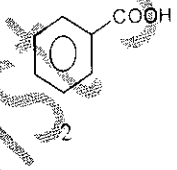

4

a) 1>2>4>3 b) 2>4>1>3 c) 3>1>2>4 d) 1>2>3>4

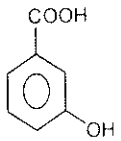
Q18. The decreasing order of basicity



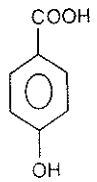
1



2



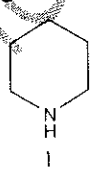
3



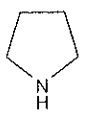
4

a) 1>3>2>4 b) 2>4>1>3 c) 4>3>2>1 d) 1>2>3>4

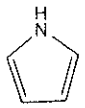
Q19. The decreasing order of basicity



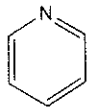
1



2



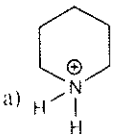
3

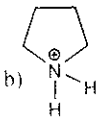


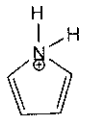
4

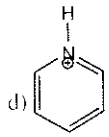
a) 1>3>2>4 b) 2>4>1>3 c) 1>2>4>3 d) 1>2>3>4

Q20. The Most acidic compound

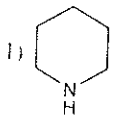
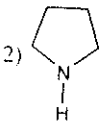
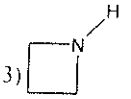
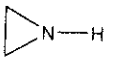
a) 

b) 

c) 

d) 

Q21. The decreasing order of basicity

1)  2)  3)  4) 

a) 1>3>2>4 b) 2>4>1>3 c) 1>2>4>3 d) 1>2>3>4

Q22. The decreasing order of nucleophilicity in polar protic solvents

1)  2)  3)  4) 

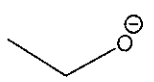
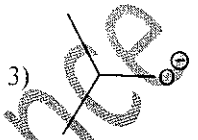
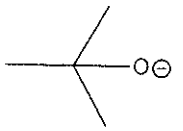
a) 1>3>2>4 b) 2>1>3>4 c) 1>2>4>3 d) 1>2>3>4

Q23. The decreasing order of nucleophilicity in polar protic solvents

1)  2)  3)  4) 

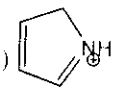
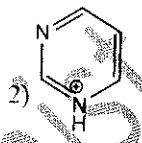
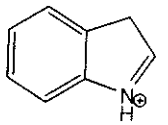
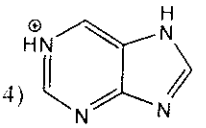
a) 1>3>2>4 b) 4>2>3>1 c) 2>3>4>1 d) 1>2>3>4

Q24. The decreasing order of nucleophilicity

1)  2)  3)  4) 

a) 1>3>2>4 b) 4>2>3>1 c) 2>3>4>1 d) 1>2>3>4

Q25. The decreasing order of acidity

1)  2)  3)  4) 

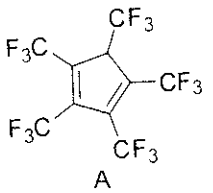
a) 1>3>2>4 b) 4>2>3>1 c) 2>3>4>1 d) 1>2>3>4

Answer Key

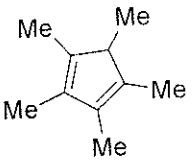
1. (d)	2. (b)	3. (a)	4. (b)	5. (b)	6. (b)	7. (c)
8. (b)	9. (a)	10. (d)	11. (d)	12. (c)	13. (c)	14. (d)
15. (b)	16. (c)	17. (c)	18. (a)	19. (c)	20. (c)	21. (d)
22. (d)	23. (b)	24. (d)	25. (a)			

Acidity, Basicity and Nucleophilicity
NET Previous Year's Question Paper

Q1. The correct order of acidity of the following compound A-C is **[NET JUNE 2011]**

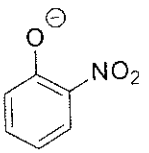

A

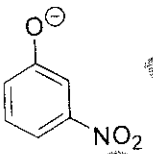

B

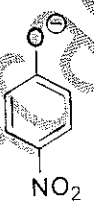

C

a) B > C > A b) C > B > A c) A > C > B d) A > B > C

Q2. The order of basicity of for the following anions is **[NET JUNE 2014]**

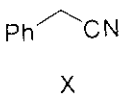

(I)

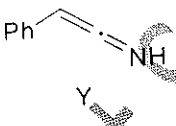

(II)


(III)

(a) II > III > I b) I > II > III c) II > I > III d) III > II > I

Q3. Consider the statement about the following structures X and Y **[NET JUNE 2014]**


X


Y

A) X and Y are resonance structure B) X and Y are tautomers

C) Y is more basic than X D) X is more basic than Y

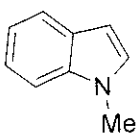
The correct statement(s) among the above is/are

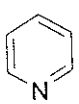
a) A and C b) C c) B and D d) B and C

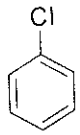
Q4. The pair of polar solvents in which PCl_5 does NOT ionize, as **[NET JUNE 2014]**

a) CH_3CN, CH_3NO_2 b) CH_3CN, CCl_4 c) C_6H_6, CCl_4 d) CH_3CN, C_6H_6

Q5. The correct order for the rates of the electrophilic aromatic substitution of the following compounds is **[NET JUNE 2014]**

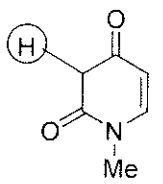

(I)


(II)

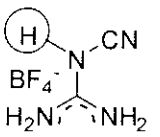

(III)

a) I > II > III b) II > I > III c) III > II > I d) I > III > II

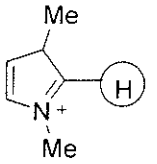
Q6. The increasing order of pKa values of the circled hydrogens in the following compounds is



(I)



(II)

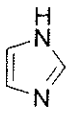


(III)

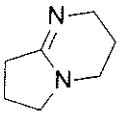
[NET DEC 2014]

a) I < II < III b) I < III < II c) II < I < III d) II < III < I

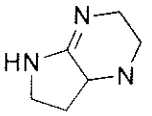
Q7. The decreasing order of basicity of the following compounds is **[NET DEC 2014]**



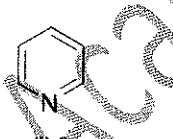
(I)



(II)



(III)

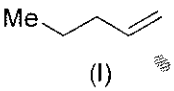


(IV)

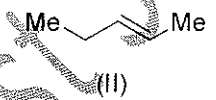
a) I > II > III> IV b) IV > I > II > III

c) III > II > I > IV d) IV > III > II > I

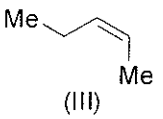
Q8. The correct order of heat of hydrogenation for the following compound is **[NET JUNE 2015]**



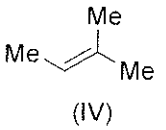
(I)



(II)



(III)

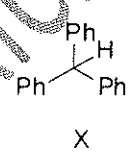


(IV)

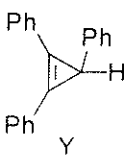
(a) I > II > III> IV (b) I > III > II > IV

(c) IV > I > III > II (d) IV > II > I > III

Q9. The correct statement about the reaction of X and Y with $NaNH_2$ are **[NET JUNE 2016]**



X



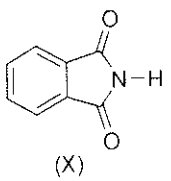
Y

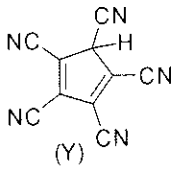
(A) X reacts faster than Y (B) Y reacts fatser than X

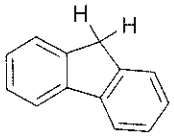
(C) X and Y behave as Lewis acids (D) X is stronger bronsted acid than Y

(a) A and C (b) A and D (c) B and C (d) B and D

Q10. The correct order of pKa values for the compounds X, Y and Z is **[NET JUNE 2016]**

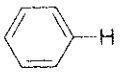

(X)


(Y)

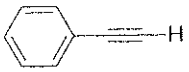

(Z)

a) X > Y > Z b) Y > Z > X c) Z > X > Y d) Y > X > Z

Q11. The correct order of the bond dissociation energies for the indicated C-H bond in the following compounds is **[NET DEC 2016]**

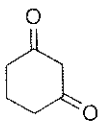

(A)

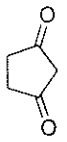

(B)

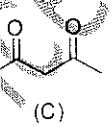

(C)

a) C > B > A b) A > B > C c) A > C > B d) C > A > B

Q12. The correct order of the acidity for the following compounds is **[NET DEC 2016]**

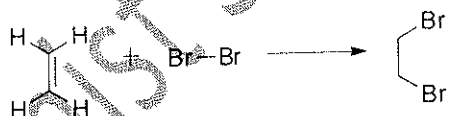

(A)


(B)


(C)

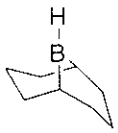
(a) B > C > A b) C > B > A c) B > A > C d) C > A > B

Q13. Molecular orbital interactions involved in the first step of the following reaction is **[NET DEC 2016]**



a) $\pi_{c=c} \rightarrow \sigma^*_{Br\text{-}Br}$ b) $n_{Br} \rightarrow \sigma_{c\text{-}c}$ c) $\pi_{c=c} \rightarrow \sigma_{Br\text{-}Br}$ d) $n_{Br} \rightarrow \sigma_{c=c}$

Q14. The IUPAC name of the following compound is **[NET JUNE 2017]**



a) 9-borabicyclo[3.3.1]nonane b) 1-borabicyclo[3.3.1]nonane

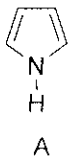
c) 9-borabicyclo[3.3.0]nonane d) 1-borabicyclo[3.3.0]octane

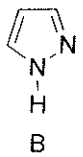
Q15. The correct order of pKa values for the following species is **[NET JUNE 2017]**

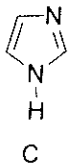
a) $PhNH_3^+ < i\text{-}Pr_2NH_2^+ < Ph_2NH_2^+$ b) $Ph_2NH_2^+ < PhNH_3^+ < i\text{-}Pr_2NH_2^+$

c) $i\text{-}Pr_2NH_2^+ < Ph_2NH_2^+ < PhNH_3^+$ d) $PhNH_3^+ < Ph_2NH_2^+ < i\text{-}Pr_2NH_2^+$

Q16. The order of basicity for the following heterocycles is **[NET JUNE 2018]**


A


B


C

(a) A > C > B b) C > A > B c) C > B > A d) B >A > C

Q17. IUPAC nomenclature of the following propellane **[NET JUNE 2018]**

a) tricyclo[1.1.1.$0^{2,4}$]pentane b) tricyclo[1.1.0.$1^{1,3}$]pentane

c) tricyclo[1.1.$1^{1,3}$.$0^{1,5}$]pentane d) tricyclo[1.1.1.$0^{1,3}$]pentane

Answer Key

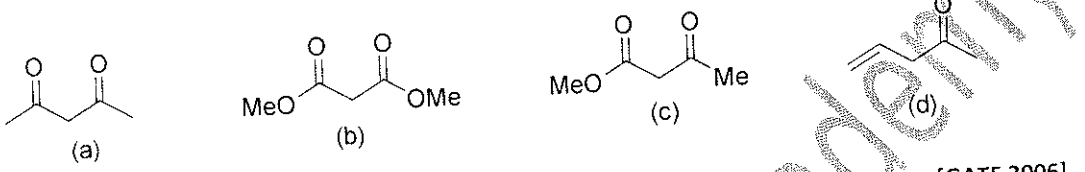
1.(c)	2. (a)	3. (d)	4. (c)	5.(d)	6.(c)	7.(c)
8.(a)	9. (b)	10.(c)	11.(d)	12.(c)	13.(a)	14.(a)
15.(b)	16.(c)	17.(d)				

Gate Previous Year's Question

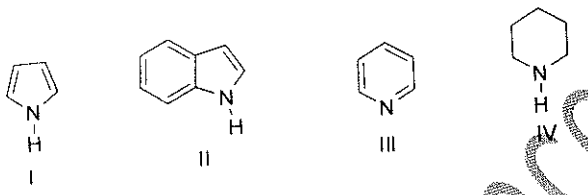
Q1. In allene the hybridization of the central and terminal carbons respectively are **[GATE 2002]**

a) sp^2 and sp^2 b) sp^2 and sp^3 c) sp and sp^2 d) sp and sp^3

Q2. Among the following compounds, the one that undergoes deprotonation most readily in the presence of a base, to form a carbanion is: **[GATE 2003]**



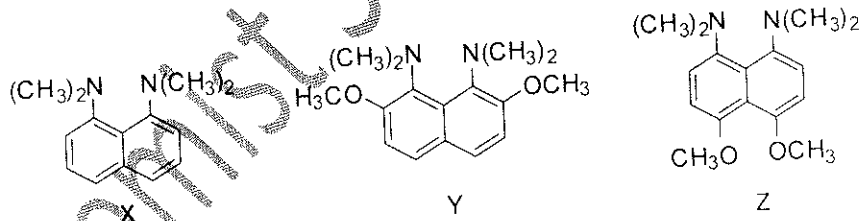
Q3. The correct order of the basicity of the following compound is **[GATE 2006]**



a) IV > III > II> I b) III > IV > I > II

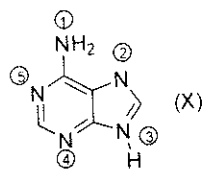
c) IV > III > I > II d) III > IV > II > I

Q4. The increasing order of basicity among the following is **[GATE 2007]**



a) Y < X < Z b) Y< Z < X c) X < Z < Y d) X <Y < Z

Q5. The mono protonatin of adenine (X) in acidic solution mainly occurs at **[GATE 2007]**



a) Position 1 b) Position 2 c) Position 3 d) Position 4 or 5

Q6. The decreasing order of nucleophilicity for the following anions is **[GATE 2009]**

$CH_3CO_2^-$, CH_3O^-, $C_6H_5O^-$, NO_3^-

a) $CH_3CO_2^- > CH_3O^- > C_6H_5O^- > NO_3^-$ b), $CH_3O^- > NO_3^- > C_6H_5O^- > CH_3CO_2^-$

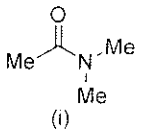
c) $CH_3O^- > C_6H_5O^- > CH_3CO_2^- > NO_3^-$ d) $C_6H_5O^- > CH_3O^- > NO_3^- > CH_3CO_2^-$

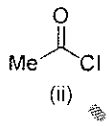
Answer Key

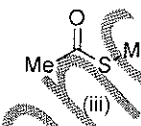
1. (c) 2.(a) 3.(c) 4. (c) 5.(d) 6.(c)

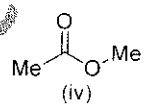
TIFR Previous Year's Question

Q1. Rank the following molecules in order of electrophilicity (from most to least electrophilic) **[TIFR 2010]**


(i)


(ii)


(iii)


(iv)

a) ii > iii >iv > i b) i > iv > iii > ii

c) ii > iv >iii > i d) i > iii > iv > ii

Q2. Arrange the pKa of the hydroxyl groups of methanol, trifluoroacetic acid, phenol and benzyl alcohol in ascending order: **[TIFR 2011]**

a) trifluoroacetic acid < phenol < benzyl alcohol < methanol

b) trifluoroacetic acid< benzyl alcohol < phenol < methanol

c) phenol < trifluoroacetic acid< benzyl alcohol <methanol

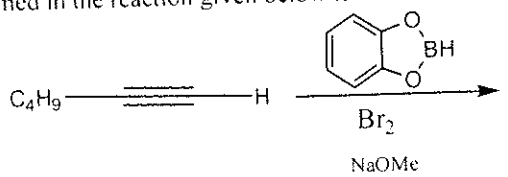
d) trifluoroacetic acid < methanol < phenol < benzyl alcohol

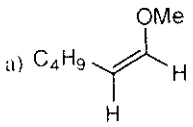
Answer Key

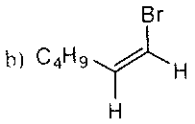
1. (a) 2. (a)

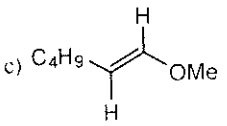
Reaction Mechanism

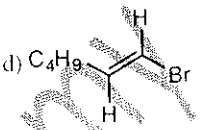
Q1. The major product formed in the reaction given below is



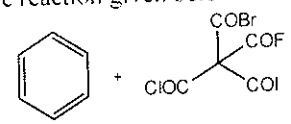
a) 

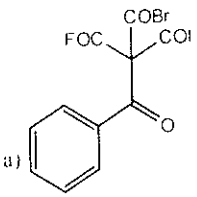
b) 

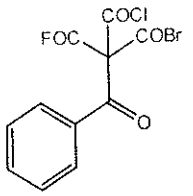
c) 

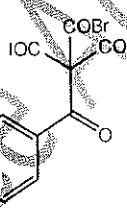
d) 

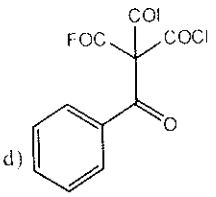
Q2. The major product formed in the reaction given below is



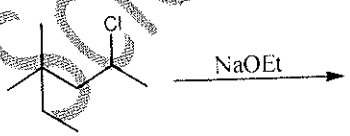
a) 

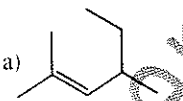
b) 

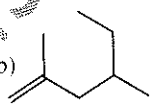
c) 

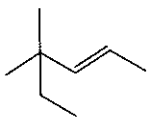
d) 

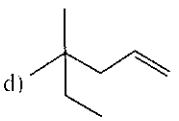
Q3. The major product formed in the reaction given below is



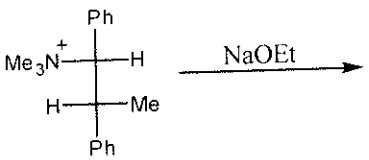
a) 

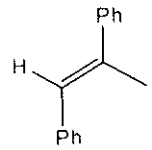
b) 

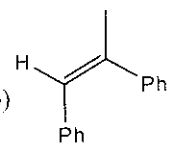
c) 

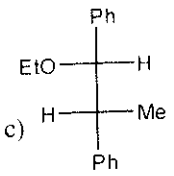
d) 

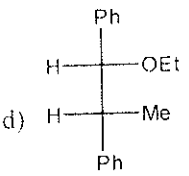
Q4. The major product formed in the reaction given below is



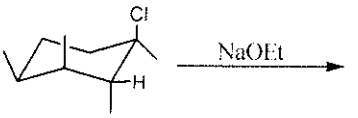
a) 

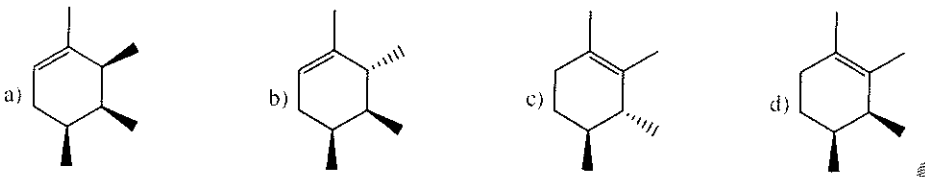
b) 

c) 

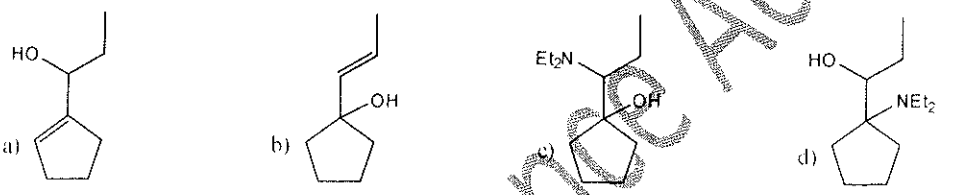
d) 

Q5. The major product formed in the reaction given below is

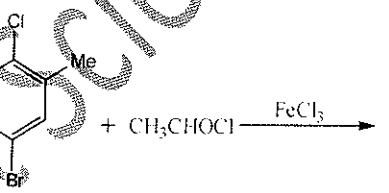


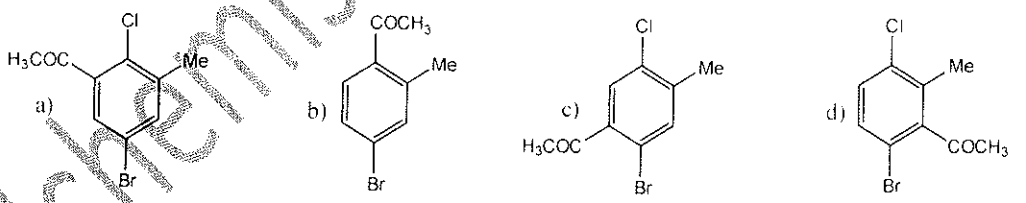


Q6. The major product formed in the reaction given below is

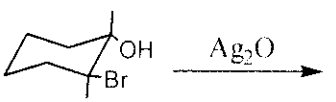


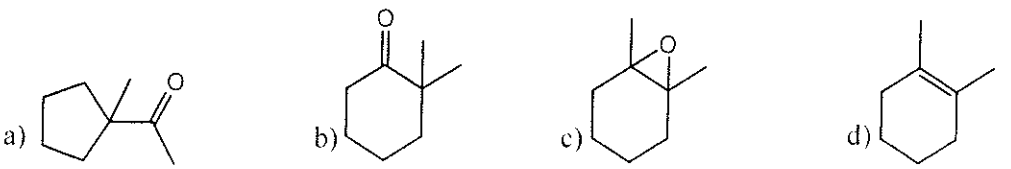
Q7. The major product formed in the reaction given below is



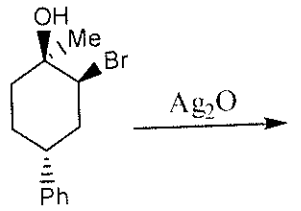


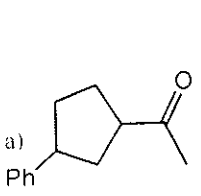
Q8. The major product formed in the reaction given below is

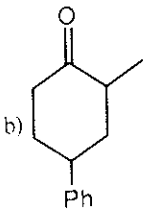


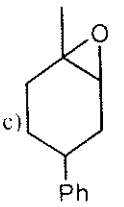


Q9. The major product formed in the reaction given below is

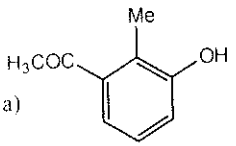


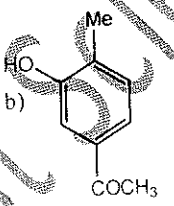


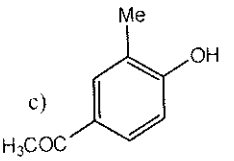


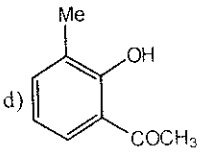


Q10. The major product formed in the reaction given below is

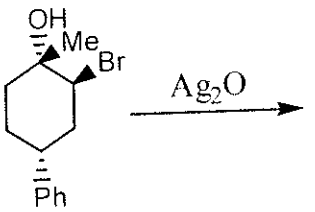


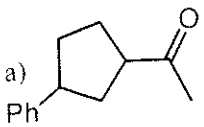


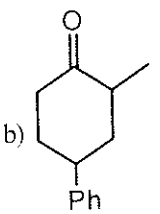


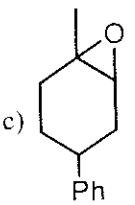


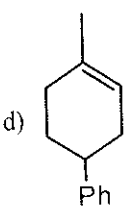
Q11. The major product formed in the reaction given below is



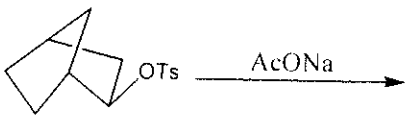




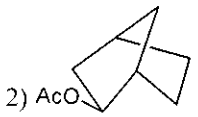


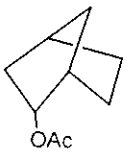


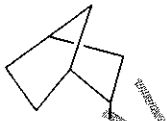
Q12. Which possible product formed in the reaction given below is



1) 

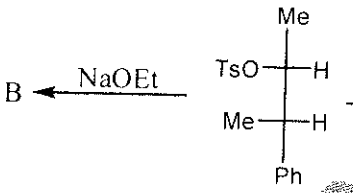
2) 

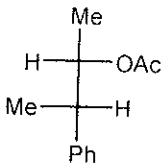
3) 

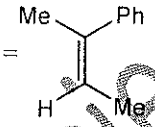
4) 

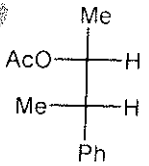
a) 1 and 2 b) 2, 3 and 4 c) 3 and 4 d) 1, 2, 3 and 4

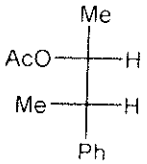
Q13. What is major product A and B formed in the reaction given below is

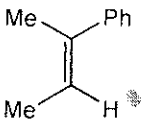


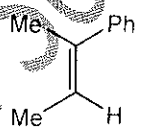
a) A = 

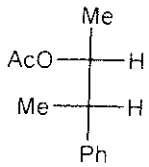
b) A = 

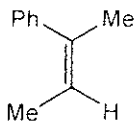
c) A = 

d) A = 

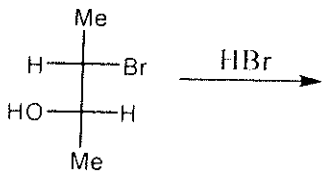
B = 

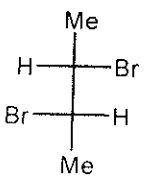
B = 

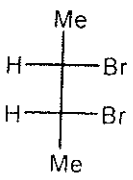
B = 

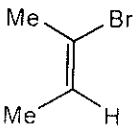
B = 

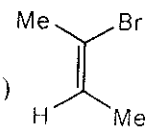
Q14. The major product formed in the reaction given below is



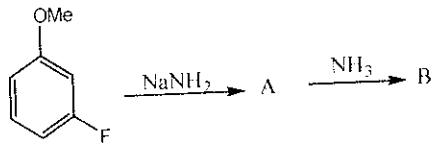
a) 

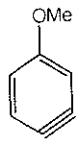
b) 

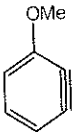
c) 

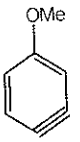
d) 

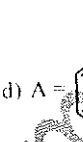
Q15. What is major product A and B formed in the reaction given below is

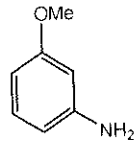


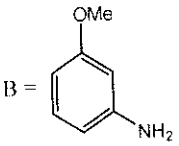
a) A = 

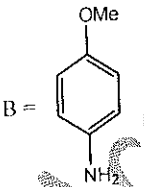
b) A = 

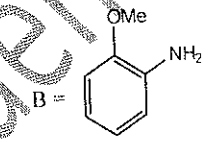
c) A = 

d) A = 

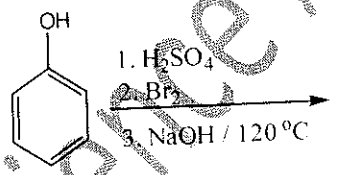
B = 

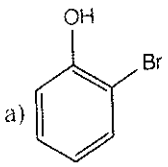
B = 

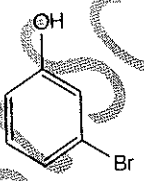
B = 

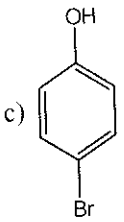
B = 

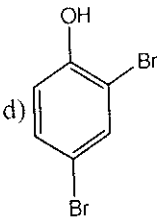
Q16. The major product formed in the reaction given below is



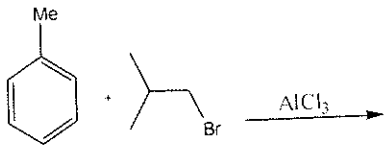
a) 

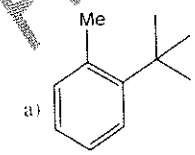
b) 

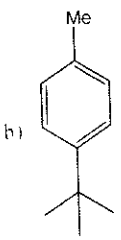
c) 

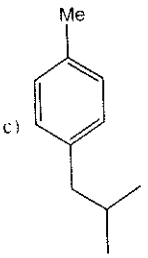
d) 

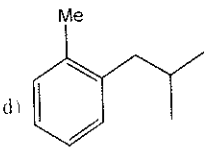
Q17. The major product formed in the reaction given below is



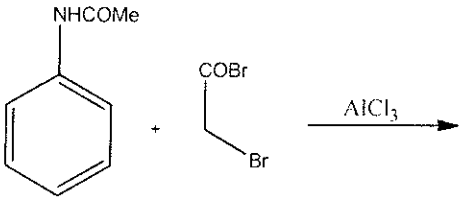
a) 

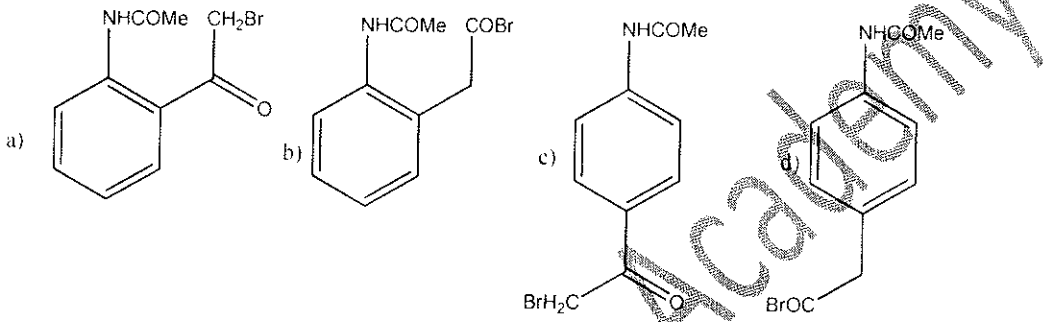
b) 

c) 

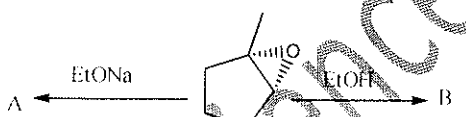
d) 

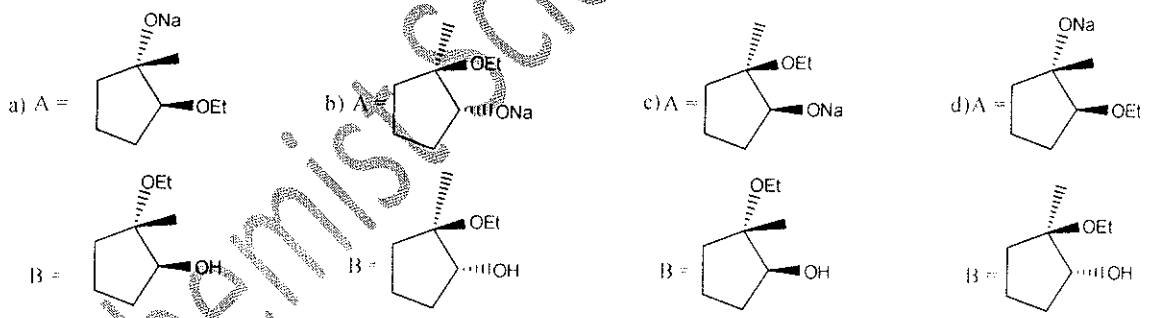
Q18. The major product formed in the reaction given below is



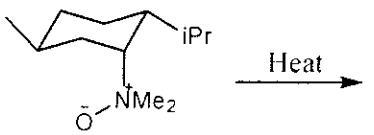


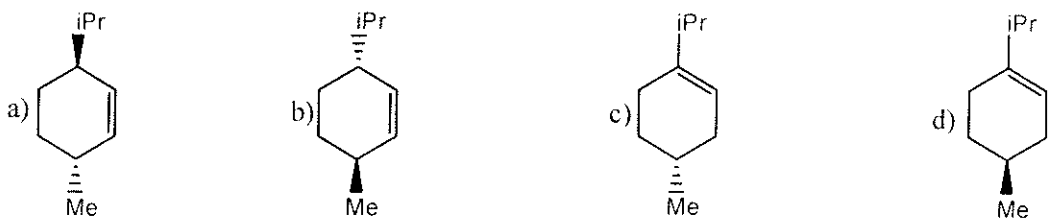
Q19. The major product formed in the reaction given below is



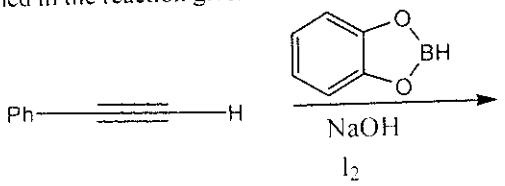


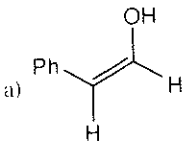
Q20. The major product formed in the reaction given below is

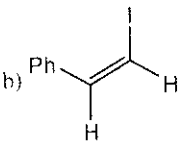


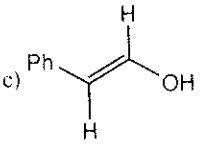


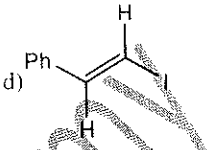
Q21. The major product formed in the reaction given below is



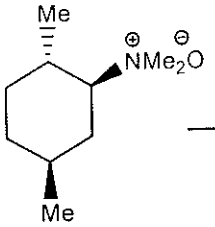
a) 

b) 

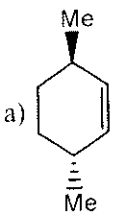
c) 

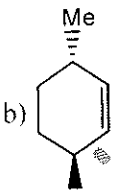
d) 

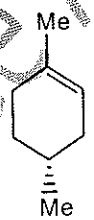
Q22. The major product formed in the reaction given below is

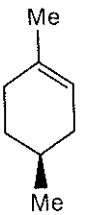


Heat

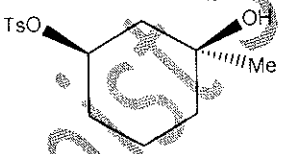
a) 

b) 

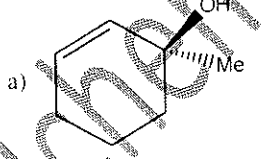
c) 

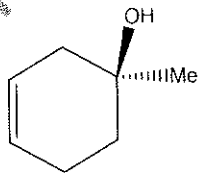
d) 

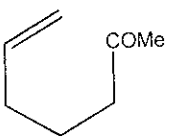
Q23. The major product formed in the reaction given below is

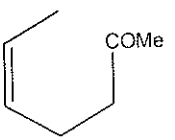


^{t}BuOK

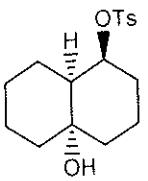
a) 

b) 

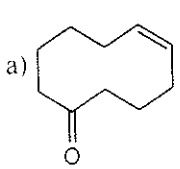
c) 

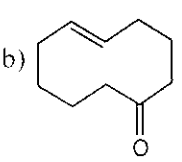
d) 

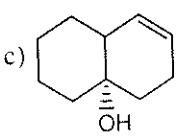
Q24. The major product formed in the reaction given below is

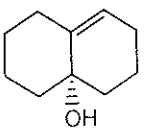


^{t}BuONa

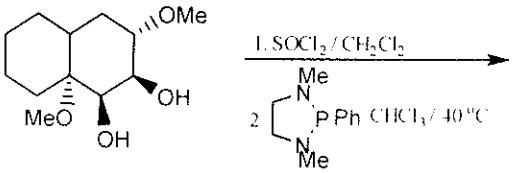
a) 

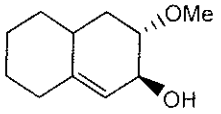
b) 

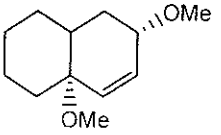
c) 

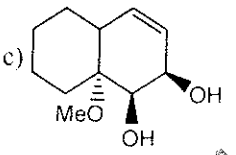
d) 

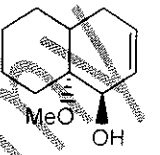
Q25. The major product formed in the reaction given below is



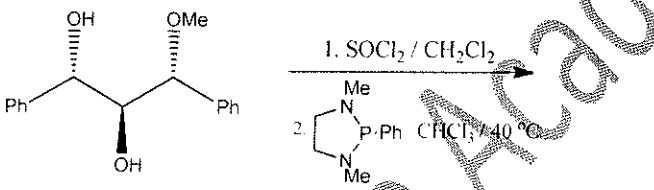
a) 

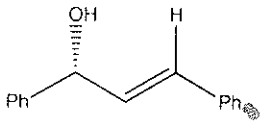
b) 

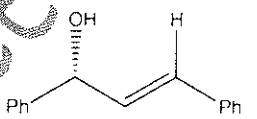
c) 

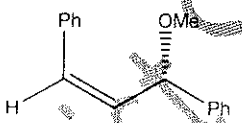
d) 

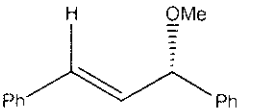
Q26. The major product formed in the reaction given below is



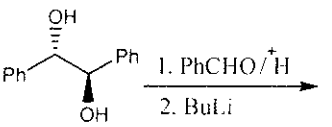
a) 

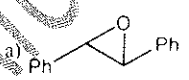
b) 

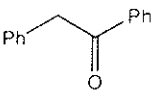
c) 

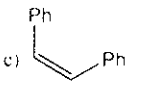
d) 

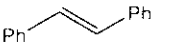
Q27. The major product formed in the reaction given below is



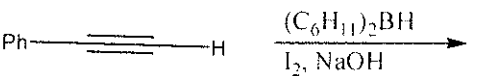
a) 

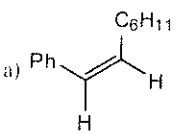
b) 

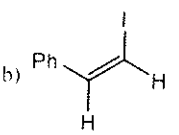
c) 

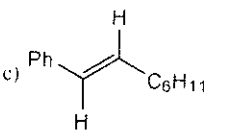
d) 

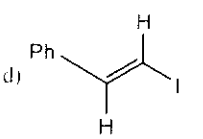
Q28. The major product formed in the reaction given below is



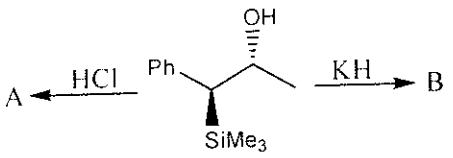
a) 

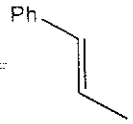
b) 

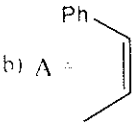
c) 

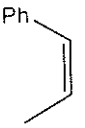
d) 

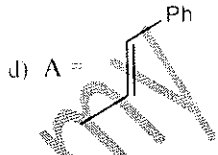
Q29. The major product formed in the reaction given below is

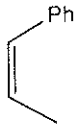


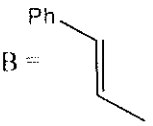
a) A = 

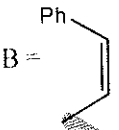
b) A = 

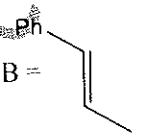
c) A = 

d) A = 

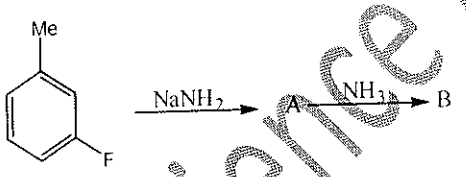
B = 

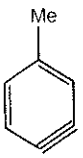
B = 

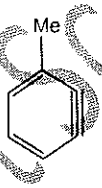
B = 

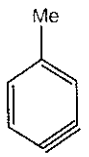
B = 

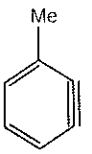
Q30. The major product formed in the reaction given below is

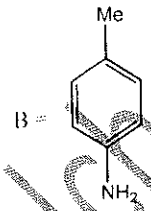


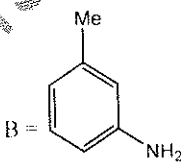
a) A = 

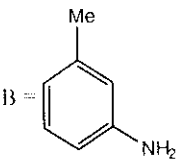
b) A = 

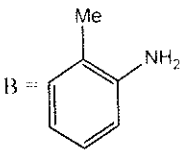
c) A = 

d) A = 

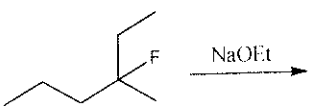
B = 

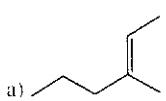
B = 

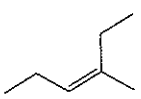
B = 

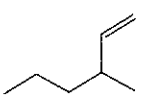
B = 

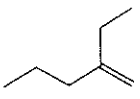
Q31. The major product formed in the reaction given below is



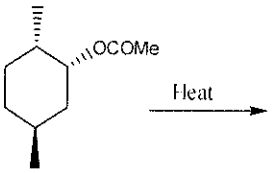
a) 

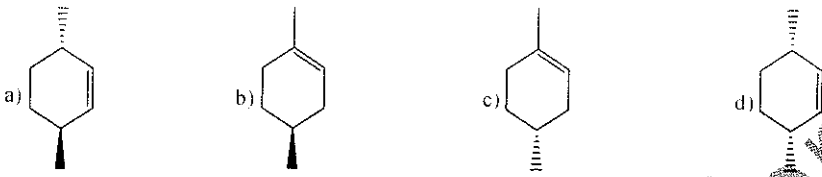
b) 

c) 

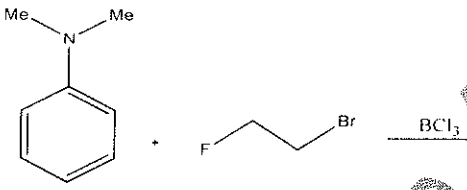
d) 

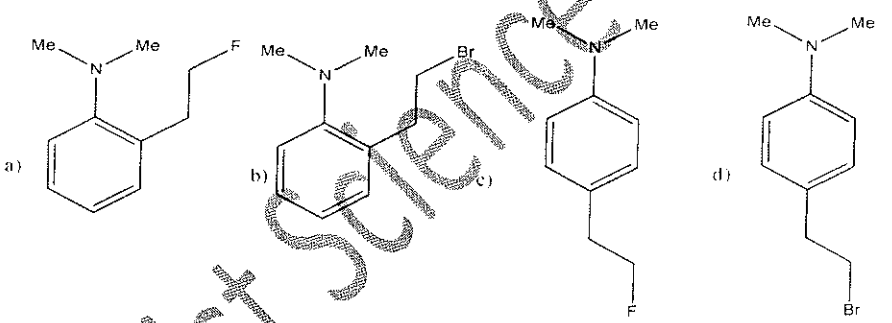
Q32. The major product formed in the reaction given below is



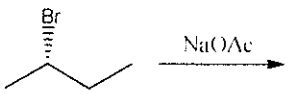


Q33. The major product formed in the reaction given below is

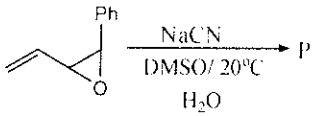


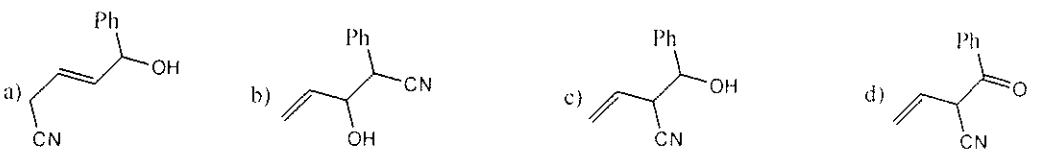


Q34. The major product formed in the reaction given below is

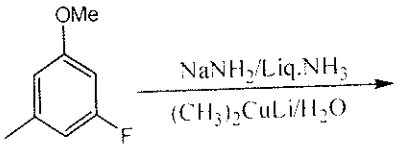


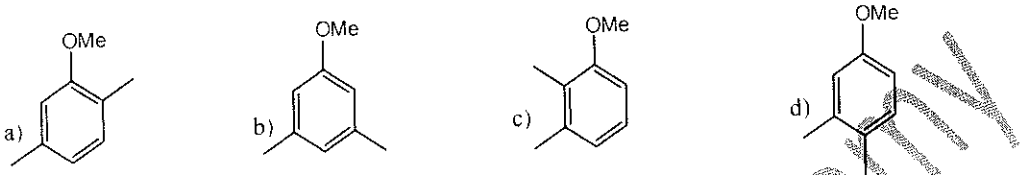
Q35. The major product formed in the reaction given below is



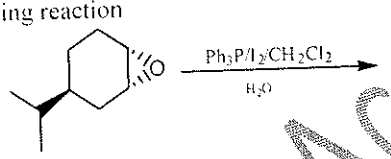


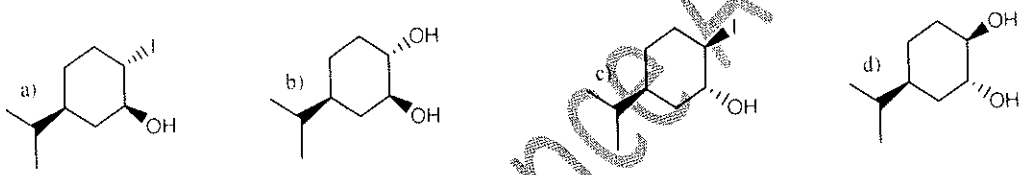
Q36. The major product formed in the reaction given below is



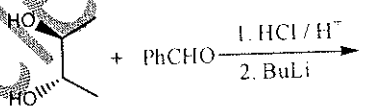


Q37. Identify the product from the following reaction

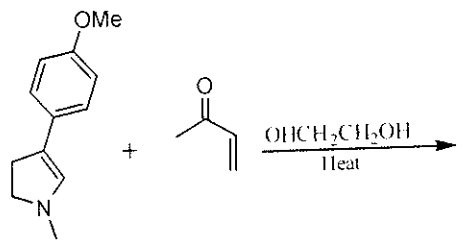


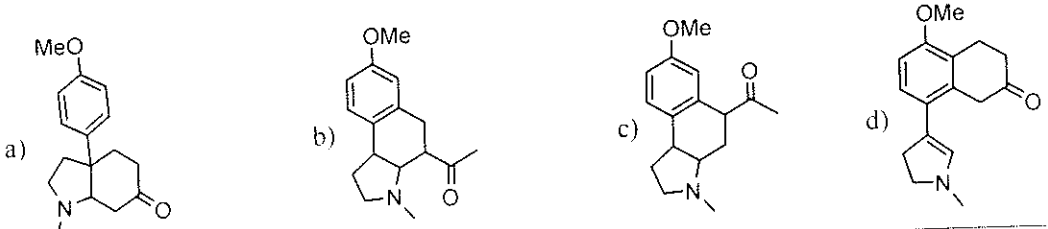


Q 38. The major product formed in the reaction given below is

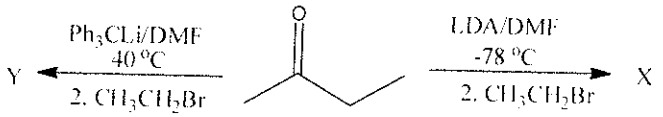


Q39. The major product formed in the reaction given below is



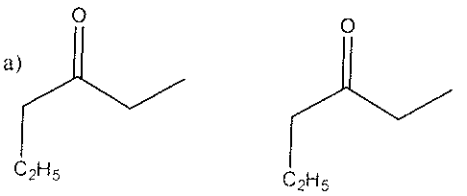
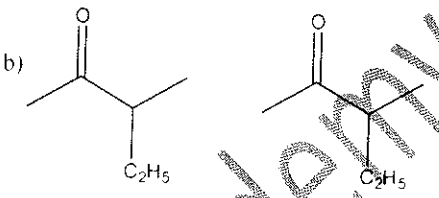


Q40. Identify the product from the following reaction

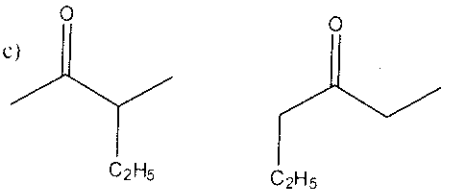
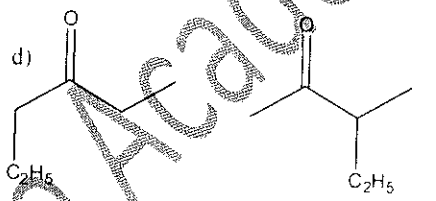


X Y X Y

a) b)

c) d)

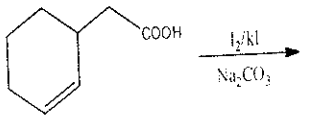



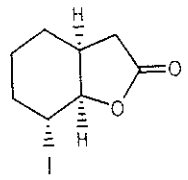
Answer Key

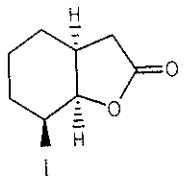
1. (b)	2. (b)	3. (d)	4. (a)	5. (b)	6. (a)	7. (c)
8. (a)	9. (b)	10. (c)	11. (c)	12. (a)	13. (d)	14. (a)
15. (b)	16. (a)	17. (b)	18. (c)	19. (d)	20. (b)	21. (d)
22. (b)	23. (c)	24. (a)	25. (b)	26. (c)	27. (c)	28. (a)
29. (a)	30. (a)	31. (d)	32. (a)	33. (d)	34. (b)	35. (a)
36. (b)	37. (c)	38. (a)	39. (a)	40. (d)		

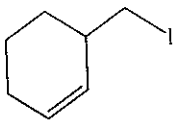
Reaction Mechanism
NET/JRF Previous Year's Question

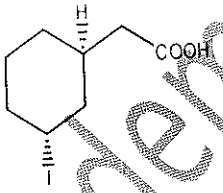
Q1. The major product formed in the reaction given below is **[NET June 2011]**



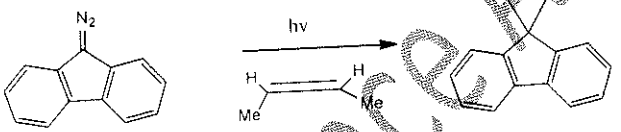
(a) 

(b) 

(c) 

(d) 

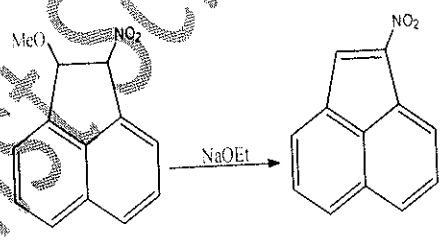
Q2. The intermediate involved in the reaction given below is **[NET June 2011]**



(a) Free radical (b) Carbocation (c) Carbanion (d) Carbene

[NET June 2011]

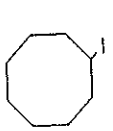
Q3. The reaction given below is an example of



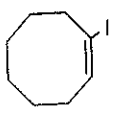
(a) E_2 -elimination (b) E_1 -elimination (c) syn-elimination (d) E_1CB -elimination

[NET June 2011]

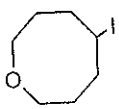
Q4. The relative rates of solvolysis of iodides A - C are



A



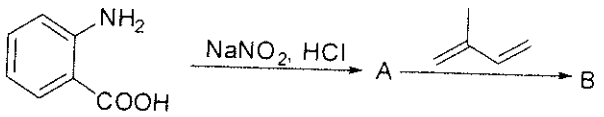
B

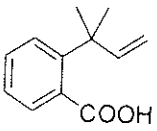


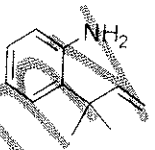
C

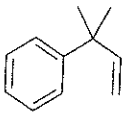
(a) C > A > B (b) C > B > A (c) B > C > A (d) B > A > C

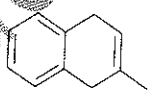
Q5. The intermediate A and the major product B in the following conversion are **[NET June 2011]**



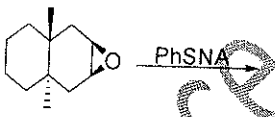
(a) A is carbocation and B is 

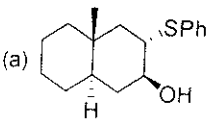
(b) A is carbocation and B is 

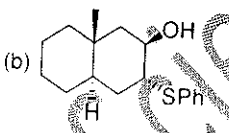
(c) A is radical and B is 

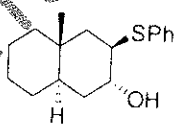
(d) A is benzyne and B is 

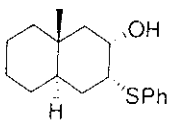
Q6. The major product formed in the following reaction is: **[NET June 2011]**



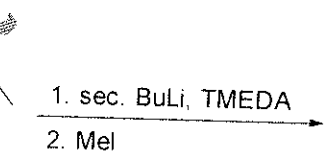
(a) 

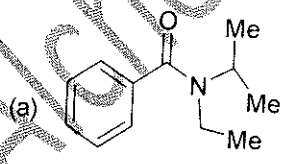
(b) 

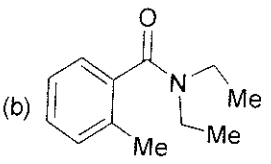
(c) 

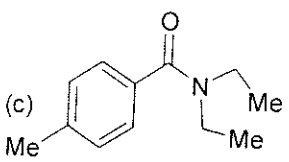
(d) 

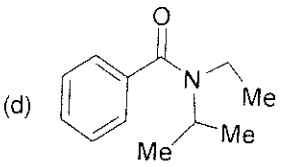
Q7. The major product formed in the following reaction is: **[NET June 2011]**



(a) 

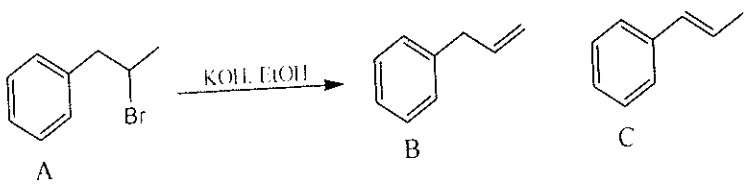
(b) 

(c) 

(d) 

[NET June 2011]

Q8. Consider the following reaction

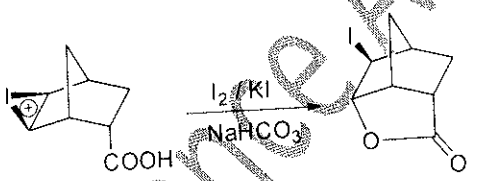


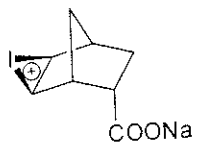
In an experiment, 1.99g of bromide A on reaction with ethanolic potassium hydroxide gave 1.062 g of a mixture of the olefins B and C. If the ratio of olefins B:C formed is 2 : 1, the yields for their formation, respectively, are

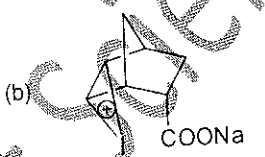
(a) 60 and 30 % (b) 50 and 25 % (c) 66 and 33% (d) 54 and 27 %

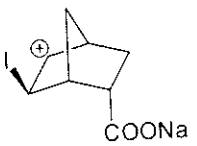
[NET Dec. 2011]

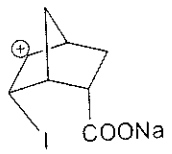
Q9. The reactions given below proceeds through



(a) 

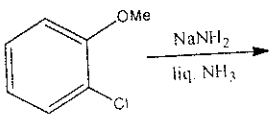
(b) 

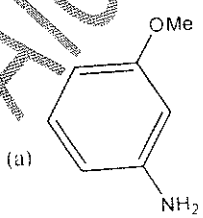
(c) 

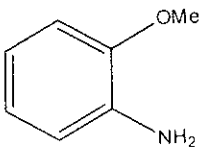
(d) 

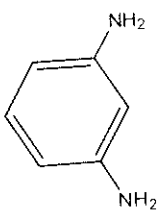
[NET Dec. 2011]

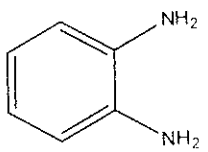
Q10. The Major product formed in the following reaction is



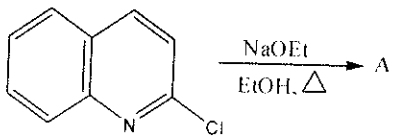
(a) 

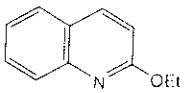
(b) 

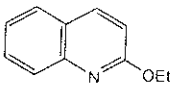
(c) 

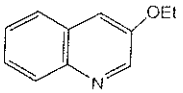
(d) 

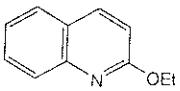
Q11. In the following reaction, the product formed and the mechanism involved are **[NET Dec. 2011]**



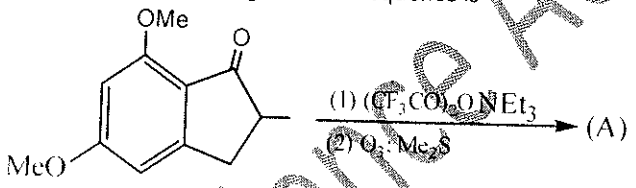
(a) A is  and is formed by addition –elimination mechanism.

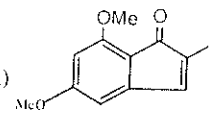
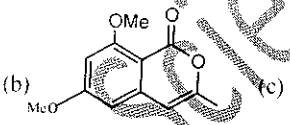
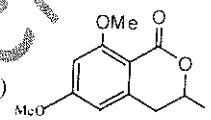
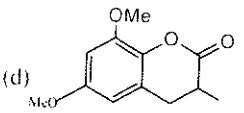
(b) A is  and is formed by benzyne mechanism.

(c) A is  and id formed by benzyne mechanism

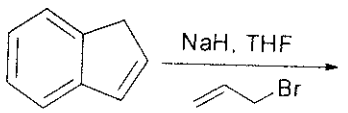
(d) A is  and is formed by displacement

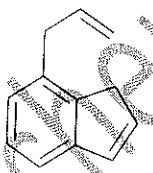
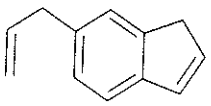
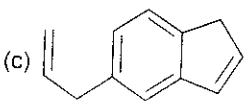
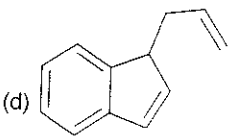
Q12. The major product formed in the following reaction sequence is **[NET Dec. 2011]**



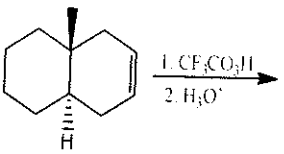
(a)  (b)  (c)  (d) 

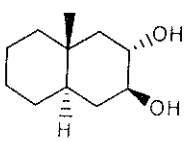
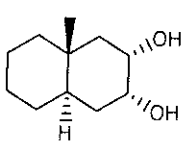
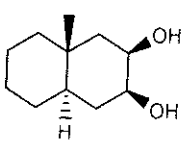
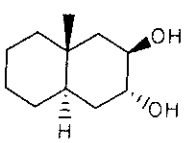
Q13. The major product formed in the following reaction is: **[NET June 2012]**



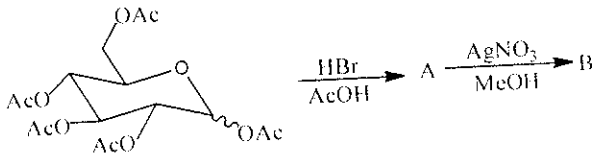
(a)  (b)  (c)  (d) 

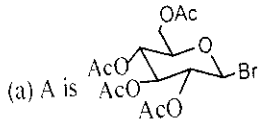
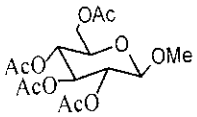
Q14. The major product formed in the following reaction is **[NET June 2012]**

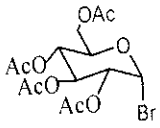
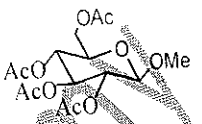


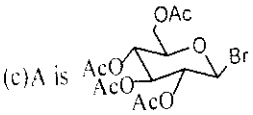
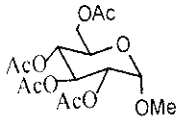
(a)  (b)  (c)  (d) 

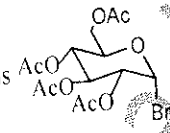
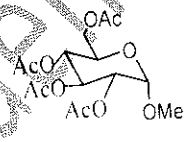
Q15. In the following reaction sequence, the major product A and B are **[NET June 2012]**



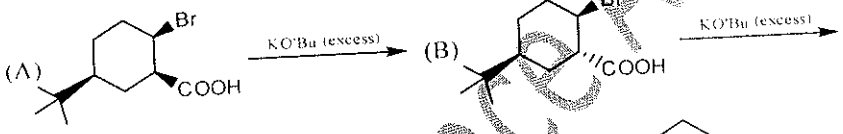
(a) A is  , B is 

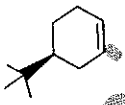
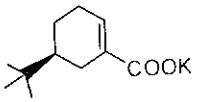
(b) A is  , B is 

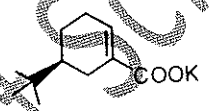
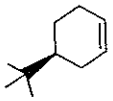
(c) A is  , B is 

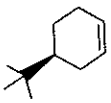
(d) A is  , B is 

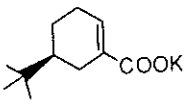
Q16. For the following two reactions A and B, the correct statements is **[NET June 2012]**



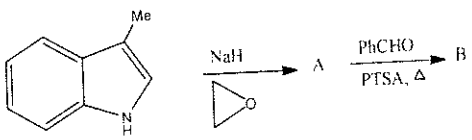
(a) A gives  , B gives 

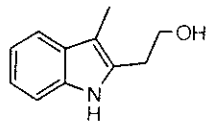
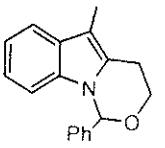
(b) A gives  , B gives 

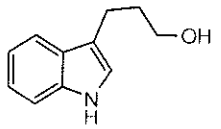
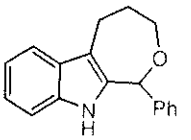
(c) Both A and B 

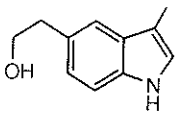
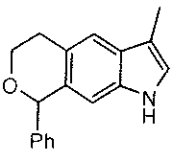
(d) Both A and B give 

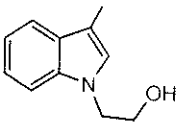
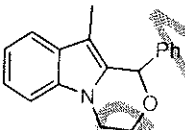
Q17. The major product A and B formed in the following reaction sequence are **[NET June 2012]**



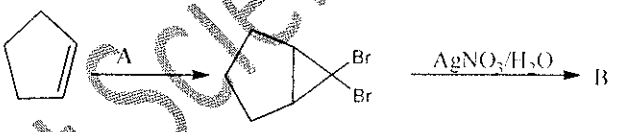
(a) A=  , B= 

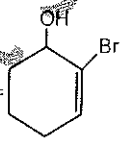
(b) A=  , B= 

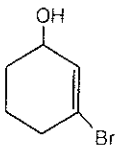
(c) A=  , B= 

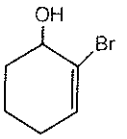
(d) A  , B= 

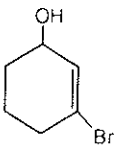
Q18. The reagent A required, and the major product B formed in the following reaction sequence Are **[NET June 2012]**



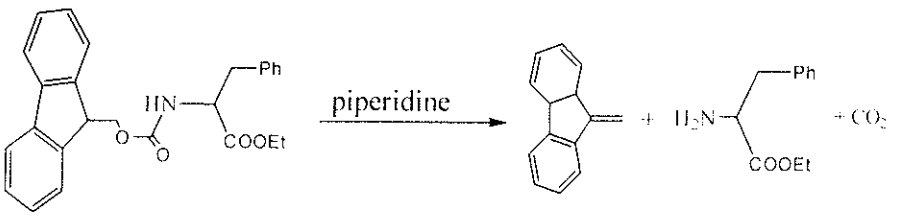
(a) A = CH_2Br_2 and KO'Bu, B= 

(b) A = CH_2Br_2 and KO'Bu, B= 

(c) A = $CHBr_3$ and KO'Bu, B= 

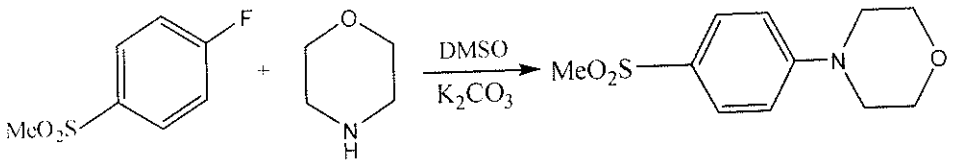
(d) A = $CHBr_3$ and KO'Bu, B= 

Q19. The mechanism involved in the following conversion is **[NET Dec. 2012]**



(a) E_2 -elimination (b) E_1 -elimination (c) syn-elimanation (d) E_1CB -elimination

Q20. The correct statement(s)-A-D are given for the following reaction. The correct one(s) is/are **[NET Dec. 2012]**

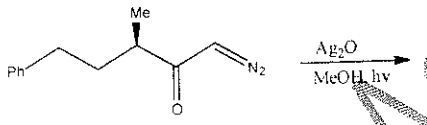


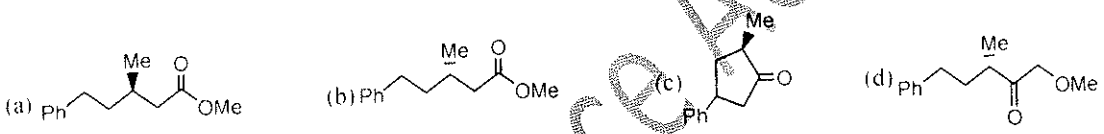
(a) aromatic ipso substitution reaction (b) aromatic nucleophilic substitution

(c) aromatic electrophilic substitution (d) aromatic free radical substitution

[NET Dec. 2012]

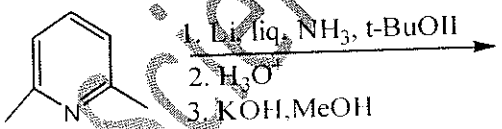
Q21. The major product formed in the following reaction is

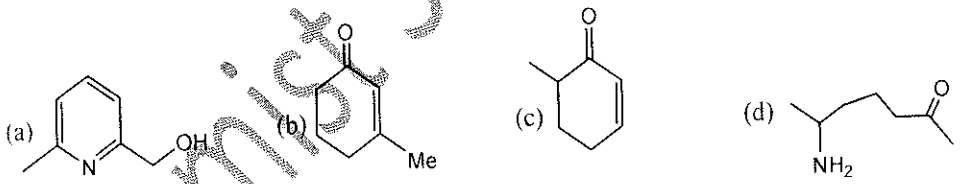




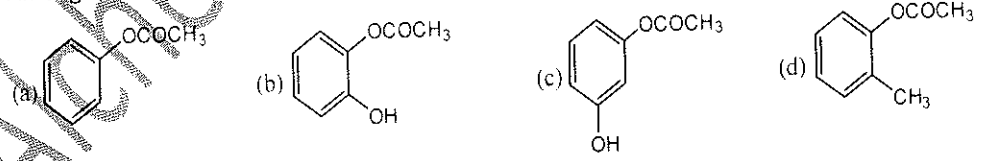
[NET Dec. 2012]

Q22. The major product formed in the following reaction is

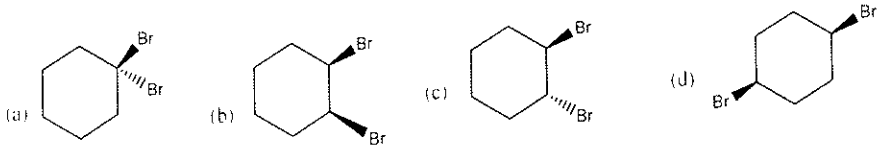




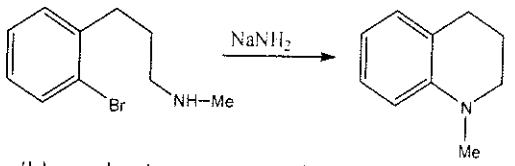
Q23. Among the following esters, the one that undergoes acid hydrolysis fastest is **[NET June 2013]**



Q24. Among the following dibromocyclohexanes, the one that reacts fastest with sodium iodide to give cyclohexene is **[NET June 2013]**

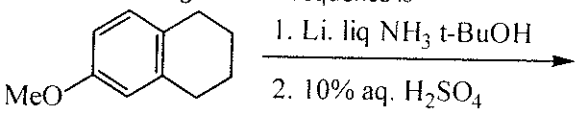


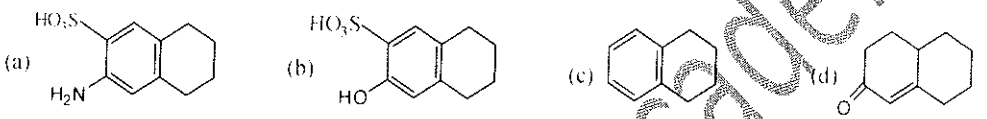
Q25. The reactive intermediate involved in the following reaction is: **[NET June 2013]**



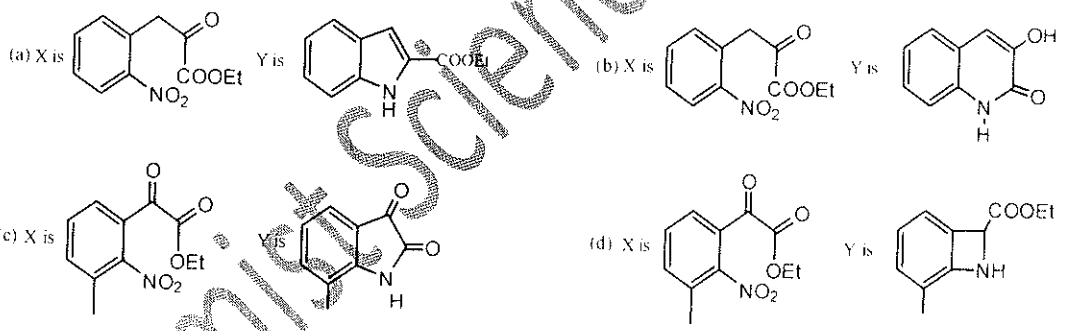
(a) a carbocation (b) a carbanion (c) a free radical (d) an aryne

Q26. The compound formed in the following reaction sequence is **[NET June 2013]**

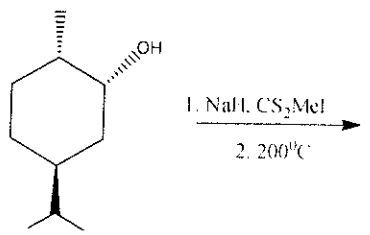


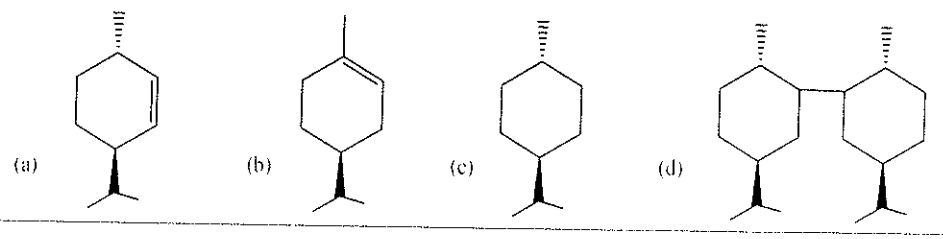


Q27. In the following reaction sequence, structure of the major product X and Y **[NET June 2013]**

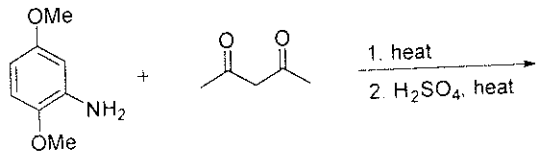


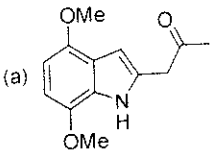
Q28. The major product formed in the following reaction **[NET June 2013]**

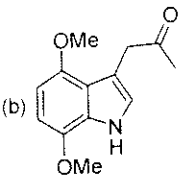


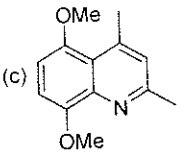


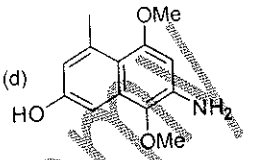
Q29. The major product formed in the following reaction is **[NET Dec. 2013]**



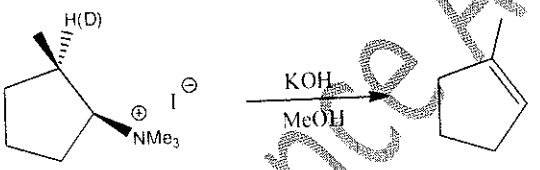
(a) 

(b) 

(c) 

(d) 

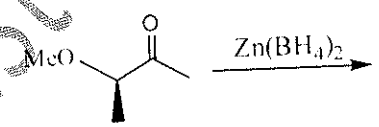
Q30. Deuterium kinetic isotope effect for the following reaction was found to 4.0. Based on this information, mechanism of the reaction is **[NET Dec. 2013]**

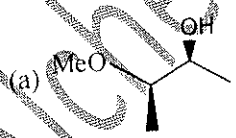


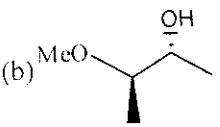
(a) E_1 (b) E_2 (c) E_{1CB} (d) free radical

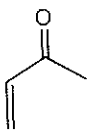
[NET De. 2013]

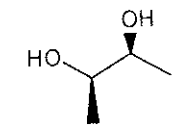
Q31. The major product formed in the following reaction is



(a) 

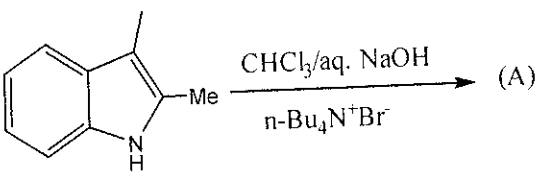
(b) 

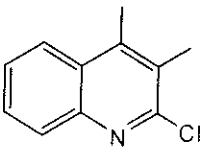
(c) 

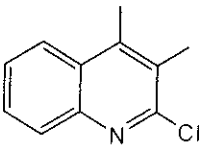
(d) 

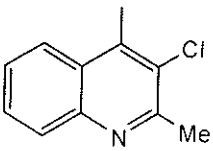
[NET Dec. 2013]

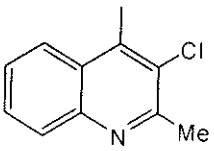
Q32. In the following reaction, the intermediate and the major product A are



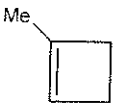
(a) : CHCl and 

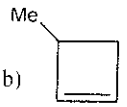
(b) : CCl_2 and 

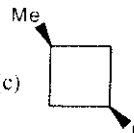
(c) : CHCl and 

(d) : CCl_2 and 

Q33. The major product formed in the reaction if transe-1-bromo-3-methylcyclobutane with sodium iodide in DMF is **[NET June 2014]**

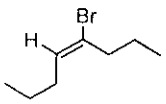
(a) 

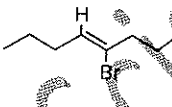
(b) 

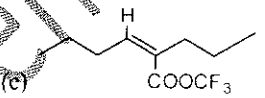
(c) 

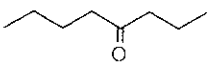
(d) 

Q34. The major product formed in the following reaction is **[NET June 2014]**

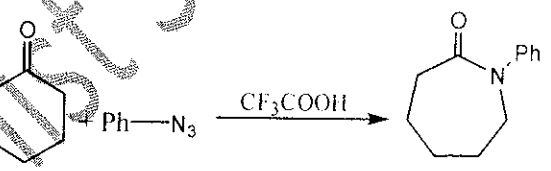
(a) 

(b) 

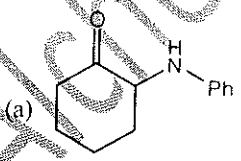
(c) 

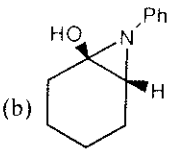
(d) 

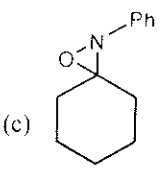
Q35. Consider the following reaction, **[NET June 2016]**

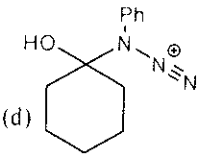


The appropriate intermediate involved in this reaction is

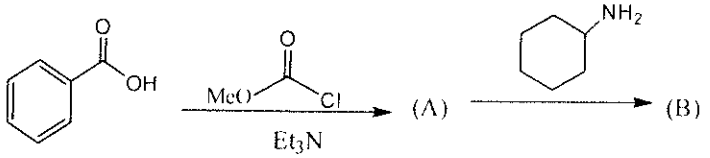
(a) 

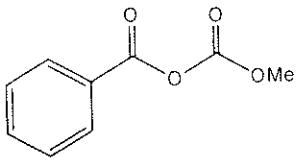
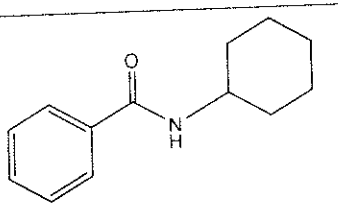
(b) 

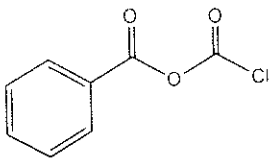
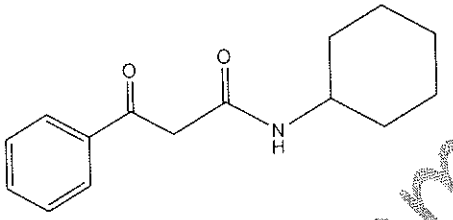
(c) 

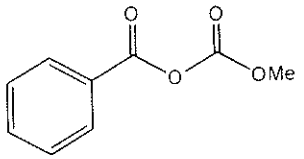
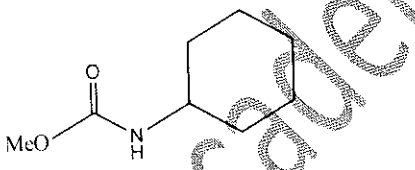
(d) 

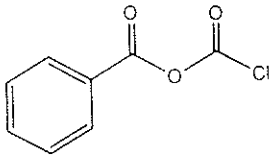
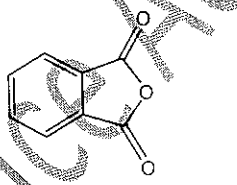
Q36. The major product A and B in the following reaction sequence are **[NET June2014]**



(a) A:  B: 

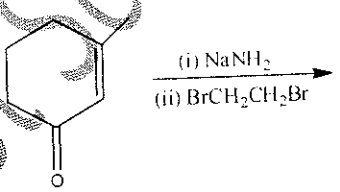
(b) A:  B: 

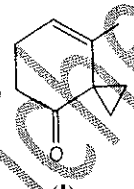
(c) A:  B: 

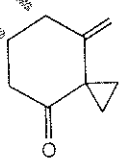
(d) A:  B: 

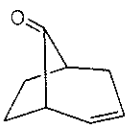
Q37. Only two product are obtained in the following reaction sequence. The structure of the product from the list I-IV are

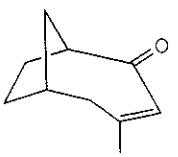
[NET June 2014]



(a)  **(I)**

(b)  **(II)**

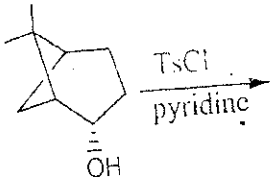
(c)  **(III)**

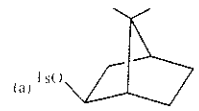
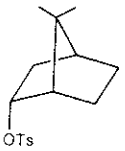
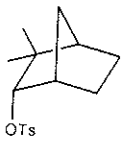
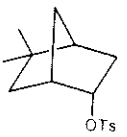
(d)  **(IV)**

(a) I and II (b) II and IV (c) I and III (d) III and IV

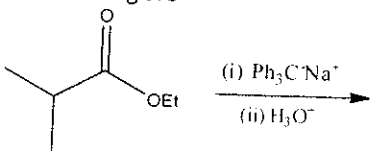
[NET June 2014]

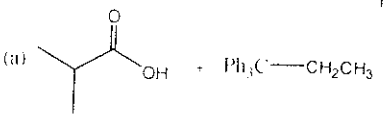
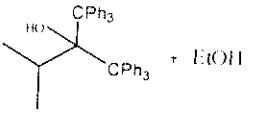
Q38. The major product formed in the following reaction is

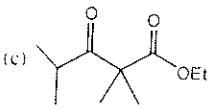
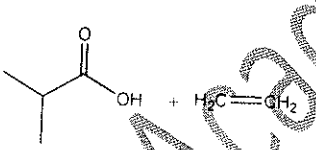


(a)  (b)  (c)  (d) 

Q39. The major products formed in the following are **[NET June 2014]**



(a)  (b) 

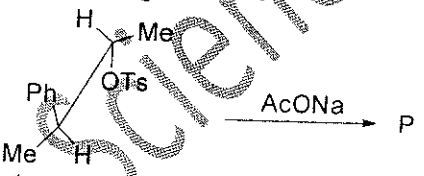
(c)  (d) 

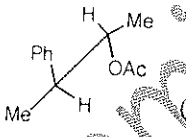
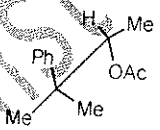
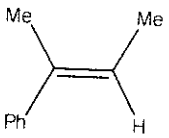
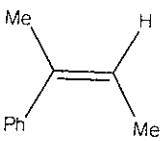
Q40. The pair of solvents in which PCl_5 does NOT ionize, is **[NET June 2014]**

(a) CH_3CN, CH_3NO_2 (b) CH_3CN, CCl_4

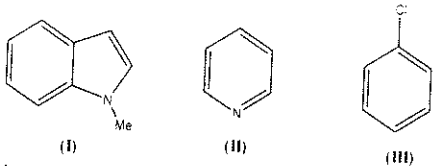
(c) C_6H_6, CCl_4 (d) CH_3CN, C_6H_6

Q41. The major product formed in the following reaction is **[NET June 2014]**



(a)  (b)  (c)  (d) 

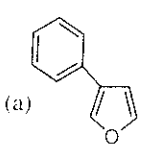
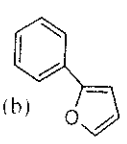
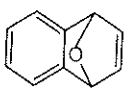
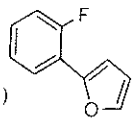
Q42. The correct order for the rates of electrophilic aromatic substation of the following compound Is **[NET June 2014]**



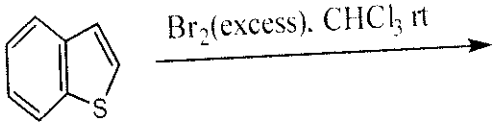
(I) (II) (III)

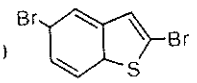
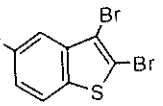
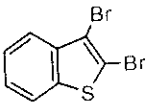
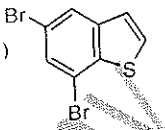
(a) I > II > III (b) II > I > III (c) III > II > I (d) I > III > II

Q43. The reaction 1-bromo-2-flurobenzene with furan in the presence of one equivalent of Mg gives **[NET Dec. 2014]**

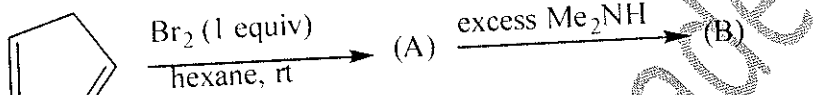
(a)  (b)  (c)  (d) 

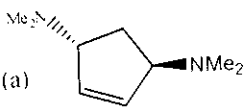
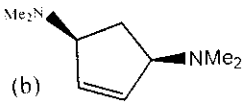
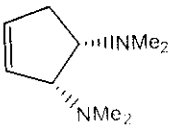
44. The major product of the following reaction is **[NET Dec. 2014]**



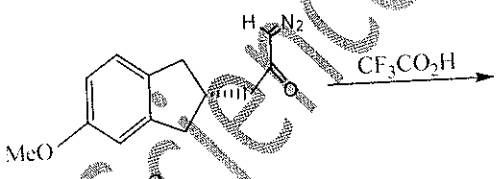
(a) 
(b) 
(c) 
(d) 

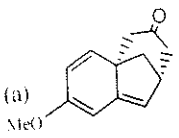
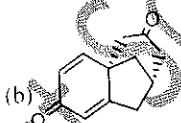
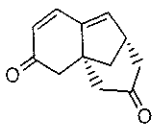
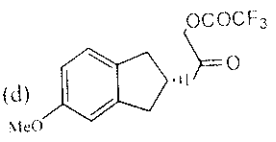
45. The product of B in the following reaction sequence is **[NET Dec. 2014]**



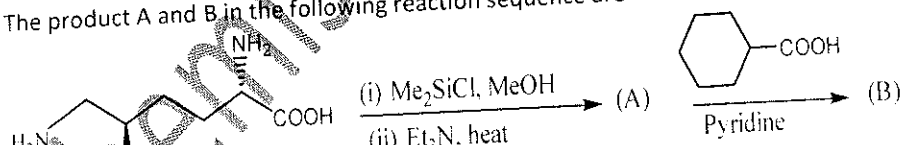
(a) 
(b) 
(c) 
(d) 

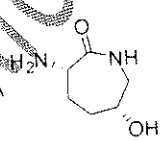
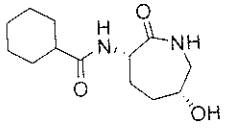
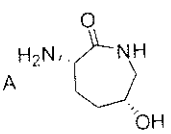
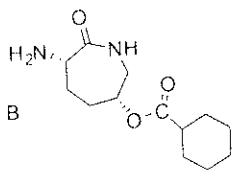
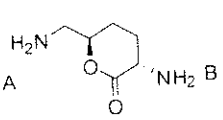
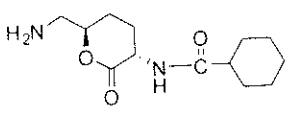
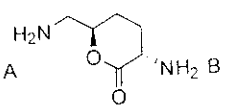
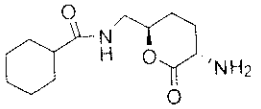
Q46. The major product of the following reaction is **[NET Dec. 2014]**



(a) 
(b) 
(c) 
(d) 

Q47. The product A and B in the following reaction sequence are **[NET Dec. 2014]**



(a) A  B 
(b) A  B 
(c) A  B 
(d) A  B 

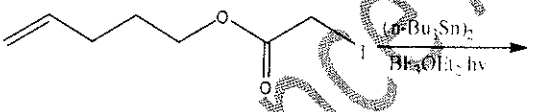
Q48. The correct combination of the following reaction and their ρ values is **NET Dec. 2014]**

Entry	Reaction	Entry	ρ value
A	$ArNH_2 + PHCOCl$ in benzene	P	+2.01
B	ArO^- In EtOH	Q	- 0.99
C	$ArCO_2Et + aq$ NaOH in EtOH	R	-2.69
		S	+0.78

(a) A – P; B – R : C – P (b) A – R; B – Q; C – P

(c) A – R; B – P; C – Q (d) A – Q; B – R; C – S

Q49. The reactive intermediate and the product formed in the following reaction are **[NET Dec. 2014]**



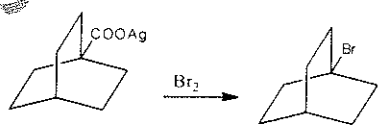
(a) Free radical and 4-iodomethyloxepan-2-one

(b) Free radical and 5-iodooxacan-2-one

(c) Carbene and 3-oxabicyclo $[5.1.0]$octane-2-one

(d) Carbene and (E)-5-iodopent-3-en-1-yl acetate

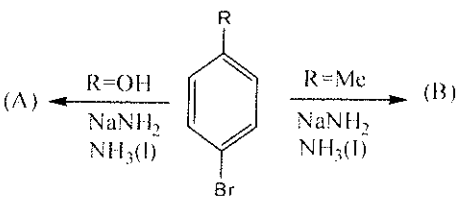
Q50. Following reaction goes through **[NET June 2015]**

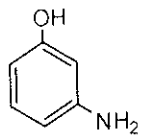
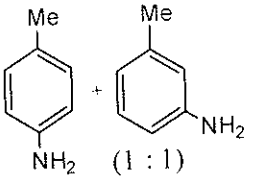


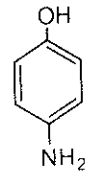
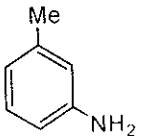
(a) Free radical intermediate (b) carbanion intermediate

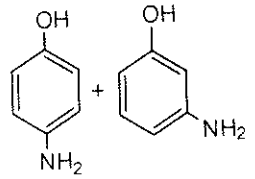
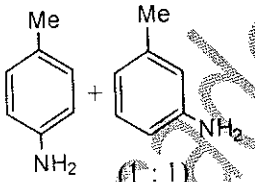
(c) carbocation intermediate (d) carbene intermediate

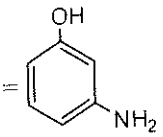
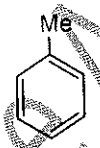
Q51. The major product A and B in the following reaction sequence are **[NET June 2015]**



(a) A =  B =  (1 : 1)

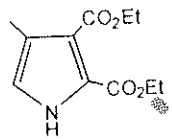
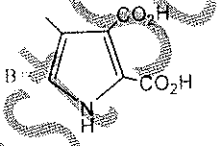
(b) A =  B = 

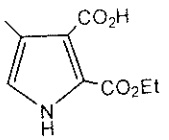
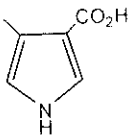
(c) A =  B =  (1 : 1)

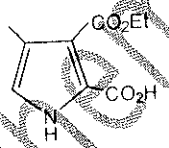
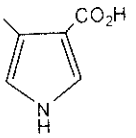
(d) A =  B = 

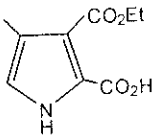
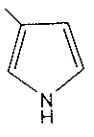
[NET June 2015]

Q52. The product A and B in the reaction sequence are

(a) A =  B = 

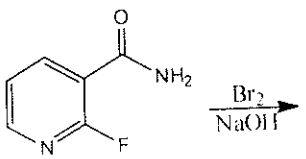
(b) A =  B = 

(c) A =  B 

(d) A =  B = 

[NET June 2015]

Q53. The correct statements about the following reaction is



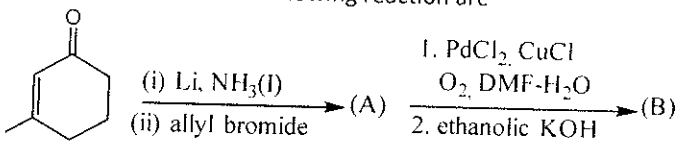
(a) The product i -2-fluropyridin-3-amine and reaction involves nitrene intermediate

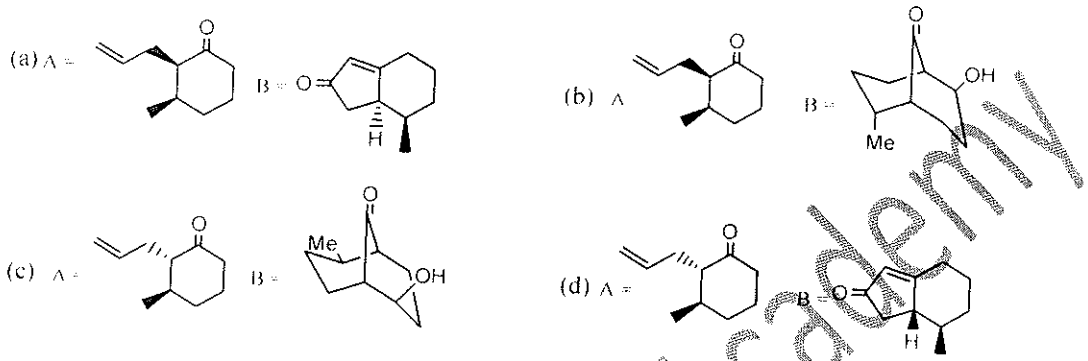
(b) The Major product is 2- fluoropyridin -3- amine and reaction involves radical intermediate

(c)The product is 2- hydroxynicotinamide and reaction involves benzene-like intermediate

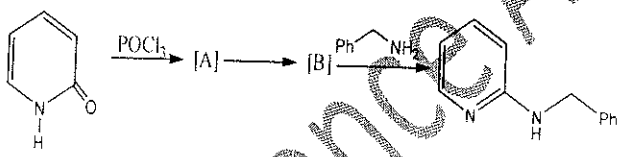
(d) The product is 2- hydroxynicotinamide and reaction involves addition-elimation mechanism

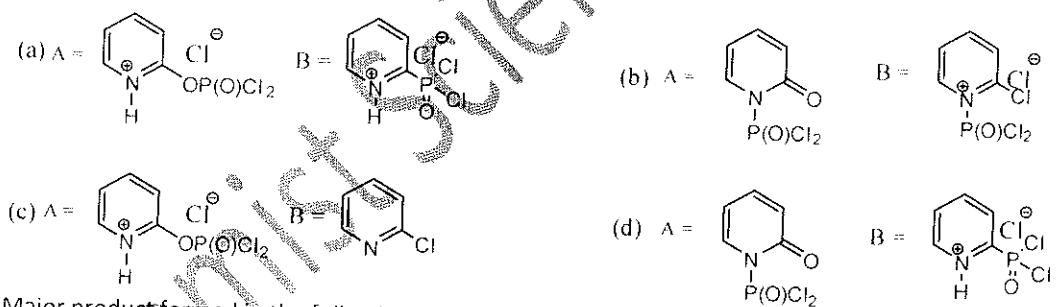
Q54. The major product A and B formed in the following reaction are **[NET June 2015]**



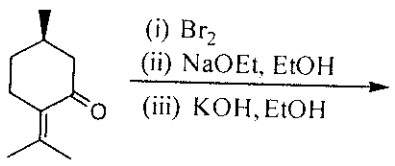


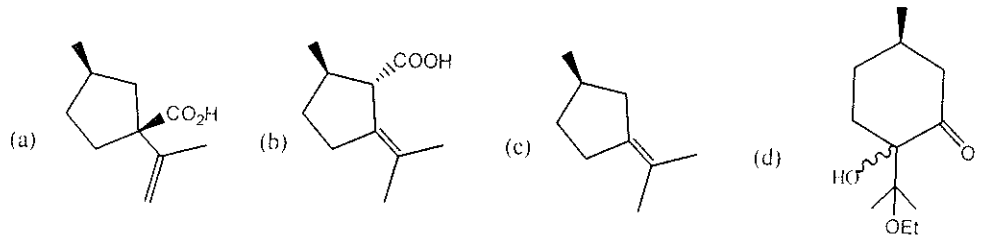
Q55. The correct structure on the intermediates [A] and [B] in the following reaction are **[NET June 2015]**



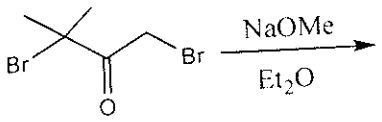


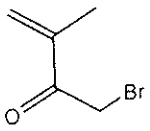
Q56. Major product formed in the following synthetic sequence on the monoterpene pulegegone is **[NET June 2015]**

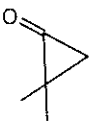


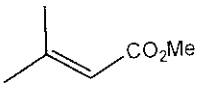


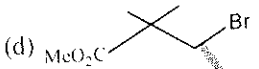
Q57. The major product formed in the following reaction is **[NET Dec. 2015]**



(a) 

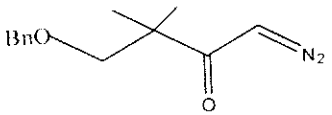
(b) 

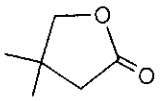
(c) 

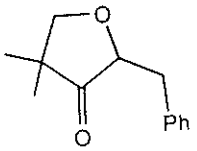
(d) 

[NET Dec. 2015]

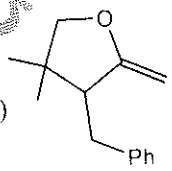
Q58. The major product formed in the following reaction is



(a) 

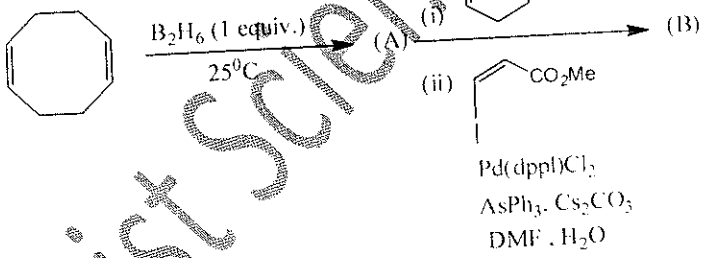
(b) 

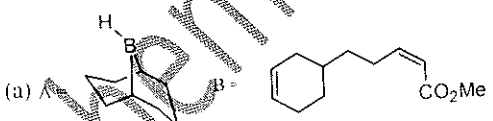
(c) 

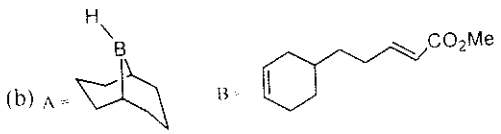
(d) 

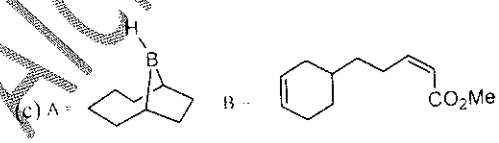
[NET Dec. 2015]

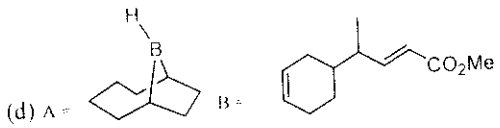
Q59. The major product A and B in the following reaction sequence are



(a) 

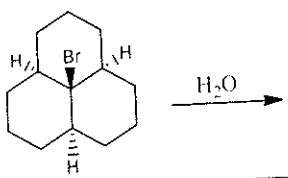
(b) 

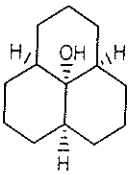
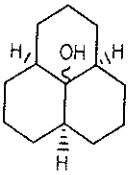
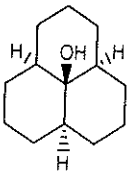
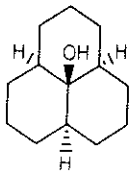
(c) 

(d) 

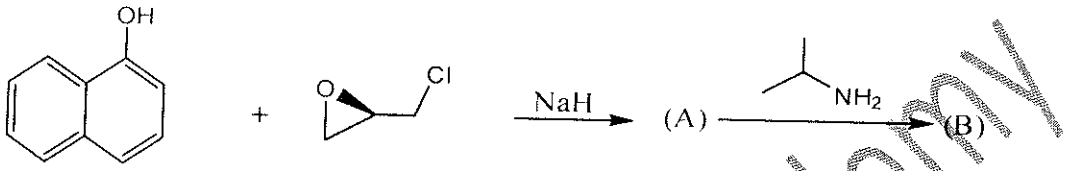
[NET Dec. 2015]

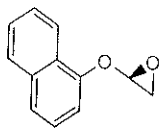
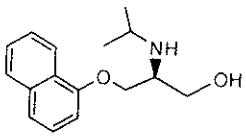
Q60. The mechanism and the product formed in the following reaction, respectively, are

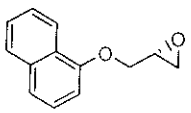
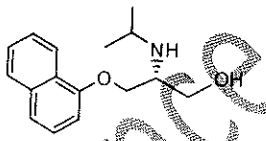


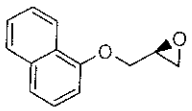
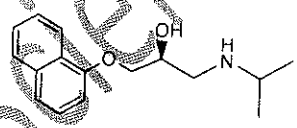
(a) S_N2  (b) S_N1  (c) S_N2  (d) S_N1 

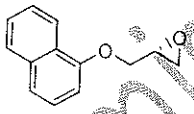
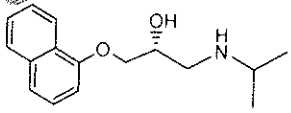
Q61. The major product A and B in the following reaction sequence are **[NET Dec. 2015]**



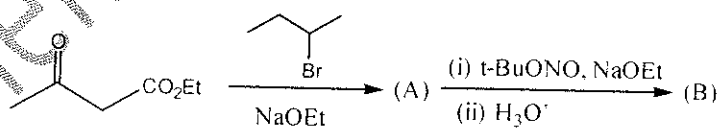
(a) A =  B = 

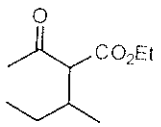
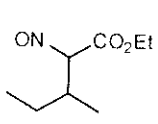
(b) A =  B = 

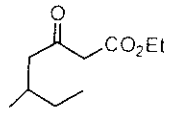
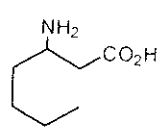
(c) A =  B = 

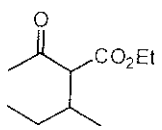
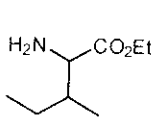
(d) A =  B = 

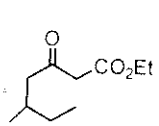
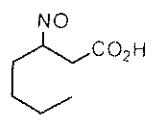
Q62. The major product A and B in the following reaction sequence are **[NET Dec. 2015]**



(a) A =  B = 

(b) A =  B = 

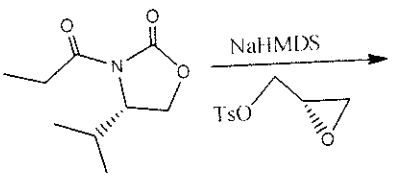
(c) A =  B = 

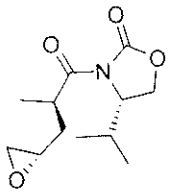
(d) A =  B = 

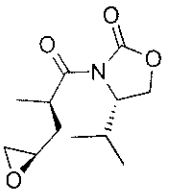
Q63. The frontier orbital interaction involved in the formation of the carbocation intermediate in the reaction of isobutylene with HCl are **[NET June 2016]**

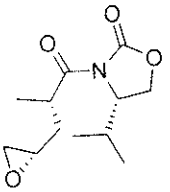
(a) π of olefin and σ^* of HCl
(b) π^* of olefin and σ of HCl
(c) π^* of olefin and σ^* of HCl
(d) π^* of olefin and σ of HCl

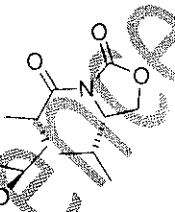
Q64. The major product formed in the following reaction is **[NET June 2016]**



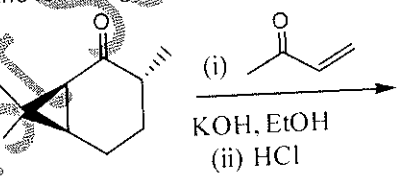
(a) 

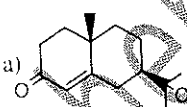
(b) 

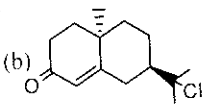
(c) 

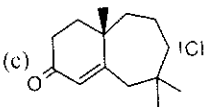
(d) 

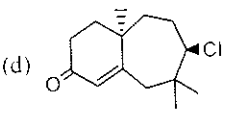
Q65. The major product formed in the following reaction sequence is **[NET June 2016]**



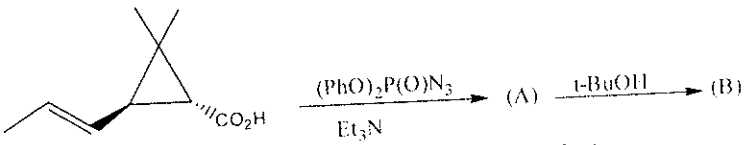
(a) 

(b) 

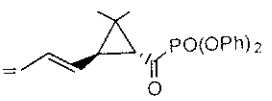
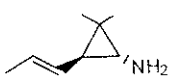
(c) 

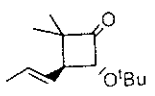
(d) 

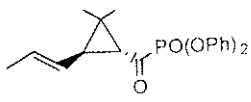
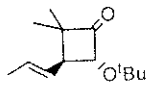
Q66. Structures of the intermediate A and the major product B in the following reaction sequence are **[NET June 2016]**



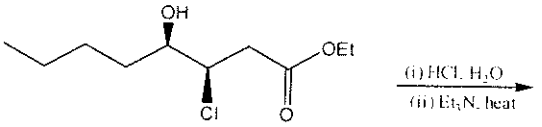
(a) A =  B = 

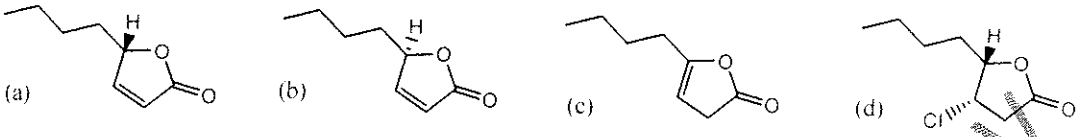
(b) A =  B = 

(c) A =  B = 

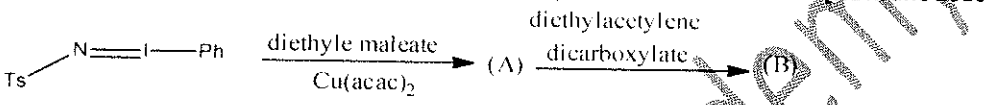
(d) A =  B = 

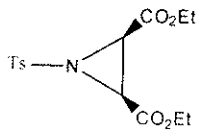
Q67. The major product formed in the following reaction is **[NET June 2016]**

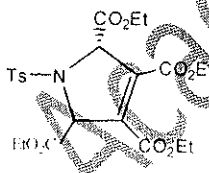


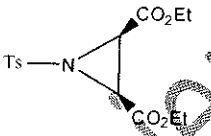


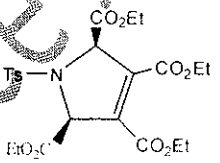
Q68. The major product A and B formed in the following reaction sequence are **[NET June 2016]**

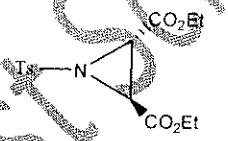


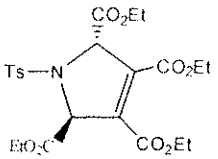
(a) A = 

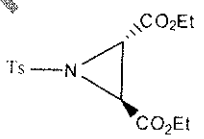
B = 

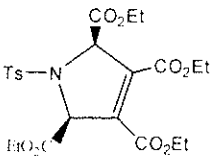
(b) A = 

B = 

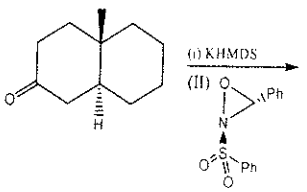
(c) A = 

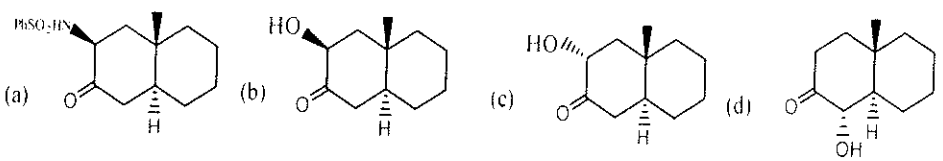
B = 

(d) A = 

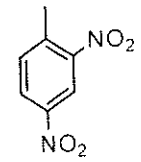
B = 

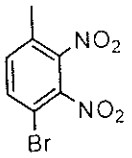
Q69. The major product formed in the following reaction is **[NET June 2016]**

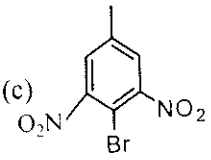


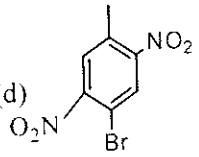


Q70. The major product formed in the dinitration of 5-bromotoluene is **[NET Dec. 2016]**

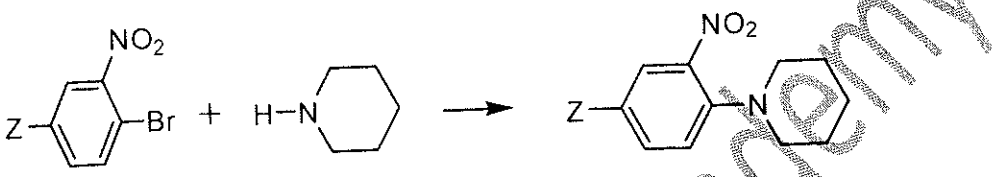
(a) 

(b) 

(c) 

(d) 

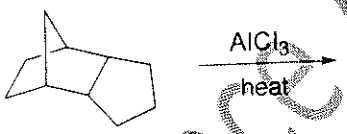
Q71. The correct order of the rate constants for the following series of reactions $(Z = CF_3 / CH_3 / OCH_3)$ is **[NET Dec. 2016]**

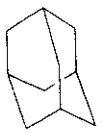


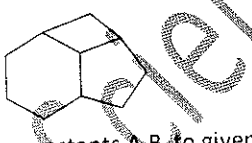
(a) $CF_3 > CH_3 > OCH_3$ (b) $CF_3 > OCH_3 > CH_3$

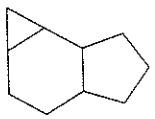
(c) $OCH_3 > CF_3 > CH_3$ (d) $CH_3 > OCH_3 > CF_3$

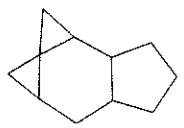
Q72. The most stable product formed in the following reaction is



(a) 

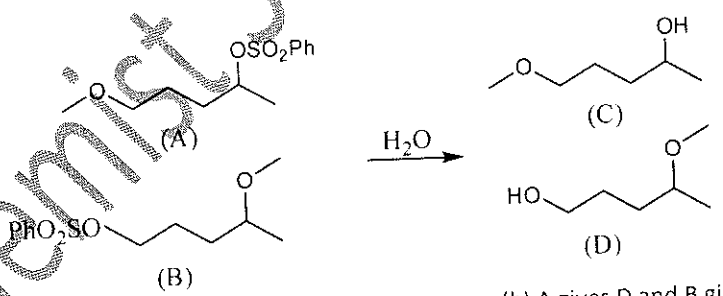
(b) 

(c) 

(d) 

[NET Dec.2016]

Q73. The correct statements for the reactants A,B to given product C,D is

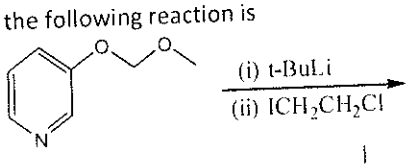


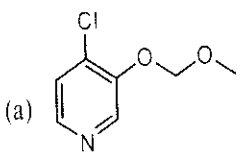
(a) A gives C and B gives D (b) A gives D and B gives C

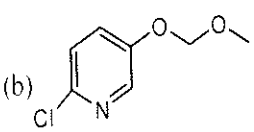
(c) A and B give identical amounts of C and D (d) A and B give D

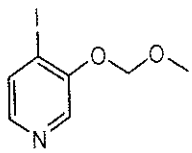
[NET Dec. 2016]

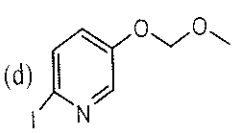
Q74. The major product formed in the following reaction is



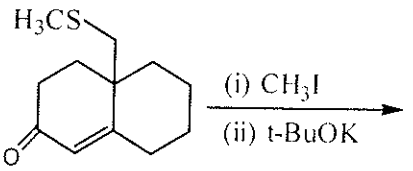
(a) 

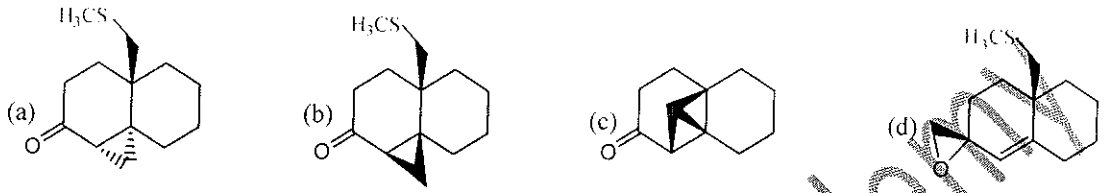
(b) 

(c) 

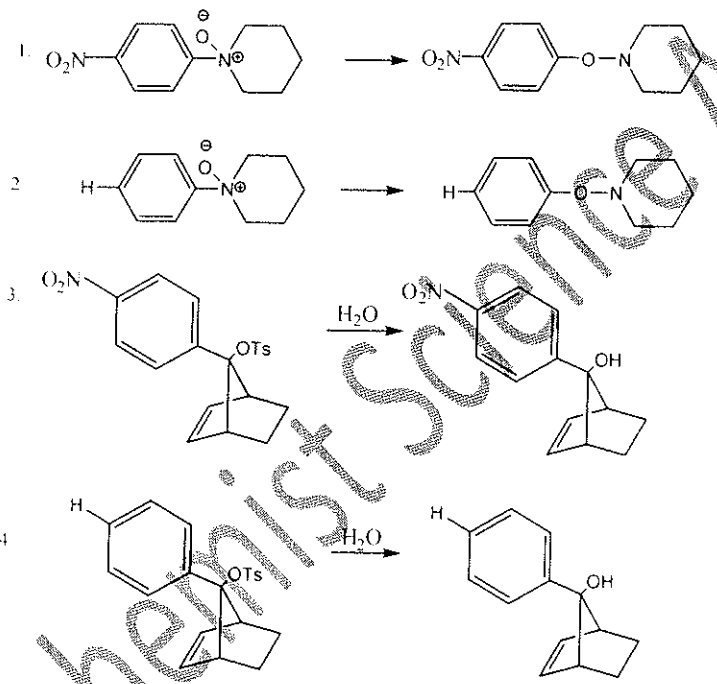
(d) 

Q75. The major product in the following reaction is **[NET Dec. 2016]**



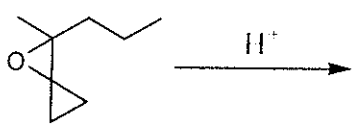


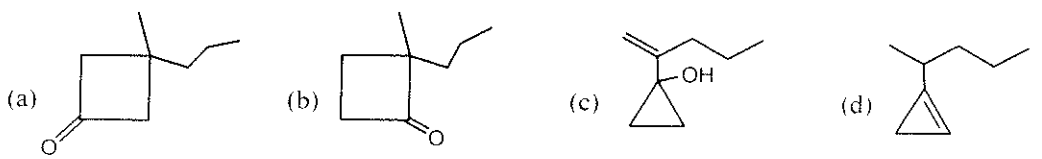
Q76. For the four reaction given below, the rates of the reaction will vary as **[NET Dec. 2016]**



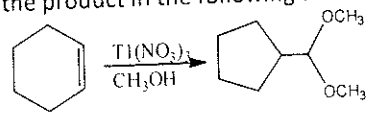
(a) 1 > 2 and 3 > 4 (b) 2 > 1 and 3 > 1 (c) 2 > 1 and 4 > 3 (d) 1 > 2 and 4 > 3

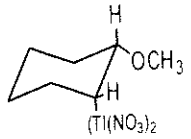
Q77. The major product formed in the following reaction **[NET Dec. 2016]**

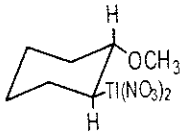




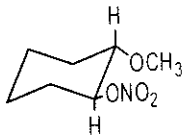
Q78. The intermediate that leads to the product in the following transformation is **[NET Dec. 2016]**



(a) 

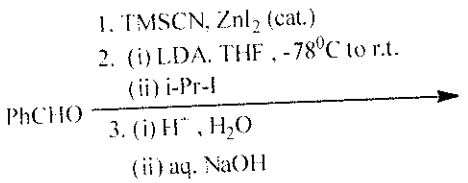
(b) 

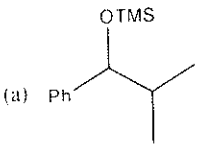
(c) 

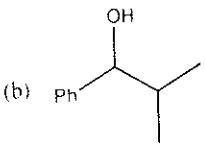
(d) 

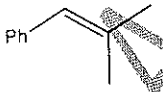
[NET Dec. 2016]

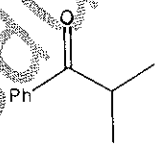
Q79. The major product formed in the following reaction



(a) 

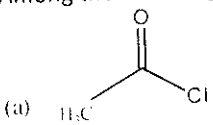
(b) 

(c) 

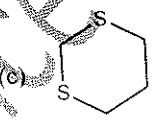
(d) 

[NET June 2017]

Q80. Among the following, the synthetic equivalent of acetyl anion is

(a) 

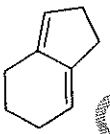
(b) CH_3CN

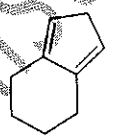
(c) 

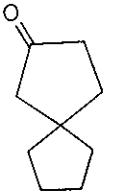
(d) $CH_3CH_2NO_2$

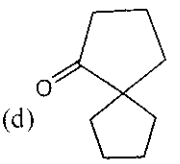
[NET June 2017]

Q81. The major product of the following reaction is

(a) 

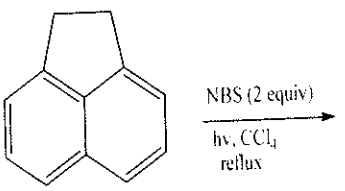
(b) 

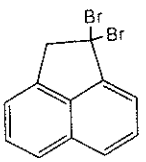
(c) 

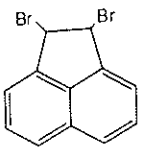
(d) 

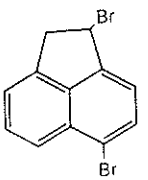
[NET June 2017]

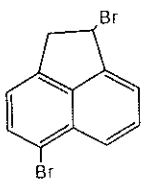
Q82. The major product formed in the following reaction is



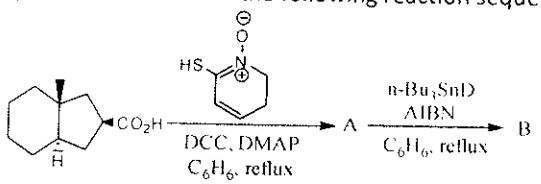
(a) 

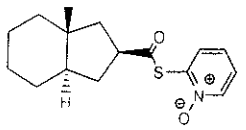
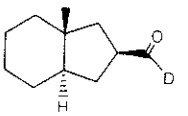
(b) 

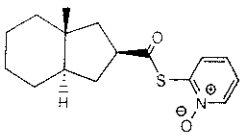
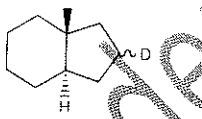
(c) 

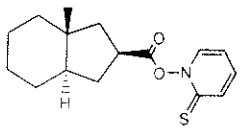
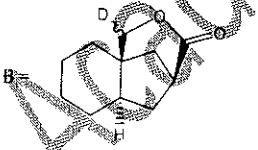
(d) 

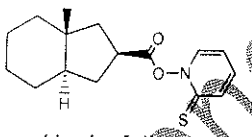
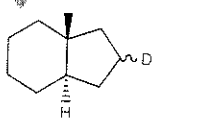
Q83. The intermediate A and product B formed in the following reaction sequence are **[NET Dec. 2017**



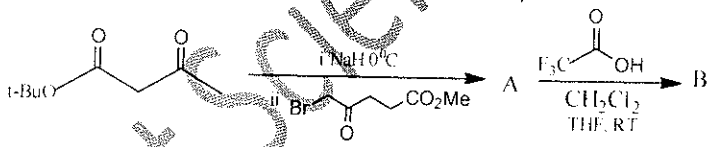
(a) A =  B = 

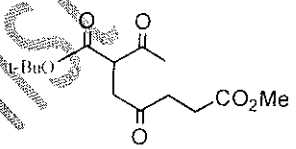
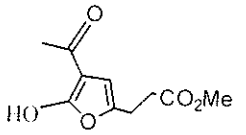
(b) A =  B = 

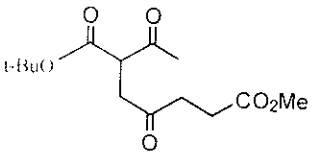
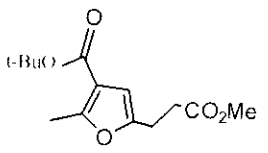
(c) A =  B = 

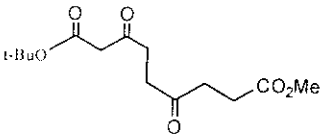
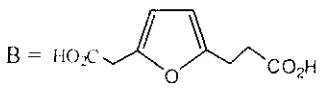
(d) A =  B = 

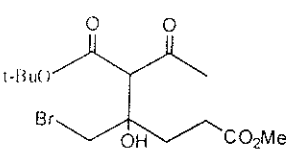
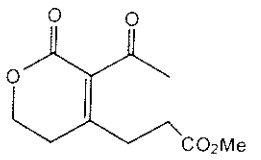
Q84. The major product A and B formed in the following reaction sequence are **[NET June 2017]**



(a) A =  B = 

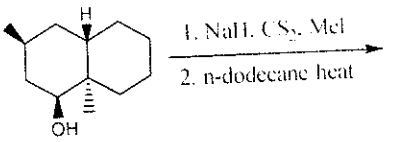
(b) A =  B = 

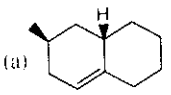
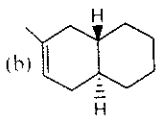
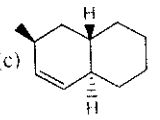
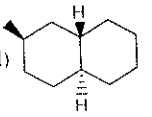
(c) A =  B = 

(d) A =  B = 

[NET June 2017]

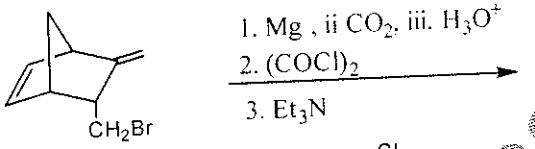
Q85. The major product formed in the following reaction is

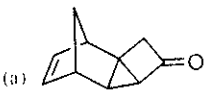
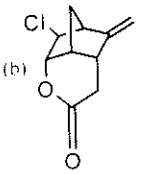
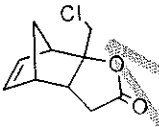
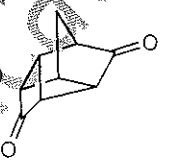


(a) 
(b) 
(c) 
(d) 

[NET June 2017]

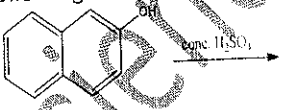
Q86. The major product formed in the following reaction is

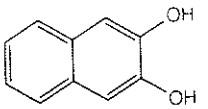
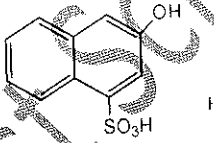
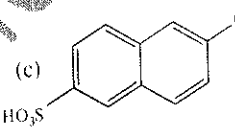
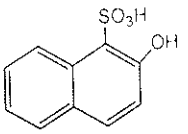


(a) 
(b) 
(c) 
(d) 

[NET Dec. 2017]

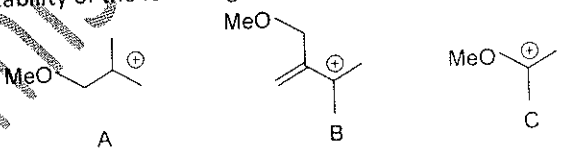
Q87. The kinetic product formed in the following reaction is



(a) 
(b) 
(c) 
(d) 

[NET Dec. 2017]

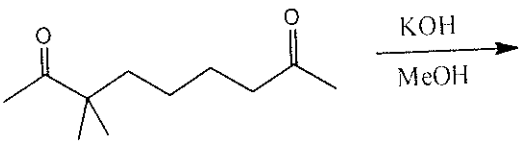
Q88. The correct order of stability of the following carbocation is

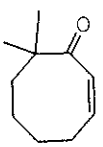
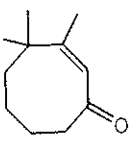
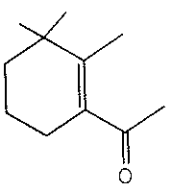
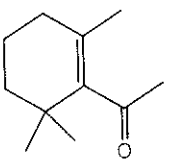


(a) A > C > B (b) B > C > A (c) C > A > B (d) C > B > A

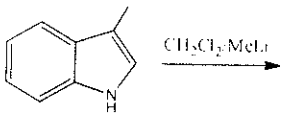
[NET Dec. 2017]

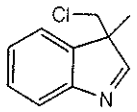
Q89. The major product formed in the following reaction is

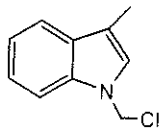


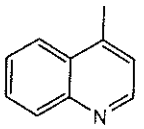
(a) 
(b) 
(c) 
(d) 

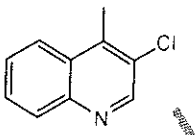
Q90. The major product formed in the following reaction is **[NET Dec. 2017]**



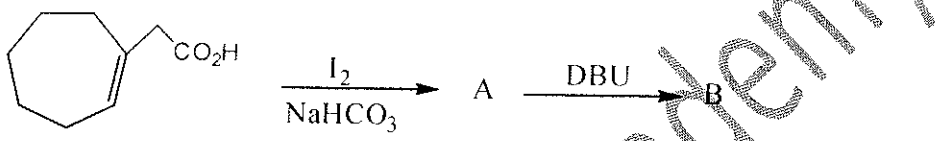
(a) 

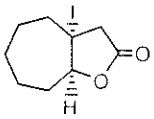
(b) 

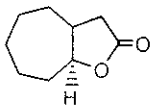
(c) 

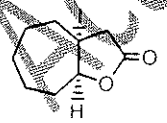
(d) 

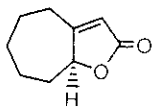
Q91. Major product A and B of the following reaction sequence are **[NET Dec. 2017]**

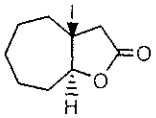


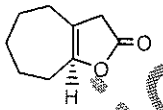
(a) A = 

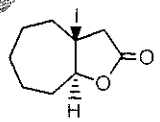
B = 

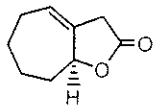
(b) A = 

B = 

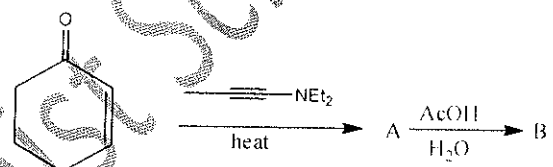
(c) A = 

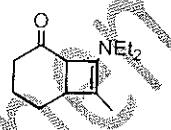
B = 

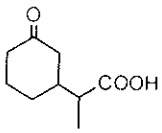
(d) A = 

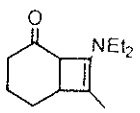
B = 

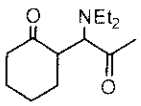
Q92. The major products A and B in the following reaction sequence are **[NET Dec. 2017]**

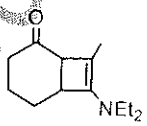


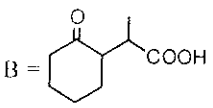
(a) A = 

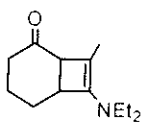
B = 

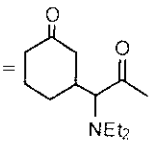
(b) A = 

B = 

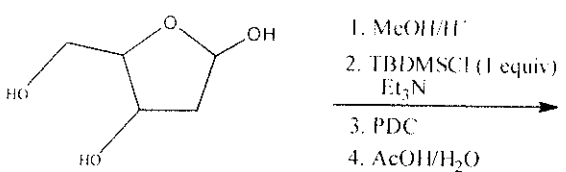
(c) A = 

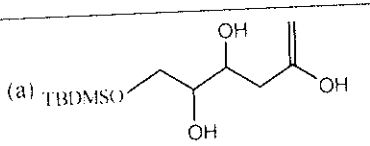
B = 

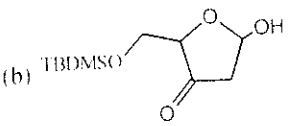
(d) A = 

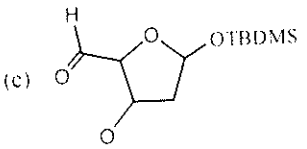
B = 

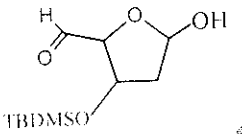
Q93. The major product formed in the following reaction sequence is **[NET Dec. 2017]**



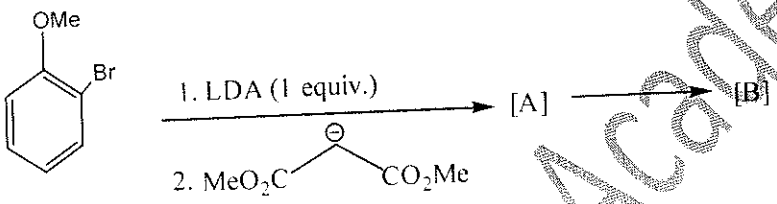
(a) 

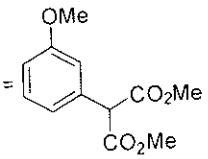
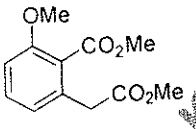
(b) 

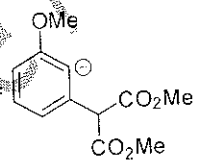
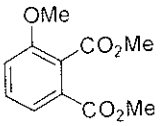
(c) 

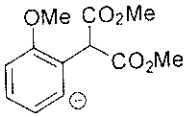
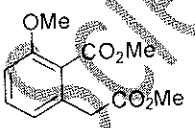
(d) 

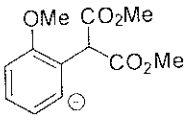
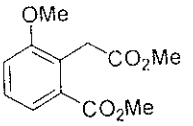
Q94. The intermediate A and the major product B in the following reaction are **[NET Dec. 2017]**



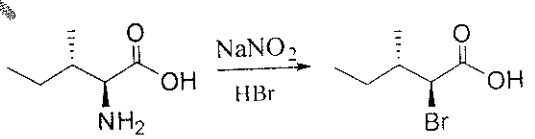
(a) A =  B = 

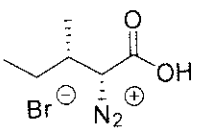
(b) A =  B = 

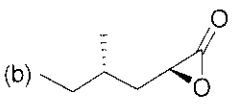
(c) A =  B = 

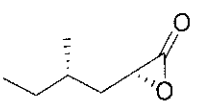
(d) A =  B = 

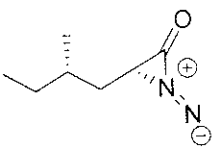
Q95. The correct intermediate which leads to the product in the following reaction is **[NET Dec. 2017]**



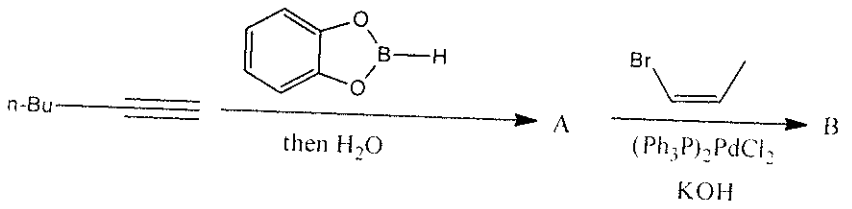
(a) 

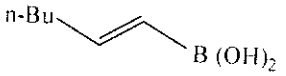
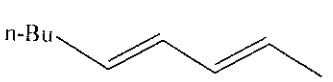
(b) 

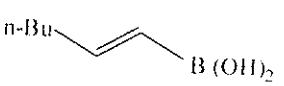
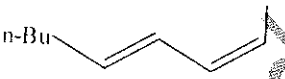
(c) 

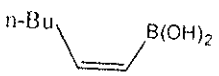
(d) 

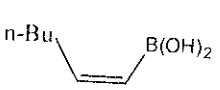
Q96. The major product A and B in the following reaction sequence are **[NET Dec. 2017]**



(a) A =  B = 

(b) A =  B = 

(c) A =  B = 

(d) A =  B = 

Q97. For the following compounds, the correct order of reactivity towards nucleophilic acyl substitution is

[NET June 2018]

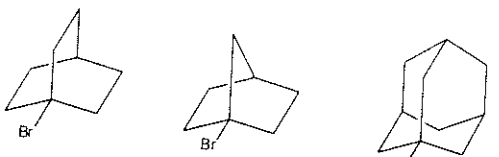
(a) acetyl chloride < methyl acetate < acetic anhydride < acetamide

(b) acetamide < methyl acetate < acetic anhydride < acety chloride

(c) accetamide < acetic anhydride < acetyl chloride < methyl acetate

(d) methyl acetate < acetamine < acetic anhydride < acety chloride

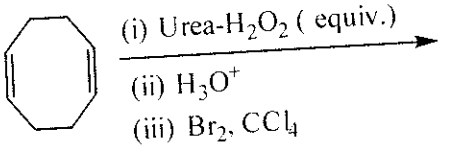
Q98. The correct order of rate of solvoysis is 80 % ethanol at 25^0C is **[NET June 2018]**



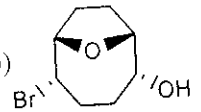
(A) (B) (C)

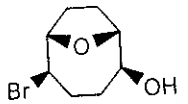
(a) $B > C > A$ (b) $A > B > C$ (c) $C > B > A$ (d) $C > A > B$

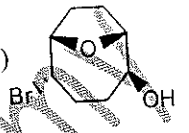
Q99. The major product formed in the following oxidation reaction is **[NET June 2018]**



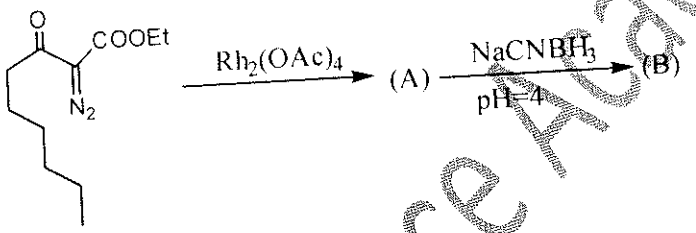
(a) 

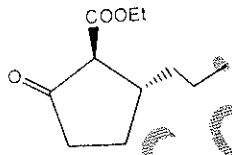
(b) 

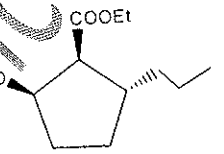
(c) 

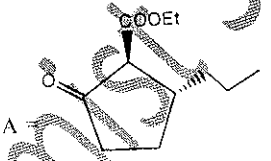
(d) 

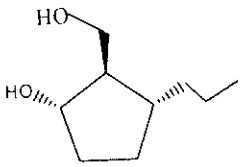
Q100. The major product A and B formed in the following reaction sequence are **[NET June 2018]**

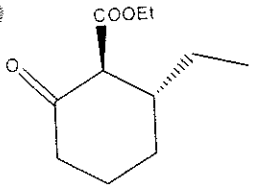


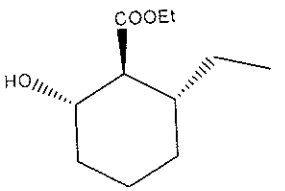
(a) A = 

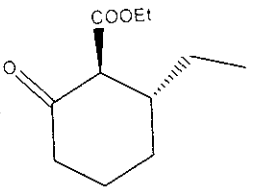
B = 

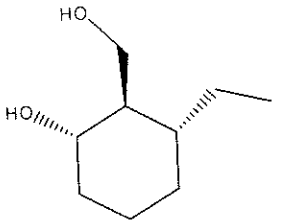
(b) A = 

B = 

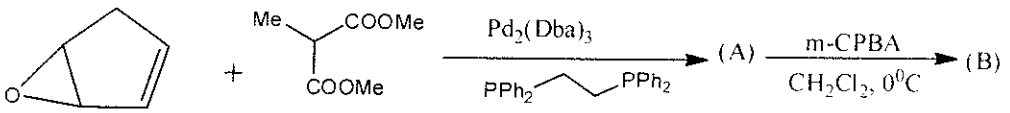
(c) A = 

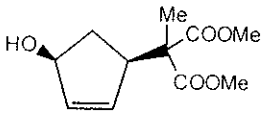
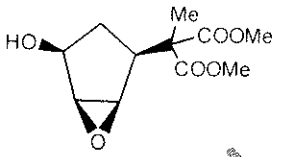
B = 

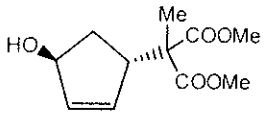
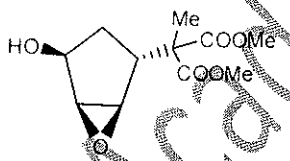
(d) A = 

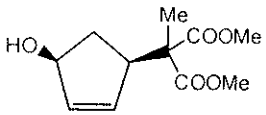
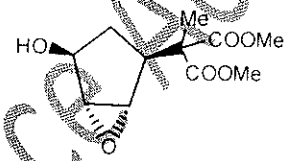
B = 

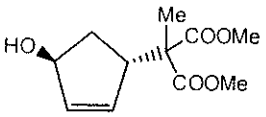
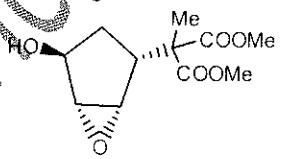
Q101. Structure of the intermediate A and the final product B in the following reaction sequence are (dba=dibenzylidene acetone) **[NET June 2018]**



(a) A=  B = 

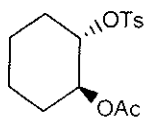
(b) A=  B = 

(c) A=  B = 

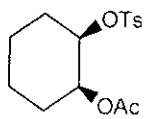
(d) A=  B = 

Q102. The correct statements about solvolysis using $NaOAc / AcOH$ of following compound is

[NET June 20118]



(A)



(B)

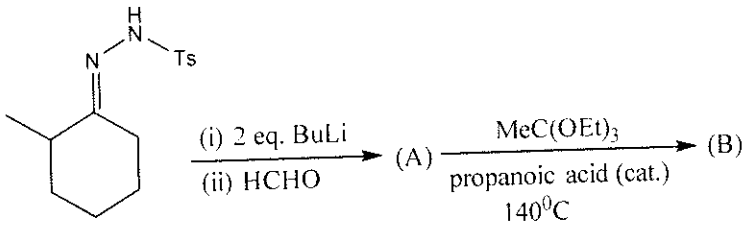
(a) A reacts faster than B to give trans-1, 2-diacetoxyclohexane

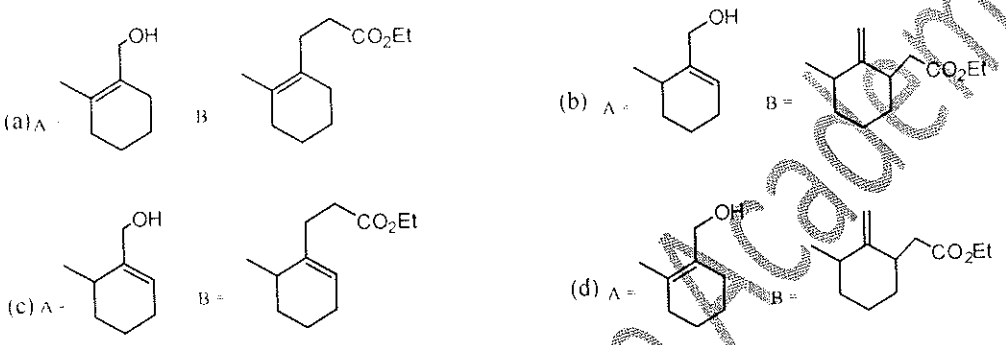
(b) B reacts faster than A to give trans-1, 2-diacetoxycyclohexane

(c) A reacts faster than B to give cis-1, 2-diacetoxycyclohexane

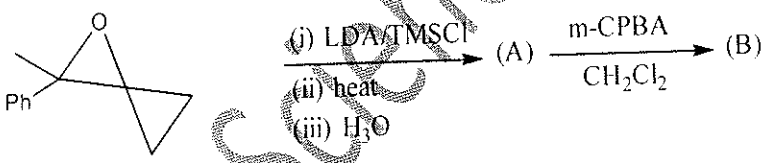
(d) B reacts faster than A to gives cis-1, 2-diacetoxycyclohexane

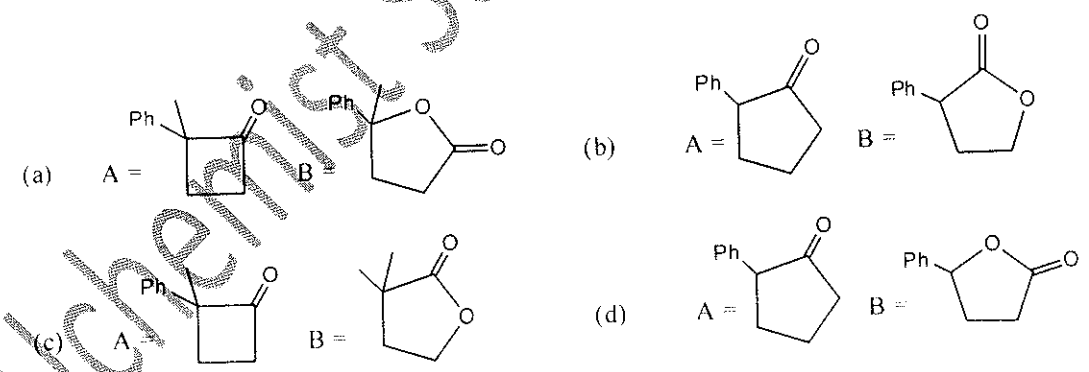
Q103. The major allylic alchol A and the ester B formed in the following reaction sequence are **[NET June 2018]**



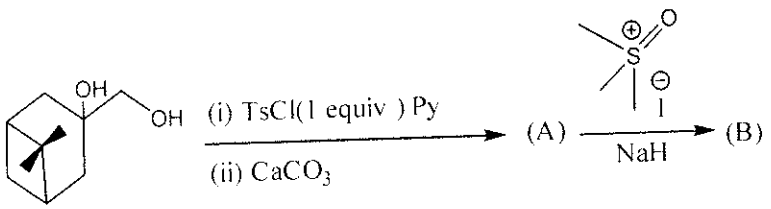


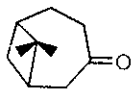
Q104. The major product A and B formed in the following reaction sequence are **[NET June 2018]**

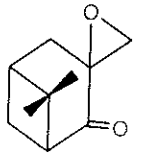
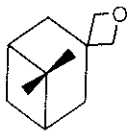


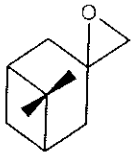
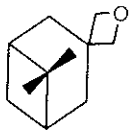


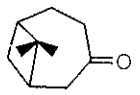
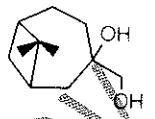
Q105. The major product A and B formed in the following reaction sequence are **[NET June 2018]**



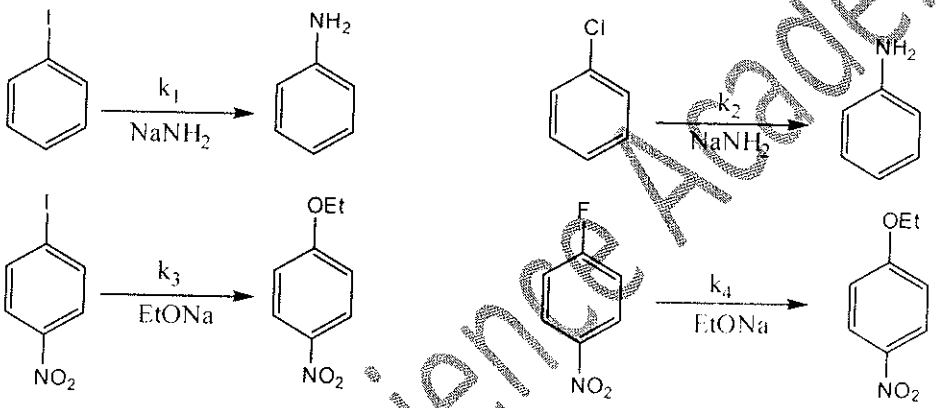
(a) A =  B = 

(b) A =  B = 

(c) A =  B = 

(d) A =  B = 

Q106. The correct order of rates for the following reaction is **[NET June 208]**



(a) $k_1 > k_2$ and $k_3 > k_4$

(b) $k_1 > k_2$ and $k_4 > k_3$

(c) $k_2 > k_1$ and $k_3 > k_4$

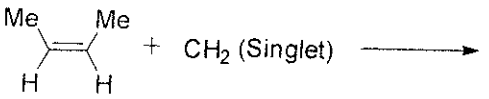
(d) $k_2 > k_1$ and $k_4 > k_3$

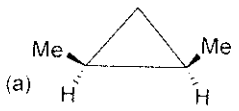
Answer Key

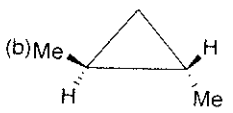
1. (a)	2. (d)	3. (d)	4. (a)	5. (d)	6. (b)	7. (b)
8. (a)	9. (a)	10. (a)	11. (a)	12. (b)	13. (d)	14. (d)
15. (b)	16. (b)	17. (d)	18. (c)	19. (d)	20. (b)	21. (a)
22. (b)	23. (b)	24. (c)	25. (d)	26. (d)	27. (a)	28. (a)
29. (c)	30. (b)	31. (a)	32. (d)	33. (d)	34. (b)	35. (d)
36. (a)	37. (a)	38. (b)	39. (c)	40. (a)	41. (a)	42. (d)
43. (c)	44. (c)	45. (c)	46. (b)	47. (a)	48. (b)	49. (b)
50. (a)	51. (a)	52. (c)	53. (a)	54. (d)	55. (c)	56. (b)
57. (c)	58. (b)	59. (a)	60. (d)	61. (c)	62. (c)	63.(a)
64. (a)	65. (a)	66. (a)	67. (b)	68. (a)	69. (c)	70. (b)
71. (a)	72. (a)	73. (c)	74. (c)	75. (b)	76. (d)	77. (b)
78. (b)	79. (d)	80. (d)	81. (d)	82. (b)	83. (d)	84. (a)
85. (c)	86. (d)	87. (a)	88. (d)	89. (c)	90. (c)	91. (b)
92. (a)	93. (b)	94. (a)	95. (c)	96. (b)	97. (b)	98. (d)
99. (b)	100. (a)	101. (a)	102. (a)	103. (b)	104. (d)	105.(a)
106. (b)						

GATE Previous Year's Question

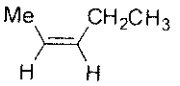
Q1. The major product formed in the following reaction is **[GATE 2000]**



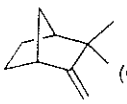
(a) 

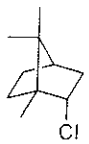
(b) 

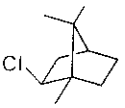
(c) 50:50 mixture of above two compounds

(d) 

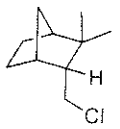
Q2. The product formed upon heating camphene with HCl is **[GATE 2000]**


(Camphene)

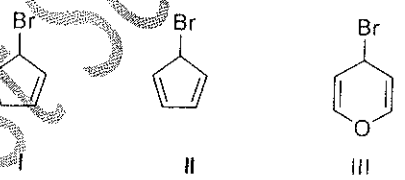
(a) 

(b) 

(c) 

(d) 

Q3. Among the bromides I-*II* given below, the order of their reactivity in the S_N1 reaction is **[GATE 2002**

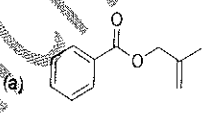


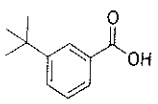
I II III

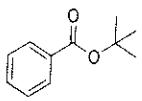
(a) III > II > I (b) II > III > I (c) III > I > II (d) II > I > III

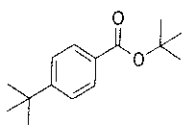
Q4. The major product formed in the reaction benzoic acid isobutylene in the presence of a catalytic amount of sulfufic acid is

[GATE 2002]

(a) 

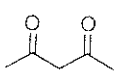
(b) 

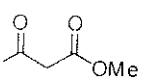
(c) 

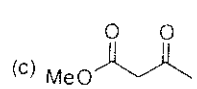
(d) 

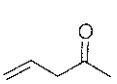
Q5. Among the following compounds, the one undergoes deprotonation most readily in the presence of a base, to from carbanion is:

[GATE 2003]

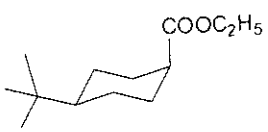
(a) 

(b) 

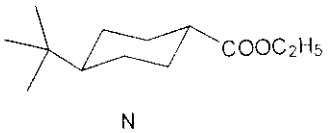
(c) 

(d) 

Q6. Regarding the saponification of M and N shown below, the correct statement is that **[GATE 2003]**



M



N

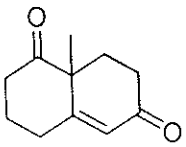
(a) M reacts faster than N because the transition state is less crowded for M than for N.

(b) M reacts slower than N because the transition state is more crowded for M than for N.

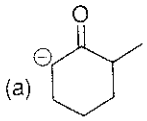
(c) N and M react at the same rate because of formation of tetrahedral intermediate in both cases.

(d) N reacts slower than M because of its greater thermodynamics stability.

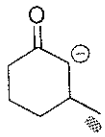
Q7. The enolate ion that reacts with 3-buten-2-one to from (Y) is:



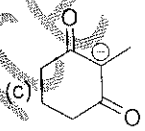
(a)



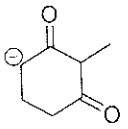
(b)



(c)

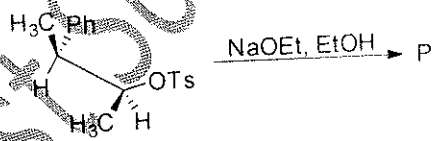


(d)

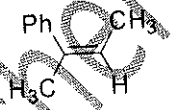


[GATE 2005]

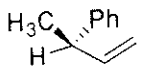
Q8. The major product P formed in the given



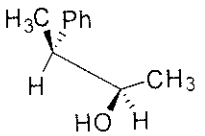
(a)



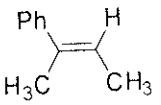
(b)



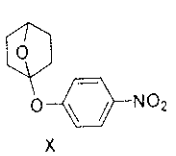
(c)



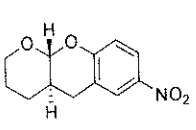
(d)



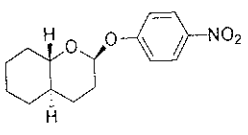
Q9. The order of reactivity towards acid catalyzed hydrolysis of the following cyclic acetals is **[GATE 2005]**



X



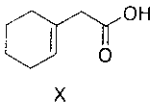
Y



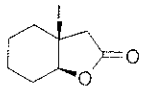
Z

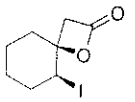
(a) Z > Y > X (b) X > Y > Z (c) X > Z > Y (d) Z > X > Y

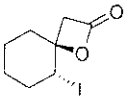
Q10. Iodo-lactonization of β,γ -unsaturated carboxylic acid X with I_2 and $NaHCO_3$, gives. **[GATE 2005]**

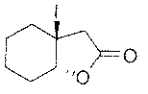


X

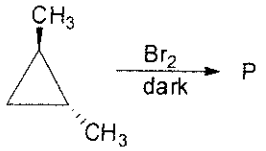
(a) 

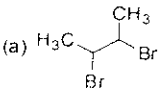
(b) 

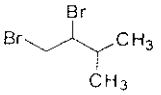
(c) 

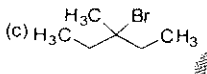
(d) 

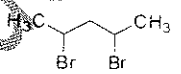
Q11. The major product P of the following reaction is **[GATE 2005]**



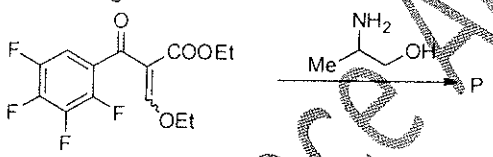
(a) 

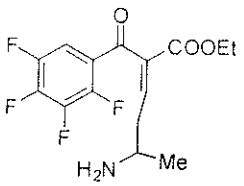
(b) 

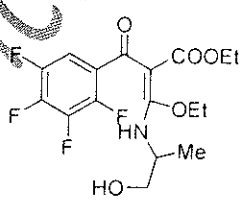
(c) 

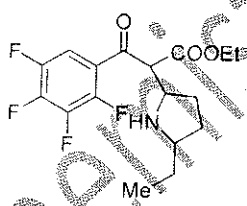
(d) 

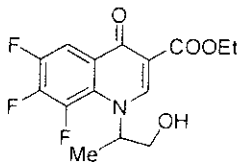
Q12. The major product P of the following reaction **[GATE 2005]**



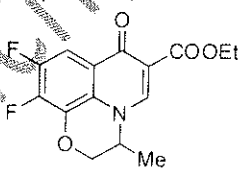
(a) 

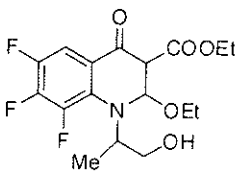
(b) 

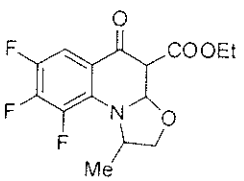
(c) 

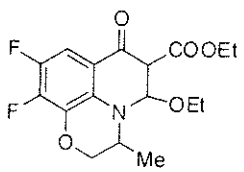
(d) 

Q13. Major compound Q obtained reaction of P with NaH in DMF is: **[GATE 2005]**

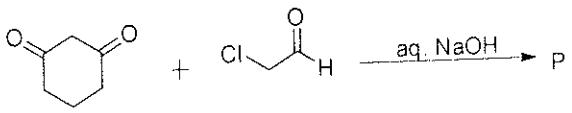
(a) 

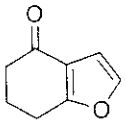
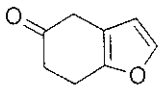
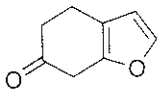
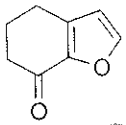
(b) 

(c) 

(d) 

Q14. Identify the major product P in the following reaction. **[GATE 2006]**



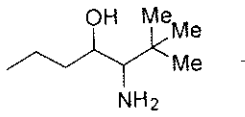
(a)  (b)  (c)  (d) 

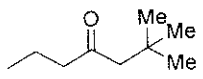
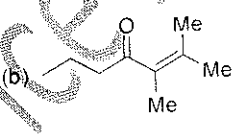
Q15. On heating with dilute sulfuric acid, naphthalene-I sulfonic acid gives predominantly **[GATE 2006]**

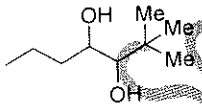
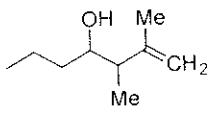
(a) naphthalene (b) naphthalene-2-sulfonic acid

(c)1-naphthol (d) 2-naphthol

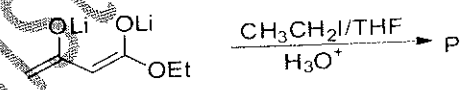
Q16. Predict the major product P in the following reaction **[GATE 2016]**

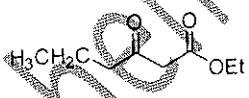
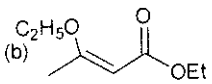
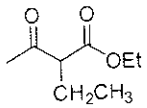
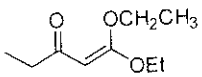


(a)  (b) 

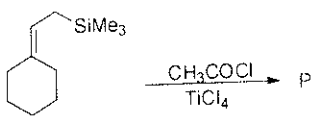
(b)  (d) 

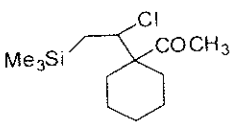
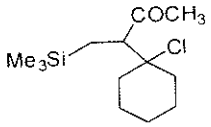
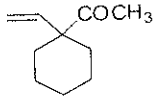
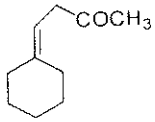
Q17. Identify the major product P in the following reaction: **[GATE 2006]**



(a)  (b)  (c)  (d) 

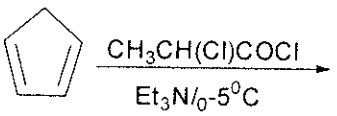
Q18. Identify the major product P in the following reaction **[GATE 2006]**

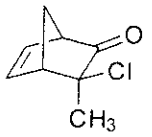
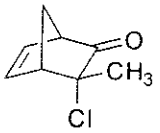
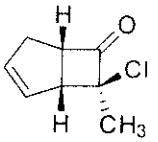
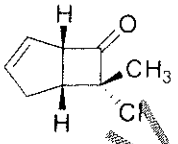


(a)  (b)  (c)  (d) 

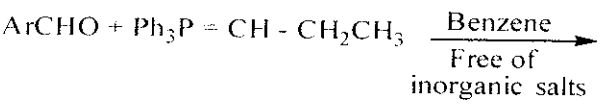
Linked Answer Q019. And Q.20:

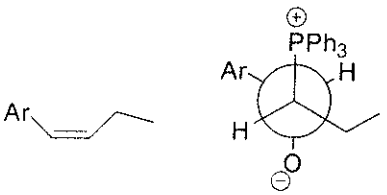
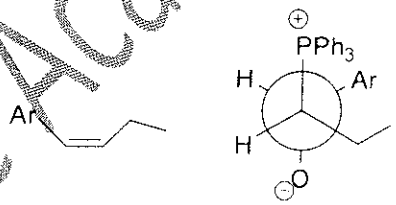
Q19. Identify the major product P in the following reaction **[GATE 2006]**

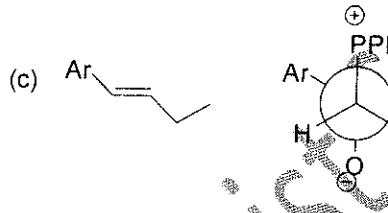
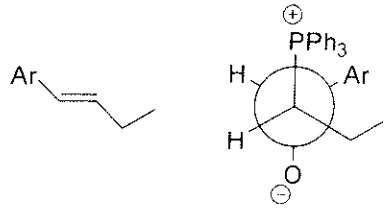


(a)  (b)  (c)  (d) 

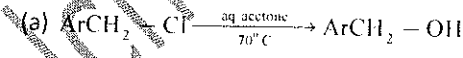
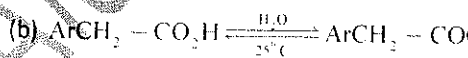
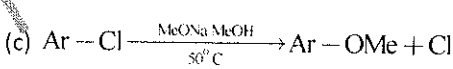
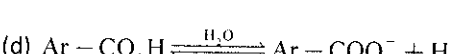
Q20. In the following wittig reaction, the structure of the major product P and the intermediate [X] respectively, are



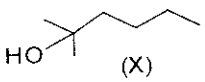
(a)  (b) 

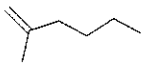
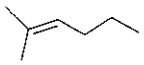
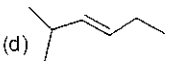
(c)  (d) 

Q21. Match the reaction of some p-substituted benzene derivatives (a) –(d) given in List I with the Hammett's p-values (i)-(iv) in List II and identify the correct match. **[GATE 2006]**

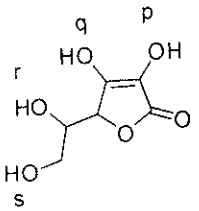
List –I	List –II
(a) 	(i) $+8.50$
(b) 	(ii) $+1$
(c) 	(iii) $+0.49$
(d) 	(iv) -1.88

Q22. The major product obtained upon treatment of compounds X with H_2SO_4 at 80^0C **[GATE 2007]**



(a)  (b)  (c)  (d) 

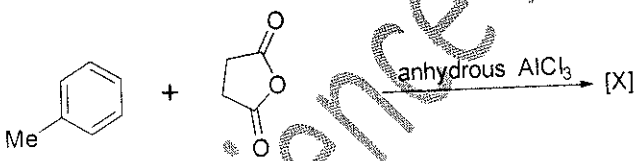
Q23. In the following compound, the hydroxyl group that is most readily methylated with CH_2N_2 is **[GATE 2008]**



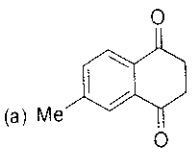
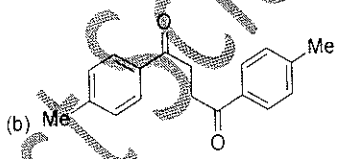
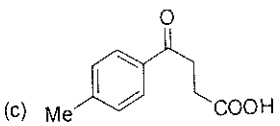
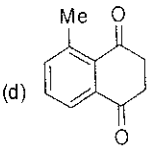
(a) p (b) q (c) r (d) s

[GATE 2009]

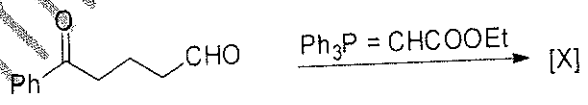
Q24. In the reaction,



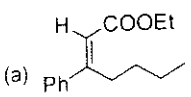
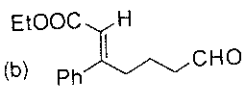
The major product X is

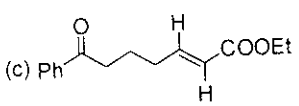
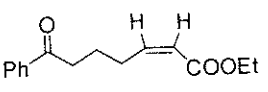
(a)  (b)  (c)  (d) 

Q25. In the reaction,

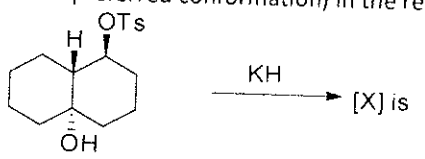


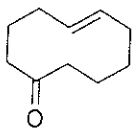
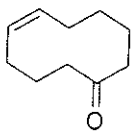
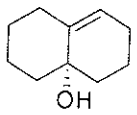
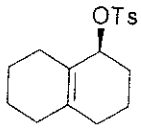
The major product X is:

(a)  (b) 

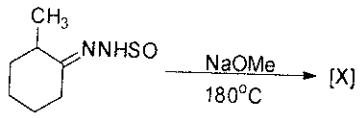
(c)  (d) 

Q26. The major product X (based on the preferred conformation) in the reaction **[GATE 2009]**

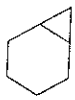
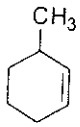
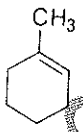
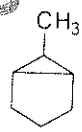


(a)  (b)  (c)  (d) 

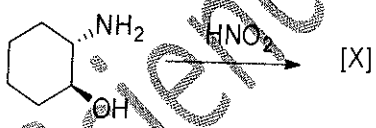
Q27. In the reaction,



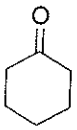
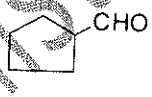
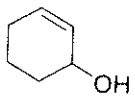
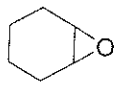
The major product $[X]$ is

(a)  (b)  (c)  (d) 

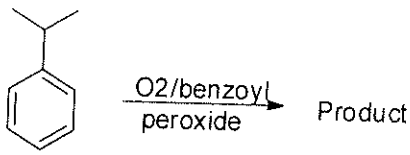
Q28. In the reaction,

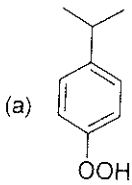
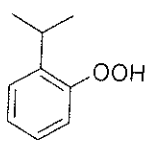
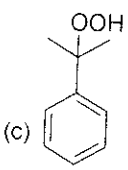
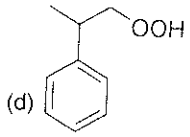


The major product $[X]$

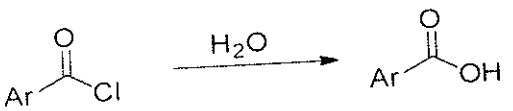
(a)  (b)  (c)  (d) 

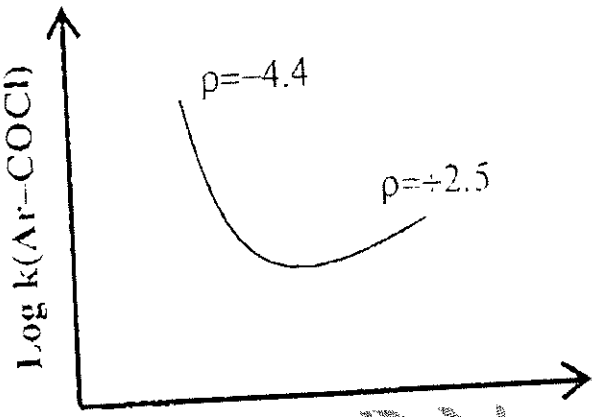
Q29. Identify the most probable product in the given reaction **[GATE 2012]**



(a)  (b)  (c)  (d) 

Q30. Show below is a Hammett plot obtained for the reaction **[GATE 2012]**





The change in slope of the plot indicates that

(a) The reaction does not follow linear free energy relationship

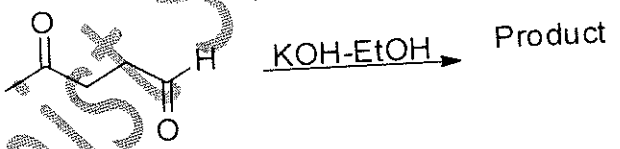
(b) electrons are being withdrawn from the transition state in the mechanism

(c) Electrons are being donated to the transition state in the mechanism

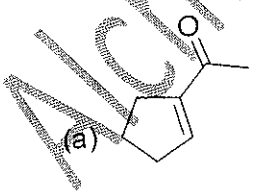
(d) the mechanism of the reaction is changing

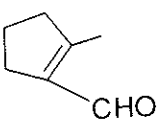
[GATE 2012]

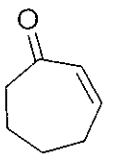
Q31. In the reaction

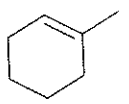


The product formed is

(a) 

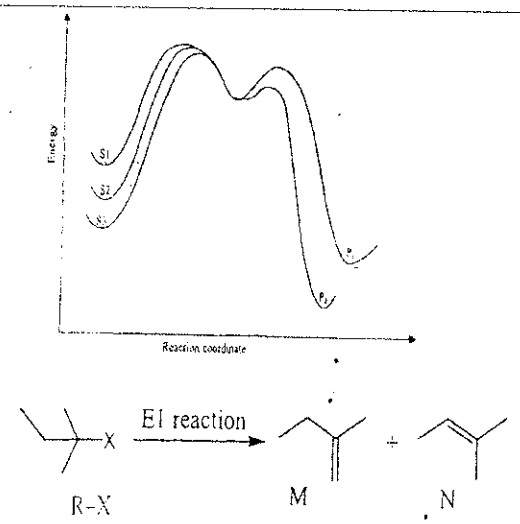
(b) 

(c) 

(d) 

Common Data for Q.32 and Q.33

Consider the E_1 reaction of tert-amyl halides from the energy profile give below



Q32. In the above reaction, $X = Cl, Br$ or I. Based on the graph, identify the alkyl halides (R-X) as S1, S2 and S3

(a) $S1 = R - Cl, S2 = R - Br$ and $S3 = R - I$

(b) $S1 = R - I, S2 = R - Br$ and $S3 = R - Cl$

(c) $S1 = R - Cl, S2 = R - I$ are $S3 = R - Br$

(d) $S1 = R - I, S2 = R - Cl$ and $S3 = R - Br$

Q33. Identify product P_1 and its yield relative to P_2

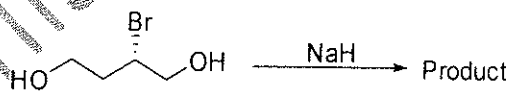
(a) P_1 is M and is the major product

(b) P_1 is N and is minor product

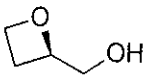
(c) P_1 is N and is the major product

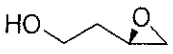
(d) P_1 is M and is the minor product

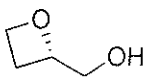
Q34. In the cyclization reaction given below, The most probable product formed is **[GATE 2012]**



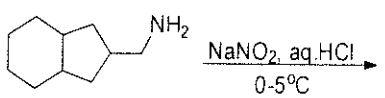
(a) 

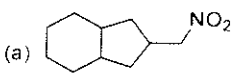
(b) 

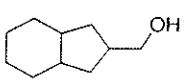
(c) 

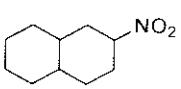
(d) 

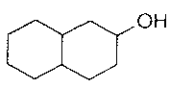
Q35. The major product formed in the reaction given below is **[GATE 2013]**



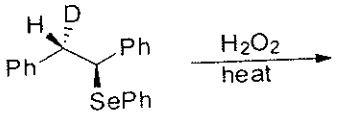
(a) 

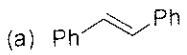
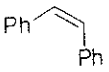
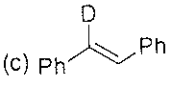
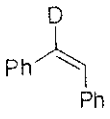
(b) 

(c) 

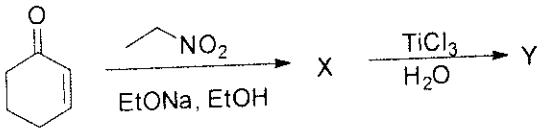
(d) 

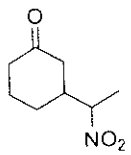
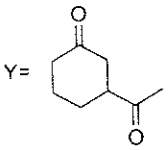
Q36. The major product formed in the following reaction is **[GATE 2014]**

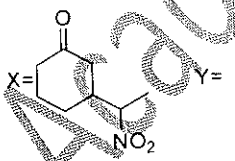
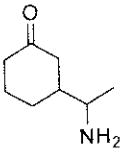


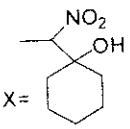
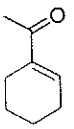
(a)  (b)  (c)  (d) 

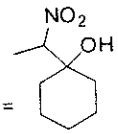
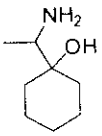
Q37. The major product X and Y formed in the following reaction sequence are **[GATE 2014]**



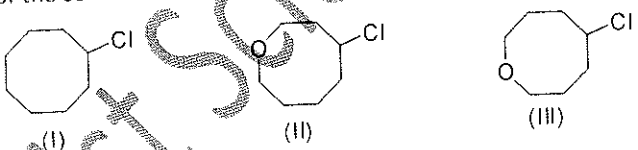
(a) X=  Y= 

(b) X=  Y= 

(c) X=  Y= 

(d) X=  Y= 

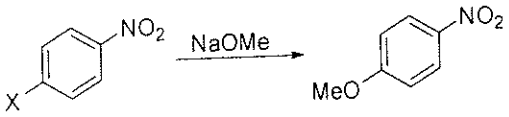
Q38. The correct order of the solvolsis for the following chlorides in acetic acid is **[GATE 2014]**



(I) (II) (III)

(a) II > I > III (b) III > II > I (c) III > I > II (d) I > III > II

Q39. The correct order of reactivity of p-halonitrobenzenes in the following reaction is **[GATE 2015]**



(X= F, Cl, Br, I)

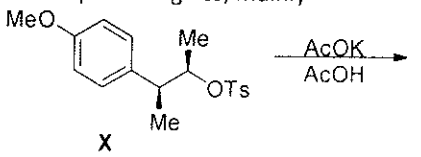
(a) p-choronitrobenzene > p-iodonitrobenzene > p-fluoronitrobenzene > p-bromonitrobenzene

(b) p-fluronitrobenzene > p-chloronitrobenzene > p-bromonitrobenzene > p-iodonitroenzene

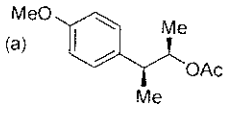
(c) p-iodonitrobenzene > p-bromonitrobenzene > p-chloronitrobenzene > p-fluoronitrobenzene

(d) p-bromonitrobenzene > p-fluoronitrobenzene > p-iodonitrobenzene > p-chloronitrobenzene

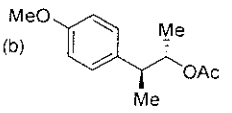
Q40. Solvolysis of the optically active compound X gives, mainly **[GATE 2015]**



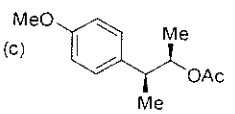
X



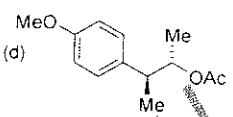
(Optically active)



(Optically active)

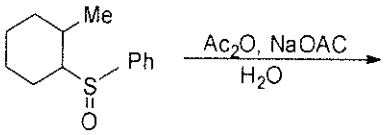


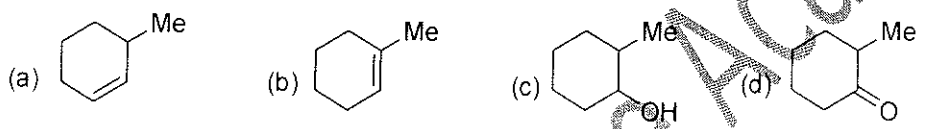
racemic
(optically inactive)



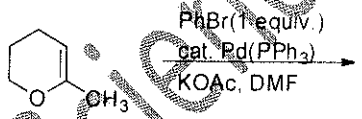
racemic
(optically inactive)

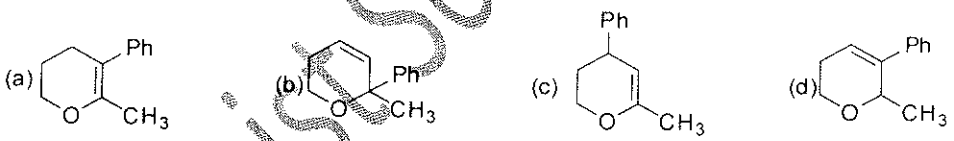
Q41. The major product formed in the following reaction is **[GATE 2015]**



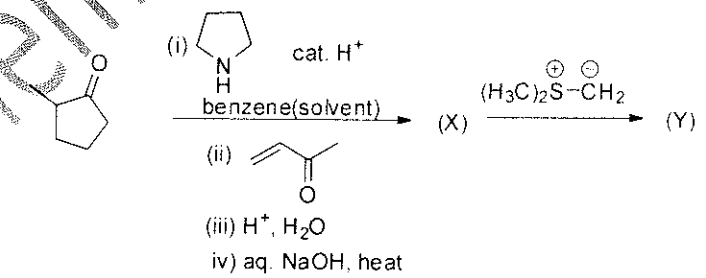


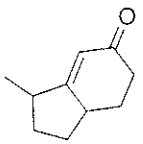
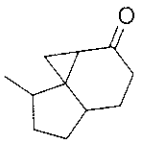
Q42. The major product formed in the following reaction is **[GATE 2016]**

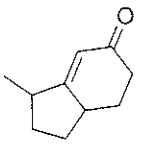
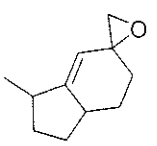


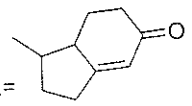
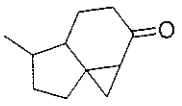


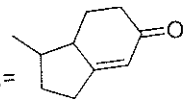
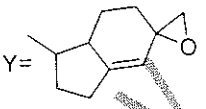
Q43. The major product X and Y formed in the following formed in the following synthetic scheme, are **[GATE 2016]**



(a) X=  Y= 

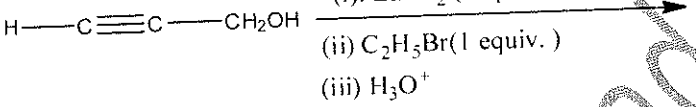
(b) X=  Y= 

(c) X=  Y= 

(d) X=  Y= 

[GATE 2016]

Q44. The major product obtained in the following reaction, is



(a) $H_3CH_2C-C\equiv C-CH_2OH$

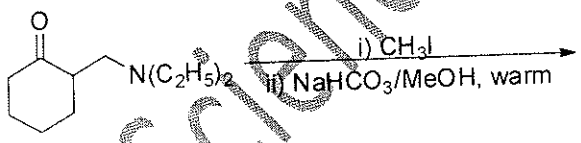
(b) $H-C\equiv C-CH_2OCH_2CH_3$

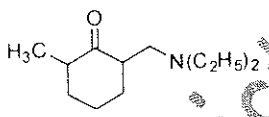
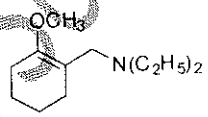
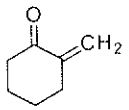
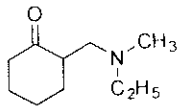
(c) $H_3CH_2C-C\equiv C-CH_2NH_2$

(d) $H-C\equiv C-CH_2NH-CH_2CH_3$

[GATE 2016]

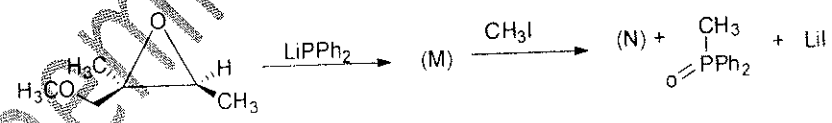
Q45. The major product formed in the following reaction, is

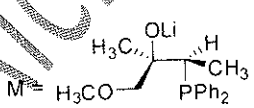


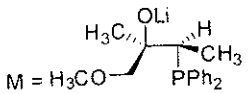
(a)  (b)  (c)  (d) 

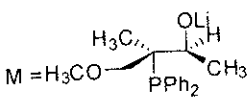
[GATE 2016]

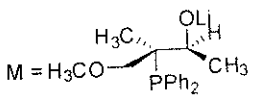
Q46. The major products M and N in the following reaction sequence are

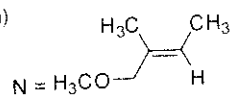


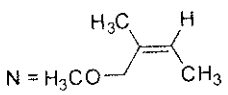


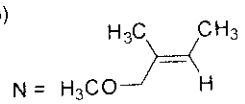


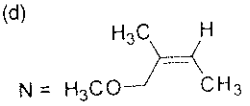




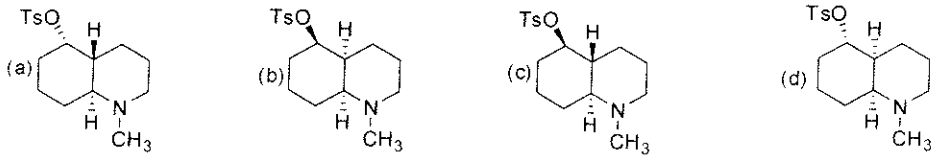
(a) 

(b) 

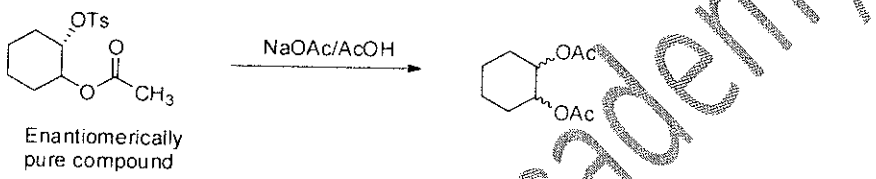
(b) 

(d) 

Q47. Among the following decahydroquinoline toluenesulfonates (Ts), the one that yields 9-methylamino-E-non 5-enal as a major product upon aqueous solvolysis is **[GATE 2017]**



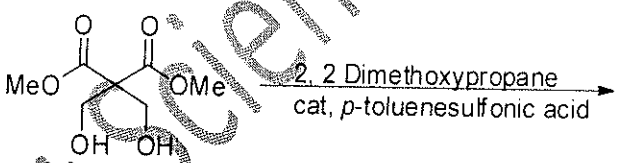
Q48. The product obtained in the following solvolysis reaction is **[GATE 2017]**

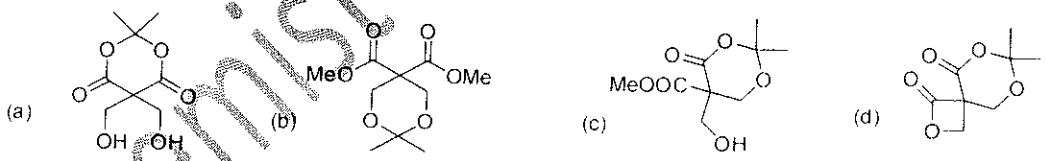


Enantiomerically pure compound

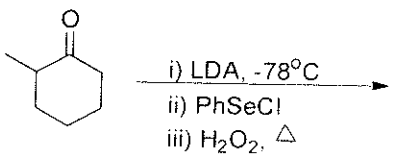
(a) a racemic mixture of trans 1, 2-diacetoxycylohexane
(b) enantiomerically pure trans 1,2-diacetoxycyclohexane
(c)racemic cis 1,2-diacetoxycyclohexane
(d) a mixture of cis and trans 1,2-diacetoxycyclohexane

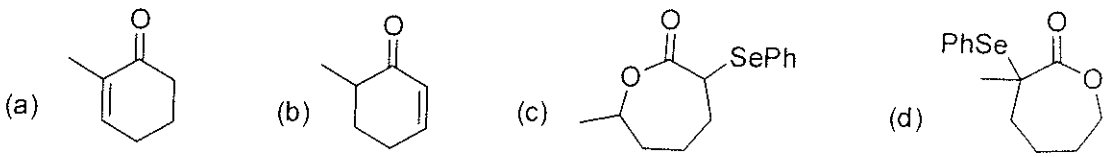
Q49. The major product obtained in the following reaction is **[GATE 2017]**



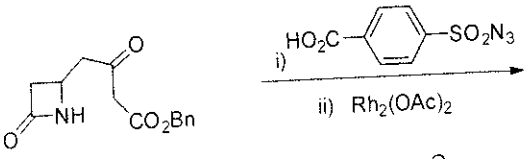


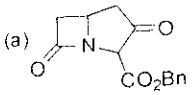
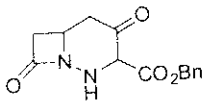
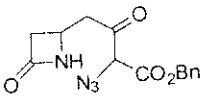
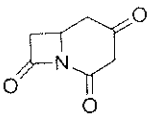
Q50. The major product formed in the following reaction sequence is **[GATE 2018]**





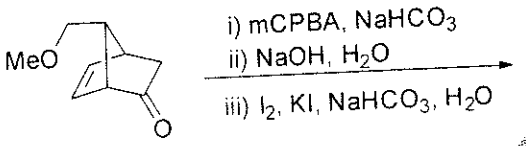
Q51. The major product formed in the following reaction sequence is

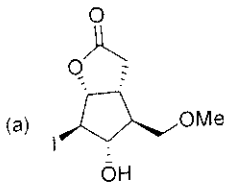
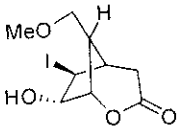
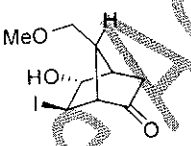
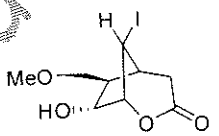


(a) 
(b) 
(c) 
(d) 

[GATE 2018]

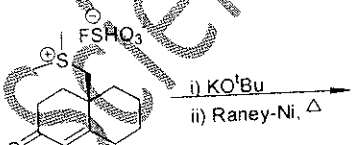
Q52. The major product in the following reaction sequence is

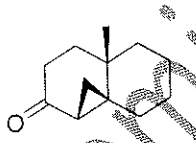
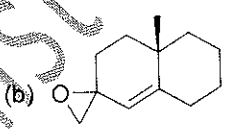
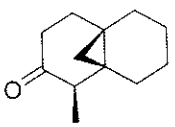
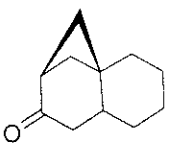


(a) 
(b) 
(c) 
(d) 

[GATE 2018]

Q53. The major product formed in the following reaction sequence is



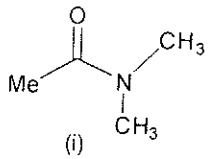
(a) 
(b) 
(c) 
(c) 

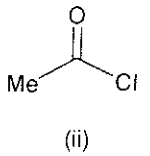
Answer Key

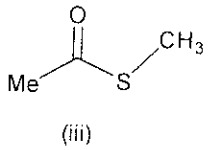
1. (a)	2. (b)	3. (c)	4. (b)	5. (a)	6. (d)	7. (c)
8. (d)	9. (a)	10. (d)	11. (d)	12. (d)	13. (d)	14. (a)
15. (c)	16. (a)	17. (a)	18. (c)	19. (b)	20. (a)	21. (d)
22. (c)	23. (b)	24. (d)	25. (c)	26. (a)	27. (c)	28. (b)
29. (c)	30. (d)	31. (b)	32. (b)	33. (d)	34. (c)	35. (d)
36. (c)	37. (a)	38. (c)	39. (b)	40. (c)	41. (d)	42. (b)
43. (b)	44. (a)	45. (c)	46. (a)	47. (c)	48. (a)	49. (b)
50. (b)	51. (a)	52. (a)	53. (a)			

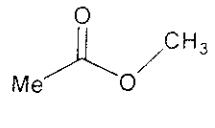
TIFR Previous Year's Question

Q1. Rank the following molecule in order of electrophillicity (from most to least electrophillic) **[TIFR:2010]**


(i)

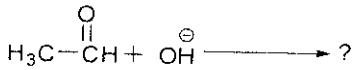

(ii)

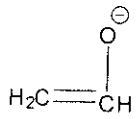

(iii)

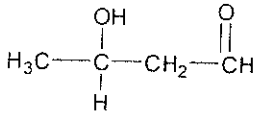
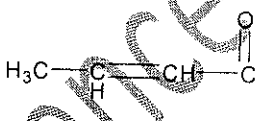

(iv)

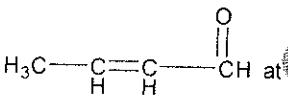
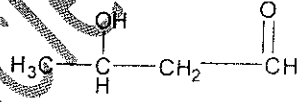
(a) ii > iii > iv > i (b) I > iv > iii > ii (c) ii > iv > iii > i (d) I > iii > iv > ii

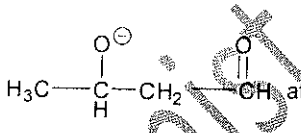
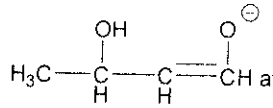
Q2. What would be the final major product of the following chemical reaction it is carried out twice, once at 5^0C and the second time at 45^0C **[TIFR 2010]**



(a)  at both the temperatures

(b)  at 5^0 and  at 45°C and

(c)  at 5°C and  at 45°C

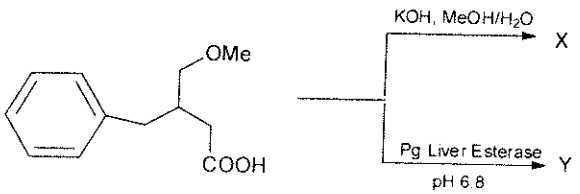
(d)  at 5^0 and 

Q3. What is the major product if HBr (in excess) is added to $H_2C=CH-CH_2-OH$ **[TIFR 2011]**

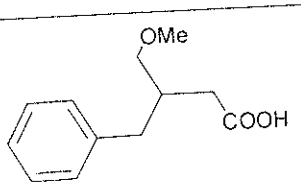
(a) $CH_3-CH(Br)-CH_2-Br$ (b) $H_2C=CH-CH_2-OH$

(c) $CH_3-CH(Br)-CH_2-OH$ (d) $CH_3-CH(OH)-CH_2-OH$

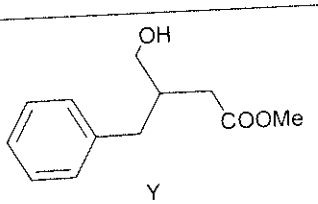
Q4. Predict the products X and Y for the following deprotection reaction: **[GATE 2014]**



(a)

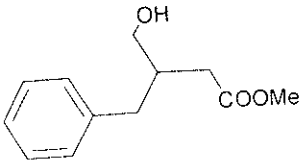


X

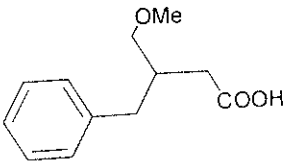


Y

(b)

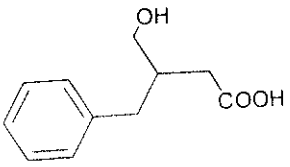


X

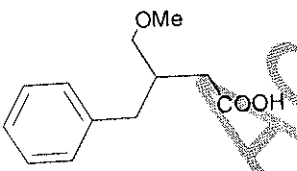


Y

(c)

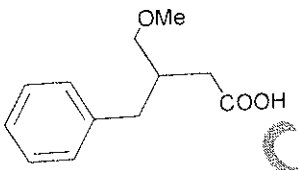


X

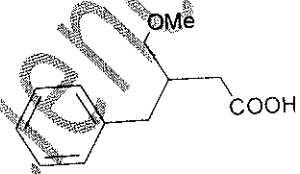


Y

(d)



X



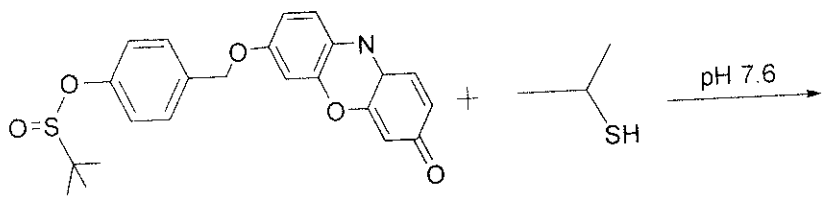
Y

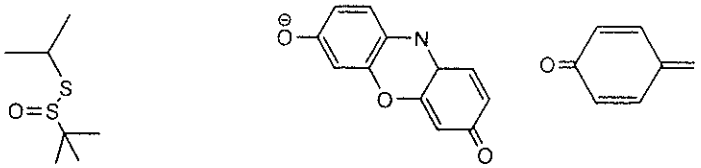
Q5. When 10 mL of each liquid of liquid pairs listed below are mixed and then allowed to stand, which pair is most likely to separate into two layers? **[TIFR 2014]**

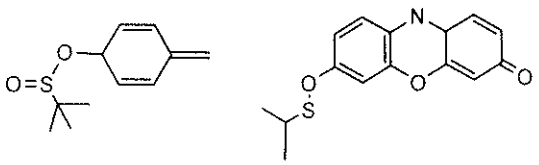
(a) carbon tetrachloride and hexane (b) ethanol and methanol

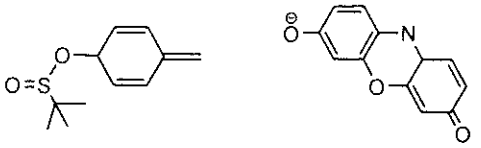
(c)carbon tetrachloride and methanol (d) hexane and pentane

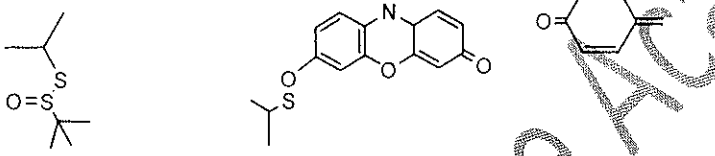
Q6. Thiols are important molecules species present in cells and can mediate cell signaling processes. A procedure for detercting thiols has been recently reported based on the following reaction. Predict the structures of reaction products. **[TIFR 2015]**



(a) 

(b) 

(c) 

(d) 

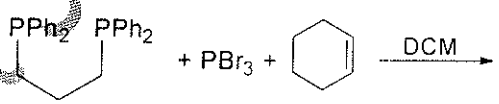
Q7. A catalyst: **[TIFR:2015]**

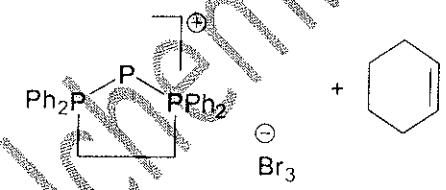
(a) Participates in the reaction (b) Does not effect a reaction energy path

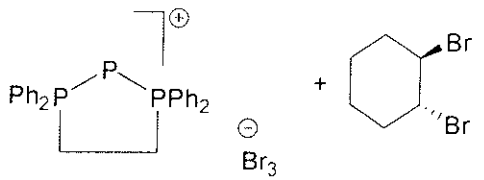
(c) Always decrease the rate for a reaction

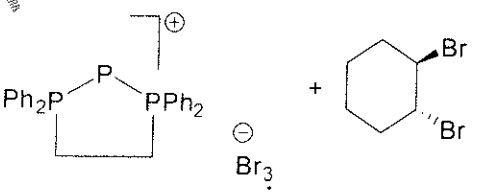
(d) Always increase the activation energy for a reaction

Q8. What is the product of the following reaction **[TIFR 2016]**



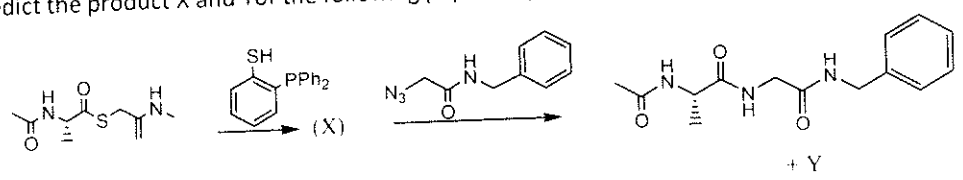
(a) 

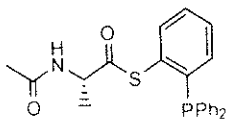
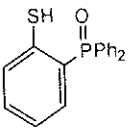
(b) 

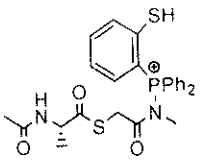
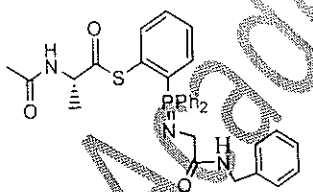
(c) 

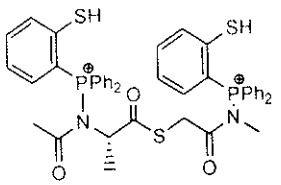
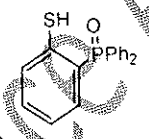
(d) None of these

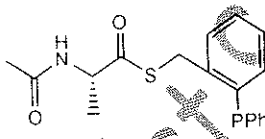
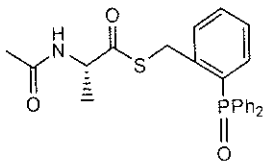
Q9. Predict the product X and Yof the following peptide ligation reaction **[TIFR 2016]**



(a) X =  Y = 

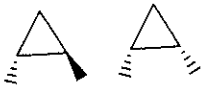
(b) X =  Y = 

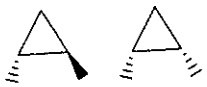
(c) X =  Y = 

(d) X =  Y = 

Q10. Predict the product of this following reactions between cis-2-butene and singlet and triplet methylencs. **[TIFR 2016]**

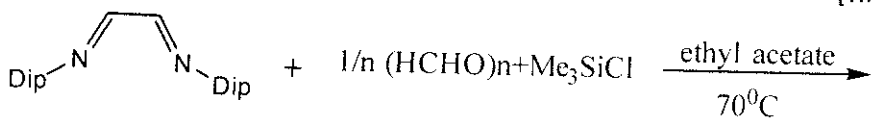
(a) singlet =  triplet = 

(b) singlet =  triplet = 

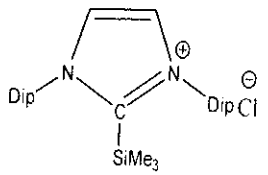
(c) singlet =  triplet = 

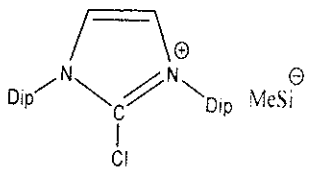
(d) singlet =  triplet = 

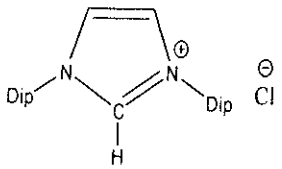
Q11. What is the product of the following reaction? **[TIFR 2016]**



Dip = 2, 6-diisopropylphenyl

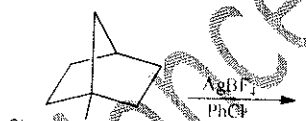
(a) 

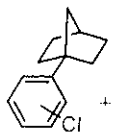
(b) 

(c) 

(d) none of the above

Q12. Predict the products of the following reaction **[TIFR 2016]**

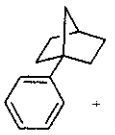


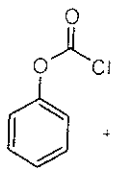
(a) 

+ CO_2

(b) 

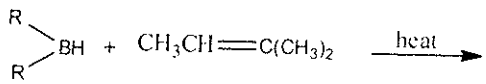
+ AgCl

(c) 
+ BF_3

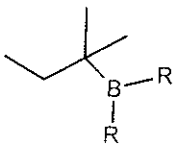
(d) 

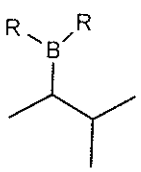
+ HF

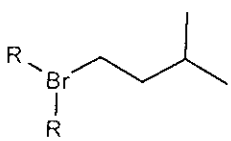
Q13. Predict the major product of the following hydroboration reaction **[TIFR 2017]**

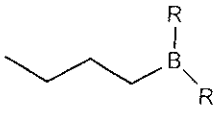


R = 

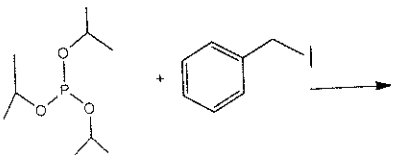
(a) 

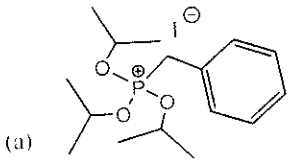
(b) 

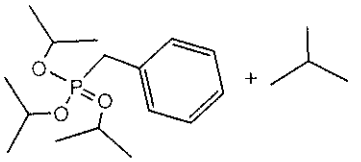
(c) 

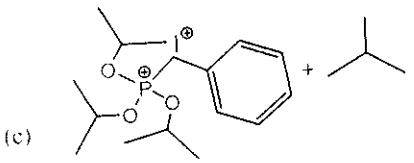
(d) 

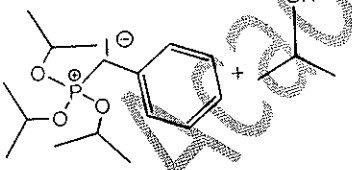
Q14. Phosphite esters undergo nucleophilic substitution with alkyl halides. Predict the final stable product of the following reaction **[TIFR 2018]**



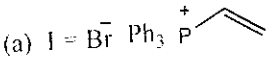
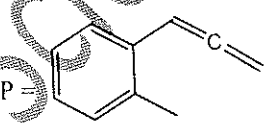
(a) 

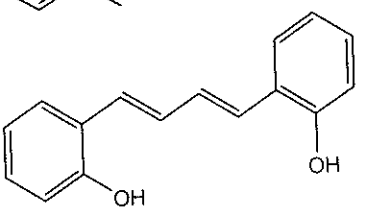
(b) 

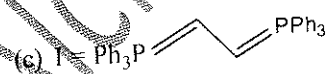
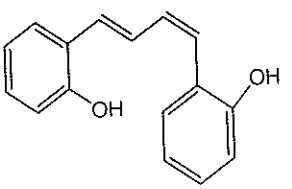
(c) 

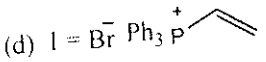
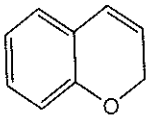
(d) 

Q15. 40. Identify the product A and B in the following reaction scheme **[TIFR 2018]**

(a) I =  P = 

(b) I =  P = 

(c) I =  P = 

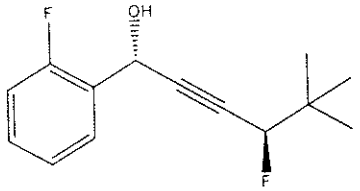
(d) I =  P = 

Answer Key

1. (a)	2. (b)	3. (a)	4. (d)	5. (c)	6. (c)	7. (a)
8. (b)	9. (a)	10. (a)	11. (c)	12. (a)	13. (c)	14. (b)
15. (b)						

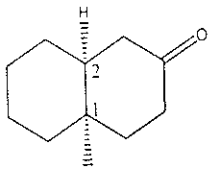
Stereochemistry

Q1. The absolute configurations of the chiral Centers



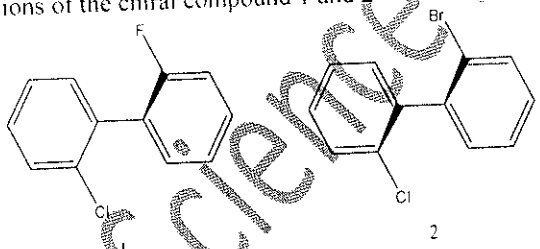
a) 1S, 4S b) 1S, 4R c) 1R, 4R d) 1S, 4S

Q2. The absolute configurations of the chiral Centers



a) 1S, 2R b) 1R, 2S c) 1R, 2R d) 1S, 2S

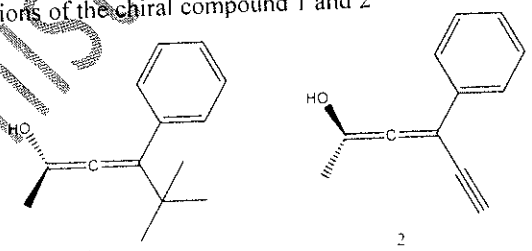
Q3. The absolute configurations of the chiral compound 1 and 2



1 2

a) 1S, 2R b) 1R, 2S c) 1R, 2R d) 1S, 2S

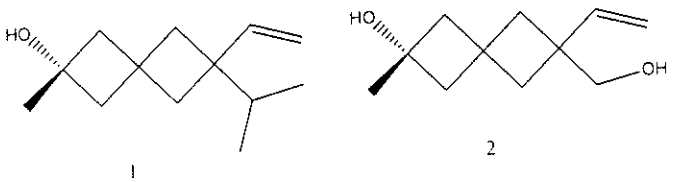
Q4. The absolute configurations of the chiral compound 1 and 2



1 2

a) 1S, 2R b) 1R, 2S c) 1R, 2R d) 1S, 2S

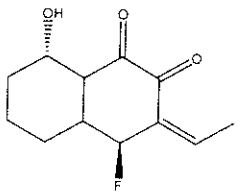
Q5. The absolute configurations of the chiral compound 1 and 2



1 2

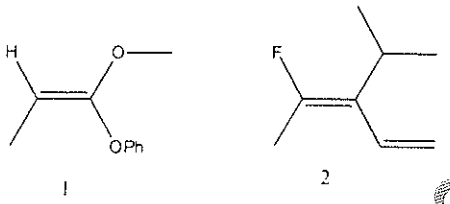
a) 1S, 2R b) 1R, 2S c) 1R, 2R d) 1S, 2S

Q6. The absolute configurations of the chiral centres in *4C* and *8C*



a) 4S, 8S and E b) 4S 8R and Z c) 4R 8R and E d) 4S 8S and Z

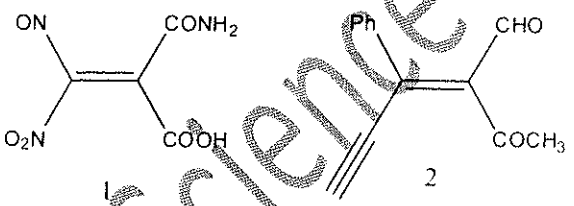
Q7. The absolute configurations of the compound 1 and 2



1 2

a) 1E, 2Z b) 1E, 2E c) 1Z, 2Z d) 1Z, 2E

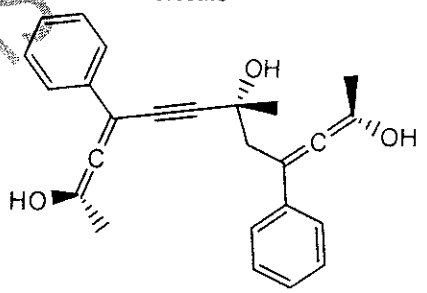
Q8. The absolute configurations of the compound 1 and 2



1 2

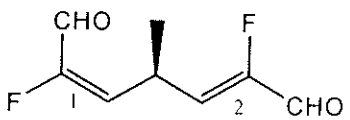
a) 1E, 2Z b) 1E, 2E c) 1Z, 2Z d) 1Z, 2E

Q9. Number of possible stereo isomer in this molecule



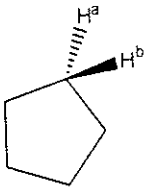
a) 2 b) 4 c) 8 d) 6

Q10. The absolute configurations of this compound



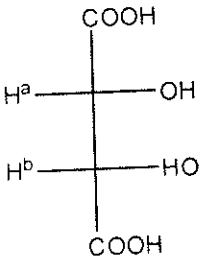
a) 1E, 2E and R b) 1E, 2Z and S c) 1E, 2Z and R d) 1Z, 2Z and S

Q11. What is relation between H^a and H^b in given compound?



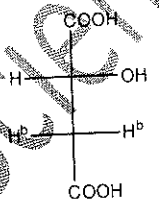
a) Homotopic b) Diastereotopic c) Enantiotopic d) Constitutional isomer

Q12. What is relation between H^a and H^b in given compound



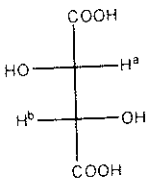
a) Homotopic b) Diastereotopic c) Enantiotopic d) Constitutional isomer

Q13. What is relation between H^a and H^b in given compound?



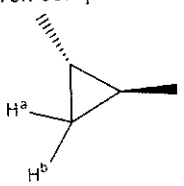
a) Homotopic b) Diastereotopic c) Enantiotopic d) Constitutional isomer

Q14. What is relation between H^a and H^b in given compound?



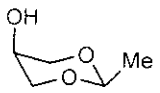
a) Homotopic b) Diastereotopic c) Enantiotopic d) Constitutional isomer

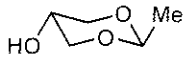
Q15. What is relation between H^a and H^b in given compound?

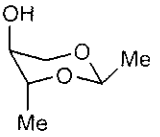


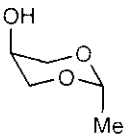
a) Homotopic b) Diastereotopic c) Enantiotopic d) Constitutional isomer

Q16. Most stable Conformation

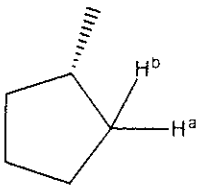
a) 

b) 

c) 

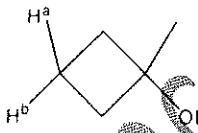
d) 

Q17. What is relation between H^a and H^b in given compound?



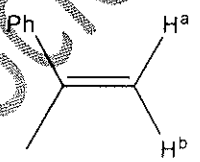
a) Homotopic b) Diastereotopic c) Enantiotopic d) Constitutional isomer

Q18. What is relation between H^a and H^b in given compound?



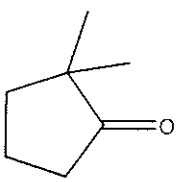
a) Homotopic b) Diastereotopic c) Enantiotopic d) Constitutional isomer

Q19. What is relation between H^a and H^b in given compound?

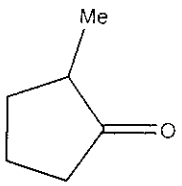


a) Homotopic b) Diastereotopic c) Enantiotopic d) Constitutional isomer

Q20. What is the face of carbonyl group is given compound?



I



II

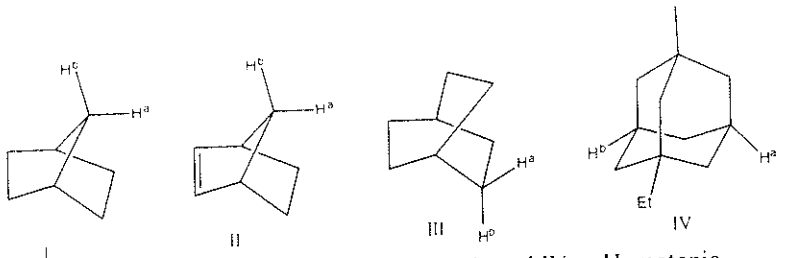
a) I = Distereotopic, II = Homotopic

b) I = Enantiotopic, II = Distereotopic

c) I = Homotopic, II = Distereotopic

d) I = Enantiotopic, II = Homotopic

Q21. What is relation between H^a and H^b in given compound?



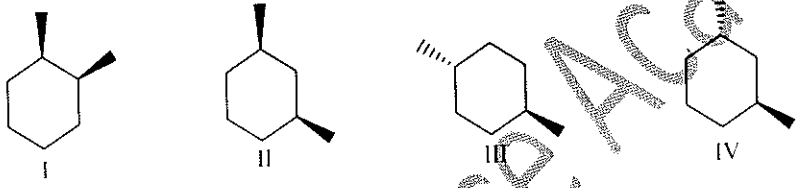
a) I = Distereotopic, II = Homotopic, III = Distereotopic and IV = Homotopic

b) I = Distereotopic, II = Homotopic, III = Enantiotopic and IV = Enantiotopic

c) I = Homotopic, II = Distereotopic, III = Enantiotopic and IV = Enantiotopic

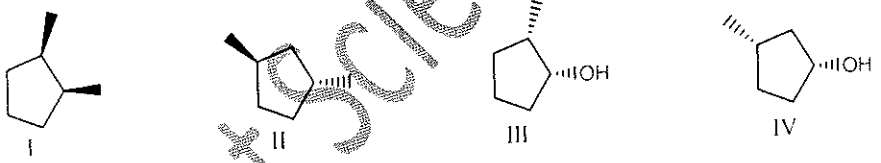
d) I = Homotopic, II = Homotopic, III = Distereotopic and IV = Distereotopic

Q22. Which molecule is chiral in given molecule?



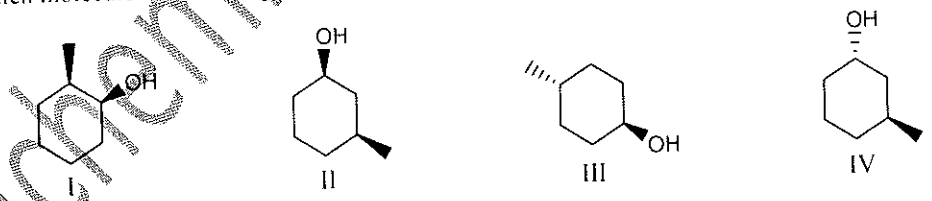
a) I, II, IV b) I, II , III c) II, IV d) I, IV

Q23. Which molecule is chiral in given molecule?



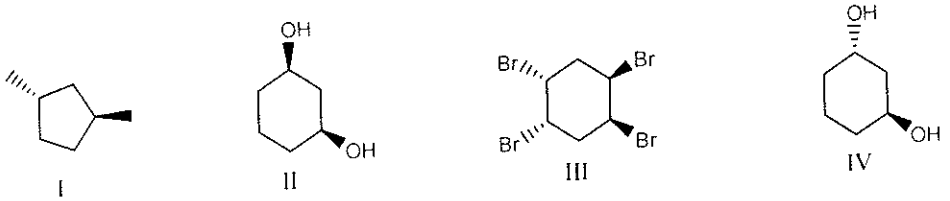
a) I, II, IV b) I, II , III c) II, III, IV d) I, IV

Q24. Which molecule is chiral in given molecule?



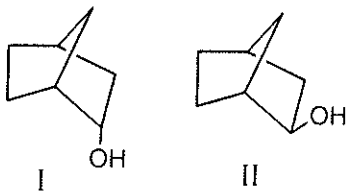
a) I, II, IV b) I, II, IV c) II, IV d) I, IV

Q25. Which molecule is meso in given molecule?



a) a II, III b) I, II , IV c) II, III, IV d) I, IV

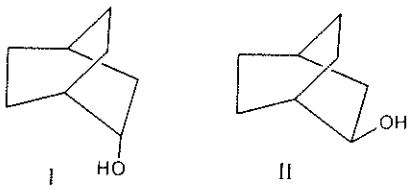
Q26. What is relation between I and II in given compound?



I II

a) Distereomers b) Homomers c) Enantiomers d) constitutional isomer

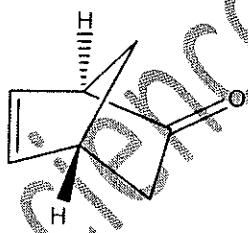
Q27. What is relation between I and II in given compound?



I II

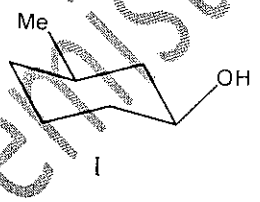
a) Distereomers b) Homomers c) Enantiomers d) Constitutional isomer

Q28. The absolute configurations of the chiral Centers

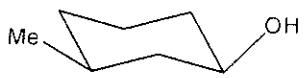


a) 1S, 4R b) 1R, 4S c) 1R, 4R d) 1S, 4S

Q29. What is relation between I and II in given compound?



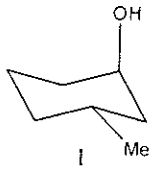
I



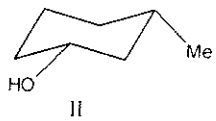
II

a) Distereomers b) Homomers c) Enantiomers d) Constitutional isomer

Q30. What is relation between I and II in given compound?



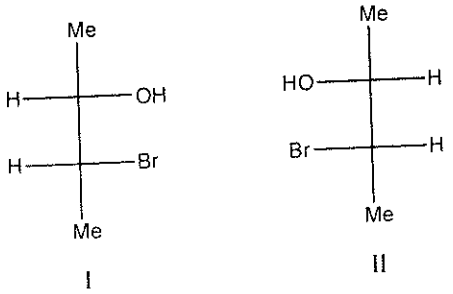
I



II

a) Distereomers b) Homomers c) Enantiomers d) Epimers

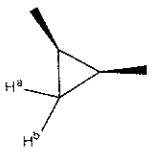
Q31. What is relation between I and II in given compound?



I II

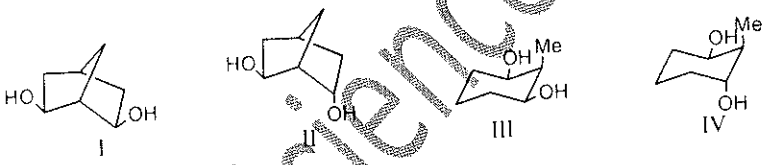
a) Erythro and Distereomers b) Threo and Distereomers
c) Erythro and Enantiomers d) Threo and Enantiomers

Q32. What is relation between H^a and H^b in given compound?



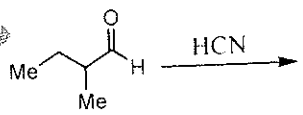
a) Homotopic b) Constitutional isomer c) Enantiotopic d) Diastereotopic

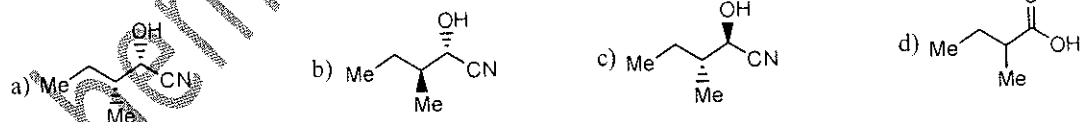
Q33. Which molecule is meso in given molecule?



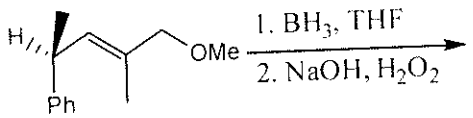
a) I, II, III b) I, IV c) I, III, d) III, IV

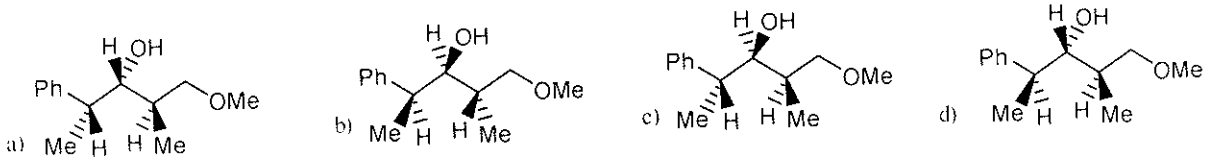
Q34. The major product formed in the reaction given below is



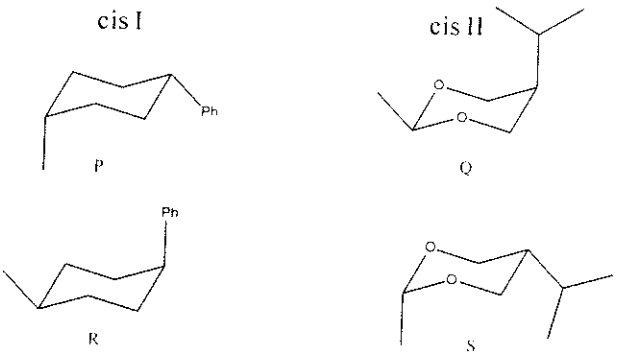


Q35. The major product formed in the reaction given below is



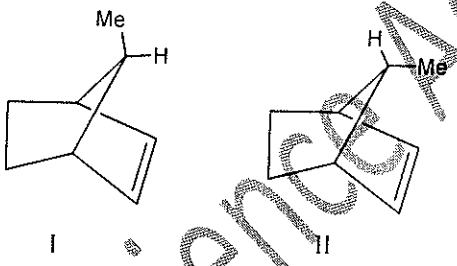


Q36. Which conformations is more stable in cis I cis II cyclohexane



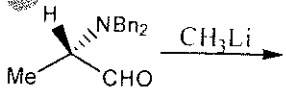
a) P and Q b) R and S c) P and S d) R and Q

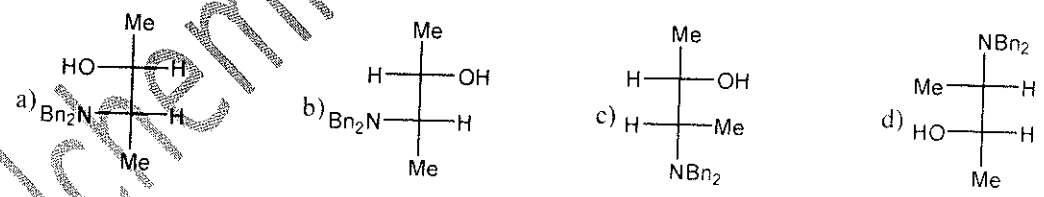
Q37. What is relation between I and II in given compound?



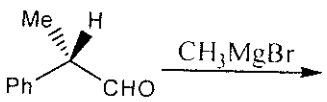
a) Distereomers b) Homomers c) Enantiomers d) Constitutional isomer

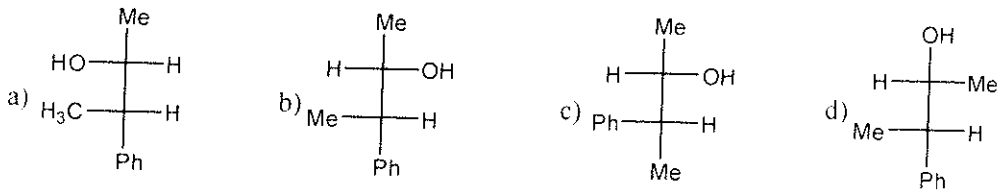
Q38. The major product formed in the reaction given below is





Q39. The major product formed in the reaction given below is





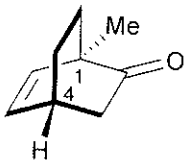
Answer Key

1. (c)	2. (b)	3. (c)	4. (a)	5. (a)	6. (a)	7. (d)
8. (d)	9. (c)	10. (c)	11. (a)	12. (c)	14. (a)	15. (a)
16. (a)	17. (b)	18. (b)	19. (b)	20. (b)	21. (c)	22. (d)
23. (c)	24. (b)	25. (a)	26. (a)	27. (c)	28. (c)	29. (c)
30. (a)	31. (c)	32. (d)	33. (c)	34. (a)	35. (a)	36. (a)
37. (a)	38. (a)	39. (b)				

Stereochemistry

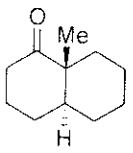
NET/JRF Previous Year's Question

Q1. The configuration at the two stereocentres in the compound given below are **[NET JUNE 2011]**

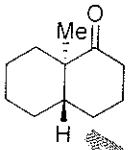


(a) 1R, 4R (b) 1R, 4S (c) 1S, 4R (d) 1S, 4S

Q2. The two compounds given below are **[NET JUNE 2011]**



and



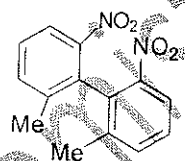
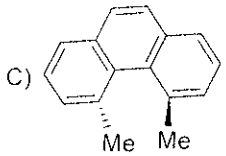
(a) Enantiomer (b) Identical (c) Diastereomers (d) Regioisomer

Q3. In the most stable conformation of trans-1-t-butyl-3-methylcyclohexane, the substituents at C-1 and C-3 respectively are **[NET JUNE 2011]**

(a) Axial and equatorial (b) Equatorial and equatorial

(c) Equatorial and axial (d) axial and axial

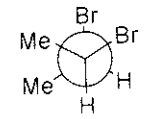
Q4. Match the following **[NET JUNE 2011]**

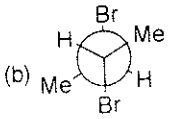
Column I	Column II
A) 	i) Chiral centre
B) 	ii) Chiral axis
C) 	iii) Chiral plane

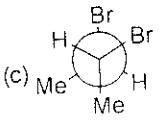
(a) (A) - iii (B) - ii (C) - I (b) (A) - I (B) - iii- (C)-ii

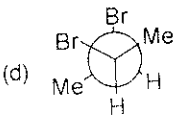
(c) (A)- ii (B)-I (C)- iii (d) (A)- ii (B)- iii (C)-i

Q5. The gauche interaction values for Me/Me, Me/Br and Br/Br are 3.3, 0.8 and 3.0kJ/mole, respectively. Among the following, the most stable conformation of 2,3-dibromobutane is: **[NET JUNE 2011]**

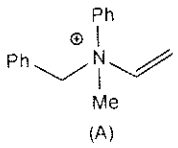
(a) 

(b) 

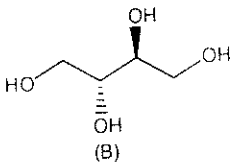
(c) 

(d) 

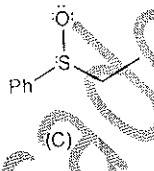
Q6. Among A-C, the following compounds which can exhibit optical activity are **[NET DEC 2011]**



(A)



(B)



(C)

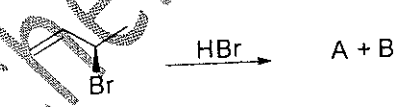
(a) A, B and C b) A and B only c) A and C only d) B and C only

Q7. The IUPAC name of the following compound is **[NET DEC 2011]**

(a) (R)-3-(prop-2-enyl)hex-5-ynoic acid (b) (S)-3-(prop-2-enyl)hex-5-ynoic acid

(c) (R)-3-(prop-2-enyl)hex-5-enoic acid (d) (S)-3-(prop-2-ynyl)hex-5-enoic acid

Q8. In the following Markownikov addition reaction, the products A and B are **[NET DEC 2011]**

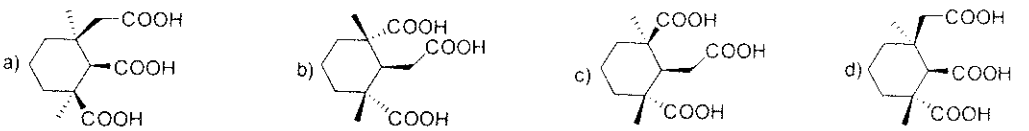


(a) homomers (b) enantiomers (c) diastereomers (d) regioisomer

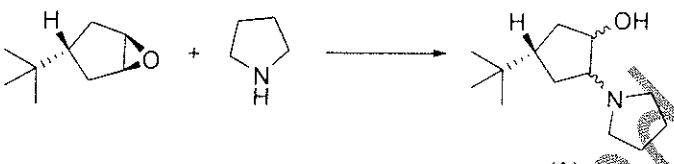
Q9. An optically active compound enriched with R-enantiomer (60% ee) exhibited $[\alpha]_D + 90°$. If the $[\alpha]_D$ value of the sample is -135°, the ratio of R and S enantiomers would be **[NET DEC 2011]**

(a) R:S = 1:19 (b) R:S = 19:1 (c) R:S = 1:9 d) R:S = 9:1

Q10. The structure of meso-tricarboxylic acid that is formed on potassium permanganate oxidation of the abietic acid is **[NET JUNE 2012]**



Q11. Among the choices, the correct statements for A formed in the following reaction **[NET JUNE 2012]**

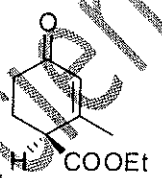


(A)

(a) A is a single enantiomer (b) A is racemic mixture

(c) A is a mixture of the two diastereomer (d) A is a mixture of two epimers

Q12. The IUPAC name of the compound given below **[NET JUNE 2012]**



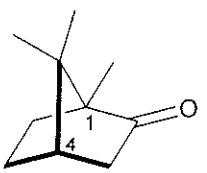
(a) ethyl(R)-2-methyl-4-oxocyclohex-2-enecarboxylate

(b) ethyl(S)-2-methyl-4-oxocyclohex-2-enecarboxylate

(c) (R)-4-ethoxycarbonyl-3-methylcyclo-hex-2-enone

(d) (S)-4-ethoxycarbonyl-3-methylcyclo-hex-2-enone

Q13. The absolute configuration at the two chiral centres of (-)- camphor is: **[NET DEC 2012]**

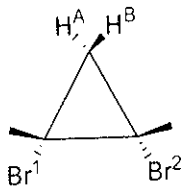


(a) 1R, 4R (b) 1R, 4S (c) 1S, 4R (d) 1S, 4S

Q14. The first person to separate a racemic mixture into individual enantiomers is **[NET DEC 2012]**

(a) J, H van't Hoff (b) Pasteur (c) H.E. Fischer (d) F. Wohler

Q15. In the compound given below, the realation between H^A, H^B and between Br^1 and Br^2 is **[NET DEC 2012]**



(a) H^A, H^B are enantiotopic; and Br^1 and Br^2 are diastereotopic

(b) H^A, H^B are diastereotopic; and Br^1 and Br^2 are enantiotopic

(c) H^A, H^B are diastereotopic; and Br^1 and Br^2 are homotopic

(d) H^A, H^B are enantiotopic; and Br^1 and Br^2 are homotopic

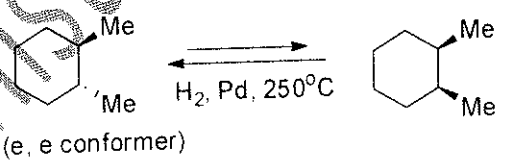
Q16. The $[\alpha]_D$ of a 90% optically pure 2-arylpropanoic acid solution is +135°. On treatment with a base at RT for one hour, $[\alpha]_D$changed to +120°. The optical purity is reduced to 40% after 3 hours. If so, the optical purity of the solution after 1 hour, and its $[\alpha]_D$ after 3 hours, respectively would be **[NET DEC 2016]**

(a) 80% and 60° (b) 70% and 40° (c) 80% and 90° (d) 70% and 60°

Q17. 12.0g of acetophenone on reaction with 76.2g of iodine in the presence of aq. NaOH gave solid A in 75% yield. Approximate amount of A obtained in the reaction and its structure are **[NET DEC 2012]**

(a) 80g, CI_4 (b) 40g, CI_4 (c) 60g, CHI_3 (d) 30g, CHI_3

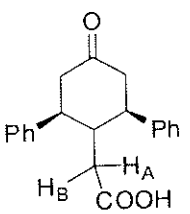
Q18. Given the energy of each gauche butane interaction is 0.9kcal/mol, ΔG value of the reaction is **[NET DEC 2012]**



(e, e conformer)

(a) 0.9 kcal/mol (b) 1.8 kcal/mol (c) 2.7 kcal/mol (d) 3.6 kcal/mol

Q19. In the compound given below, the hydrogens marked A and B are **[NET JUNE 2013]**



(a) Homotopic (b) Isotopic (c) Enantiotopic (d) Diastereotopic

Q20. The gauche conformation (φ = 60°) of n-butane possess **[NET JUNE 2013]**

(a) plane of symmetry; and is achiral

(b) C2-axis of symmetry; and is chiral

(c) Centre of symmetry; and is achiral

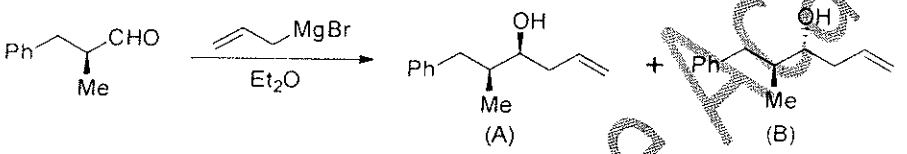
(d) plane of symmetry; and is chiral

Q21. Identify the chiral complex from the following **[NET JUNE 2013]**

A) $[Cr(EDTA)]^{-}$ **B)** $[Ru(bipy)_3]^{3+}$ **C)** $[PtCl(diene)]^{+}$

(a) A only (b) A and B only (c) A and C only (d) B and C only

Q22. Which one of the following statements is true for the following transformation? **[NET JUNE 2013]**



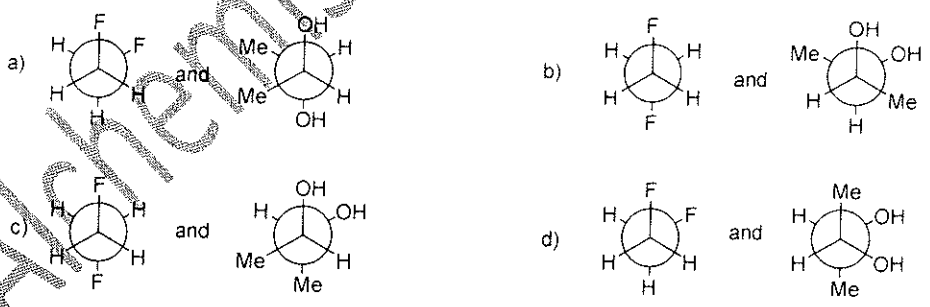
(a) A is the major product and it is a cram product

(b) A is the major product and it is a anti- cram product

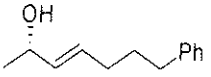
(c) B is the major product and it is a cram product

(d) B is the major product and it is a anti-cram product

Q23. The most stable conformations of 1, 2-difluoroethane and dl-2, 3-butanediol are **[NET JUNE 2013]**



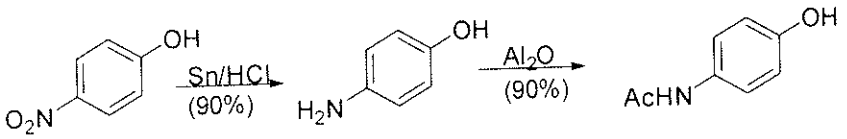
Q24. The IUPAC name for the compound given below is **[NET JUNE 2013]**



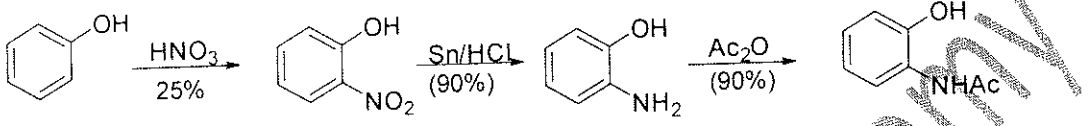
(a) (2R, 3Z)-7-Phenylhept-3-en-2-ol b) (2S, 3Z)-7-Phenylhept-3-en-2-ol

(c) (2R, 3E)-7-Phenylhept-3-en-2-ol d) (2S, 3E)-7-Phenylhept-3-en-2-ol

Q25. Consider the following reaction sequence



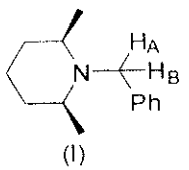
70%



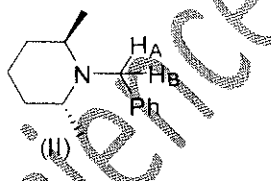
The overall yield for the formation of p-hydroxyacetanilide and o-hydroxyacetanilides from phenol, respectively are approximately **[NET JUNE 2013]**

(a) 57 and 20% (b) 57 and 68% (c) 83 and 68% (d) 83 and 20%

Q26. The two benzylichydrogens H_A and H_B in the compounds I and II are **[NET DEC 2013]**



(I)

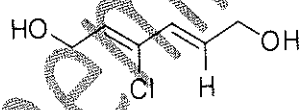


(II)

(a) diastereotopic in I and enantiotopic in II (b) diastereotopic in II and enantiotopic in I

(c) diastereotopic in both I and II (d) enantiotopic in both I and II

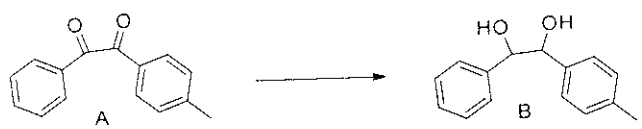
Q27. The IUPAC name of the compound given below is **[NET DEC 2013]**

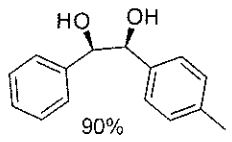
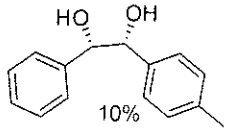


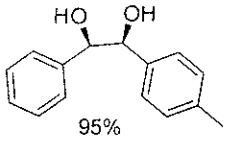
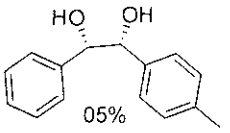
(a) (2E, 4E)-3-chlorohexa-2, 4-diene-1, 6-diol (b) (2Z, 4E)-3-chlorohexa-2, 4-diene-1, 6-diol

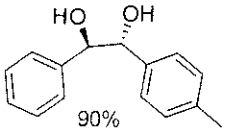
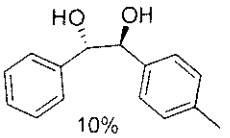
(c) (2Z, 4Z)-4-chlorohexa-2, 4-diene-1, 6-diol(d) (2E, 4Z)-3-chlorohexa-2, 4-diene-1, 6-diol

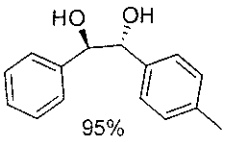
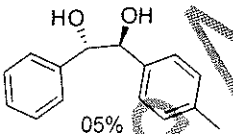
Q28. Stereoselective reduction of the dione A with a chiral reducing agent provides the correspondingdiol B in 100% diastereoselectivity and 90% ee favoring R, R configuration. The composition of the product is **[NET DEC 2013]**



a)  and 

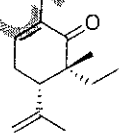
b)  and 

c)  and 

d)  and 

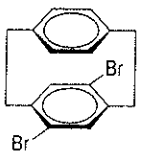
Q29. The absolute configuration of the two stereogenic (chiral) centres in the following molecule is

[NET JUNE 2014]



(a) 5R, 6R (b) 5R, 6S (c) 5S, 6R (d) 5S, 6S

Q30. The correct statement about the following molecule is **[NET JUNE 2014]**



(a) Molecule is chiral and possess chiral plane

(b) Molecule is chiral and possess chiral axis

(c) Molecule is achiral as it possess a plane of symmetry

(d) Molecule is achiral as it possess centre of symmetry

Q31. Consider the following statements about cis- and trans- decalins **[NET JUNE 2014]**

(A) cis-isomer is more stable than trans-isomer

(B) trans-isomer is more stable than cis-isomer

(C) trans-isomer undergoes ring-flip

(D) cis-isomer undergoes ring-flip

The correct statements among the above are

(a) B and D (b) A and C (c) A and D (d) B and C

Q32. An aqueous solution of an optically pure compound of concentration 100mg in 1ml of water and measured in a quartz tube of 5cm length was found to be -3°. The specific rotation is **[NET JUNE 2014]**

(a) -30° (b) -60° (c) -6° (d) +6°

Q33. The configuration of carbon atoms C3 and C4 in D-ribose, respectively are **[NET JUNE 2014]**

(a) R and S (b) S andR (c) R and R (d) S and S

Q34. In the most stable configuration of neomenthol, stereochemical orientation of the three substituents on the cyclohexane ring are **[NET DEC 2014]**

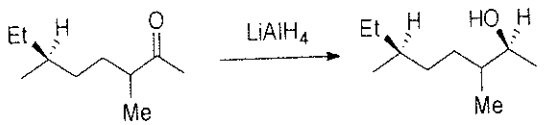
(a) OH: equatorial; *i*-Pr: equatorial and Me: equatorial

(b) OH: axial; *i*-Pr: equatorial and Me: equatorial

(c) OH: equatorial; *i*-Pr: equatorial and Me: axial

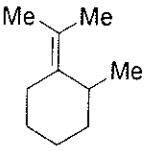
(d) OH: equatorial; *i*-Pr: axial and Me: equatorial

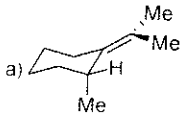
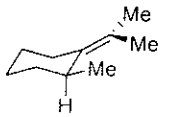
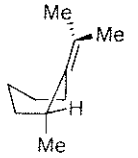
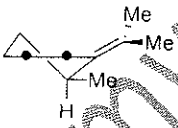
Q35. The absolute configurations of the chiral centres of the starting ketone in the following reaction is **[NET DEC 2014]**



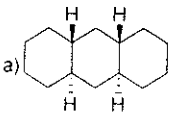
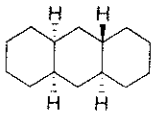
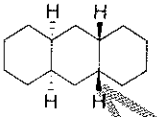
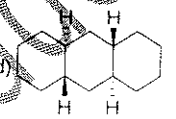
(a) 3R, 6S (b) 3S, 6S (c) 3R, 6R (d) 3S, 6R

Q36. The most stable conformation for the following compound is **[NET DEC 2015]**

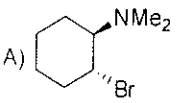
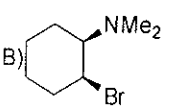
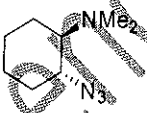
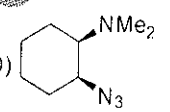


a)  b)  c)  d) 

Q37. The hydrocarbon among the following having conformationally locked chair-boat-chair form is

a)  b)  c)  d) 

Q38. Optically pure isomers A and B were heated with NaN3 in DMF. The correct statement from the following is **[NET JUNE 2015]**

A)  B)  C)  D) 

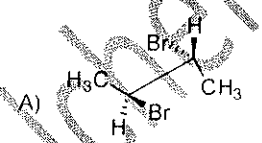
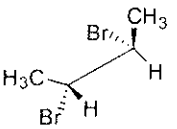
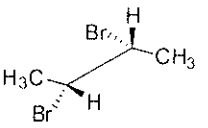
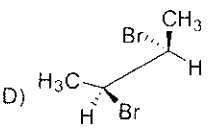
(a) A gives optically pure D and B gives optically pure C

(b) A gives racemic mixture of C and B gives optically pure C

(c) A gives optically pure C and B gives racemic C

(d) A gives optically pure D and B gives racemic D

Q39. Identify two enantiomers among the following compounds **[NET DEC 2015]**

A)  B)  C)  D) 

(a) A and B (b) A and C (c) B and D (d) C and D

Q40. Among the following complexes **[NET DEC 2015]**

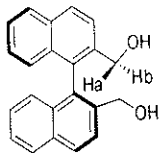
(A) $[Co(ox)_3]^{3-}$

(B) trans- $[CoCl_2(en)_2]^+$

(C) [Cr(EDTA)]⁻ the chiral one(S) is/are

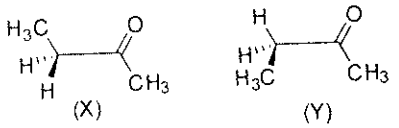
(a) A and B (b) Cand B (c) C only (d) A and C

Q41. In the following compound, the stereochemical descriptor for H_a and H_b is **[NET JUNE 2016]**



(a) Enantiotopic (b) diastereotopic (c) homotopic (d) constitutionally heterotopic

Q42. The correct statements about the conformations X and Y of 2-butanone are **[NET JUNE 2016]**



(A) X is more stable than Y (B) Y is more stable than X

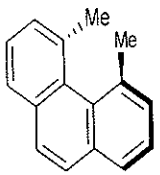
(C) Methyl groups in X are anti (D) Methyl groups in Y are gauche

(a) A and D (b) A and C (c) B and C (d) A,C and D

Q43. The correct order of magnitude of 'A values' for the given substituents in cyclohexane derivatives is **[NET JUNE 2016]**

(a) Ph> CN > Me (b) Me>Ph> CN (c) CN > Me >Ph (d) Ph> Me > CN

Q44. The correct statements about the following compound is **[NET DEC 2016]**



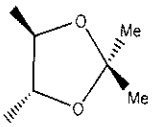
(a) compound is chiral and has P configuration

(b) compound is chiral and has M configuration

(c) compound is achiral as it possess C_2-axis of symmetry

(d) compound is achiral as it possess plane of symmetry

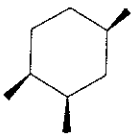
Q45. Methyl group in the following compound are **[NET Dec. 2016]**

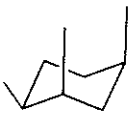
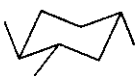


(a) homotopic (b) diastereotopic

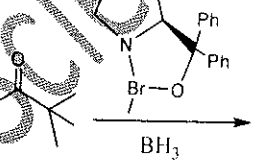
(c) enantitopic (d) constitutionally heterotopic

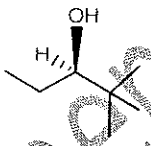
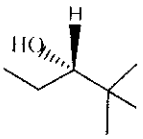
Q46. Among the structures given, below the most stable conformation for the following compounds is **[NET Dec. 2016]**

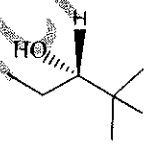
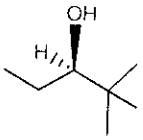


(a)  (b)  (c)  (d) 

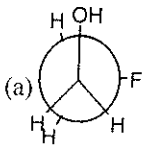
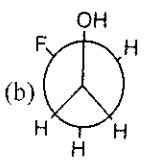
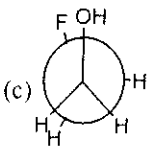
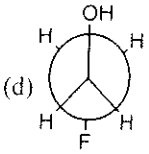
Q47. The major product in the following reaction is **[NET Dec. 2016]**



(a)  , by Re face attack (b)  , by Re face attack

(c)  , by Si face attack (d)  , by Si face attack

Q48. The most stable conformation of $2-$ fluoroethanol is **[NET June 2017]**

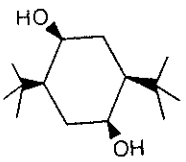
(a)  (b)  (c)  (d) 

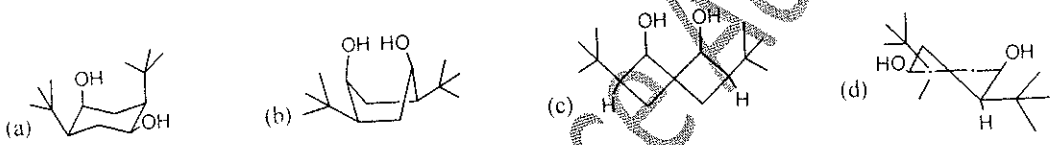
Q49. The specific rotation $[\alpha]_D$ for $(S)-(+)-2-$ butanol is $10^{\circ}\,mL/g\,dm$ The observed optical rotation (α_{obs}) of a sample composed of a mixture of $(R)-$ and $(S)-2-$ butanolis -0.45^{0}. If if the cell path length is $0.6\,dm$ and the concentration of 2 - butanol in the sample is $0.15\,g/mL$, the percentage of (R) and (S) enantiomers in the sample are **[NET June 2017]**

(a) $(R)=25\%,\ (S)=75\%$ (b) $(R)=40\%,\ (S)=60\%$

(c) $(R)=60\%,\ (S)=40\%$ (d) $(R)=75\%,\ (S)=25\%$

Q50. The most stable conformation for the following compound is **[NET June 2017]**





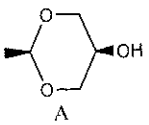
[NET Dec. 2017]

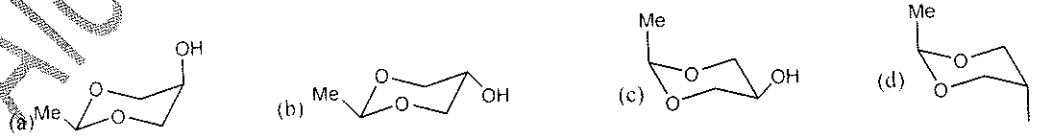
Q51. The following molecule has

(a) plane of symmetry (b) R configuration

(c) S configuration (d) centre of symmetry

Q52. Among the structures given below, the one that corresponds to the most stable conformation of compound A is **[NET Dec. 2017]**





[NET Dec. 2017]

Q53. The number of optically active stereoisomers possible for

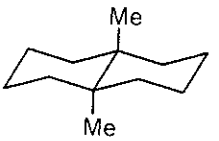
$CH_3-CH(OH)-CH(OH)-CH(OH)-CH_3$ is

(a) two (b) four (c) six (d) eight

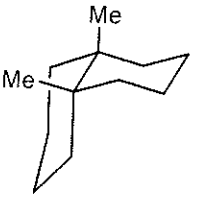
Q54. An optically pure organic compound has specific rotation of $+40^{0}$. The optical purity of the sample that exhibits specific of $+32$ is **[NET Dec. 2017]**

(a) 8% (b) 12 % (c)20 % (d) 80 %

Q55. The correct statements about following compounds is **[NET June 2018]**



(A)



(B)

(a) A is more stable than B (b) B is more stable than A

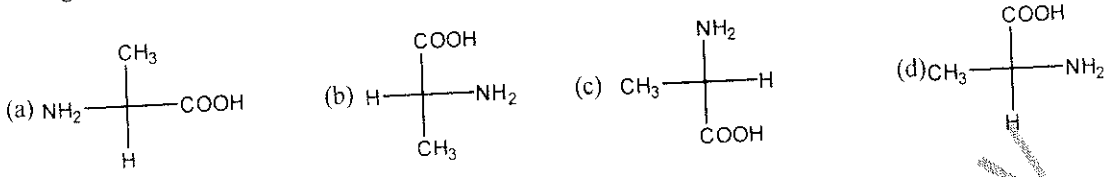
(c) A and B are equally stable (d) A and B are both locked conformations

Answer Key

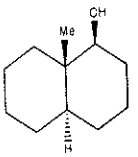
1. (a)	2. (b)	3. (c)	4. (d)	5. (b)	6. (c)	7. (d)
8. (c)	9. (a)	10. (b)	11. (b)	12. (b)	13. (d)	14. (b)
15. (b)	16. (a)	17. (d)	18. (b)	19. (c)	20. (b)	21. (b)
22. (a)	23. (d)	24. (d)	25. (a)	26. (b)	27. (b)	28. (d)
29. (c)	30. (a)	31. (a)	32. (b)	33. (c)	34. (b)	35. (a)
36. (a)	37. (d)	38. (b)	39. (d)	40. (d)	41. (b)	42. (d)
43. (d)	44. (a)	45. (a)	46. (c)	47. (d)	48. (b)	49. (d)
50. (c)	51. (b)	52. (a)	53. (a)	54. (d)	55. (b)	

GATE Previous Year's Question

Q1. Among the following amino acids, the (R)-enantiomor is represented by **[GATE 2001]**

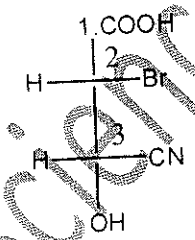


Q2. The configurations at three chiral centers in the bicyclodecanol given below, are **[GATE 2002]**



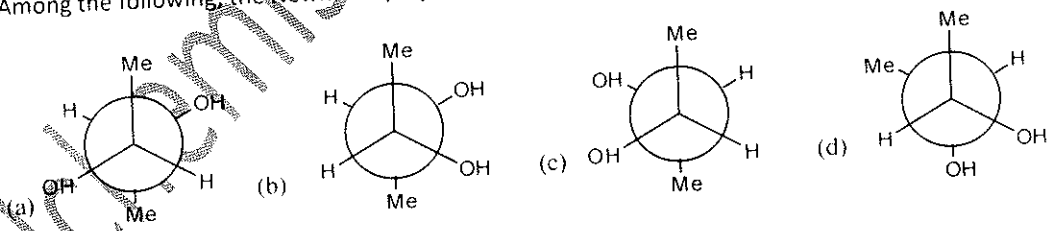
(a) $1,S\ 2S, 6R$ (b) $1S, 2S, 6S$ (c) $1R, 2S, 6R$ (d) $1R, 2S, 6R$

Q3. The absolute configurations of the two chiral centers in the following molecule are **[GATE 2003]**

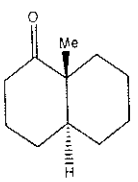


(a) $2(R), 3(S)$ (b) $2(R), 3(R)$ (c) $2(S), 3(S)$ (d) $2(S), 3(R)$

Q4. Among the following, the Newmann projections of meso- 2, 3 butanediol are **[GATE 2003]**

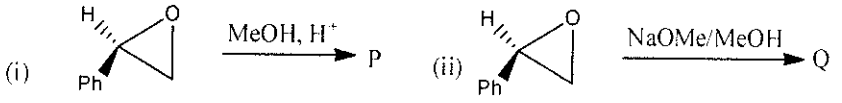


Q5. The configurations at the two asymmetric centers ($C-1$ and $C-6$) in the bicycle $[4.4.0]$ decane, given below **[GATE 2004]**



(a) $1R, 6R$ (b) $1R, 6S$ (c) $1S, 6S$ (d) $1S, 6R$

Q6. For the reactions shown below, identify the correct statements with regard to the products formed. **[GATE 2004]**



(S)-stryreneoxide (S)-styreneoxide

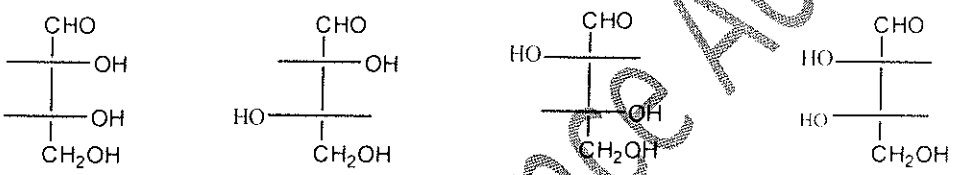
(a) P and Q are identical, both are optically active.

(b) P and Q are positional isomer, P is recemic and Q is optically active.

(c) P and Q are positional isomers, P is optically active and Q is racemic.

(d) P and Q are positional isomers, both are optically active.

Q7. For the aldotetroses I-IV, the combination of TRUE statements, among P-T, is. **[GATE 2004]**



P = I and II are diastereomers and II and III are enantiomers.

Q = I and IV are mesomers and are optically inactive.

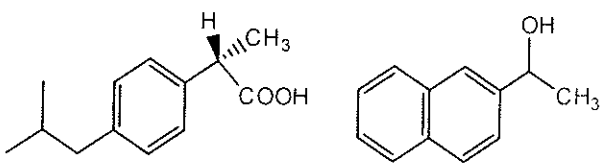
R = I and III can be interconverted by a base catalysedisomerisation.

S = only I and IV are HIO_4 cleavable.

T = I and III are D-sugars and II and IV are L -sugars.

(a) Q, R, T (b) P, R, T (c) Q, S, T (d) P, Q, S

Q8. Esterifications of the acid P with the alcohols Q will give **[GATE 2004]**



(S)-P (±)-Q

(a) Only one enantiomer (b) A mixture of diastereomers

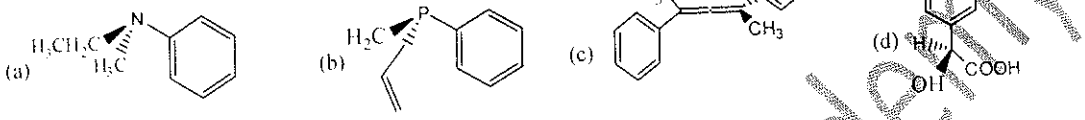
(c)A mixture of enantiomers (d) Only one diastereomers

Q9. Bridge-head hydrogen of the conformer of cis-decalin is positioned as **[GATE 2004]**

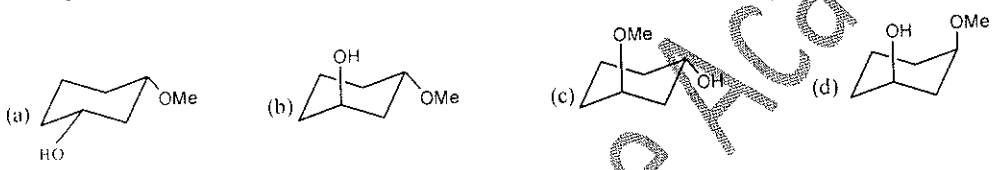
(a) a, a (b) e, e (c) a, e (d) $pseudo - a, pseudo - e$

$[a = axial \ : e = equatorial]$

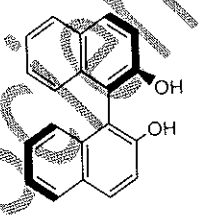
Q10. Among the following, the optically inactive compound is **[GATE 2015]**



Q11. Among the following, the most stable isomer for 3-methoxycyclohexanol is **[GATE 2005]**



Q12. The binaphthol (Bnp) is **[GATE 2005]**



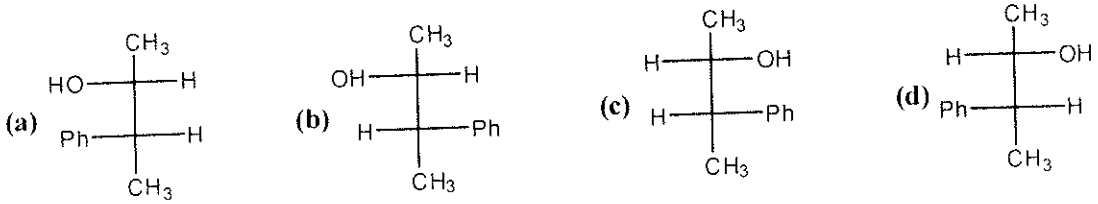
(a) An optically active compound with (R)-configuration.

(b) An optically inactive compound

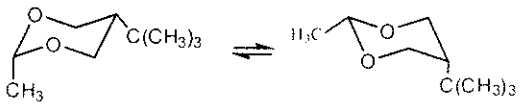
(c)A meso compound

(d) An optically active compound with (S)-configuration.

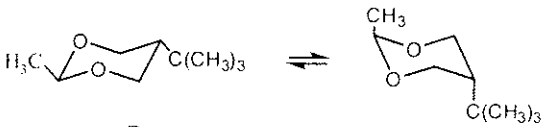
Q13. The major stereoisomer obtained in the reaction of $(S)-2-$ phenylpropanal with MeMgBr is **[GATE 2005]**



Q14. Cis-and trans-2- methyl-5-butyl-1,3-dioxane each can exit as two conformers as shown below



cis-P **cis-Q**

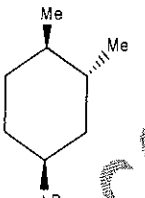


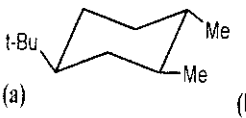
trans-R **trans-S**

The preferred conformation for cis-and trans-compound will be **[GATE 2005]**

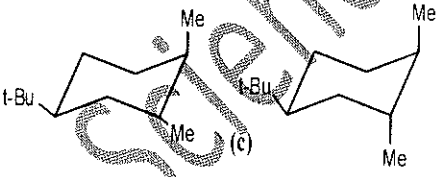
(a) P,R (b) Q,S (c) P,S (d) Q,R

Q15. The most stable conformation of the following compound **[GATE 2016]**

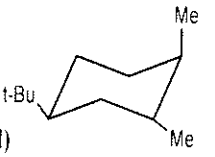




(a)

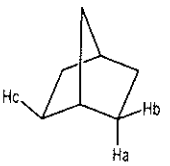


(b) (c)



(d)

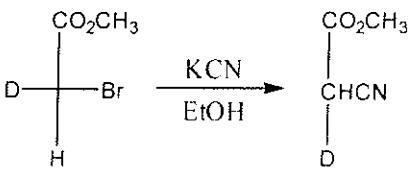
Q16. Identify the correct stereochemicalrelationship amongst the hydrogen atoms H_a, H_b and H_c in the following molecule: **[GATE 2016]**



(a) H_a and H_b : enantiotopic (b) H_a and H_b : diastereotopic

(c) H_a and H_c : enantiotopic (d) H_b and H_c : diastereotopic

Q17. The configuration of the reactant and the product in the following reaction, respectively, are **[GATE 2016]**



(a) R,R (b) R,S (c)S,R (d) S,S

Q18. The result of the reduction of either (R) or (S) 2-methyclohexanone, in separate reactions, using $LiAlH_4$ is that the reduction of **[GATE 2007]**

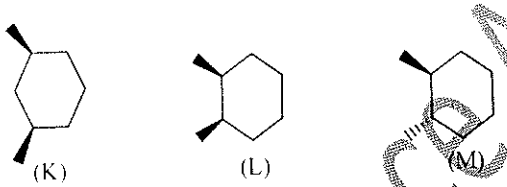
(a) The R enantiomer is stereoselective

(b) The R enantiomer is stereospecific.

(c)The S enantiomer is stereospecific

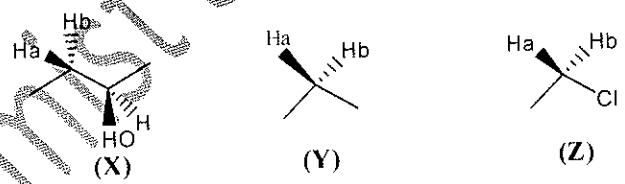
(d) Both the R and S enantiomers is stereoselective.

Q19. The molecules(s) that exist as meso structure(s). Is/are **[GATE 2007]**



(a) Only M (b) Both K and L (c) Only L (d) Only K

Q20. Stereochemicaldescriptore for the atoms labeled H_a and H_b in the structure. **[GATE 2007]**



Respectively are:

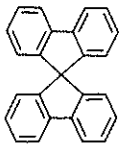
(a) X- homotopic, Y- enantiotopic and Z- diastereotopic

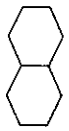
(b) X- enantiotopic, Y- homotopic and Z- diastereotopic

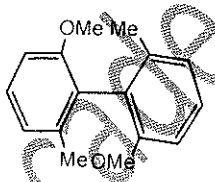
(c) X-diastereotopic, Y- homotopic and Z- enantiotopic

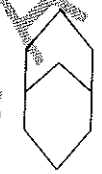
(d) X- homotopic, Y- diastereotopic and Z- enantiotopic

Q21. Match the entries a-d with their corresponding structure P-S **[GATE 2008]**

(A) bridged system (P) 

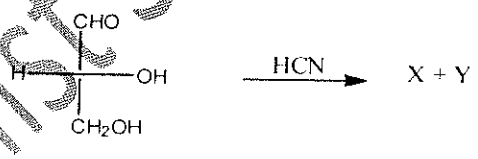
(B) atropisometric system (Q) 

(C) spiro system (R) 

(D) Fused system (S) 

(a) A-S, B-R, C-Q, D-P (b) A-P, B-S, C-Q, D-R
(c) A-Q, B-P, C-S, D-R (d) A-S, B-R, C-P, D-Q

Q22. In the following reaction, **[GATE 2008]**

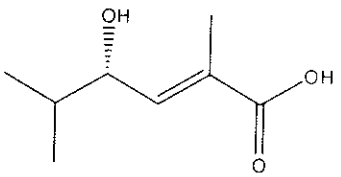


The absolute configurations of the chiral centresin X and Y are

(a) $2S, 3R$ and $2R, 3R$ (b) $2R, 3R$ and $2R, 3S$

(c) $2S, 3S$ and $2R, 3R$ (d) $2S, 3R$ and $2S, 3R$

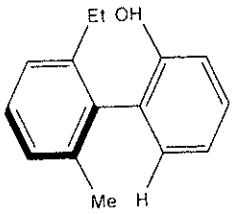
Q23. For the compound **[GATE 2009]**

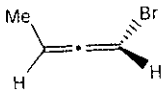


The stereochemical notations are

(a) $2Z, 4R$ (b) $2Z, 4S$ (c) $2E, 4R$ (d) $2E, 4S$

Q24. The absolute configurations for compound X and Y, respectively are **[GATE 2010]**





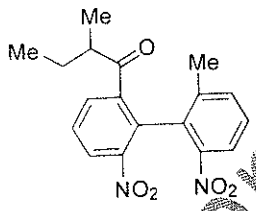
(a) R,S (b) S,R (c)R,R (d) S,S

Q25. Among the following, a pair of resolvable configurational enantiomers is given by **[GATE 2010]**

(a) cis-1, 2-dimethylcyclohexane (b) cis-1,3-dimethycyclohexane

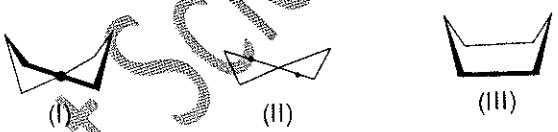
(c) cis-1, 4-dimethycyclohexane (d) trans -1, 3-dimethylcclohexane

Q26. The maximum number of stereosisomers possible for the compound given below is _____



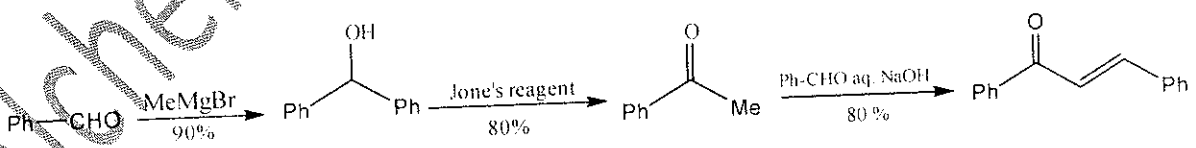
[GATE 2013]

Q27. The correct order stability for the following conformation of cyclohexane is **[GATE 2014]**

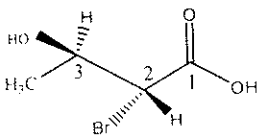


(a) I > II > III (b) I > III > II (c) II > I > III (d) III > I > II

Q28. The overall yield (in %) for the following reactions sequence is _____ **[GATE 2014]**

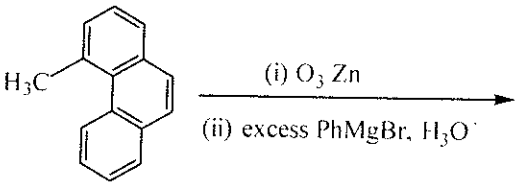


Q29. The absolute configuration of C 2 and C 3 in the following compound is **[GATE 2015]**

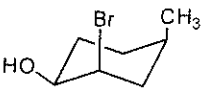


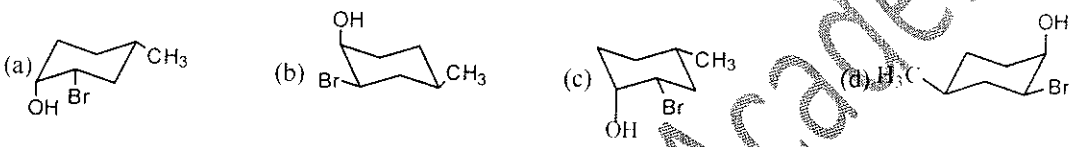
(a) $2R, 3S$ (b) $2S, 3R$ (c) $2S, 3S$ (d) $2R, 3R$

Q30. The number of possible stereoisomers obtained in the following reaction is ——— **[GATE 2015]**

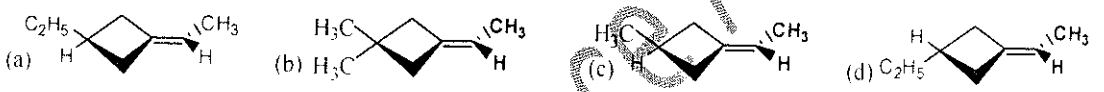


Q31. Ring flipping of the compound in the following conformations leads to **[GATE 2016]**

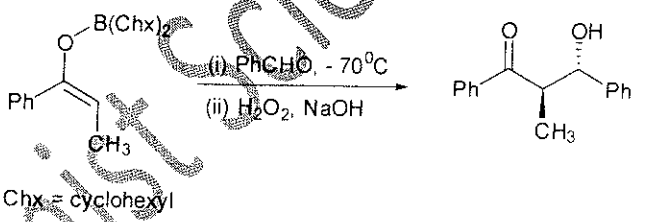


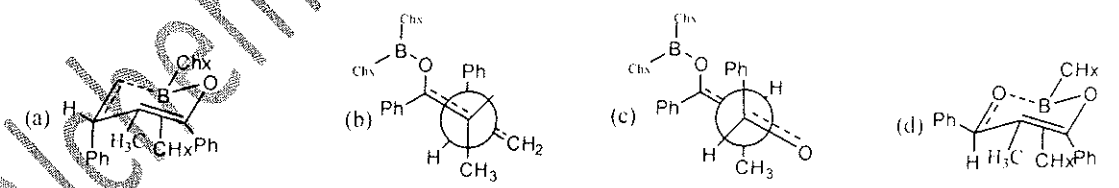


Q32. The compound in 'R' configurations is **[GATE 2016]**

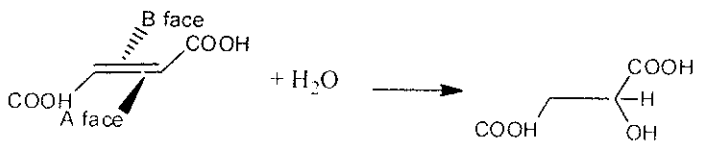


Q33. The Favourable transition state leading to the formation of the product in the following reactions, is **[GATE 2016]**





Q34. Hydration of fumaric acid gives malic acid as shown below. Assume that addition of water takes place specifically from A face or B face. The correct statements pertaining to stereochemistry of malic acid formed is **[GATE 2017]**



(a) additions specifically from A face gives S isomer of malic acid

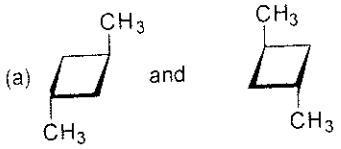
(b) addition specifically from B face gives S isomer of malic acid

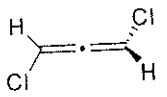
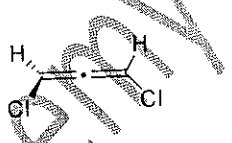
(c)additions specifically from A face gives R isomer of malic acid

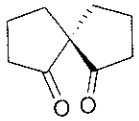
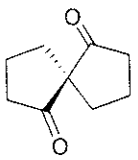
(d) additions specifically from B face gives a recemic mixture of malic acid

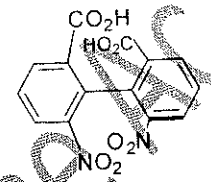
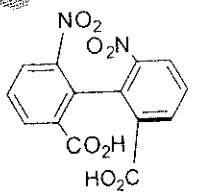
[GATE 2018]

Q35. The enantiomeric pair, among the following is

(a)  and

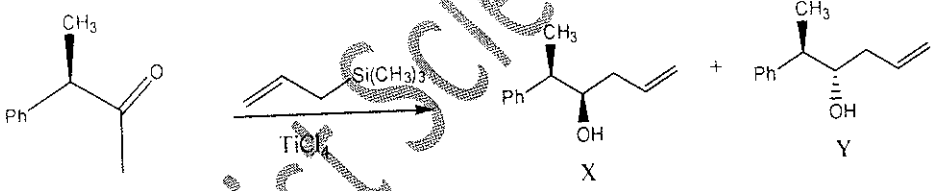
(b)  and 

(c)  and 

(d)  and 

[GATE 2018]

Q36. In the following reactions,



(a) X is the major product and Y is the minor product
(b) X is the only product
(c) Y is the only product
(d) X is the minor product and Y is the major product

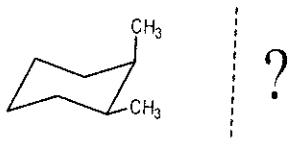
Answer Key

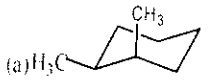
1. (b)	2. (a)	3. (a)	4. (a)	5. (b)	6. (d)	7. (b)
8. (b)	9. (c)	10. (a)	11. (d)	12. (a)	13. (c)	14. (d)
15. (c)	16. (b)	17. (d)	18. (d)	19. (d)	20. (c)	21. (d)
22. (a)	23. (d)	24. (b)	25. (d)	26. (4)	27. (b)	
28.(57.66)	29. (d)	30. (8)	31. (b)	32. (a)	33. (a)	34.(a)
35. (d)	36. (a)					

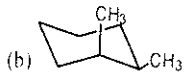
TIFR Previous year's Question

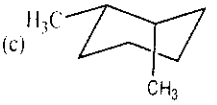
Q1. Structure of 1, 2 -demethylcyclohexane is show below. Which of the following is an enantiomer to the given conformer?

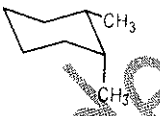
[TIFR 2011]



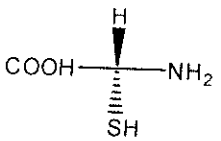


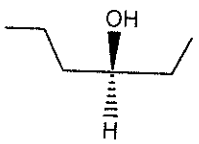


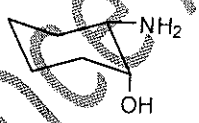




Q2. What are the configurations (R or S) of the chiral centers in the following molecules. **[TIFR 2012]**







(a)Compound 1 = R Compound2 = R; Compound 3 = 1S, 2S

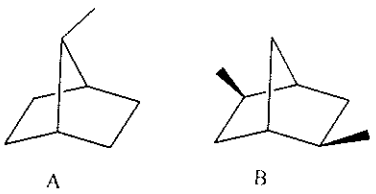
(b) Compound 1 = R Compound2 = S; Compound 3 = 1R, 2S

(c)Compound 1 = S; Compound 2 = S; Compound 3 = 1S, 2R

(d) Compound 1 = R; Compound 2 = S; Compound3 = 1S, 2R

Q3. What are the element of symmetry present in the following molecules and which of them is chiral?

[TIFR 2013]



A B

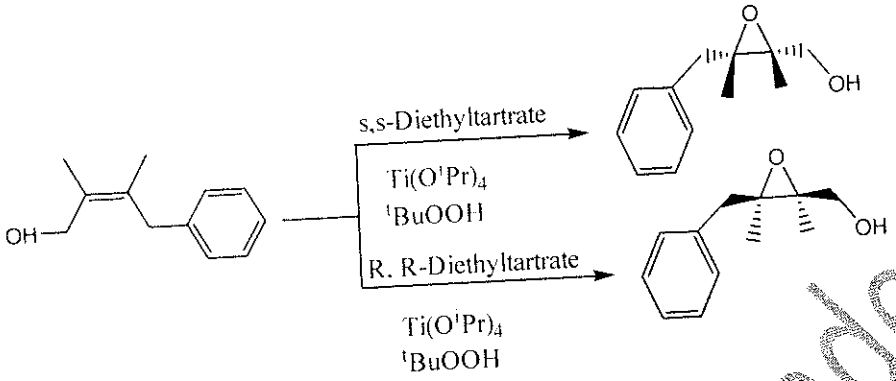
(a) A has a 2-fold rotation axis and B has a plane of symmetry, A is chiral.

(b) A has a plane of symmetry and B has a centre of inversion; B is Chiral.

(c) A has a plane of symmetry and B has a 2- fold rotation axis, A is chiral

(d) A has a plane of symmetry and B has a 2- fold rotation; B is chiral.

Q4. The Sharplessepoxidation catalyst $Ti\left(O^{i}Pr\right)_4$ converts allylic alcohols to epoxides stereoselectively. What is the stcreochemistry of the product obtained in the following oxidation reactions? **[TIFR 2014]**



(a) $X:(2R,3S)-3-benzyl-2,3-$ dimethylox iran $-2-yl)$ methanol

$Y:(2S,3R)-3-$ benzyl $-2,3-$ dimethyloxiran $-2-yl)$ methanol

(b) $X:(2S,3R)-3-benzyl-2,3-$ dimethylox iran $-2-yl)$ methonol

$Y:(2R,3S)-3-benzyl-2,3-$ demethylox iran $-2-yl)$ methanol

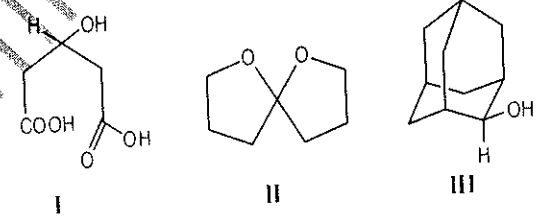
(c) $X:(2S,3R)-3-$ benzyl $-2,3-$ dimethylox iran $-2-$ yl) methanol

$Y:(2S,3S)-3-$ benzyl $-2,3-$ dimethylox iran $-2-$ yl) methanol

(d) $X:(2R,3S)-3-$ benzyl $-2,3-$ dimethylox iran $-2-$ yl) methanol

$Y:(2S,3S)-3-$ benzyl $-2,3-$ dimethylox iran $-2-yl)$ methanol

Q5. Which among the following molecules is chirals?

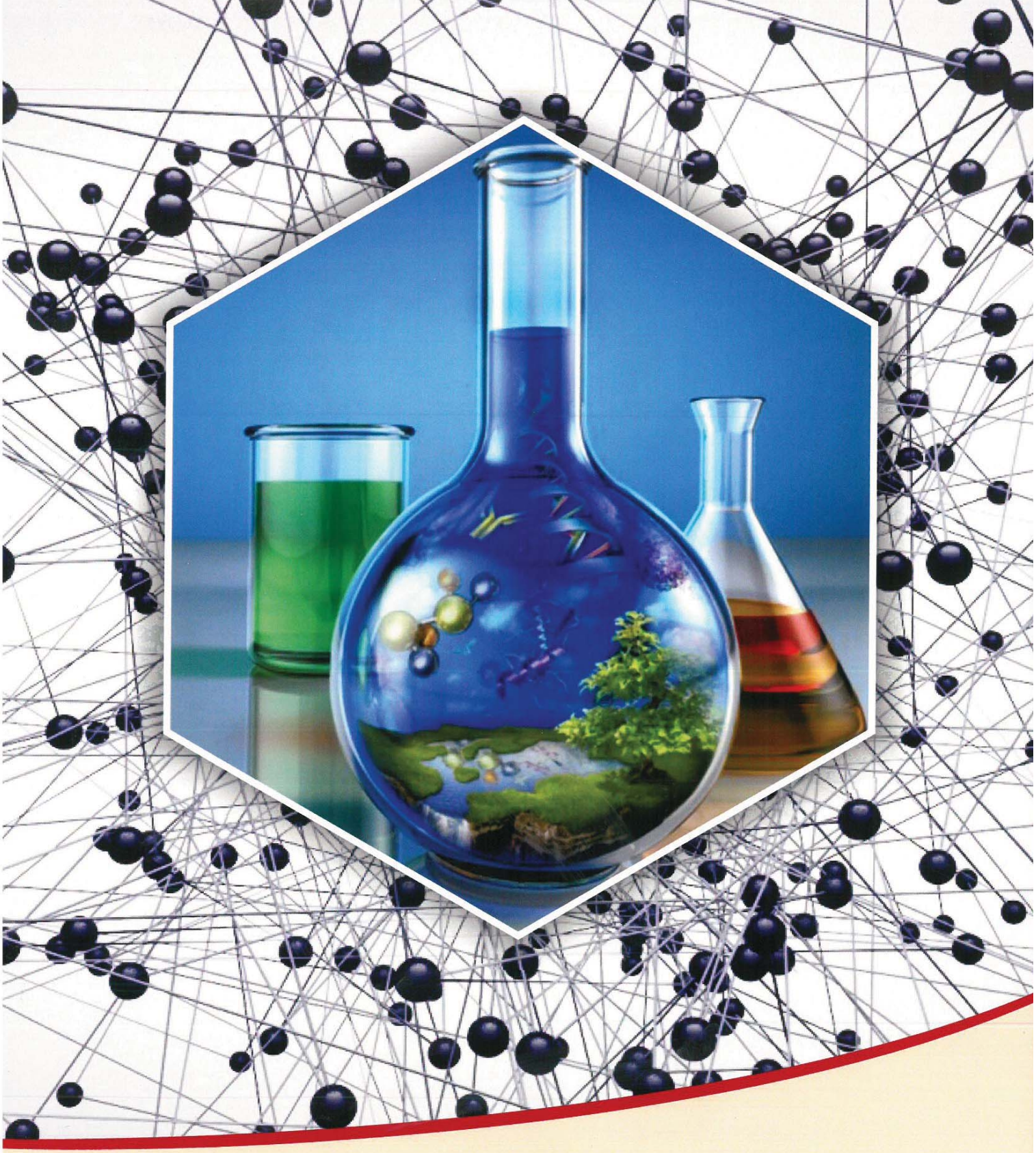


I II III

(a) I (b) II (c) III (d) None of the above

Answer Key

1. (b) 2. (b) 3. (d) 4. (a) 5. (b)



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28-/A, Jia Sarai, Hauz Khas, New Delhi-16 • Ph. : 011-26511021, 8285787633, 9582285416, 9149049297
www.csirnetalchemist.com • alchemistscienceacademy@gmail.com