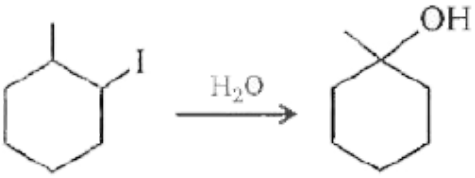
CHEMISTRY

BOOKS - MS CHOUHAN

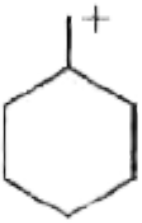
ALKYL HALIDES (SUBSTITUTION REACTIONS)

Level 1

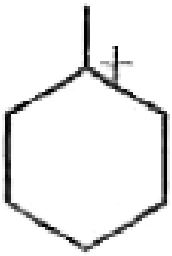
1. Which of the following is not expected to be intermediate of the following reaction ?



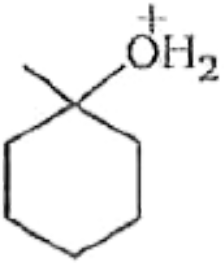
A.



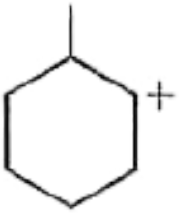
B.



C.



D.



Answer: A

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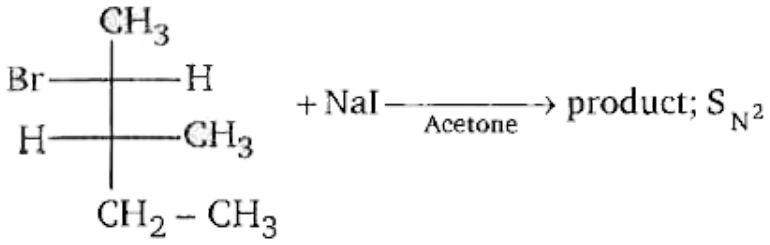
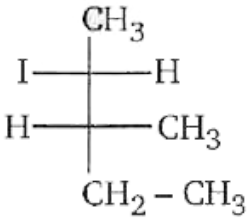
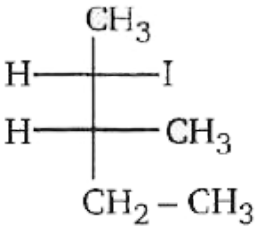


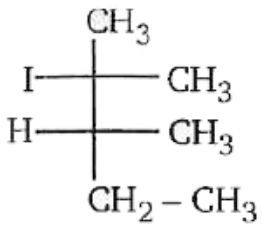
2. product of the reaction is :

A.

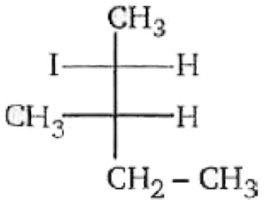


B.





C.



D.

Answer: B

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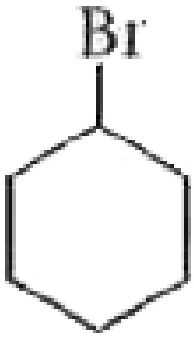
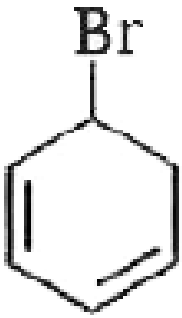
3. Rate of S_{N^2} will be negligible in :

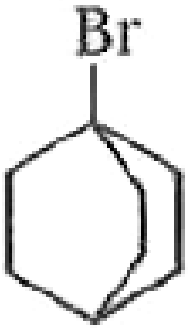


A.

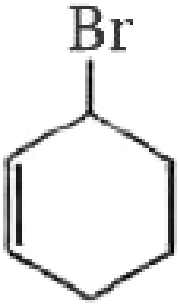
B.



C.



D.



Answer: C

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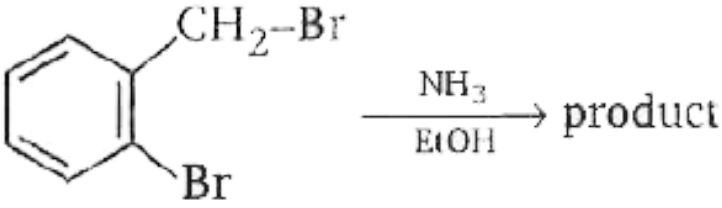
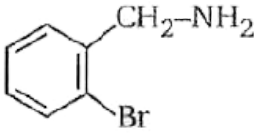
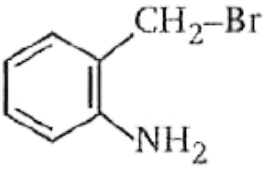
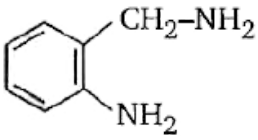
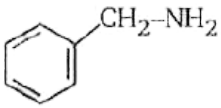
4. What is the major product obtained in the following reaction ?



A. 

B. 

C. 

D. 

Answer: A

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5. $Cl-CH_2-\overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}}-CH_2-CH_2-Cl+l^- \xrightarrow[DMF]{}$ product, Major product of this reaction is:

A. $l-CH_2-\overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}}-CH_2-CH_2-Cl$

B. $Cl-CH_2-\overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}}-CH_2-CH_2-l^-$

C. $H_2C=\overset{\overset{CH_3}{|}}{C}-CH_2-CH_2=Cl$

D. $Cl-CH_2-\overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}}-CH_2=CH_2$

Answer: B

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6. Which of the following expressions is representative of the rate law for a S_{N^2} reaction ?

A. Rate = k [electrophile]

B. Rate = k [electrophile] [nucleophile]

C. Rate = $k[\text{nucleophile}]^2$

D. Rate = $k[\text{electrophile}]^2$

Answer: B

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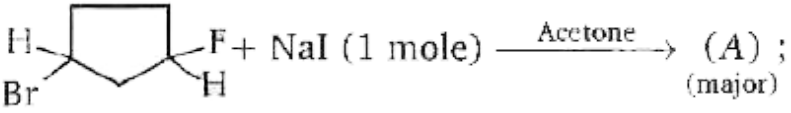
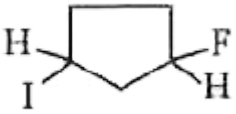
7. 

Major product of this reaction is :

A. 

B. 

C.

D.

Answer: B

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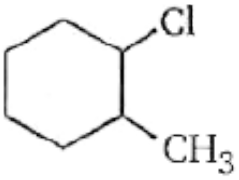
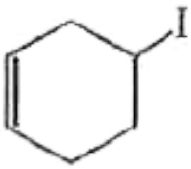
8. Which of the following alkyl halide undergo rearrangement in S_{N^1} reaction ?

A. $CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - \underset{\underset{I}{|}}{CH} - CH_3$

B.



C. 

D. All of these

Answer: D

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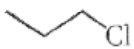
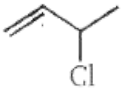
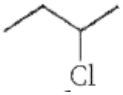
9. Arrange the following three chlorides in decreasing order towards S_{N1} reactivity.

(1) 

(2) 

(3) 

A. 1 gt 2 gt 3

B. 2 gt 3 gt 1

C. 2 gt 1 gt 3

D. 3 gt 2 gt 1

Answer: B

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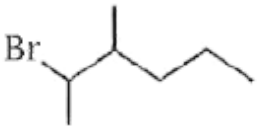
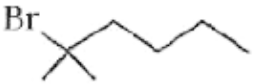
10. Which compound undergoes nucleophilic substitution with NaCN at the fastest rate ?

A. 

B. 

C. 

D. 

Answer: A

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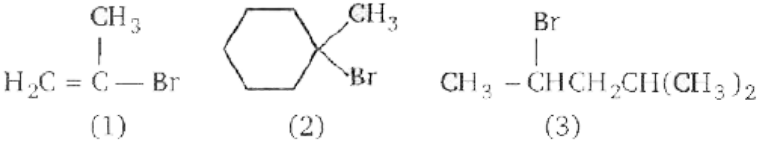
11. Rank the following in order of decreasing rate of solvolysis with aqueous ethanol (fastest $\rightarrow$ slowest)



A. 2 gt 1 gt 3

B. 1 gt 2 gt 3

C. 2 gt 3 gt 1

D. 1 gt 3 gt 2

Answer: C

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12. The reaction of 4-bromobenzyl chloride with sodium cyanide in ethanol leads to the formation of :

A. 4-bromobenzyl cyanide

B. 4-cyanobenzyl chloride

C. 4-cyanobenzyl cyanide

D. 4-bromo-2-cyanobenzyl chloride

Answer: A

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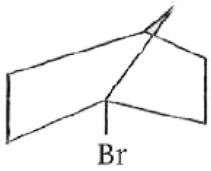
13. Which of the following reactant will not favour nucleophilic substitution reaction ?

A. 

B. Ph-Br

C. $CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_2-Br$

D. All the above

Answer: D

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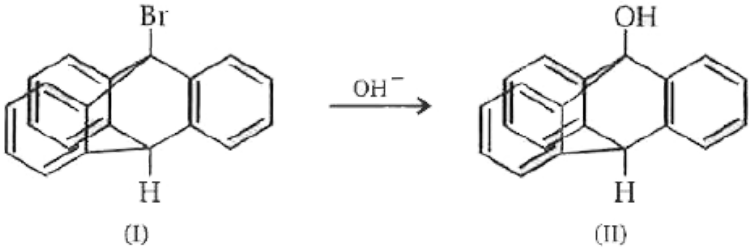

14.

Conversion of I to II :

A. takes place by S_N^1

B. takes place by S_N^2

C. takes place both by S_N^1 and S_N^2

D. does not take place

Answer: D

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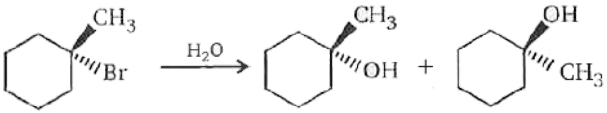
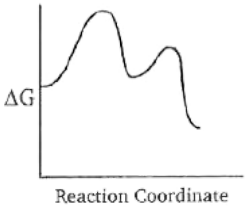
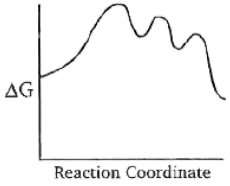
15. Which is the correct reaction coordinate diagram for the following solvolysis reaction ?



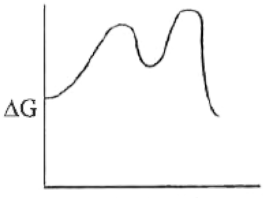
A.



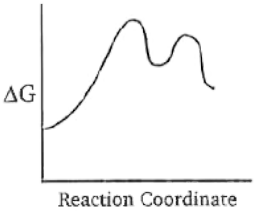
B.



C.



D.



Answer: B

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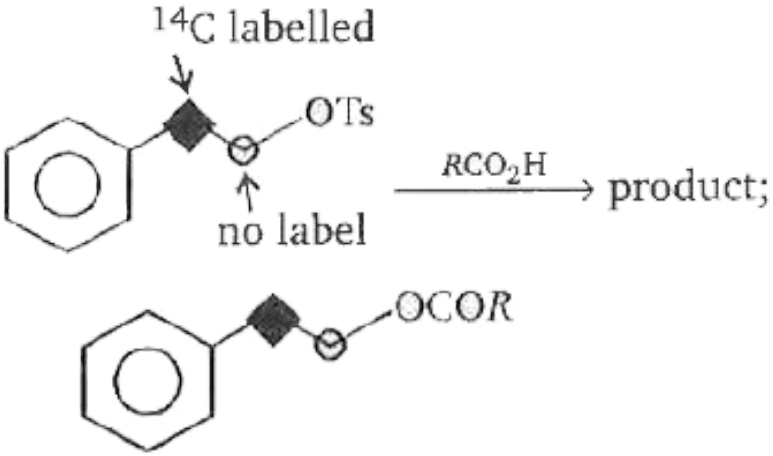
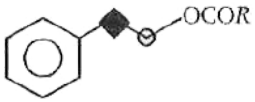
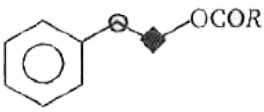


16. product,

Product of this reaction is

A. 

B. 

C. both (a) and (b)

D. None of these

Answer: C

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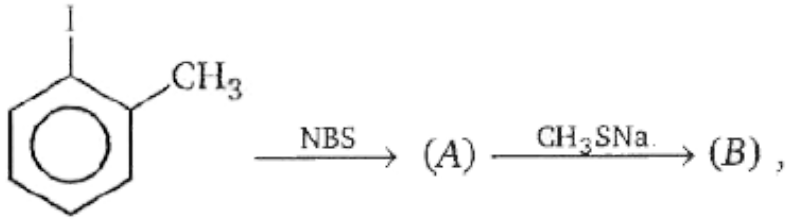
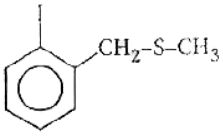
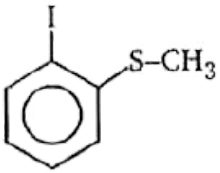
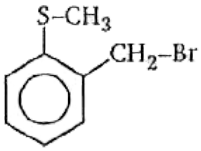


17. Product (B) is :

A. 

B. 

C. 

D. None of these

Answer: A

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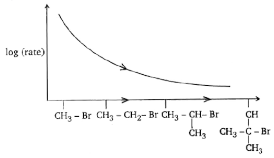
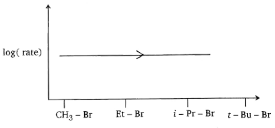
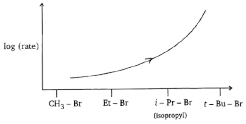
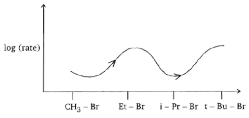
18. Which of the following represents the correct graph for S_{N^2} reaction ?

A. 

B. 

C. 

D. 

Answer: A

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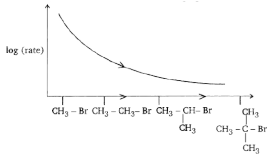
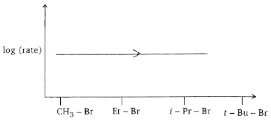
19. Which of the following graph represents correct graph for S_{N1} reaction :

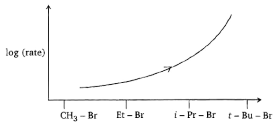
A.



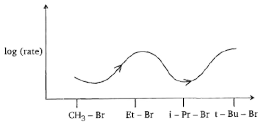
B.



C.



D.



Answer: C

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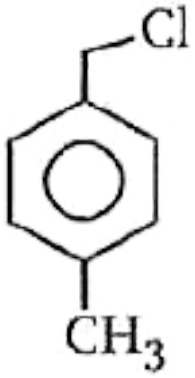
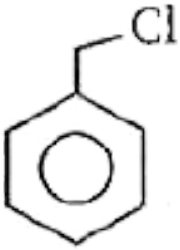
20. Which of the following is most reactive towards S_N1 reaction?

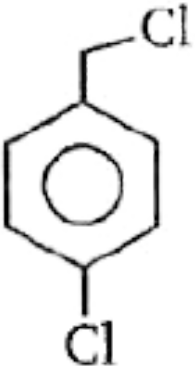
A.

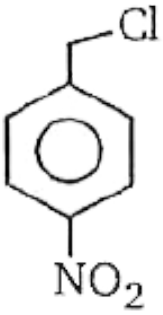


B.



C.



D. 

Answer: D

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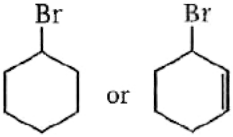
21. Among the given pairs, in which pair first compound reacts faster than second compound in S_{N1} `reaction ?

A. $CH_3 - CH_2 - CH_2 - CH_2 - Br$ or $CH_3 - CH_2\text{-}\underset{\displaystyle Br}{\underset{|}{CH}} - CH_3$

B. $CH_3 - \underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}} - CH_2 - CH_2Br$ or $CH_3 - \underset{\displaystyle Br}{\underset{|}{CH}} - \underset{\displaystyle CH_3}{\overset{|}{CH}} - CH_3$

C. 

D. $CH_3 - \underset{\displaystyle Br}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}} - CH_3$ or $CH_3 - \underset{\displaystyle I}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}} - CH_3$

Answer: B

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22. What is the major product of the following reaction ?

$$H_2C = CH - CH_2 - OH \xrightarrow[excess]{HBr} Product$$

A. $CH_3 - \overset{\overset{Br}{|}}{CH} - CH_2 - Br$

B. $H_2C = CH - CH_2 - Br$

C. $CH_3 - \overset{\overset{Br}{|}}{CH} - CH_2 - OH$

D. $CH_3 - \overset{\overset{OH}{|}}{C}H - CH_2 - OH$

Answer: A

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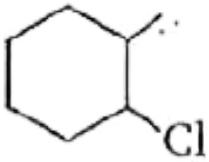
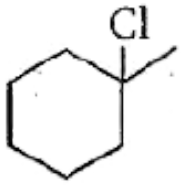
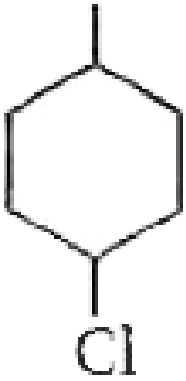
23. S_{N^1} and S_{N^2} products are same with (excluding stereoisomer):

A. 

B. 

C. 

D. $Ph - \underset{\underset{CH_3}{|}}{CH} - \underset{\underset{Cl}{|}}{CH} - CH_3$

Answer: C

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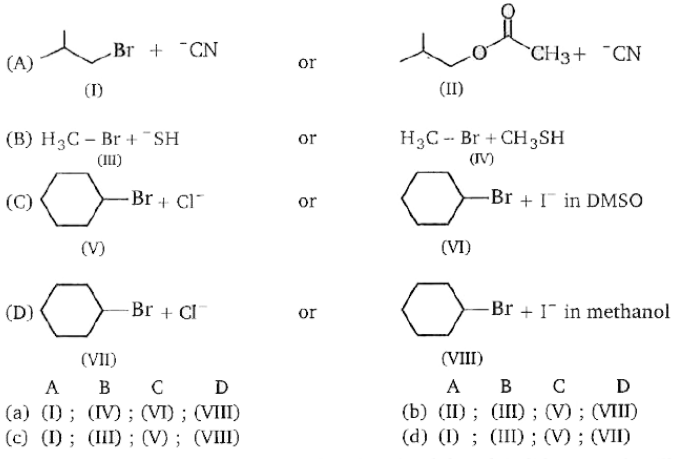
24. Consider the nucleophilic attacks given below. Select in each pair that shows the greater S_{N^2} reaction rate.



A B C D
(a) (I) ; (IV) ; (VI) ; (VIII)
(c) (I) ; (III) ; (V) ; (VIII)

A B C D
(b) (II) ; (III) ; (V) ; (VIII)
(d) (I) ; (III) ; (V) ; (VII)

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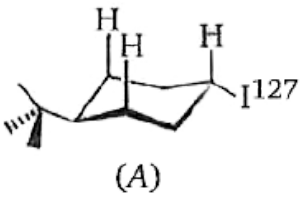
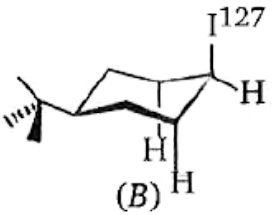
25. Which of the two stereoisomers of 4-t-butylcyclohexyl iodide $\left({}^{127}I^{-}\right)$ will undergo S_N^2 substitution with ${}^{128}I^{-}$ faster, and why?



(A)



(B)

A. A will react faster because it is the more stable of the two isomers

B. A will react faster because it will yield a more stable product, and the transition state for both reactions is of the same energy

C. A will react faster because the approach of $^{128}I^-$ can depart unhindered.

D. B will react faster because it is less stable than A, and the transition state for both reactions is of the same energy

Answer: D

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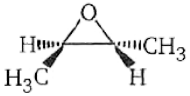
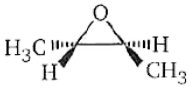
26. (Z)-2-Butene reacts with Br_2 / H_2O. The resulting bromohydrin when treated with methoxide in methanol undergoes an intramolecular S_{N^2} reaction. Taking into consideration the stereochemical consequences of the reaction mechanism involved, choose the final product(s) of these transformations.



(II)



(III)

A. (I) only

B. (II) only

C. (III) only

D. Equal amounts of (I) and (II)

Answer: D

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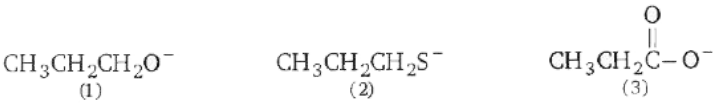
27. Rank the following species in order of decreasing nucleophilicity in a polar protic solvent (most $\rightarrow$ least nucleophilic):



A. 3 gt 1 gt 2

B. 2 gt 3 gt 1

C. 1 gt 3 gt 2

D. 2 gt1 gt 3

Answer: D

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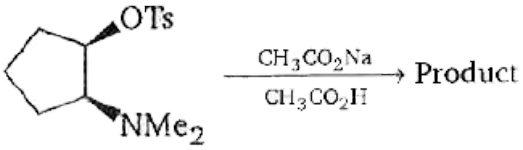
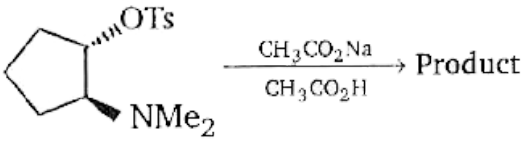
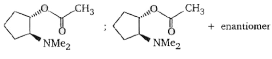
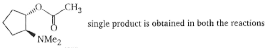
28. Identify products of the given reactions :

Reaction-1 

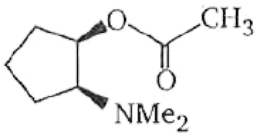
Reaction-2 

A. 

B. 

C. 

single product is obtained in both the reactions

D. 

single product obtained in both the reactions

Answer: A

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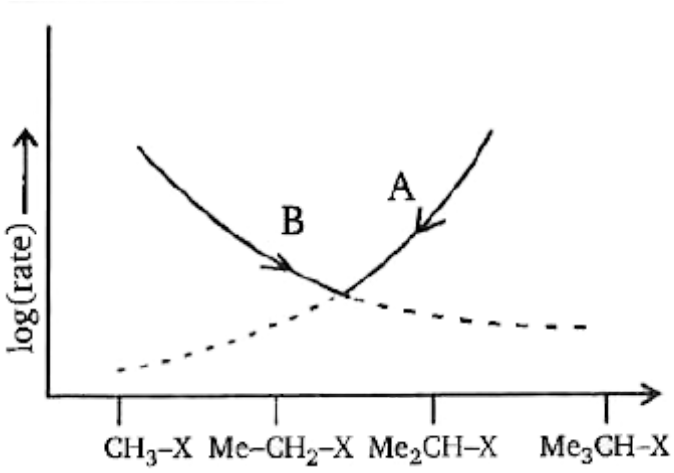
29.



Which of the following is true about given graphs A and B ?

A. $A \rightarrow S_{N^1} \quad B \rightarrow S_{N^2}$

B. $A \rightarrow S_{N^2} \quad B \rightarrow S_{N^1}$

C. A and $B \rightarrow E_1$

D. A and $B \rightarrow E_2$

Answer: A

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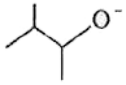
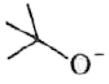
30. In each of the following groups, which is the strongest (best) nucleophile ?

(I) (1) H_3C-O^- (2)  (3) H_3C-S^- in CH_3OH

(II) (1) OH^- (2) H_2O (3) NH_2^- in DMF

(III) (1)  (2)  (3) CH_3O^- in DMSO

A. I,3 , II,3 , III,2

B. 1,2 , II,1 , III,3

C. I,1, II,2 , III,1

D. 1,3 , II, 3 , III,3

Answer: D

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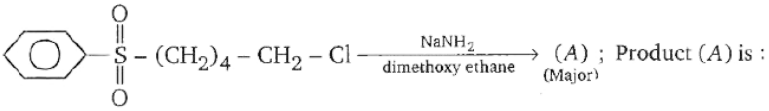
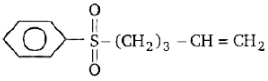
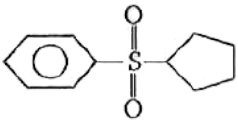
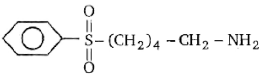
31. 

; Product (A) is :

A. 

B. 

C. 

D. None of these

Answer: B

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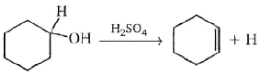
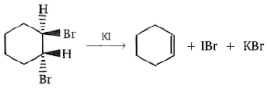
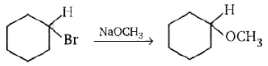
32. Which of the following reaction is an elimination reaction ?

A. 

B. 

C. 

D. both (a) and (b)

Answer: D

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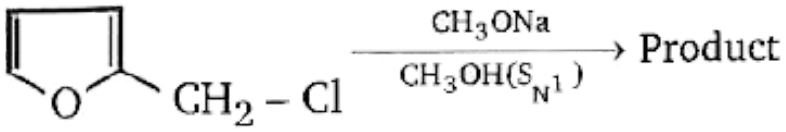
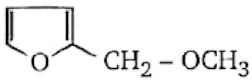
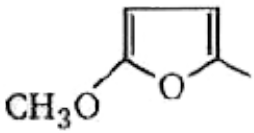
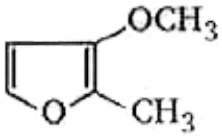
33. 

Which of the following products can be obtained from above reaction ?

A. 

B. 

C. 

D. All of these

Answer: D

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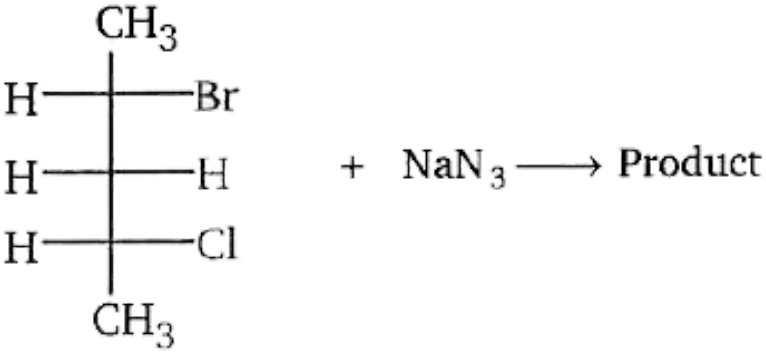
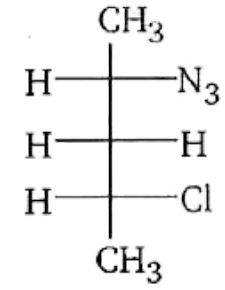
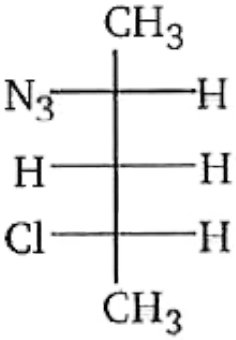
34. What is the principal product of the following reaction ?



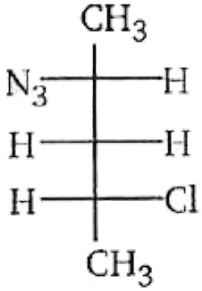
A.


CH3
H
N3
H
H
H
Cl
CH3

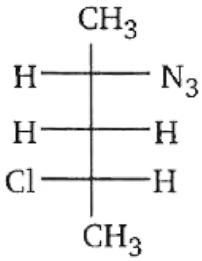
B.


CH3
N3
H
H
H
Cl
H
CH3

C.


CH3
N3
H
H
H
Cl
CH3

D.


CH3
H
N3
H
H
Cl
H
CH3

Answer: C

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35. What would be the effect of increasing solvent polarity on the rate of each of the following reactions ?

(A) $Nu + R - L \rightarrow \overset{\oplus}{N}u - R + L^{-}$

(B) $R - L^{\oplus} \rightarrow R^{\oplus} + L$

A. increases

B. decrease

C. constant

D. can not predict

Answer: A

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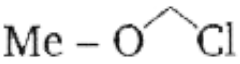
36. Which of the following is most reactive towards S_N1 reaction?

A. $CH_2 = CH - CH_2 - Cl$

B. $Ph - CH_2 - Cl$

C. 

D. $Ph - \underset{\underset{O}{||}}{C} - CH_2 - Cl$

Answer: D

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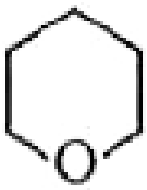
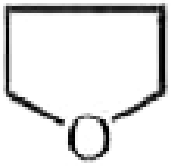
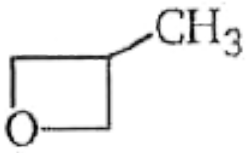
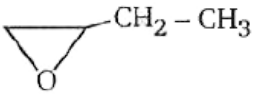
37. 4-chloro-1-butanol + NaOH $\rightarrow$ (B)

Product (B) of the above reaction is :

A. 

B. 

C. 

D. 

Answer: B

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38. In the given pairs of alkyl-halide, in which pair the first compound is more reactive than second compound toward S_{N^2} reaction ?

A. $(CH_3)_2CHBr$ or $CH_3 - CH_2 - CH_2 - Br$

B. $CH_3 - CH_2 - CH_2 - Br$ or $CH_3 - CH_2 - CH_2 - CH_2 - I$

C. $Ph - Br$ or $CH_3 - CH_2 - CH_2 - Br$

D. $CH_2 = CH - CH_2 - Cl$ or $H_2C = CH - Cl$

Answer: D

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39. Among the following pair of reactions in which pair the second reaction is more reactive than first in S_{N^1} reaction ?

A. $CH_3 - CH_2 - Cl + CH_3 - CH_2 - O^- \rightarrow Et - O - E$ (or)

$CH_2 - CH_2 - Cl + CH_3 - CH_2 - OH \rightarrow Et - O - Et$

B. $CH_3 - CH_2 - Cl + ErO^- \rightarrow Et - O - Et$ (or)

$CH_3 - CH_2 - Cl + ErS^- \rightarrow CH_3 - CH_2 - S - Et$

C. $\underset{(1m)}{Et} - Cl + \underset{(2m)}{CH_3O^-} \rightarrow Et - O - CH_3$ (or) underset((2m))

(Et)-Cl+underset((1m))(CH_(3))O^(-)rarrEt-O-CH_(3)`

D. $Et - Br + Ph_3P \rightarrow Et - \overset{\oplus}{P}Ph_3 \quad (\text{or}) \quad "$

$Et - Br + Ph_3N \rightarrow E + \ - \overset{\oplus}{N}Ph_3$

Answer: B

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40. Among the following pair of reactions in which pair the second reaction is more reactive than first in S_{N^1} reaction ?

A. $Me_3CCl + H_2O \rightarrow Me_3COH \quad (\text{or})$

$Me_3CBr + H_2O \rightarrow Me_3COH$

B.

$Me_3CCl + CH_3OH \rightarrow Me_3C - OCH_3 \quad (\text{or}) \quad Me^3\ C - Cl \ + H_2C$
$\downarrow$
$Me_3C - OH$

C. $\underset{(1m)}{Me_3CCl} + H_2O \rightarrow \quad (\text{or}) \quad \underset{(2m)}{Me_3CCl} + H_2O$

D. All of these

Answer: D

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41. Which is a true statement concerning the transition state of an S_{N^2} reaction ?

A. Closely resembles a carbocation intermediate

B. The electrophile is responsible for the reaction

C. Lower is energy than the starting materials

D. Involves both the nucleophile and electrophile

Answer: D

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42. Increasing the concentration of a nucleophile in a typical S_{N^2} reaction by a factor of 10 will cause the reaction rate to :

A. increase by a factor of 10

B. increase by a factor of 10^2

C. decrease by a factor of 10

D. remain about the same

Answer: A

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43. Decreasing the concentration of an electrophile in a typical S_{N^2} reaction by a factor of 3 will cause the reaction ratio to :

A. increase by a factor of 3

B. increase by a factor of 3^2

C. decrease by a factor of 3

D. remain about the same

Answer: C

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44. Increasing the concentration of an electrophile in a typical S_{N^2} reaction by a factor of 3 and the concentration of the nucleophile by a factor of 3 will change the reaction rate to :

A. increase by a factor of 6

B. increase by a factor of 9

C. decrease by a factor of 3

D. remain about the same

Answer: B

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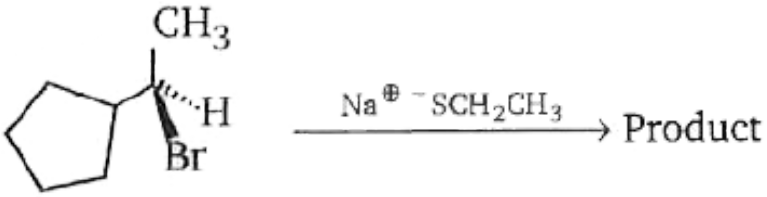
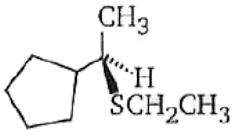
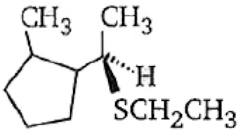
45. Consider the following reaction and select the best choice that represents the reaction.



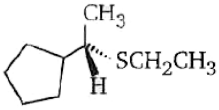
A.



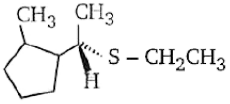
B.



C.



D.



Answer: C

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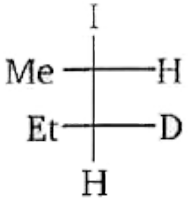
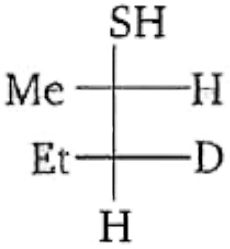
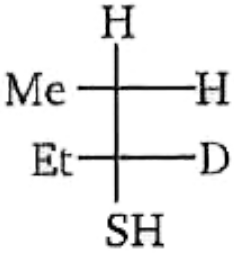
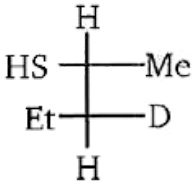
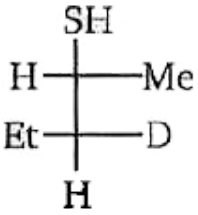
46. 

$\xrightarrow{KSH}$ Product; Identify the product.

A. 

B. 

C. 

D. 

Answer: D

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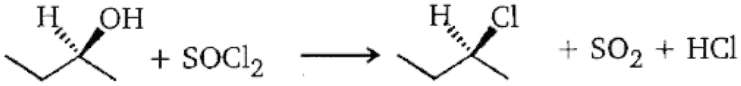
47. The reaction,



proceeds by the..... mechanism.

A. S_{N^1}

B. S_{N^2}

C. S_{E^2}

D. S_{N^i}

Answer: A

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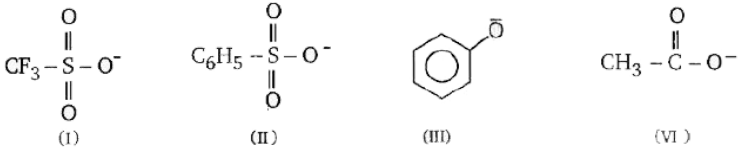
48. Consider the following anions.



When attached to sp -hybridized carbon, their leaving group ability in nucleophilic substitution reaction decreases in the order :

A. $I > II > III > IV$

B. $I > II > IV > III$

C. $IV > I > II > III$

D. $IV > III > II > I$

Answer: B

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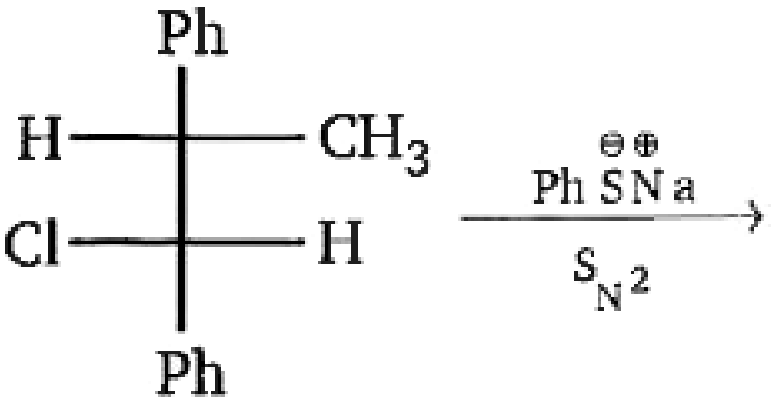
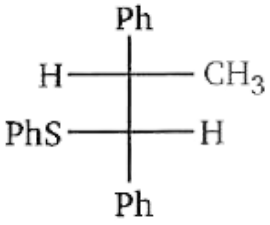
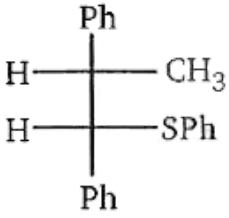
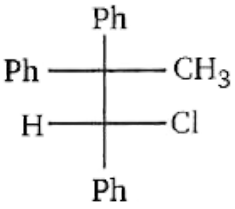
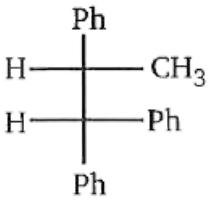


49. Principal organic product of the reaction will be :

A.


B.


C.


D. 

Answer: B

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50. Reaction of R-2-butanol with p-toluenesulphonyl chloride in pyridine followed by reaction with LiBr gives:

A. R-2-butyl bromide

B. S-2-butyl tosylate

C. R-2-butyl tosylate

D. S-2-butyl bromide

Answer: D

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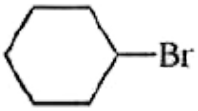
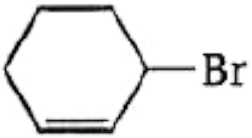
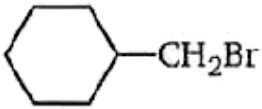
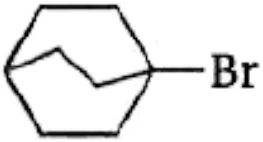
51. The compound which undergoes SN1 reaction most rapidly is :

A. 

B. 

C. 

D. 

Answer: B

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52. Addition of KI accelerates the hydrolysis of primary alkyl halides because :

A. KI is soluble in organic solvents

B. the iodide ion is a weak base and a poor leaving group

C. the iodide ion is a strong base

D. the iodide ion is a powerful nucleophile as well as a good leaving group

Answer: D

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53. Which of the following phrases are not correctly associated with Svi reaction ?

(1) Rearrangement is possible

(2) Rate is affected by polarity of solvent

(3) The strength of the nucleophile is important in determining rate

(4) The reactivity series is tertiary > secondary > primary

(5) Proceeds with complete inversion of configuration

A. 3,5

B. 5 only

C. 2, 3, 5

D. 3 only

Answer: A

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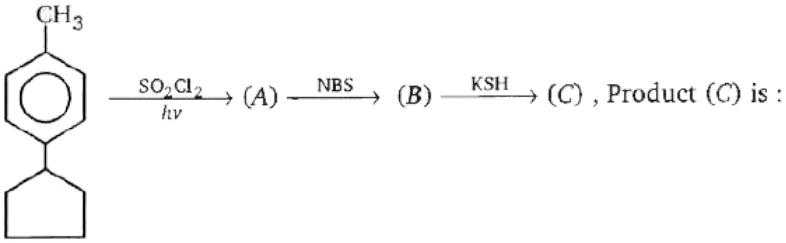
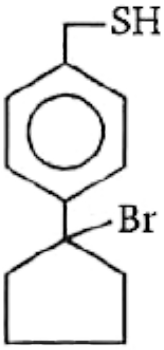
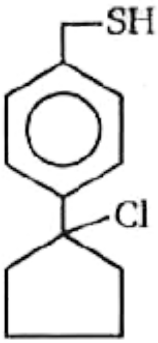
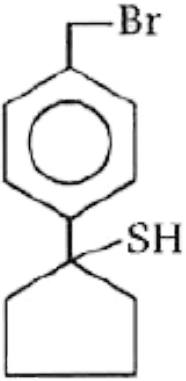
54. 

A. 

B.



C.



D.

Answer: B

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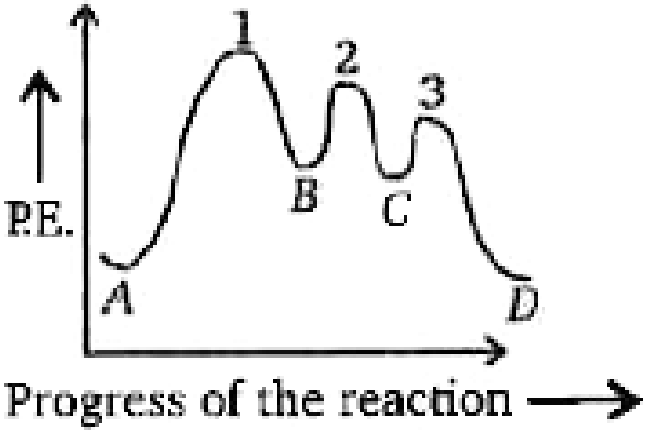
55. Energy profile diagram for exothermic reaction, $A \rightarrow B \rightarrow C \rightarrow D$, is given below, The rate determining step of reaction :



A. $A \rightarrow B$

B. $B \rightarrow C$

C. $C \rightarrow D$

D. can not predict

Answer: A

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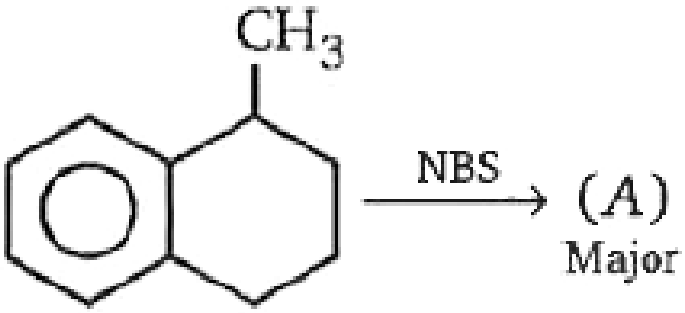
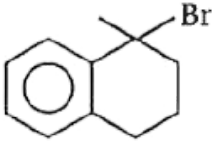
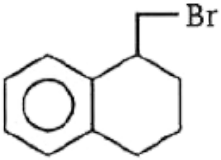
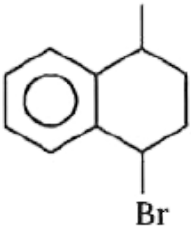
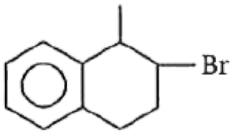
56. 

A. 

B. 

C. 

D. 

Answer: A

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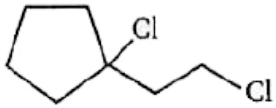
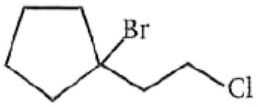
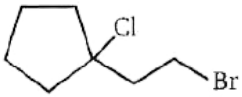
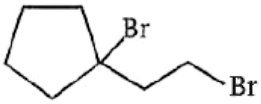
57. 

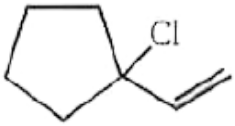
$\xrightarrow[S_N2 \text{ conditions}]{LiBr/DMSO}$ Major product (X)

The product X is :

A. 

B. 

C. 

D. 

Answer: B

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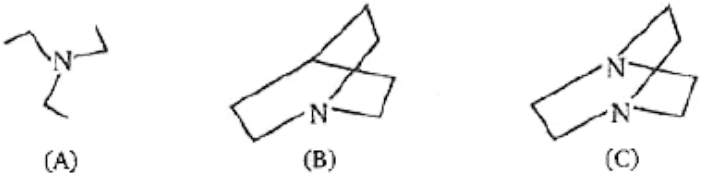
58. Relative rate of reaction of the following amine with methyl iodide is:



A. $A > B > C$

B. $A > C > B$

C. $B > C > A$

D. $B > A > C$

Answer: C

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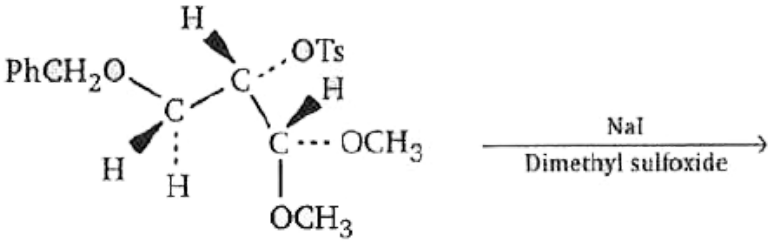
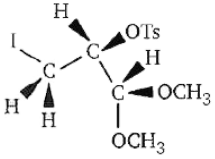
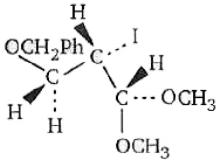
59.



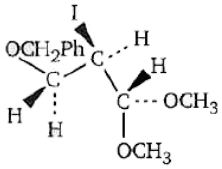
A.



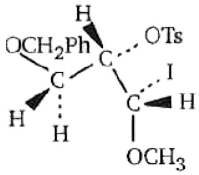
B.



C.



D.



Answer: C

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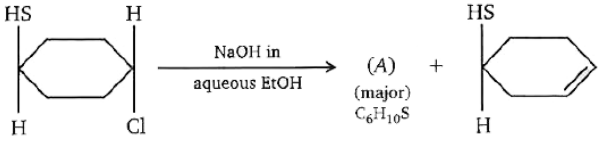
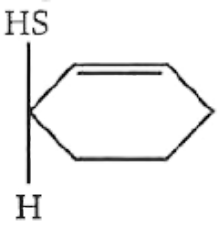
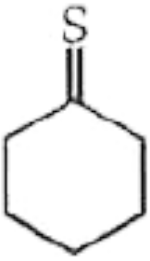
60.



A. 

B. 

C. 

D. 

Answer: B

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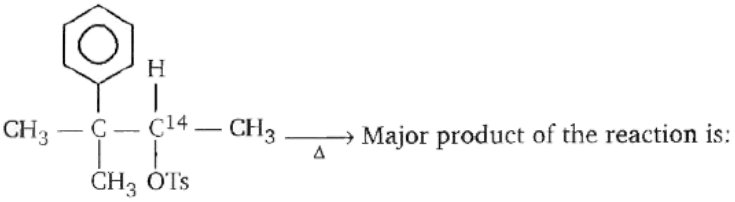
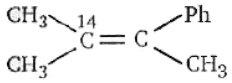
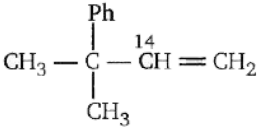
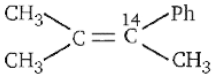
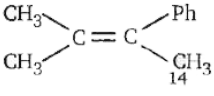
61. 

A. 

B. 

C. 

D. 

Answer: C

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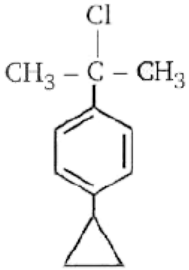
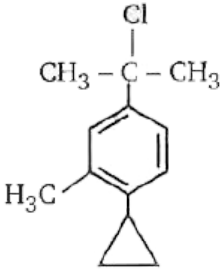
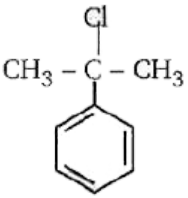
62. The decreasing order of reactivity of the compounds given below towards solvolysis under identical conditions is :



(I)



(II)



(III)

A. $II > III > I$

B. $I > II > III$

C. $III > II > I$

D. $II > I > III$

Answer: D

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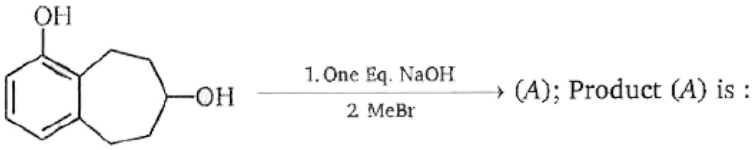
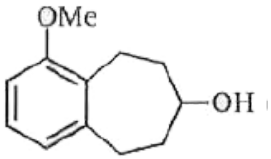
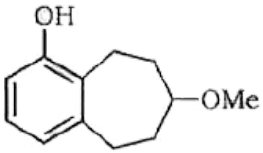
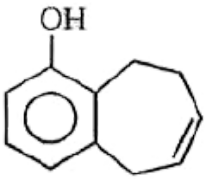
63. 

A. 

B. 

C. 

D. None of these

Answer: A

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64. (R)-2-octyl tosylate is solvolyzed in water under ideal conditions. The product(s) will be:

A. R-2-octanol and S-2-octanol in a 1:1 ratio

B. R-2-octanol and S-2-octanol in a 1.5:1 ratio

C. R-2-octanol only

D. S-2-octanol only

Answer: B

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65. From each of the following pairs select the compound that will react faster with sodium iodide in acetone :

Pair-A: (1) 2-Chloropropane

(2) 2- Bromopropane

Pair-B: (3) 1 - Bromobutane

(4) 2- Bromobutane

A. 1,3

B. 1,4

C. 2,3

D. 2,4

Answer: C

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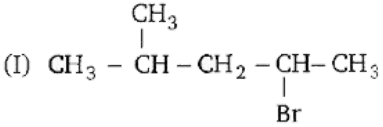
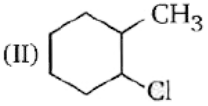
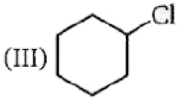
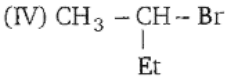
66. Among the given halides, which one will give same product in both S_{N^1} and S_{N^2} reactions.

(I) 

(II) 

(III) 

(IV) 

A. (III) only

B. (I) & (II)

C. (III) & (IV)

D. (I), (III) & (IV)

Answer: D

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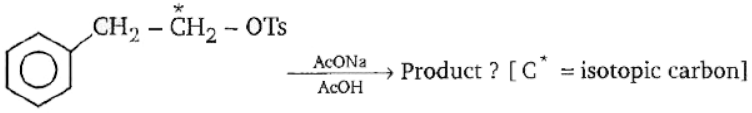
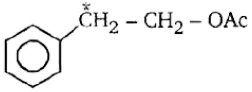
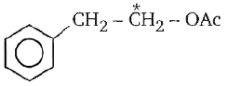
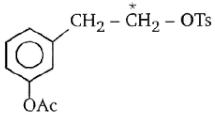
67. Product(s) formed during this reaction is/are :



A. 

B. 

C. 

D. both (a) and (b)

Answer: D

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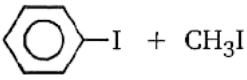
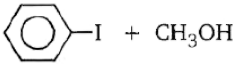
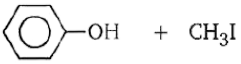
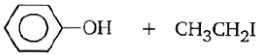
68. Anisole $\underset{\text{reflux}}{o}\ veset(\text{excess HI (conc.)}) \rightarrow$ Product

A. 

B. 

C. 

D. 

Answer: C

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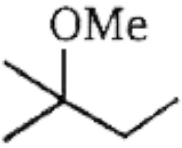
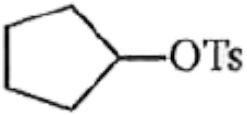
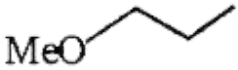
69. Which of the following compounds would react faster with NaCN in an S_{N^2}reaction ?

A. 

B. 

C. 

D. 

Answer: D

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70. $HC \equiv CNa + Cl - CH_2 - CH_2 - CH_2 - I \rightarrow (A)$ Major product (A) is :

A. $H - C \equiv C - CH_2 - CH_2 - CH_2 - I$

B. $CH_2 = CH - CH_2 - I$

C. $H - C \equiv C - CH_2 - CH_2 - CH_2 - Cl$

D. $CH_2 = CH - CH_2 - Cl$

Answer: C

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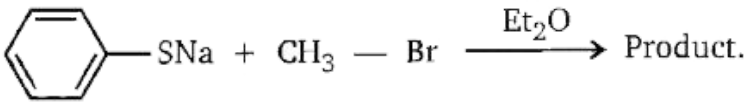
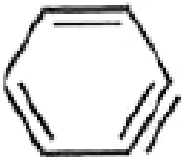
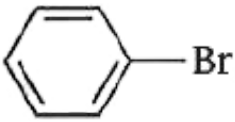
71. What is the major product obtained in the following reaction



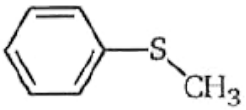
A.



B.



C.



D.

Answer: C

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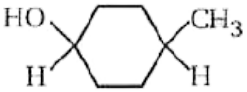
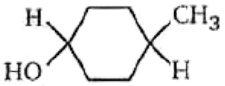
72.  $+ OH^- \xrightarrow{S_N2} A$; The product A is :

A. 

B. 

C. Both (a) and (b) are correct

D. None is correct

Answer: B

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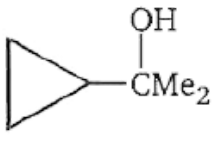
73. $Me_2C = CH - CH_2 - CH_2 - Cl \xrightarrow[CaCO_3]{H_2O}$ (X), Major product of the reaction is :

A. $Me - \underset{\underset{Me}{|}}{\overset{\overset{OH}{|}}{C}} - CH_2 - CH_2 - CH_2$

B. $Me_2C = CH - CH_2 - CH_2 - OH$

C. $Me_2C = CH - \underset{\underset{OH}{|}}{CH} - CH_2 - OH$

D. 

Answer: D

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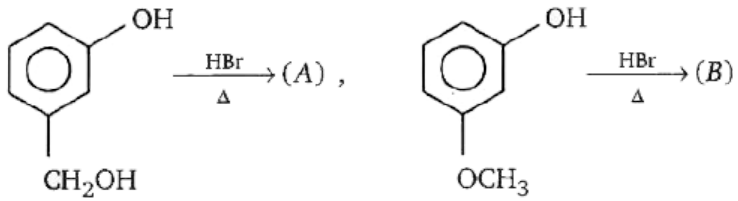
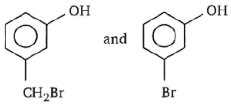
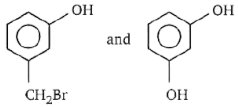
74.



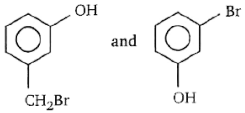
A.



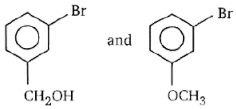
B.



C.



D.



Answer: B

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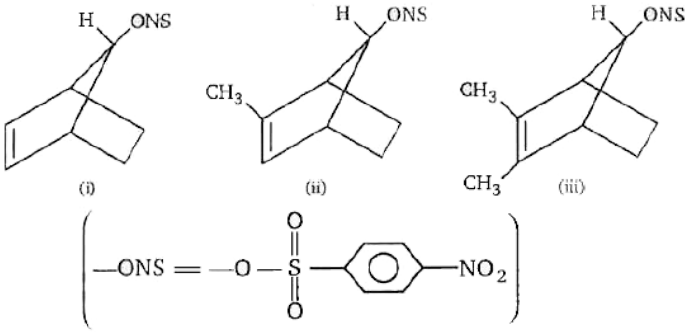
75. Relative rate of reaction with H_2O.



A. $(i) > (ii) > (iii)$

B. $(ii) > (i) > (iii)$

C. $(iii) > (ii) > (i)$

D. $(iii) > (i) > (ii)$

Answer: C

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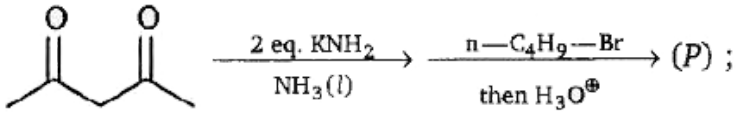
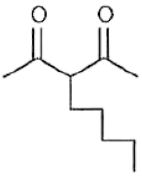
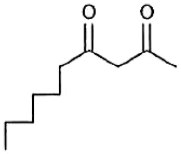
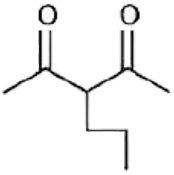
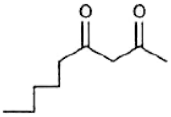
76.



A. 

B. 

C. 

D. 

Answer: D

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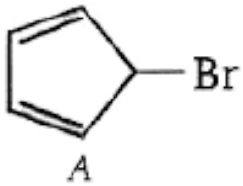
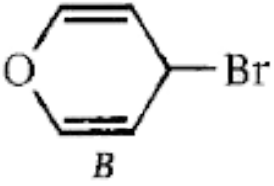
77. Which of the following statements is correct regarding the rate of hydrolysis of the compounds (A) and (B) by S_{N^2} reaction ?



A



B

A. A reacts faster than B

B. B reacts faster than A

C. Both A and B reacts at the same rate

D. Neither A nor B reacts

Answer: B

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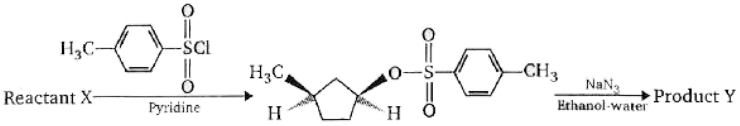
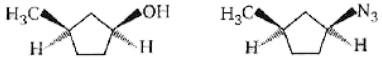
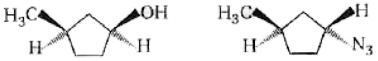
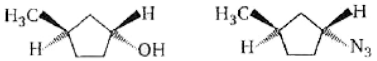
78. What are reactant X and product Y in the following sequence of reactions ?

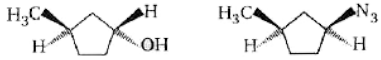


Reactant X Product Y

(a) 

(b) 

(c) 

(d) 

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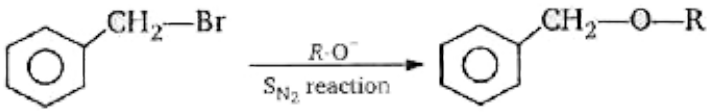
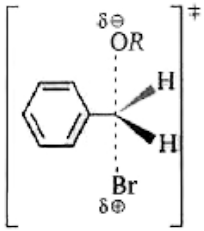
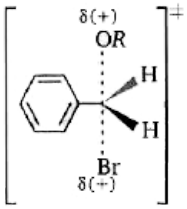
79. 

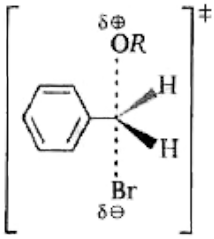


A.

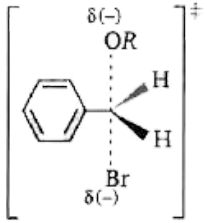
B.



C.



D.



Answer: D

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80. $C_6H_{13}Br + OH^- \rightarrow C_6H_{13}OH + Br^-$ this reaction is an example of:

A. Nucleophilic addition

B. Nucleophilic substitution

C. Electrophilic addition

D. Electrophilic substitution

Answer: B

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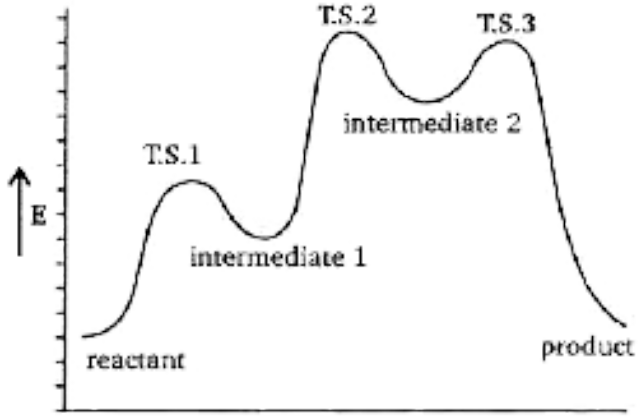
81. Transition state 2 is structurally most likely as :



A. intermediate 1

B. transition state 3

C. intermediate 2

D. product

Answer: C

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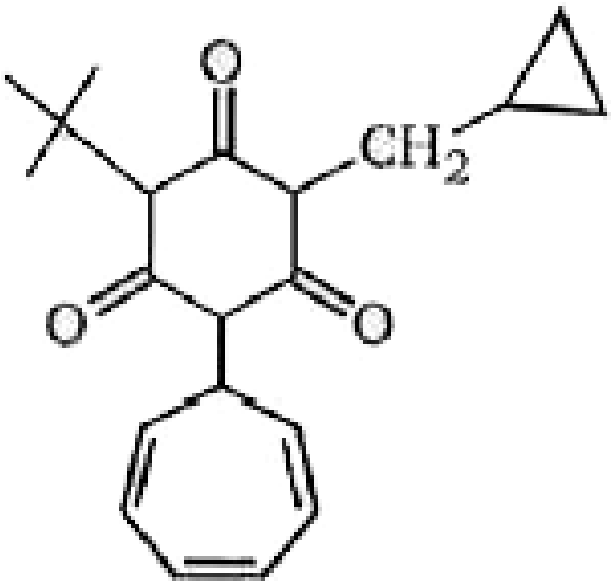

82.

x = Number of aromatic compound obtained when above compound undergo complete acidic hydrolysis.

A. 1

B. 2

C. 3

D. 4

Answer: B

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83. S_{N1} and S_{N2} reactions are

A. Both stereospecific

B. Both stereoselective

C. Stereoselective and stereospecific respectively

D. Stereospecific and stereoselective respectively

Answer: B::C

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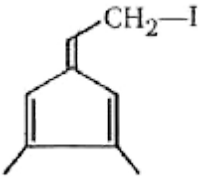
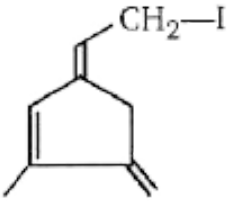
84. Most reactive compound toward S_{N1} is :

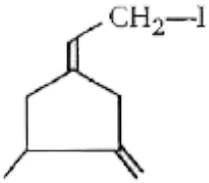
A.



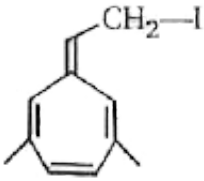
B.



C.



D.



Answer: D

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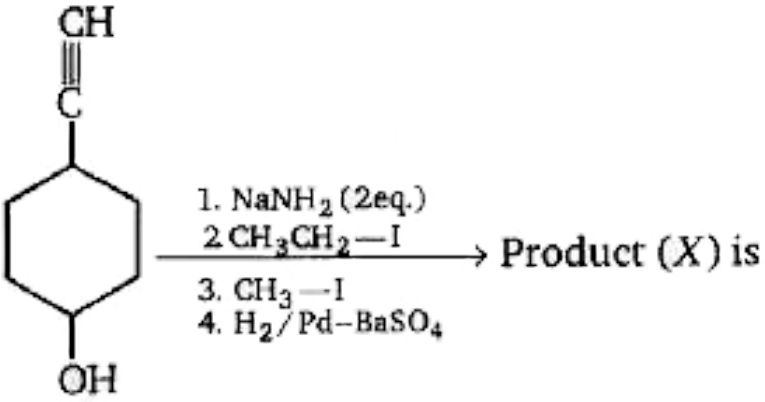
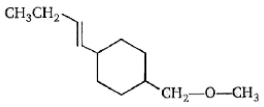
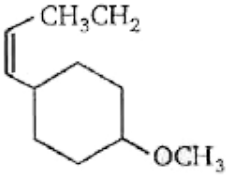
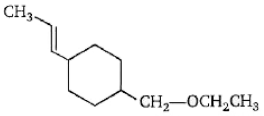
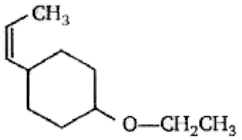
85.



A. 

B. 

C. 

D. 

Answer: B

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86. Following reaction is an example of :

A. S_{N^2} Reaction

B. S_{N^1} Reaction

C. Electrophilic Addition

D. S_N - NGP

Answer: A

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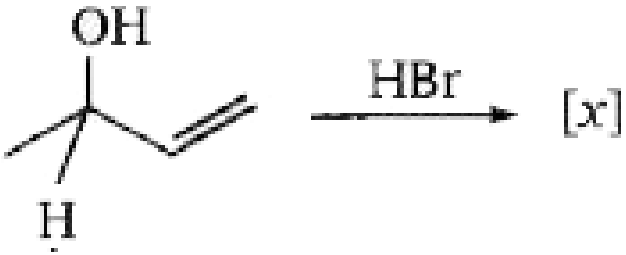
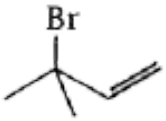
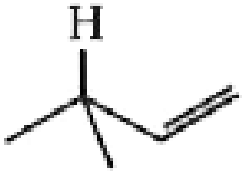
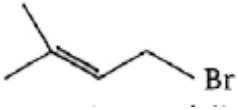
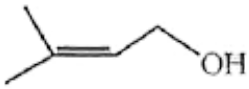
87. The major product of the following reaction : :



A. 

B. 

C. 

D. 

Answer: C

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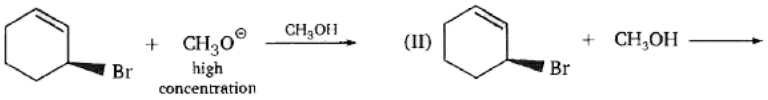
88. Choose the suitable option for the correct mechanism for the following reactions.



A. S_{N1}, S_{N1}

B. S_{N1}, S_{N2}

C. S_{N2}, S_{N1}

D. S_{N2}, S_{N2}

Answer: C

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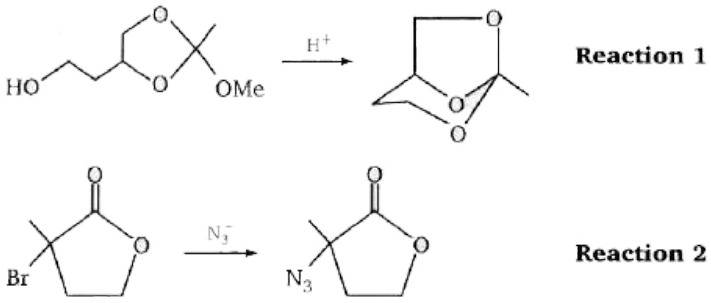
89.



Type of mechanism followed by reaction 1 and 2 respectively .

A. S_{N^1}, S_{N^1}

B. S_{N^1}, S_{N^2}

C. S_{N^2}, S_{N^1}

D. S_{N^2}, S_{N^2}

Answer: C

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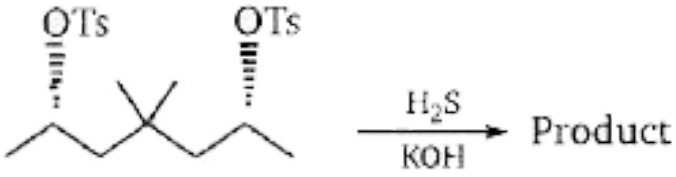
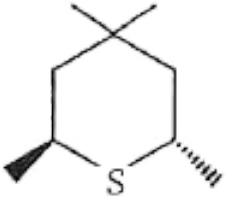
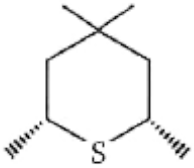
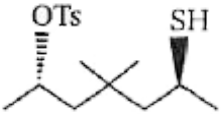
90.



A. 

B. 

C. 

D. 

Answer: B

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Level 2

1. Statement - 1 : Nucleophilicity order in polar-protic solvent is `I^(-)< Br^(-)< Cl^(-) Statement-2 : Due to bigger size of I it is less solvated in polar-protic solvent.

A. Statement-1 is true, statement -2 is true and statement - 2 is correct explanation for statementn-1

B. Statement-1 is true, statement - 2 is true and statement -2 is NOT the correct explanation statement-1.

C. Statement-1 is true, statement-2 is false.

D. Statement-1 is false, statement- 2 is true.

Answer: D

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2. Statement - 1 :

$$CH_3 - CH_2 - Cl + NaI \xrightarrow{\text{Acetone}} CH_3 - CH_2 - I + NaCl \downarrow$$

Statement- 2 : Acetone is polar-aprotic solvent and solubility order of sodium halides decreases dramatically in order NaI > NaBr > NaCl. The last being virtually insoluble in this solvent and a 1° and 2° chloro alkane in acetone is completely driven to the side of Iodoalkane by the precipitation reaction.

A. Statement-1 is true, Statement-2 is true and Statement-2 is correct explanation for statement-1.

B. Statement-1 is true, Statement-2 is true and Statement-2 is Not the correct explanation for statement-1.

C. Statement-1 is true, Statement-2 is false.

D. Statement-1 is false, Statement-2 is true.

Answer: A::C

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3. Encircle whichever of the following:

A. is the stronger nucleophile (aprotic solvent): F^- or I^-

B. is the stronger nucleophile (protic solvent): F^- or I^-

C. is the stronger base : F^- or I^-

D. is the stronger nucleophile (protic solvent) : NH_3, or $NH_2\ NH_2$

(e) is the better leaving group : CH_3COO^- or $CH_3SO_3^-$

Answer:

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4. Encircle whichever of the following:

undergoes S_{N^2} reaction more rapidly,

$C_2H_5 - Br$ or $CH_3 - Br$ or $CH_3 - \overset{Br}{\underset{|}{C}}H - CH_3$

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5. Encircle whichever of the following:

undergoes S_{N1} reaction more rapidly, $CH_3 - Br$ or $CH_3 - \overset{Br}{\underset{|}{C}}H - CH_3$

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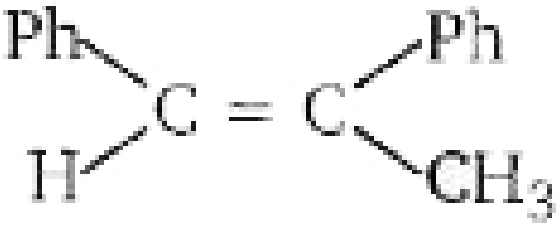
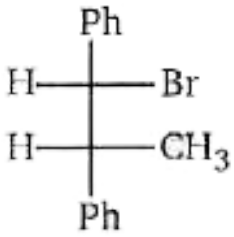
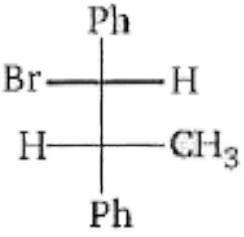
6. Encircle whichever of the following:

undergoes an E_2 reaction to give (Z) - 1,2 - diphenylpropene :





or



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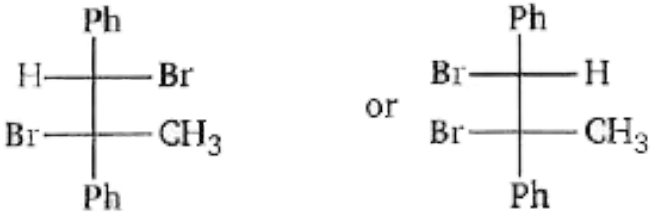
7. Encircle whichever of the following:

reacts with Nal to give (Z) - 1,2 diphenylpropene :



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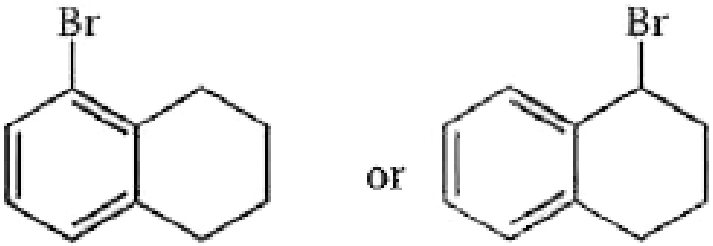
8. Encircle whichever of the following:

undergoes S_{N^1} reaction more rapidly,



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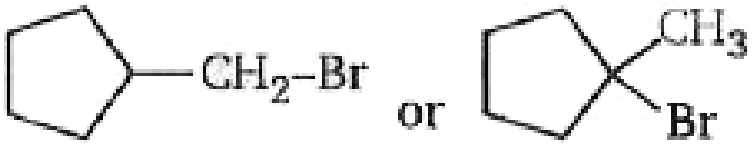
9. Encircle whichever of the following :

undergoes S_{N^2} reaction more rapidly :



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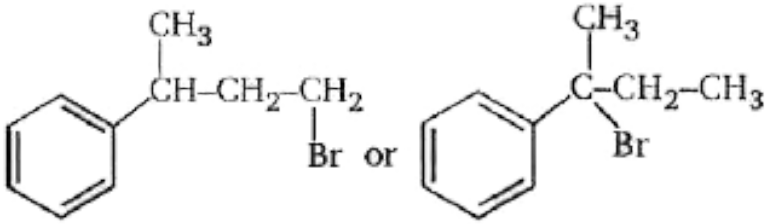
10. Encircle whichever of the following :

undergoes an E_1 reaction more rapidly :



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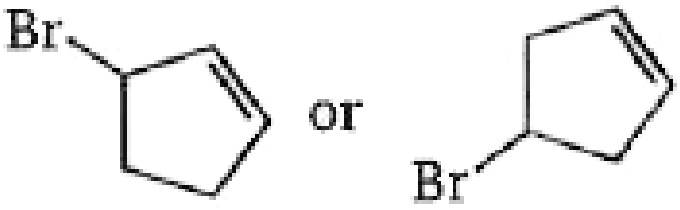
11. Encircle whichever of the following :

undergoes an S_{N1} reaction more rapidly :



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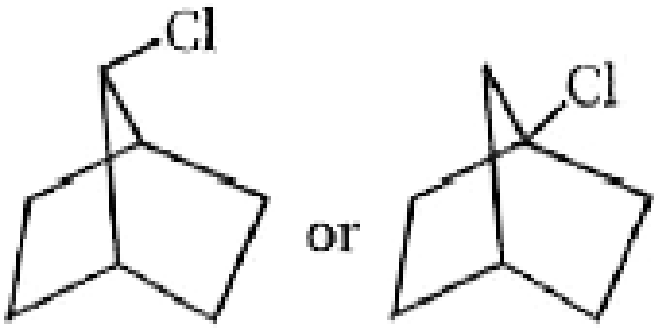
12. Encircle whichever of the following :

undergoes an S_{N2} reaction more rapidly :



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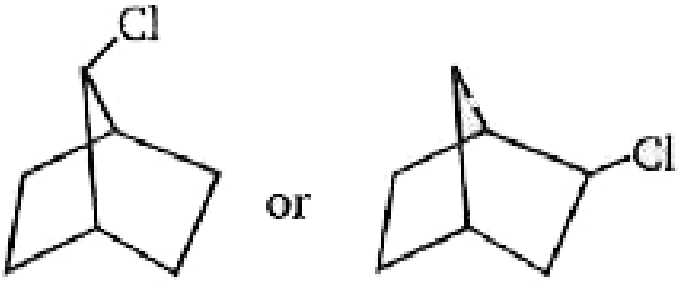
13. Encircle whichever of the following :

undergoes an E_2 reaction more rapidly :



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14. Match the column :

Alkyl halide			Relative rate (S_{N1})		Relative rate (S_{N2})
(a)	CH_3-Br	(p)	1	(w)	1200
(b)	CH_3-CH_2-Br	(q)	1.05	(x)	40
(c)	$CH_3-\underset{\displaystyle CH_3}{\overset{}{\underset{\vert}{CH}}}-Br$	(r)	11	(y)	16
(d)	$CH_3-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\underset{\vert}{\overset{\vert}{C}}}}-Br$	(s)	1,200000	(z)	1

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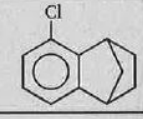
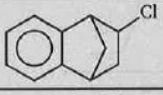
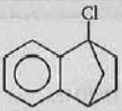
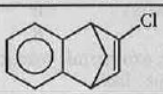
15. Matrix :

Column (I)		Column (II)	
Compound		Type of reaction	
(a)		(p)	S_{N^1} reaction can take place
(b)		(q)	S_{N^2} reaction can take place
(c)		(r)	S_{N^1} is not possible
(d)		(s)	S_{N^2} is not possible

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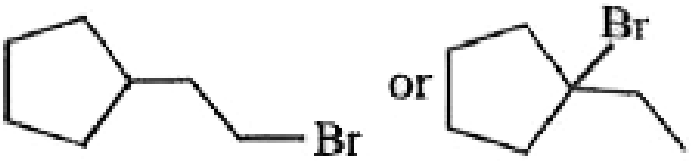
16. Encircle whichever of the following :

undergoes an S_{N^2} reaction more rapidly :



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17. Encircle whichever of the following :

undergoes an S_{N^1} reaction more rapidly :

$(CH_3)_3C - Br$ or $(CH_3)_3C - I$

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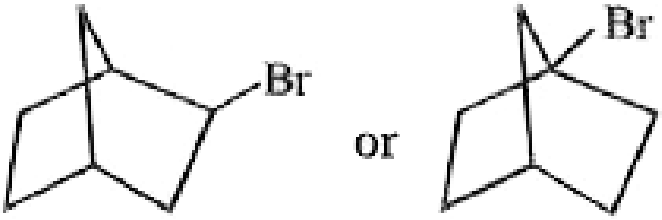
18. Encircle whichever of the following :

undergoes an S_{N^1} reaction more rapidly ,



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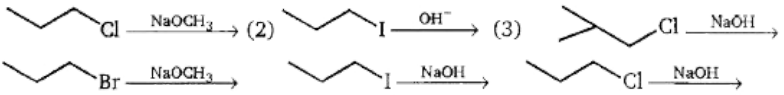
19. Reativity : Circle the reaction that reacts FASTER by S_{N^2} in each pair ,



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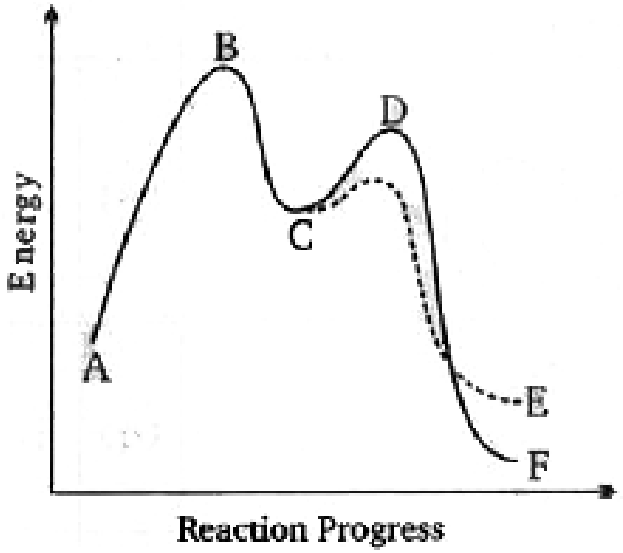
20. Consider the potential energy diagram given below



(X) Name the positions A-D

(Y) Answer the following quesitons :

(i) Both reactoin pathways are :

(ii) Which step is the determining step (RDS) ?

(iii) Which product is most stable ?

(iv) In accordance with Hammonds postulate, exothermic reactions tend to have

A. early transition states that are reactant - like

B. late transition states that are reactant - like

C. early transition states that are product - like

D. late transition states that are product- like.

Answer: A::B::C::D

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21. Select whether the following combinations of reactants will react by substitution $(S_{N^1}$ or S_{N^2} mechanism) elimination $(E_1$ or E_2

mechanism)

A. S_{N^1}

B. S_{N^2}

C. E_1

D. E_2

Answer: A::B

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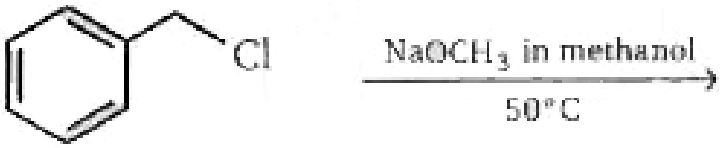
22. Select whether the following combinations of reactants will react by substitution (S_{N^1} or S_{N^2} mechanism) elimination (E_1 or E_2

mechanism)



A. S_{N^1}

B. S_{N^2}

C. E_1

D. E_2

Answer: B

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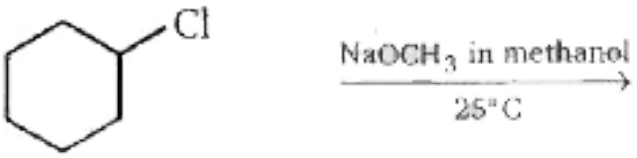
23. Select whether the following combinations of reactants will react by substitution (S_{N^1} or S_{N^2} mechanism) elimination (E_1 or E_2

mechanism)



A. S_{N^1}

B. S_{N^2}

C. E_1

D. E_2

Answer: C::D

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24. Select whether the following combinations of reactants will react by substitution (S_{N^1} or S_{N^2} mechanism) elimination (E_1 or E_2

mechanism)

A. S_{N^1}

B. S_{N^2}

C. E_1

D. E_2

Answer: A::D

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25. Select whether the following combinations of reactants will react by substitution (S_{N^1} or S_{N^2} mechanism) elimination (E_1 or E_2

mechanism)

A. S_{N^1}

B. S_{N^2}

C. E_1

D. E_2

Answer: B

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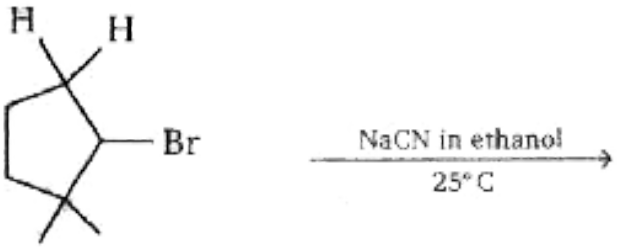
26. Select whether the following combinations of reactants will react by substitution (S_{N^1} or S_{N^2} mechanism) elimination (E_1 or E_2

mechanism)

F. 

A. S_{N^1}

B. S_{N^2}

C. E_1

D. E_2

Answer: B

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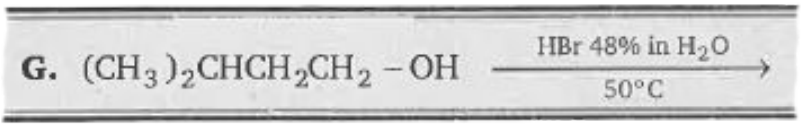
27. Select whether the following combinations of reactants will react by substitution (S_{N^1} or S_{N^2} mechanism) elimination (E_1 or E_2

mechanism)



A. S_{N^1}

B. S_{N^2}

C. E_1

D. E_2

Answer: B

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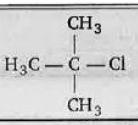
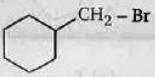
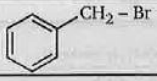
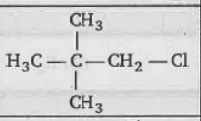
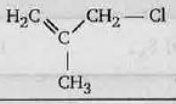
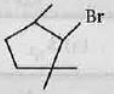
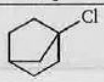
28. Examine the ten structural formulas shown in fig. & select that satify each of the following conditions. Write one or more (a through J) in each answer box.

(a)		(b)		(c)	
(d)	CH_3-I	(e)		(f)	
(g)		(h)		(i)	
(j)					

A. Which compounds give and S_{N^2} substitution reaction on treatment with alcoholic NaSH ?

B. Which compounds give and E_2 elimation reaction on treatment with alcoholic KOH ?

C. Which compounds do not react under either of the previous reaction conditions ?

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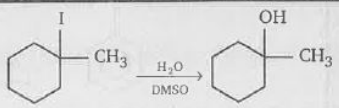
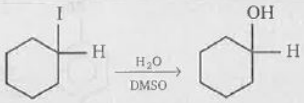
29. Select which reaction from the following reaction pairs will occur faster.

PART - 1	
Reaction A	
Reaction B	

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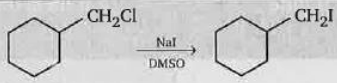
30. Select which reaction from the following reaction pairs will occur faster.

PART - 2	
Reaction C	
Reaction D	

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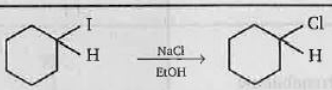
31. Select which reaction from the following reaction pairs will occur faster.

PART - 3	
Reaction E	
Reaction F	

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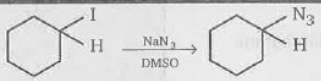
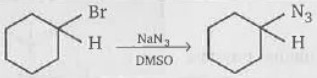
32. Select which reaction from the following reaction pairs will occur faster.

PART - 4	
Reaction G	
Reaction H	

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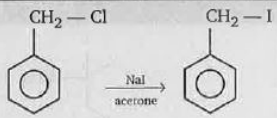
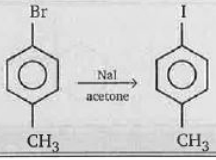
33. Select which reaction from the following reaction pairs will occur faster.

PART - 5	
Reaction I	
Reaction J	

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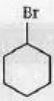
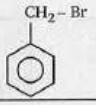
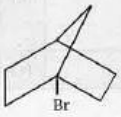
34. Tick your answer in the given box.

	Alkyl Halide	2-D Structure		Expect S_{N^2} (at a reasonable rate)
(a)	1-Bromobutane			Yes
				No
(b)	1- Chlorobutane			Yes
				No
(c)	2-Bromobutane			Yes
				No
(d)	2-Chlorobutane			Yes
				No
(e)	2-Chloro-2-methyl propane			Yes
				No

(f)	Bromocyclohexane			Yes
				No
(g)	Bromobenzene			Yes
				No
(h)	Benzyl bromide			Yes
				No
(i)	1-Bromo-2,2-dimethyl propane			Yes
				No
(j)	Bicyclo compound			Yes
				No
(k)	1-bromotriptycene			Yes
				No

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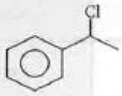
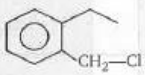
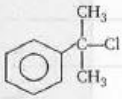
35. Match the column :

	Column-I		Column-II
(a)		(p)	It will uncergo Nucleophilic Substitution reaction
(b)		(q)	It will undergo E_2 reaction
(c)		(r)	It will undergo E_1 reaction
(d)		(s)	It will undergo S_{N^2} reaction
		(t)	It will undergo S_{N^1} reaction

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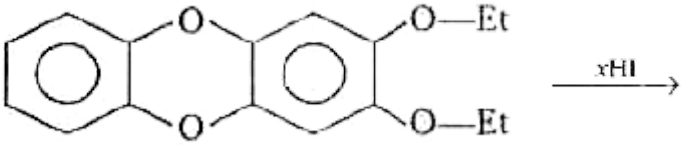
36.



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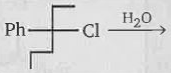
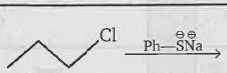
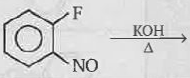
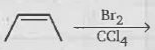
37.

	Column (I)		Column (II)
(a)		(p)	S_{N^1}
(b)		(q)	S_{N^2}
(c)		(r)	Carbocation is intermediate
(d)		(s)	Carbanion is intermediate

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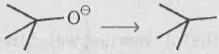
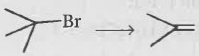
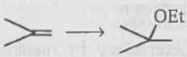
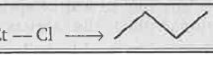
38.

	Column (I) (Reaction sequence)		Column (II) (Reagent required)
(a)		(p)	$EtO^{\ominus}$
(b)		(q)	EtBr
(c)		(r)	$EtOH/H^{\oplus}$
(d)		(s)	Et–Cl/Na ether

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39. Choose the one compound within each set the meets the indicated criterion :

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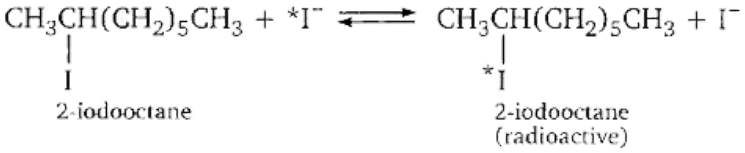
40. Comprehension

The first demonstration of the stereochemistry of the S_{N^2} reaction was carried out in 1934 by Prof. E.D Hughes and his colleagues at the University of London. They allowed (R) -2- iodooctane to react with radioactive iodide ion $(^*I^-)$



The rate of substitution (rate constant K_5) was determined by measuring the rate of incorporation of radioactivity into the alkyl halide. The rate of loss of optical acitivity from the alkyl halide (rate constant K_0) was also determined under the same conditions:

What ratio K_0 / K_s is predicted for each of the following stereochemical

scenarios :

For inversion reaction :

A. $\frac{K_O}{K_S} = 1$

B. $\frac{K_O}{K_S} < 1$

C. $\frac{K_O}{K_S} > 1$

D. can not be predicted

Answer:

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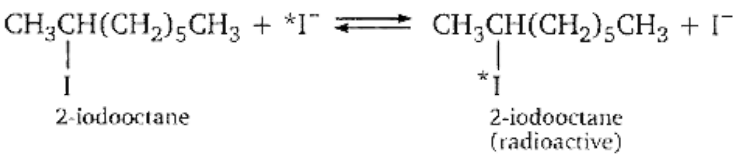
41. Comprehension

The first demonstration of the stereochemistry of the S_{N^2} reaction was carried out in 1934 by Prof. E.D Hughes and his colleagues at the University of London. They allowed (R) -2- iodooctane to react with radioactive iodide ion $\left({}^*I^-\right)$



The rate of substitution (rate constant K_5) was determined by measuring the rate of incorporation of radioactivity into the alkyl halide. The rate of loss of optical acitivity from the alkyl halide (rate constant K_0) was also determined under the same conditions:

What ratio K_0 / K_s is predicted for each of the following stereochemical scenarios :

For equal amounts of both retention and inversion ?

A. $\frac{K_O}{K_S} = 1$

B. $\frac{K_O}{K_S} < 1$

C. $\frac{K_O}{K_S} > 1$

D. can not be predicted

Answer:

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