

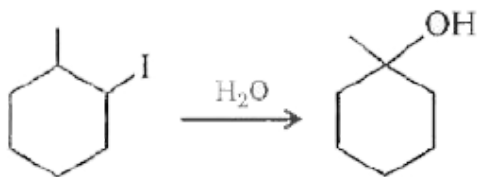
CHEMISTRY

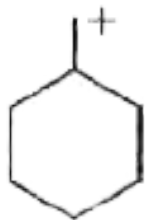
BOOKS - MS CHOUHAN

ALKYL HALIDES (SUBSTITUTION REACTIONS)

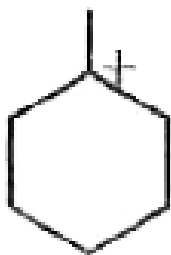
Level 1

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

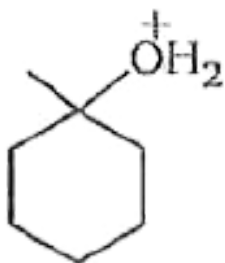




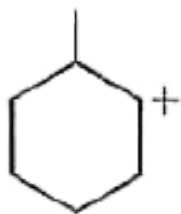
A.



B.

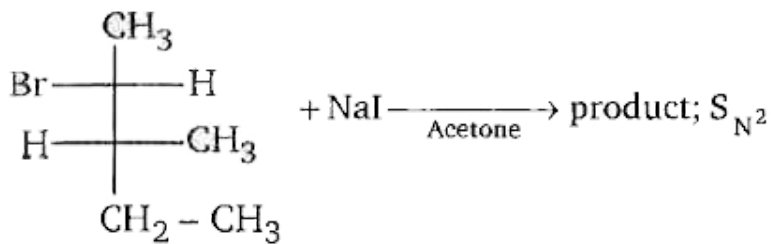


C.



D.

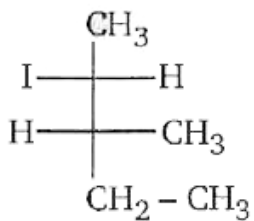
Answer: A



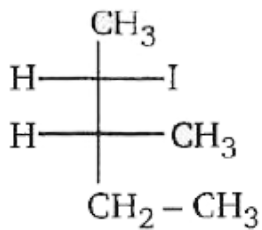
2.

product of

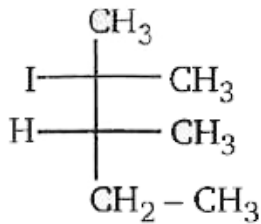
the reaction is :



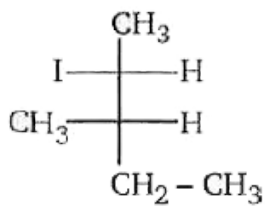
A.



B.



C.

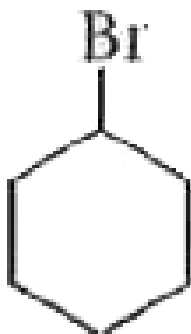


D.

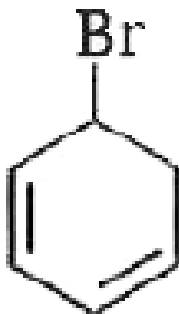
Answer: B

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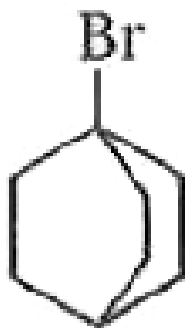
3. The rate of SN^2 will be negligible in



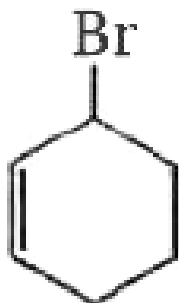
A.



B.



C.



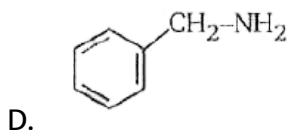
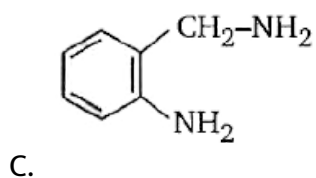
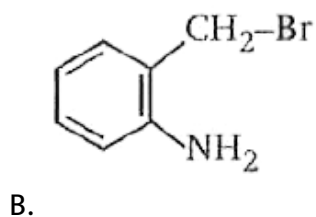
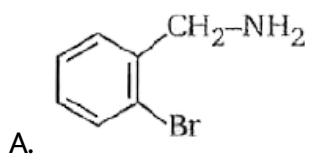
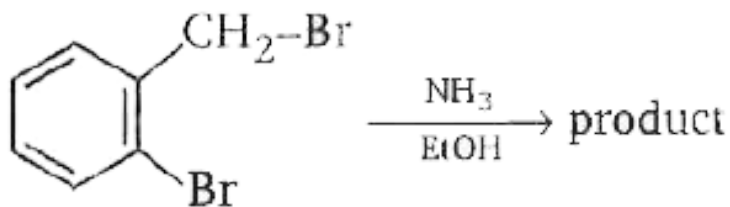
D.

Answer: C



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

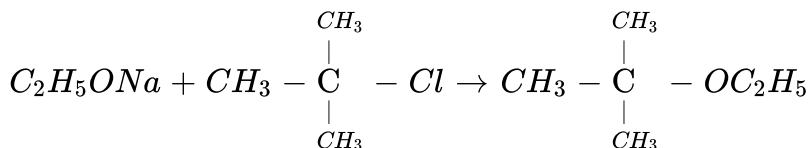


Answer: A



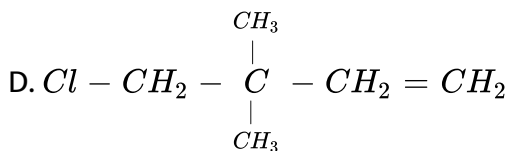
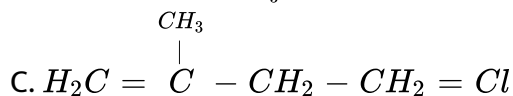
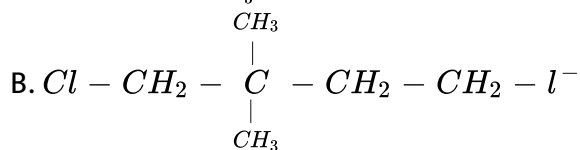
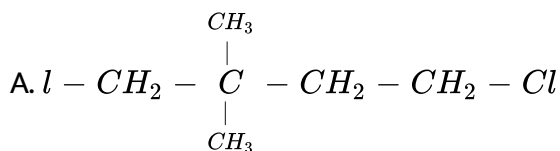
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5. The following is not an appropriate reaction for the preparation of t-butyl ethyl ether.



(i) What would be the major product of this reaction ?

(ii) Write a suitable reaction for the preparation of t-butylethyl ether.



Answer: B



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6. Which of the following expressions is representative of the rate law for a S_N2 reaction ?

A. Rate = k [electrophile]

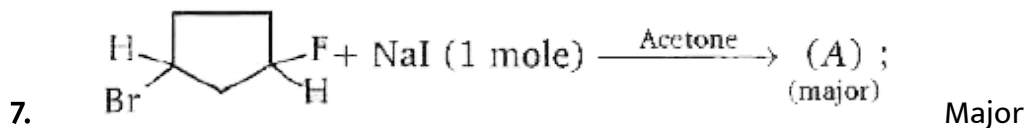
B. Rate = k [electrophile] [nucleophile]

C. Rate = k [nucleophile]²

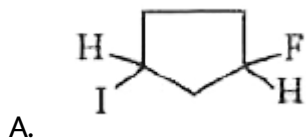
D. Rate = k[electrophile]²

Answer: B

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product of this reaction is :





B.



C.

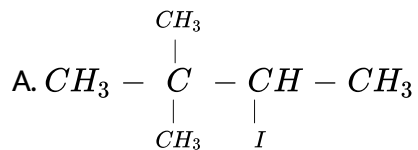


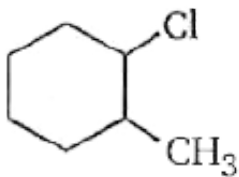
D.

Answer: B

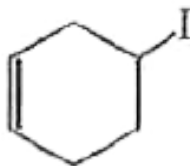
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8. Which of the following alkyl halide undergo rearrangement in S_N1 reaction ?





B.



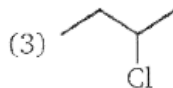
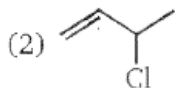
C.

D. All of these

Answer: D

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9. Arrange the following three chlorides in decreasing order towards S_N1 reactivity.



A. $1 > 2 > 3$

B. $2 > 3 > 1$

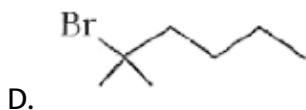
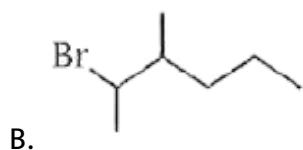
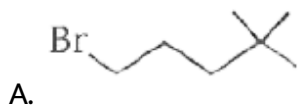
C. $2 > 1 > 3$

D. $3 > 2 > 1$

Answer: B

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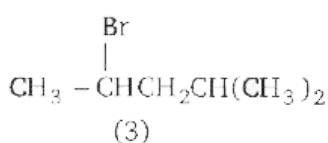
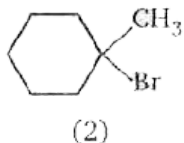
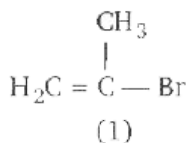
10. Which one of the following undergoes nucleophilic aromatic substitution at the fastest rate ?



Answer: A

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



A. $2 > 1 > 3$

B. $1 > 2 > 3$

C. $2 > 3 > 1$

D. $1 > 3 > 2$

Answer: C

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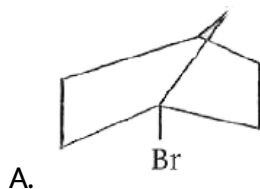
12. The reaction of 4-bromobenzyl chloride with sodium cyanide in ethanol leads to the formation of :

- A. 4-bromobenzyl cyanide
- B. 4-cyanobenzyl chloride
- C. 4-cyanobenzyl cyanide
- D. 4-bromo-2-cyanobenzyl chloride

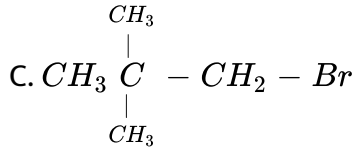
Answer: A

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



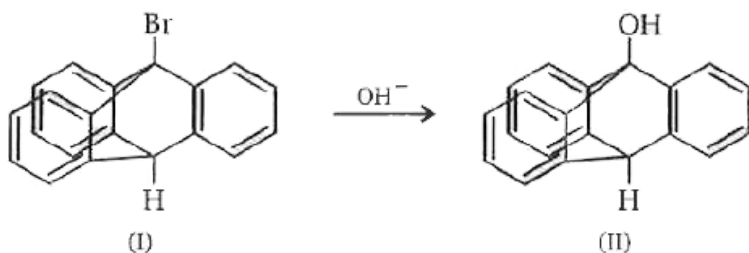
B. Ph-Br



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

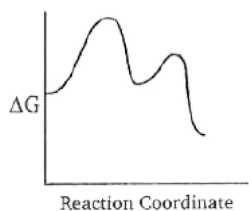
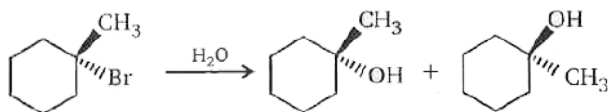
C. takes place both by S_N^1 and S_N^2

D. does not take place

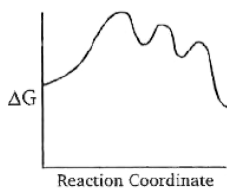
Answer: D

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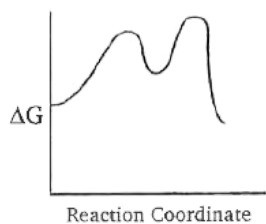
15. Which is the correct reaction coordinate diagram for the following solvolysis reaction ?



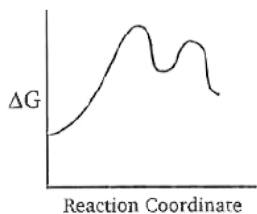
A.



B.



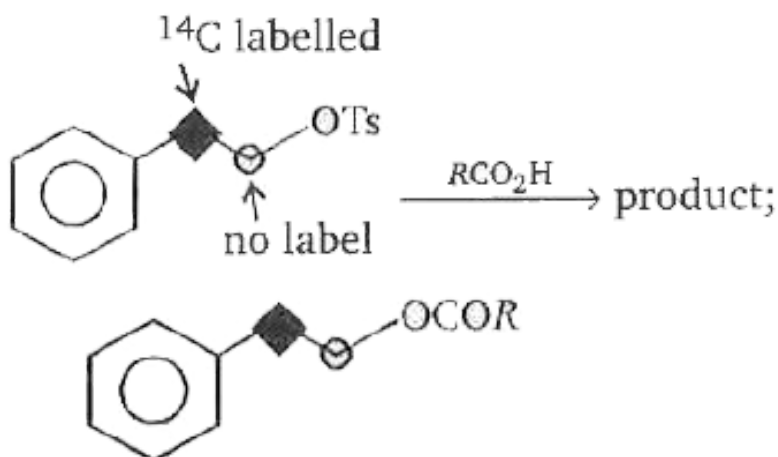
C.



D.

Answer: B

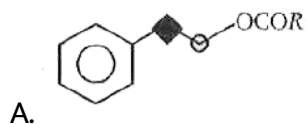
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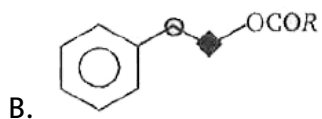


16.

product,

Product of this reaction is



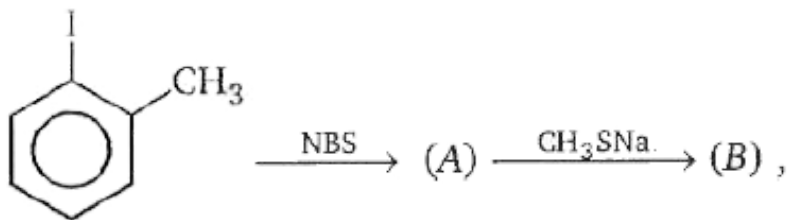


C. both (a) and (b)

D. None of these

Answer: C

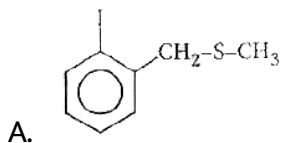
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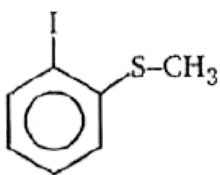


17.

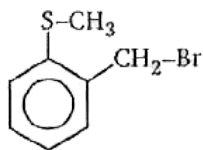
Product (B)

is :





B.



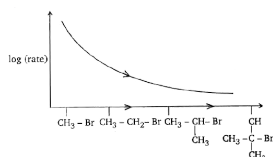
C.

D. None of these

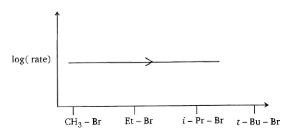
Answer: A

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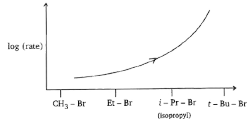
18. Which of the following represents the correct graph for S_N2 reaction ?



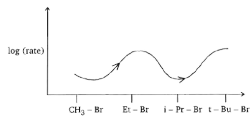
A.



B.



C.



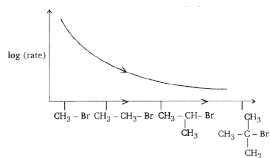
D.

Answer: A

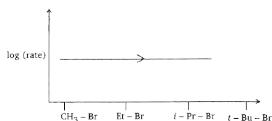


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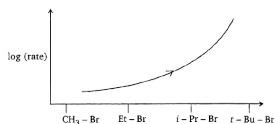
19. Which of the following graph represents correct graph for S_N1 reaction :



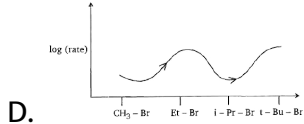
A.



B.



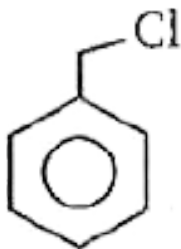
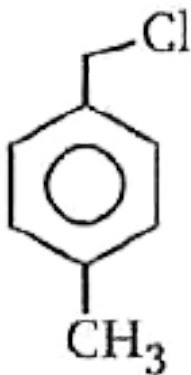
C.

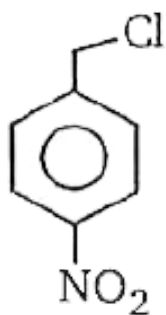
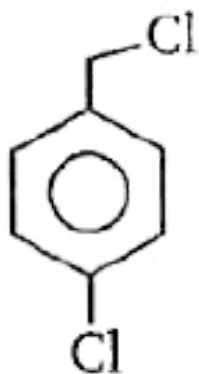


Answer: C

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20. Which of the following is most reactive towards SN^1 reaction

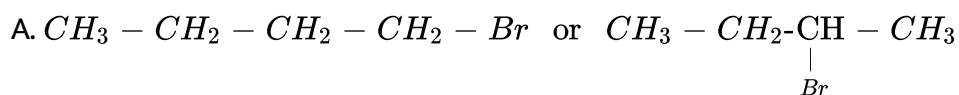


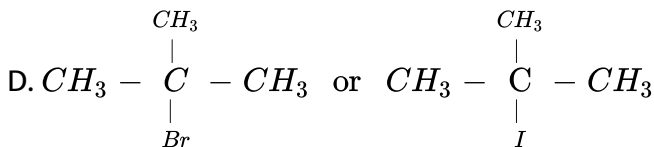
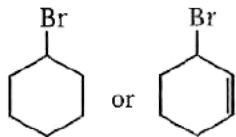
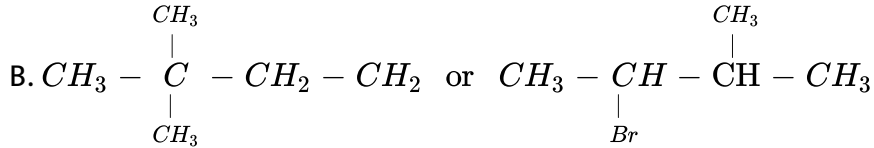


Answer: D

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21. Among the given pairs in which pair, first compound has higher boiling point than second ?

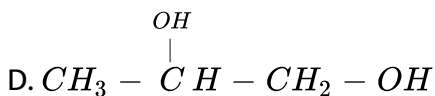
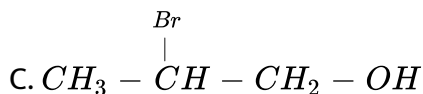
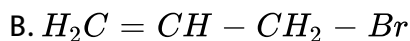
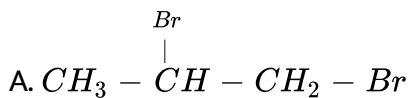
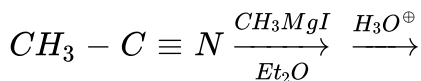




Answer: B

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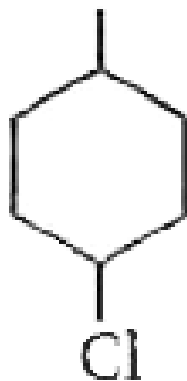
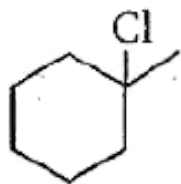
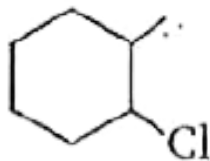
22. What is the major product of the following reaction ?



Answer: A

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23. S_N1 and S_N2 products are same with (excluding stereoisomer):



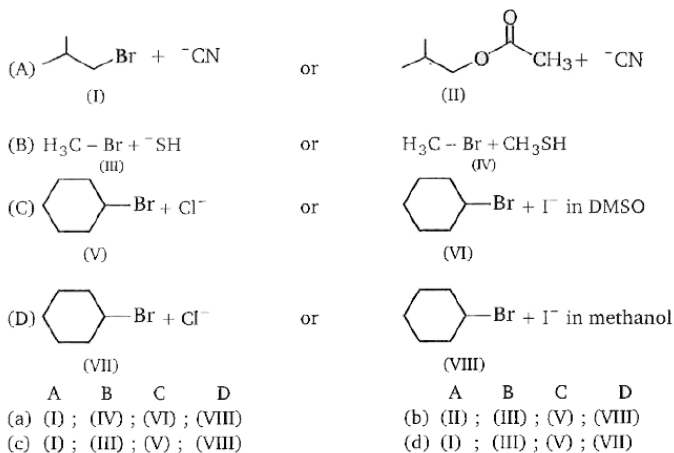
C.



Answer: C

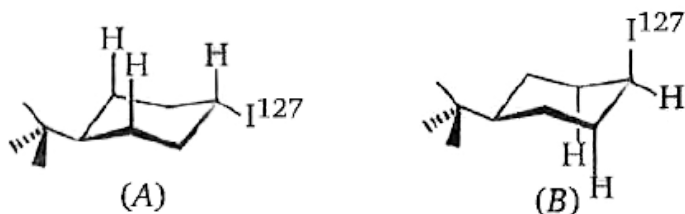
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24. Consider the nucleophilic attacks given below. Select in each pair that shows the greater S_N2 reaction rate.



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25. Which of the two stereoisomers of 4-*t*-butylcyclohexyl iodide ($^{127}\text{I}^-$) will undergo S_N2 substitution with $^{128}\text{I}^-$ faster, and why?

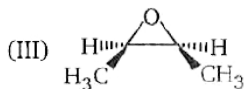
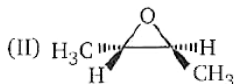
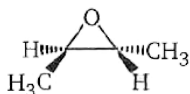


- A. A will react faster because it is the more stable of the two isomers
- B. A will react faster because it will yield a more stable product, and the transition state for both reactions is of the same energy
- C. A will react faster because the approach of $^{128}\text{I}^-$ can depart unhindered.
- 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_N2 reaction. Taking into consideration the stereochemical consequences of the reaction mechanism involved, choose the final product(s) of these transformations.



A. (I) only

B. (II) only

C. (III) only

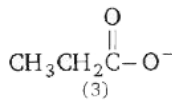
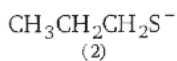
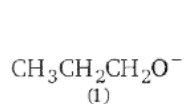
D. Equal amounts of (I) and (II)

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. $3 > 1 > 2$

B. $2 > 3 > 1$

C. $1 > 3 > 2$

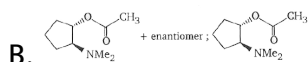
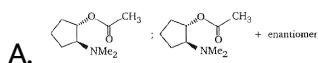
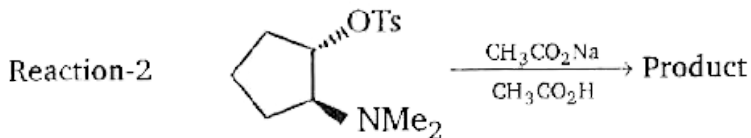
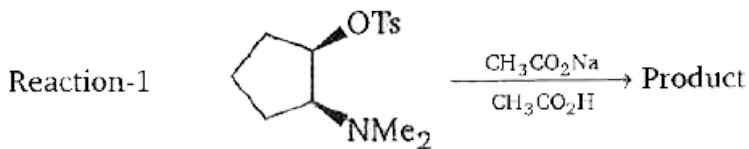
D. $2 > 1 > 3$

Answer: D



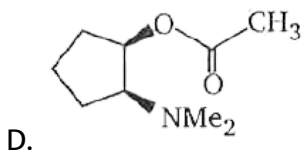
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28. Identify products of the given reactions :



single product is obtained in both the

reactions

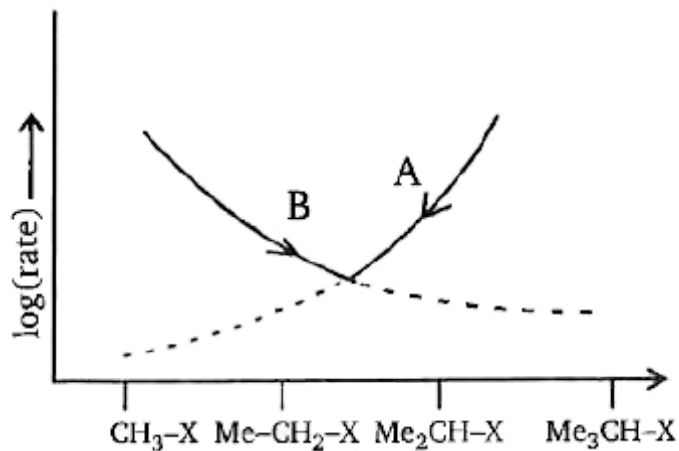


single product obtained in both the reactions

Answer: A

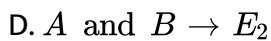
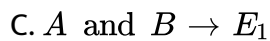
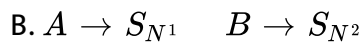
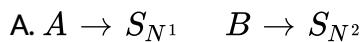


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29.

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

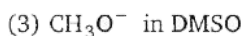
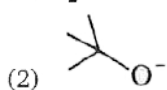
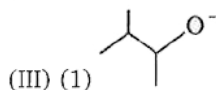
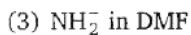
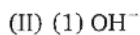
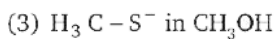
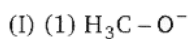


Answer: A



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



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

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

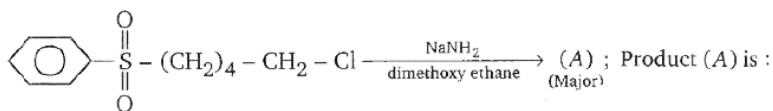
C. I,1, II,2 , III,1

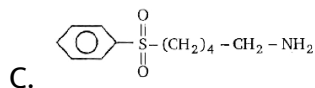
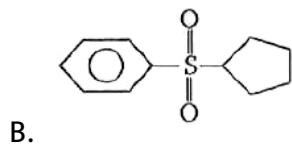
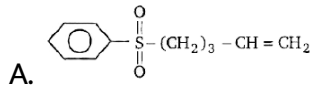
D. I,3 , II, 1 , III,3

Answer: D

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31.



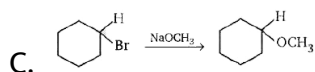
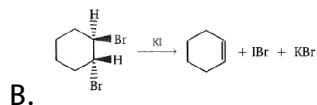
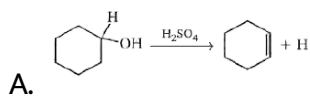


D. None of these

Answer: B

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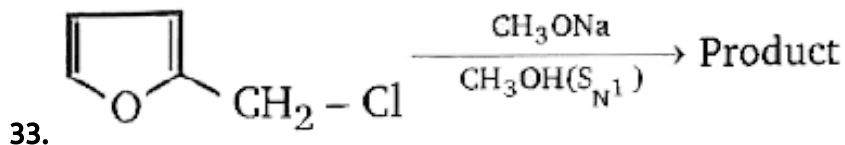
32. Which of the following reaction is an elimination reaction ?



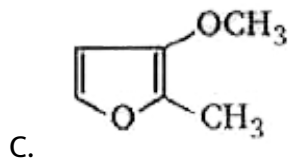
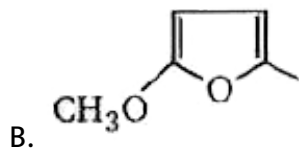
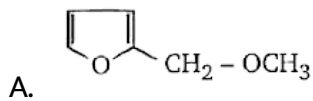
D. both (a) and (b)

Answer: D

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



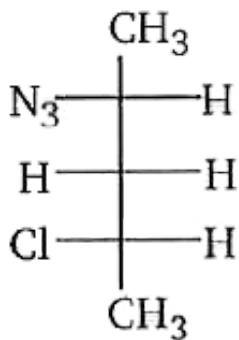
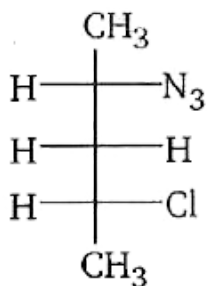
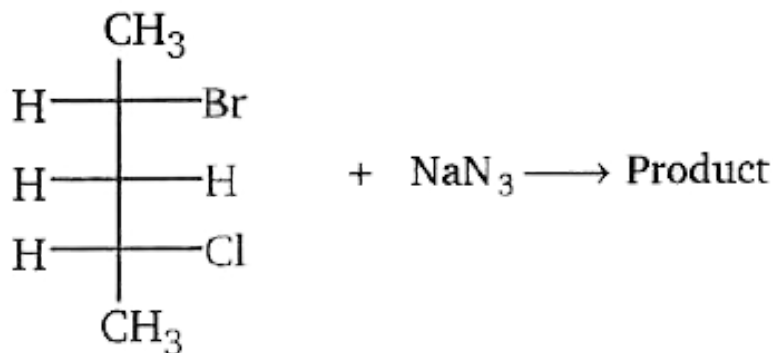
D. All of these

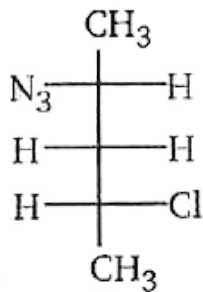
Answer: D



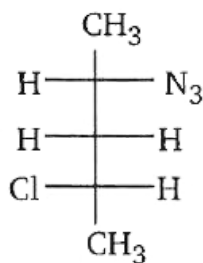
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34. What is the principal product of the following reaction ?





C.

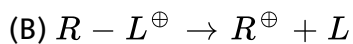
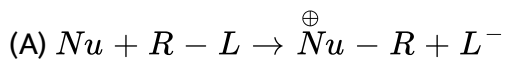


D.

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. increases

B. decrease

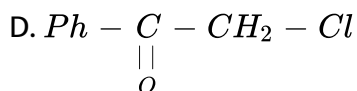
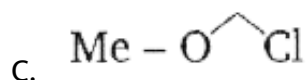
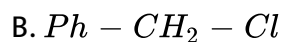
C. constant

D. can not predict

Answer: A

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36. Which one of the following is more reactive towards S_N2 reaction?

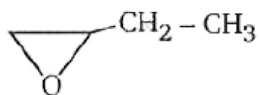
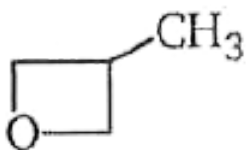
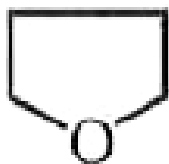


Answer: D

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

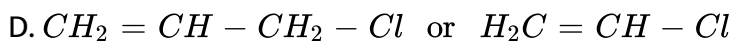
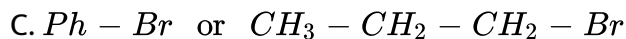
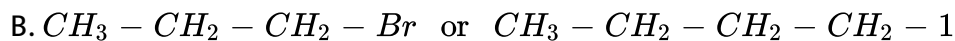
Product (B) of the above reaction is :



Answer: B

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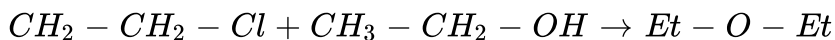
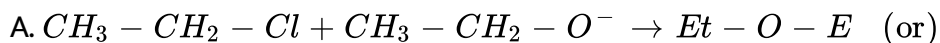
38. In the given pairs of alkyl-halide, in which pair the first compound is more reactive than second compound toward S_N2 reaction ?

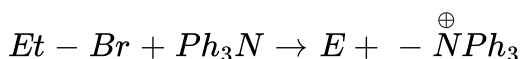
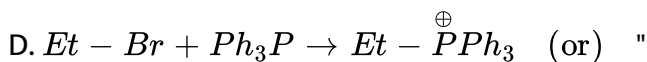
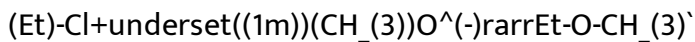
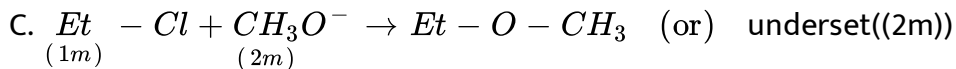
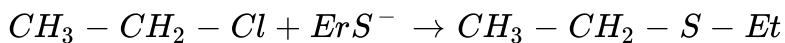
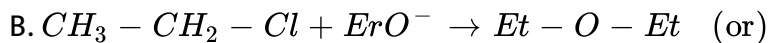


Answer: D

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39. In the given pair of compound, in which pair the second compound is more reactive than first toward S_N2 reaction

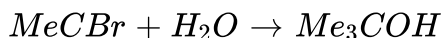
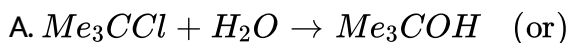
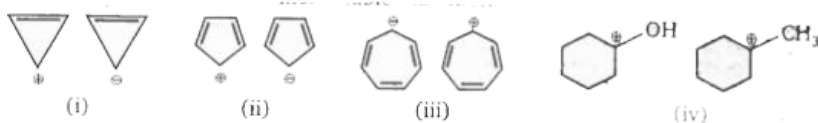




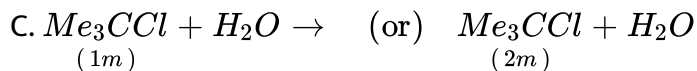
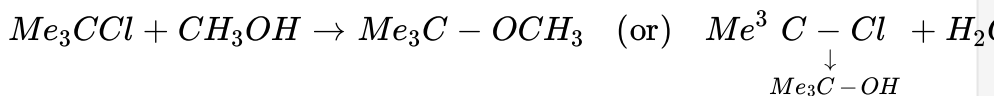
Answer: B

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40. In which pair second ion is more stable than first?



B.



D. All of these

Answer: D



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41. Which is a true statement concerning the transition state of an S_N2 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_{N2} 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_{N2} 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

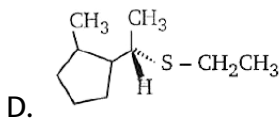
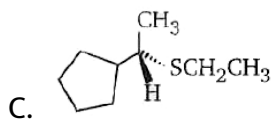
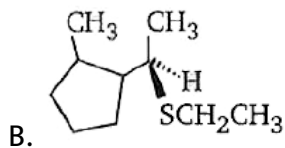
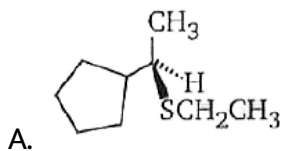
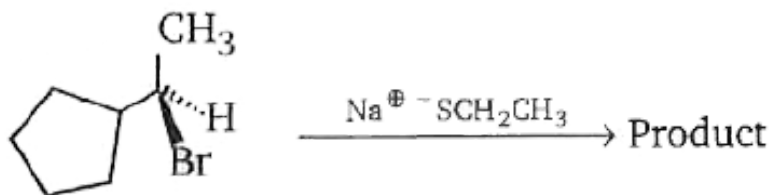
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44. Increasing the concentration of an electrophile in a typical S_N2 reaction by a factor of 3 and the concentration of the nucleophile by a factor of 3 will change the reaction rate to :

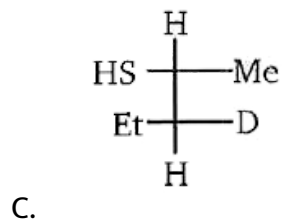
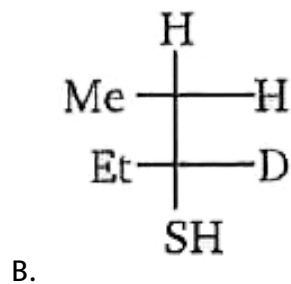
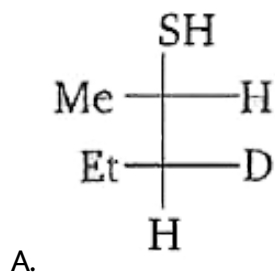
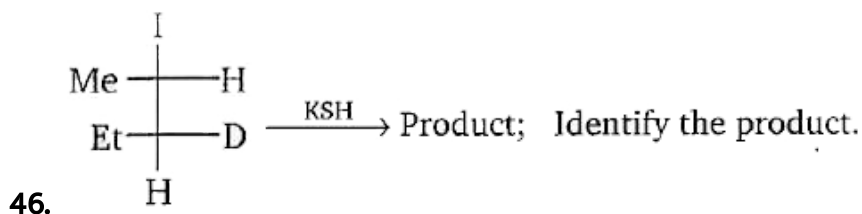
- A. increase by a factor of 6
- B. increase by a factor of 9
- C. decrease by a factor of 3
- D. remain about the same

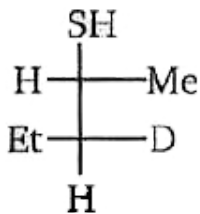
Answer: B

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



Answer: C



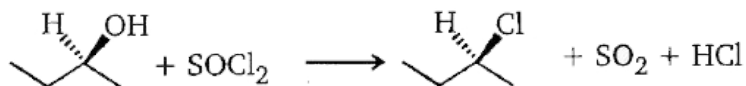


D.

Answer: D

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47. The reaction,



proceeds by

the..... mechanism.

A. S_N^i

B. S_N^2

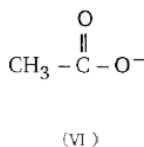
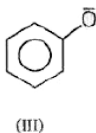
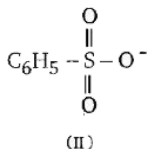
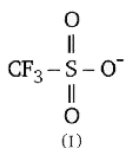
C. S_E^2

D. S_N^1

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 > III > IV

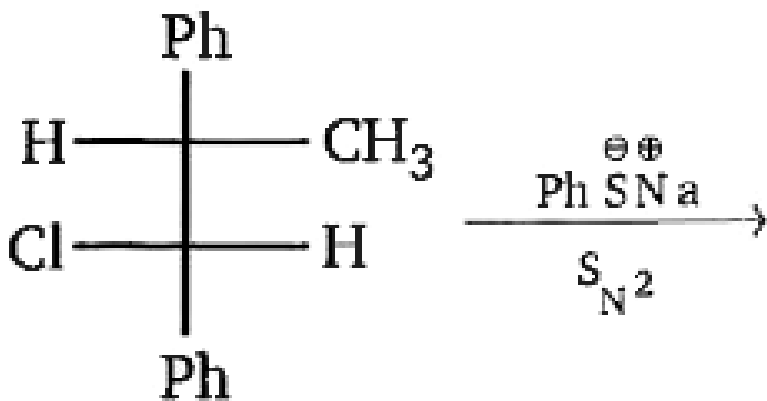
B. I > II > IV > III

C. IV > I > II > III

D. IV > III > II > I

Answer: B

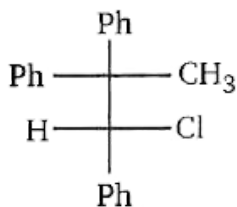
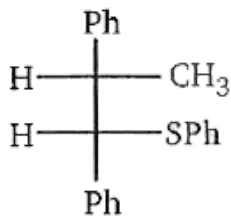
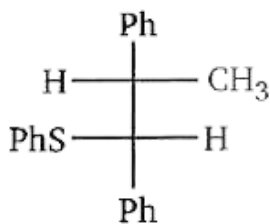
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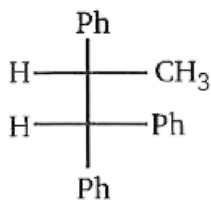


49.

Principal

organic product of the reaction will be :





D.

Answer: B

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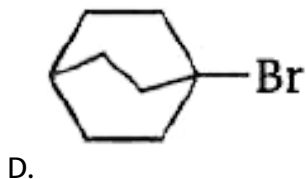
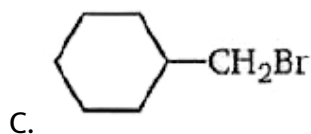
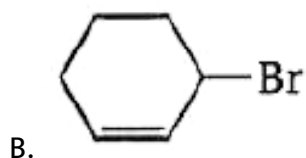
50. Reaction of R-2-butanol with p-toluenesulphonyl chloride in pyridine followed by reaction with LiBr gives:

- 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 $S_N(1)$ reaction most rapidly is :



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 SN1 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

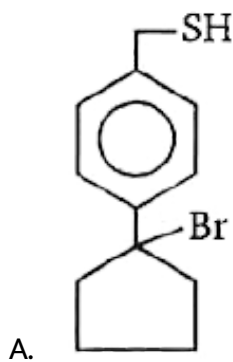
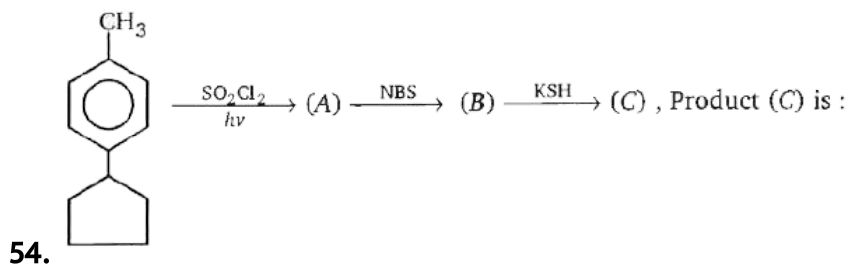
B. 5 only

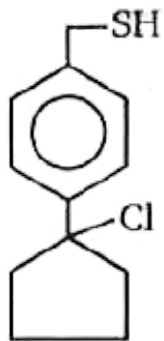
C. 2, 3, 5

D. 3 only

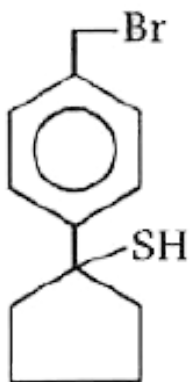
Answer: A

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B.



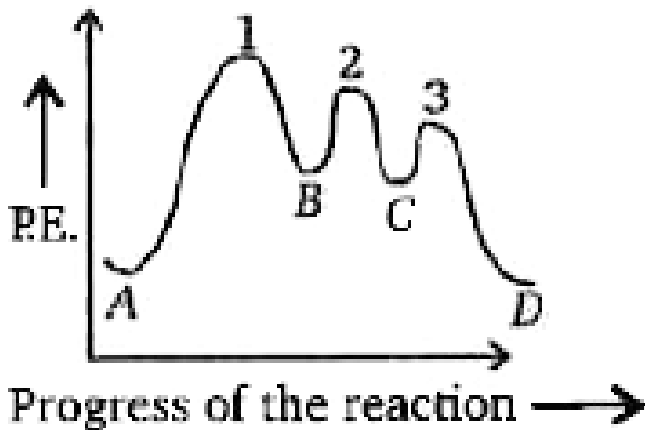
C.



D.

Answer: B

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55.

A. $A \rightarrow B$

B. $B \rightarrow C$

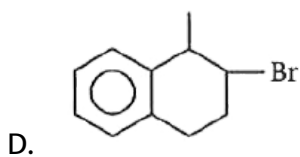
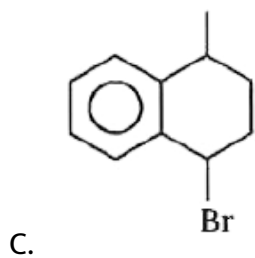
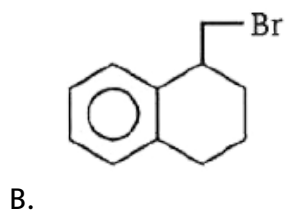
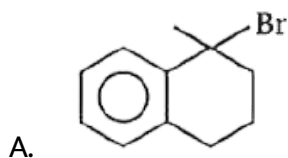
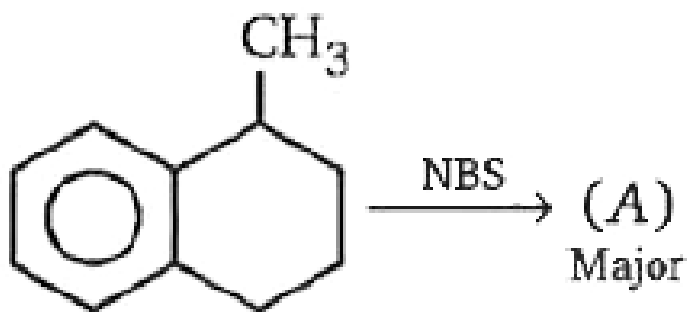
C. $C \rightarrow D$

D. can not predict

Answer: A

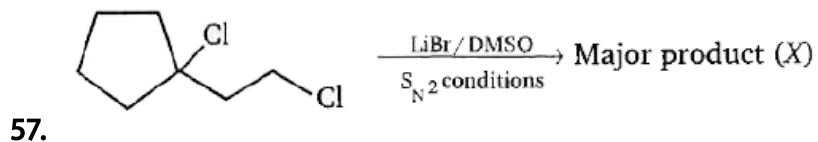


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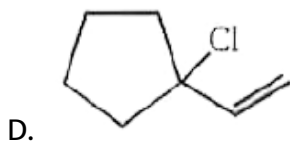
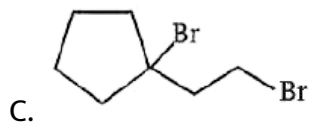
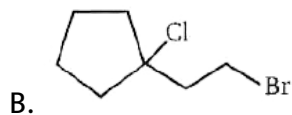
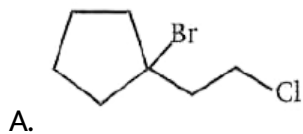


Answer: A

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The product X is :



Answer: B



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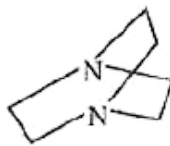
58. Relative rate of reaction of the following amine with methyl iodide is:



(A)



(B)



(C)

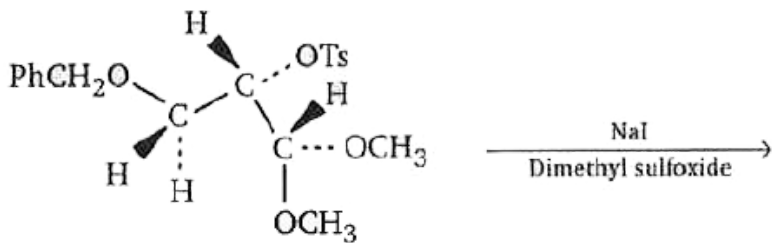
A. $A > B > C$

B. $A > C > B$

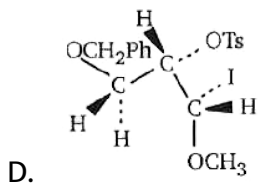
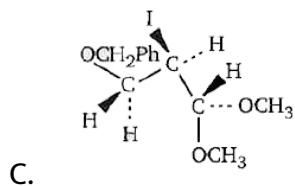
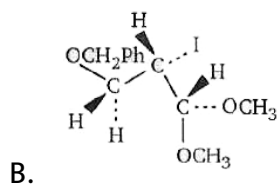
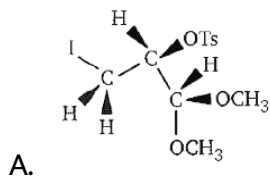
C. $B > C > A$

D. $B > A > C$

Answer: C



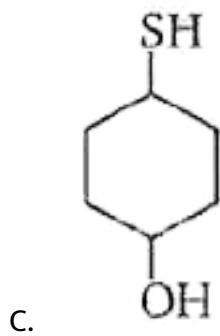
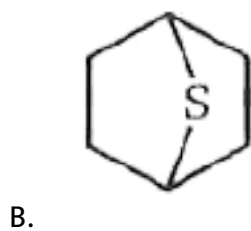
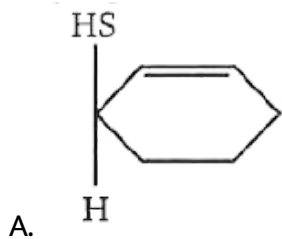
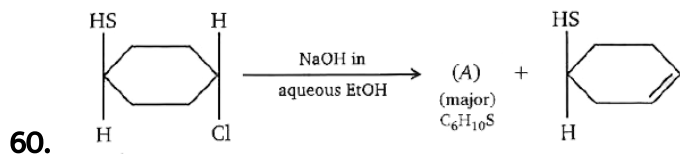
59.

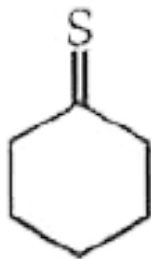


Answer: C



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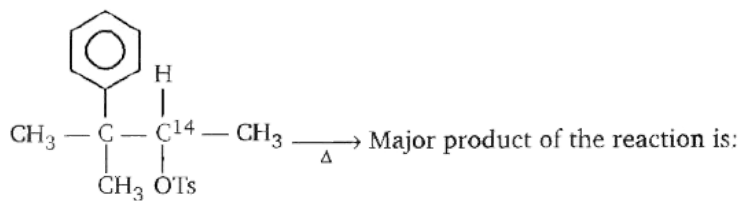


D.

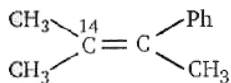
Answer: B

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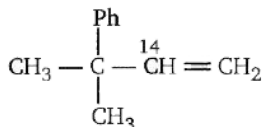
61.



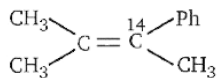
A.

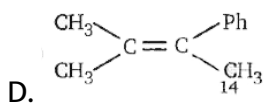


B.



C.

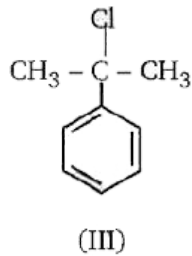
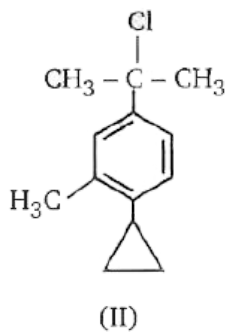
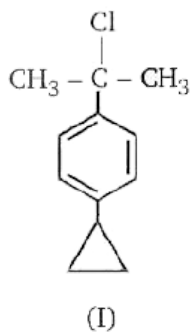




Answer: C

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



A. II > III > I

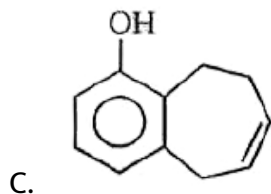
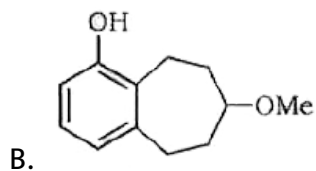
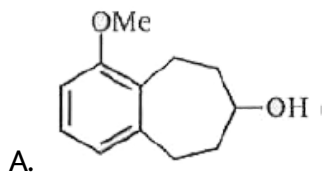
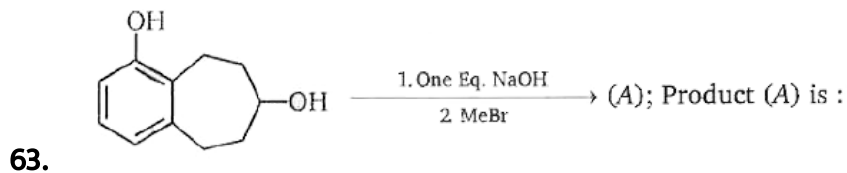
B. I > II > III

C. III > II > I

D. II > I > III

Answer: D

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D. None of these

Answer: A



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64. (R)-2-octyl tosylate is solvolyzed in water under ideal S_N1 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

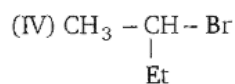
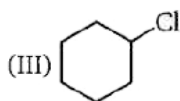
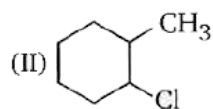
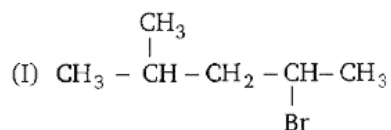
D. 2,4

Answer: C

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66. Among the given halides, which one will give same product in both

S_N1 and S_N2 reactions.



A. (III) only

B. (I) & (II)

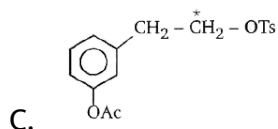
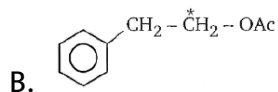
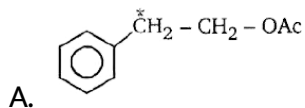
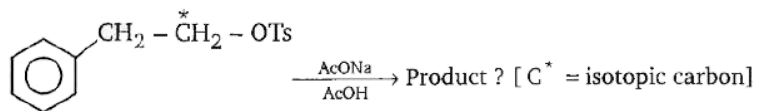
C. (III) & (IV)

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

Answer: D

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

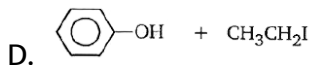
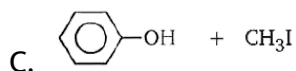
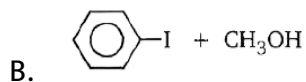
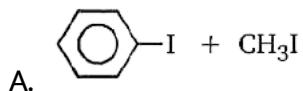


D. both (a) and (b)

Answer: D

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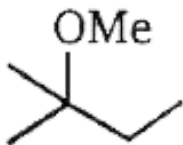
68. Anisole reflux with excess conc. HI to give Product



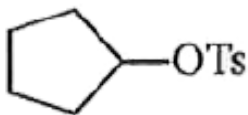
Answer: C

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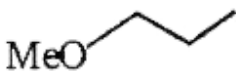
69. Which of the following compounds would react faster with NaCN in an S_N2 reaction ?



A.



B.



C.



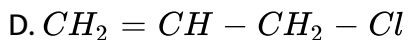
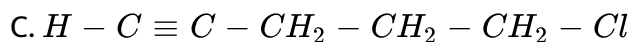
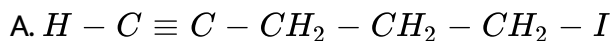
D.

Answer: D

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

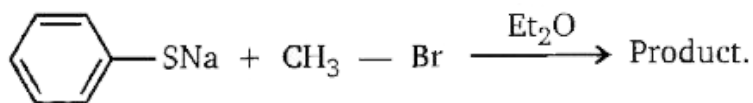
(A) is :



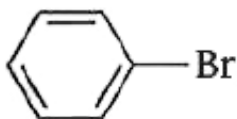
Answer: C

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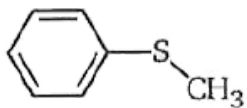
71. What is the major product obtained in the following reaction



A.



B.



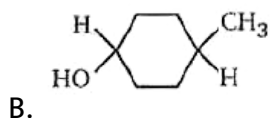
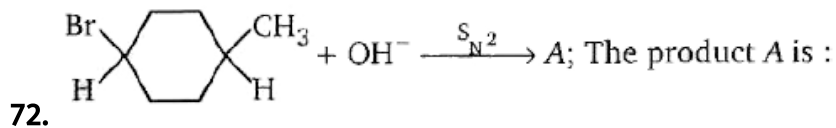
C.



D.

Answer: C

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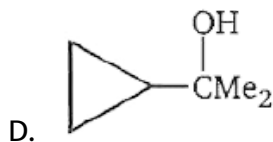
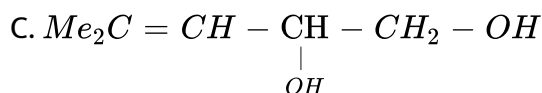
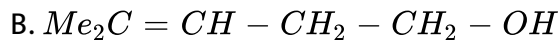
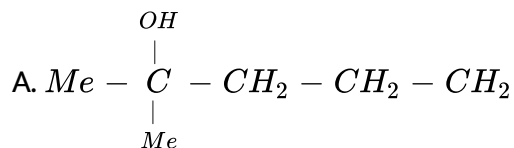
C. Both (a) and (b) are correct

D. None is correct

Answer: B

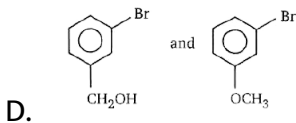
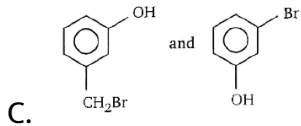
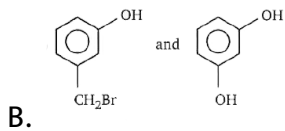
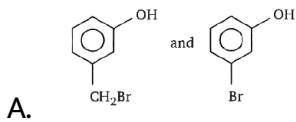
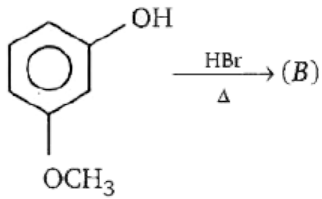
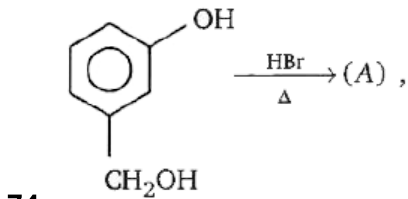
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73. $Me_2C = CH - CH_2 - CH_2 - Cl \xrightarrow[CaCO_3]{H_2O}$ (X), Major product of the reaction is :



Answer: D

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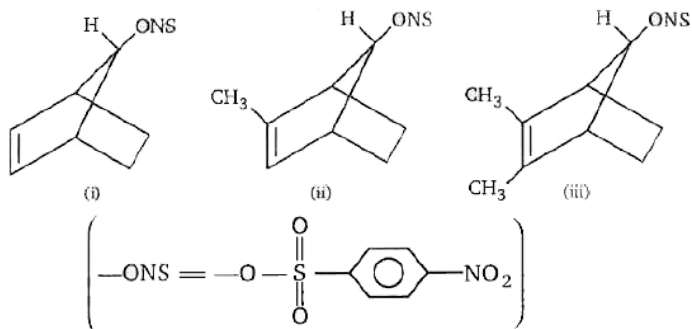


Answer: B



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75. Relative rate of reaction with H_2O .



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

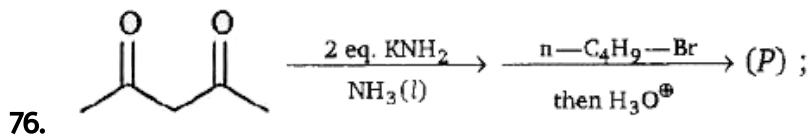
B. (ii) > (i) > (iii)

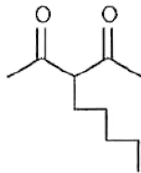
C. (iii) > (ii) > (i)

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

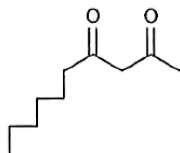
Answer: C

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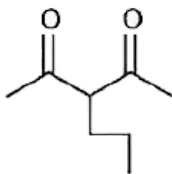




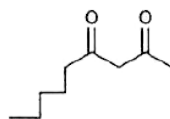
A.



B.



C.

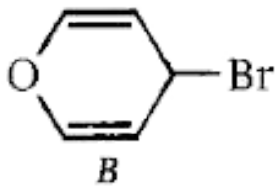
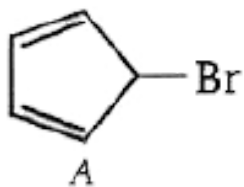


D.

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 SN^1 reaction ?

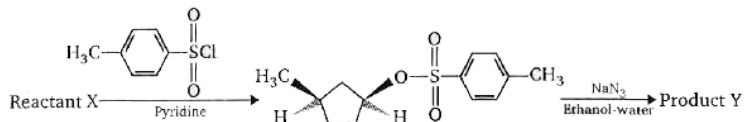


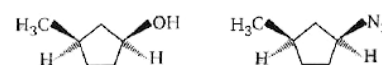
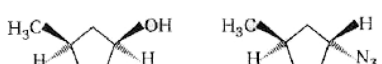
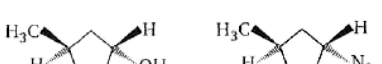
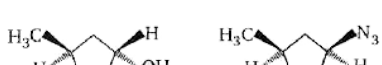
- A. A reacts faster than B
- B. B reacts faster than A
- C. Both A and B reacts at the same rate
- D. Neither A nor B reacts

Answer: B

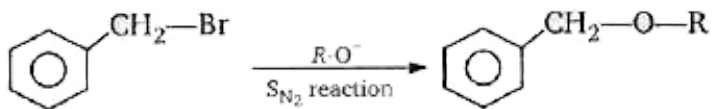
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78. What are reactant X and product Y in the following sequence of reactions ?

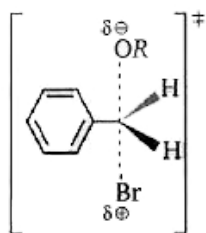


- Reactant X Product Y
- (a) 
- (b) 
- (c) 
- (d) 

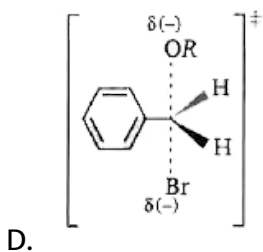
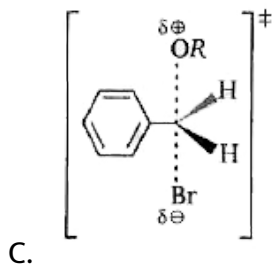
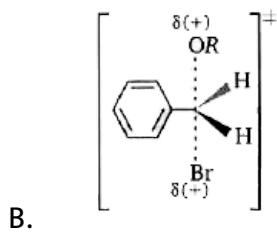
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79.



A.



Answer: D

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

A. Nucleophilic addition

B. Nucleophilic substitution

C. Electrophilic addition

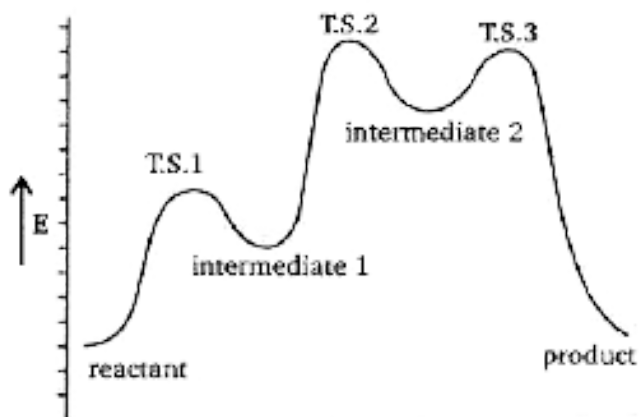
D. Electrophilic substitution

Free radical substitution

Answer: B

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81. Transition state 2 is structurally most likely as :



A. intermediate 1

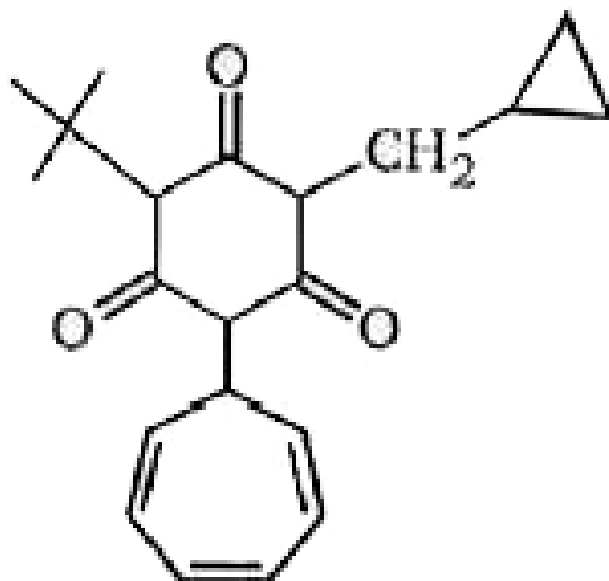
B. transition state 3

C. intermediate 2

D. product

Answer: C

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82.

A. 1

B. 2

C. 3

D. 4

Answer: B

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83. What is the stereochemical result of S_N^1 and S_N^2 reactions ?

A. Both stereospecific

B. Both stereoselective

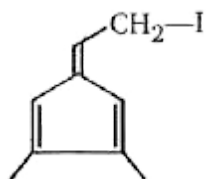
C. Stereoselective and stereospecific respectively

D. Stereospecific and stereoselective respectively

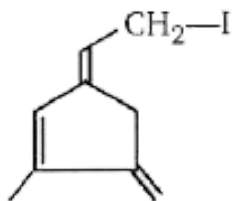
Answer: B::C

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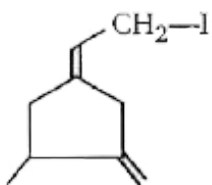
84. Most reactive halide towards S_N1 reaction is



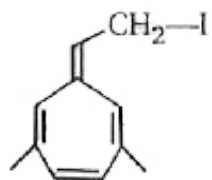
A.



B.



C.

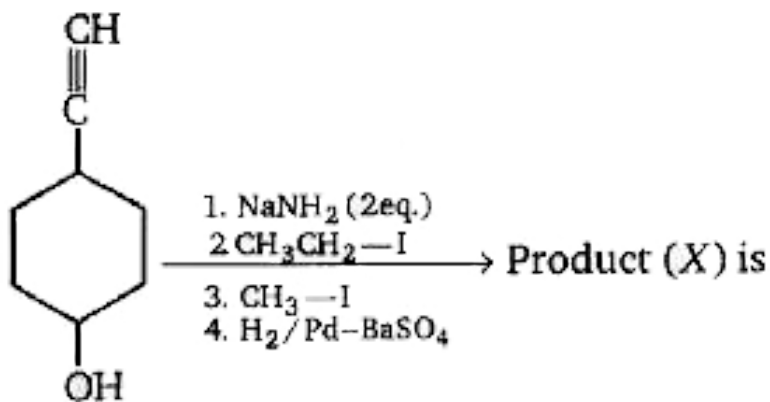


D.

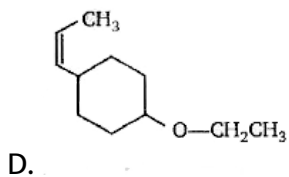
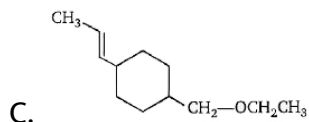
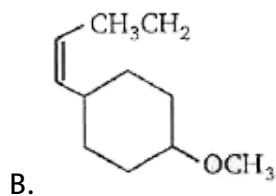
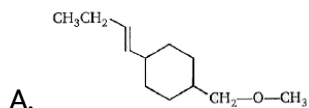
Answer: D



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85.



Answer: B

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86. Following reaction is an example of :

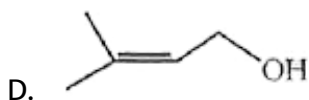
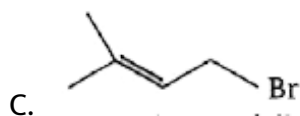
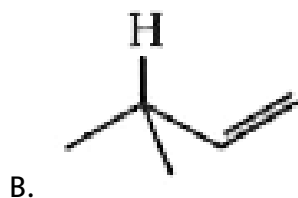
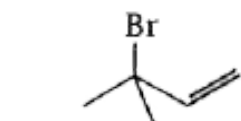
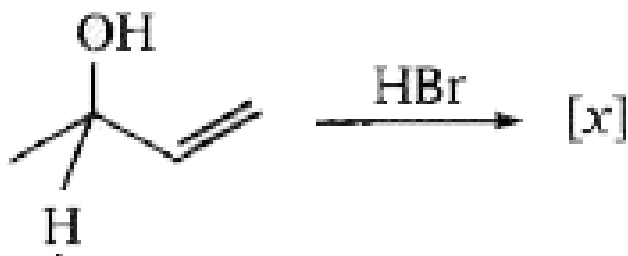


- A. S_N2 Reaction
- B. S_N1 Reaction
- C. Electrophilic Addition
- D. S_N - NGP

Answer: A

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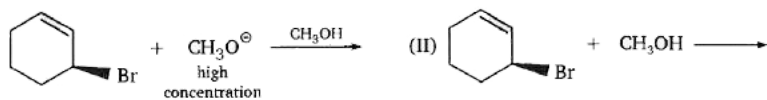
87. The major product of the following reaction : :



Answer: C

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



A. S_N1, S_N1

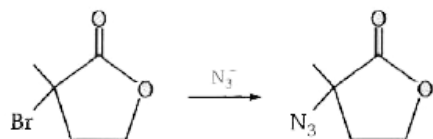
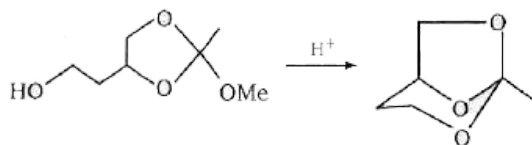
B. S_N1, S_N2

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_{N1} , S_{N1}

B. S_{N1} , S_{N2}

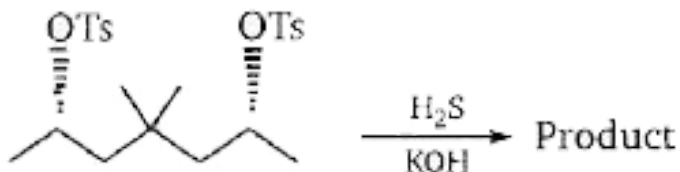
C. S_{N2} , S_{N1}

D. S_{N2} , S_{N2}

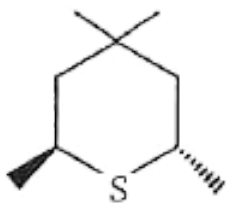
Answer: C



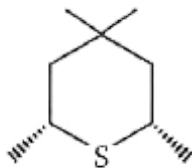
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A.



B.



C.



D.



Answer: B



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Level 2

1. The order of the nucleophilicity of F^- , Cl^- , Br^- and I^- in protic solvents is

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 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 :



Statement- 2 : Acetone is polar-protic solvent and solubility order of

sodium halides decreases dramatically in order $\text{NaI} > \text{NaBr} > \text{NaCl}$. 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): For I

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

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

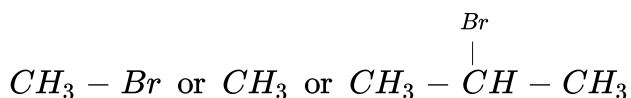
(e) is the better leaving group : CH_3COO^- or $CH_3SO_3^-$

Answer:

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4. Encircle whichever of the following:

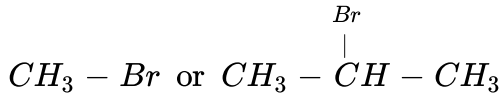
undergoes and S_{N2} reaction more rapidly,



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5. Encircle whichever of the following:

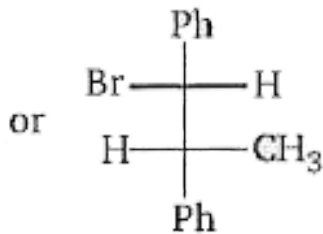
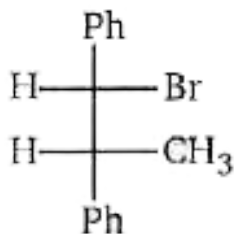
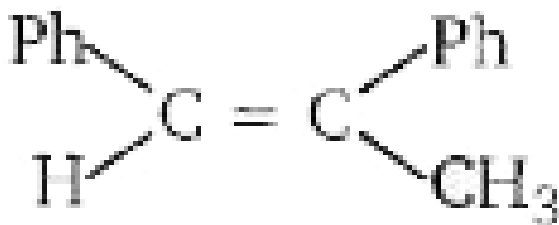
undergoes and S_{N1} reaction more rapidly,



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6. Encircle whichever of the following:

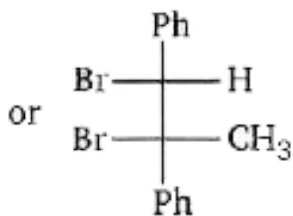
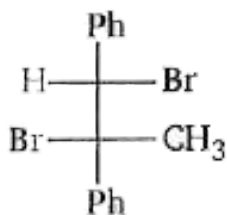
undergoes an E_2 reaction to give (Z) - 1,2 - diphenylpropene :



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7. Encircle whichever of the following:

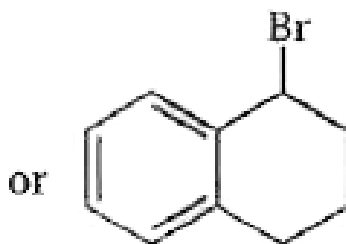
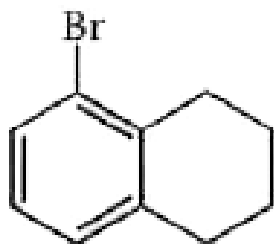
reacts with NaI to give (Z) - 1,2 diphenylpropene :



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8. Encircle whichever of the following:

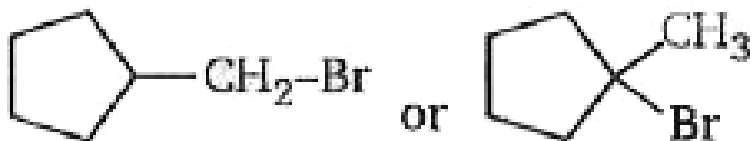
undergoes and S_N1 reaction more rapidly,



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9. Encircle whichever of the following :

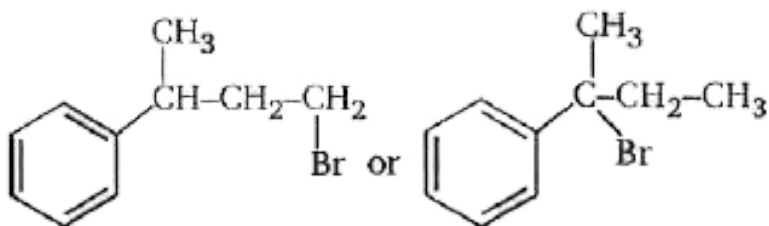
undergoes and S_N2 reaction more rapidly :



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10. Encircle whichever of the following :

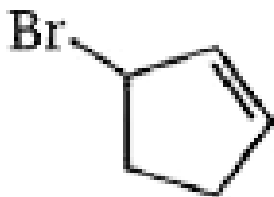
undergoes an E_1 reaction more rapidly :



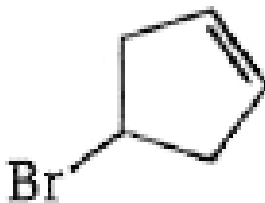
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11. Encircle whichever of the following :

undergoes an S_N1 reaction more rapidly :



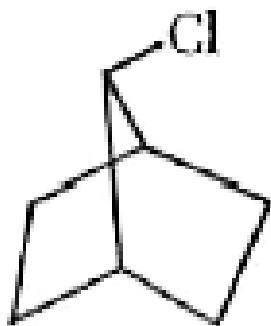
OR



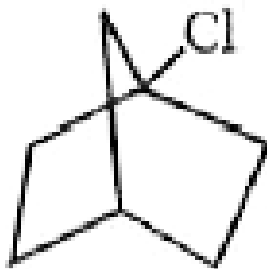
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12. Encircle whichever of the following :

undergoes an S_N2 reaction more rapidly :



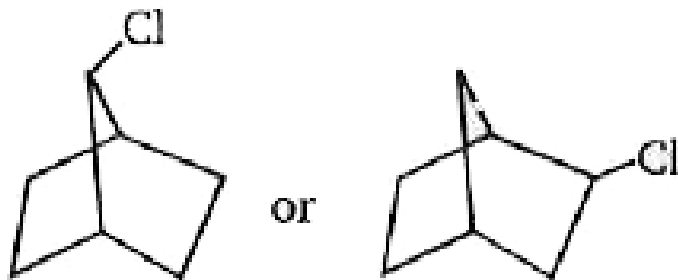
OR



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13. Encircle whichever of the following :

undergoes an E_2 reaction more rapidly :



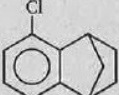
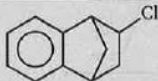
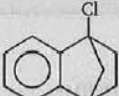

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14. Match the column :

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)	$\begin{array}{c} CH_3 - CH - Br \\ \\ CH_3 \end{array}$	(r)	11	(y)	16
(d)	$\begin{array}{c} CH_3 \\ \\ CH_3 - C - Br \\ \\ CH_3 \end{array}$	(s)	1,200000	(z)	1

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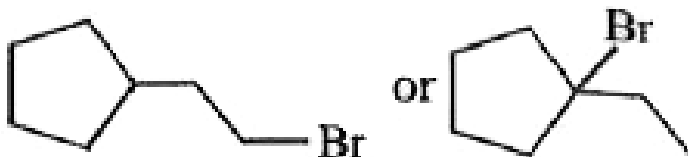
15. Matrix :

Column (I)		Column (II)	
Compound		Type of reaction	
(a)		(p)	S_N1 reaction can take place
(b)		(q)	S_N2 reaction can take place
(c)		(r)	S_N1 is not possible
(d)		(s)	S_N2 is not possible

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16. Encircle whichever of the following :

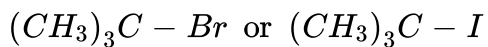
undergoes an S_N2 reaction more rapidly :



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17. Encircle whichever of the following :

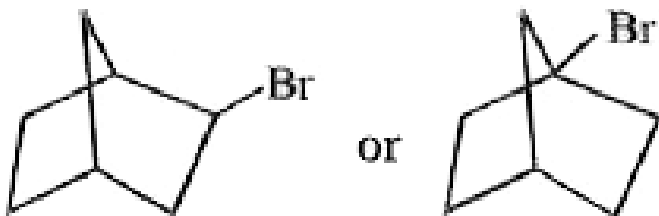
undergoes an S_N1 reaction more rapidly :



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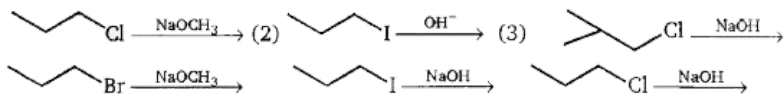
18. Encircle whichever of the following :

undergoes an S_N1 reaction more rapidly ,



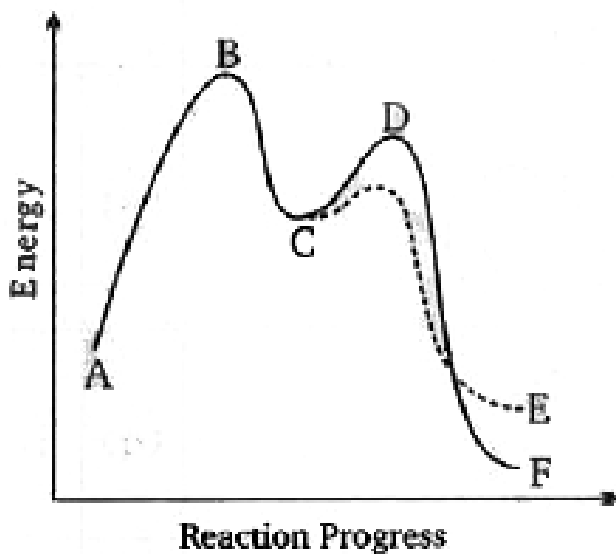
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19. Reactivity : Circle the reaction that reacts FASTER by S_N2 in each pair ,



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20. Consider the potential energy diagram given below



(X) Name the positions A-D

(Y) Answer the following questions :

(i) Both reaction 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_{N1} or S_{N2} mechanism) elimination (E_1 or E_2)

mechanism)



A. S_N1

B. S_N2

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_N1 or S_N2 mechanism) elimination (E_1 or E_2)

mechanism)



A. S_N1

B. S_N2

C. E_1

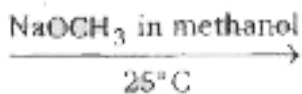
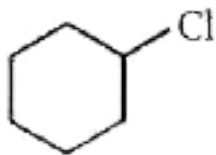
D. E_2

Answer: B

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23. Select whether the following combinations of reactants will react by substitution (S_N1 or S_N2 mechanism) elimination (E_1 or E_2)

mechanism)



A. S_N1

B. S_N2

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_N1 or S_N2 mechanism) elimination (E_1 or E_2)

mechanism)



A. S_N1

B. S_N2

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_{N1} or S_{N2} mechanism) elimination (E_1 or E_2)

mechanism)



A. S_N1

B. S_N2

C. E_1

D. E_2

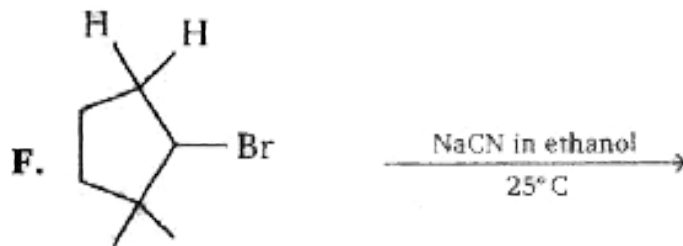
Answer: B



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26. Select whether the following combinations of reactants will react by substitution (S_{N1} or S_{N2} mechanism) elimination (E_1 or E_2)

mechanism)



A. S_N1

B. S_N2

C. E_1

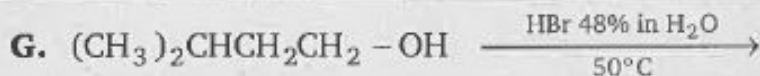
D. E_2

Answer: B

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27. Select whether the following combinations of reactants will react by substitution (S_N1 or S_N2 mechanism) elimination (E_1 or E_2)

mechanism)



A. S_N1

B. S_N2

C. E_1

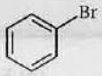
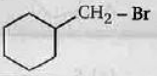
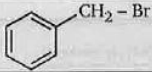

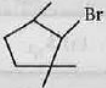
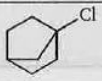
D. E_2

Answer: B



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

(a)		(b)	$\begin{array}{c} \text{CH}_3 \\ \\ \text{H}_3\text{C}-\text{C}-\text{Cl} \\ \\ \text{CH}_3 \end{array}$	(c)	
(d)	CH_3-I	(e)		(f)	
(g)	$\begin{array}{c} \text{CH}_3 \\ \\ \text{H}_3\text{C}-\text{C}-\text{CH}_2-\text{Cl} \\ \\ \text{CH}_3 \end{array}$	(h)	$\begin{array}{c} \text{H}_2\text{C} \\ \diagdown \\ \text{C}=\text{CH}_2-\text{Cl} \\ \diagup \\ \text{CH}_3 \end{array}$	(i)	
(j)					

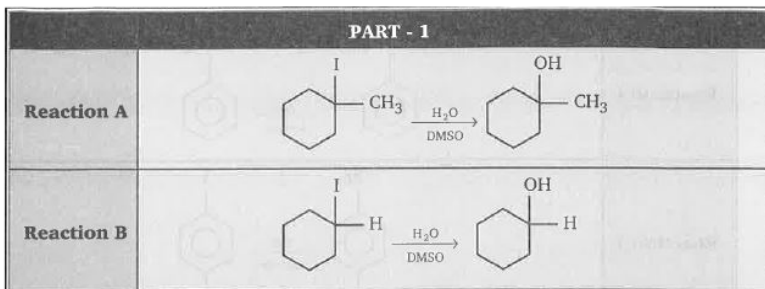
A. Which compounds give and S_{N2} substitution reaction on treatment with alcoholic NaSH ?

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

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

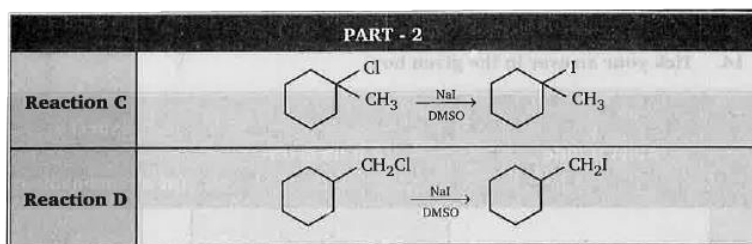
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29. Select which reaction from the following reaction pairs will occur faster.



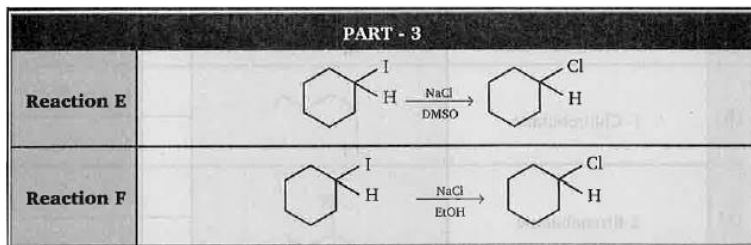
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30. Select which reaction from the following reaction pairs will occur faster.



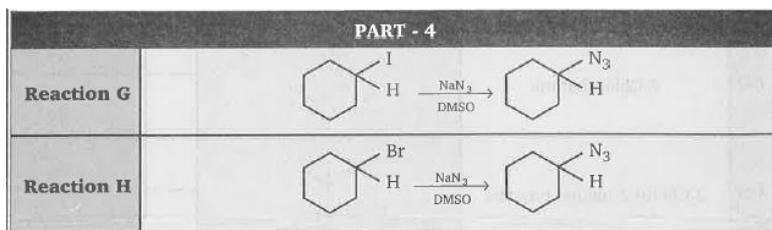
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31. Select which reaction from the following reaction pairs will occur faster.



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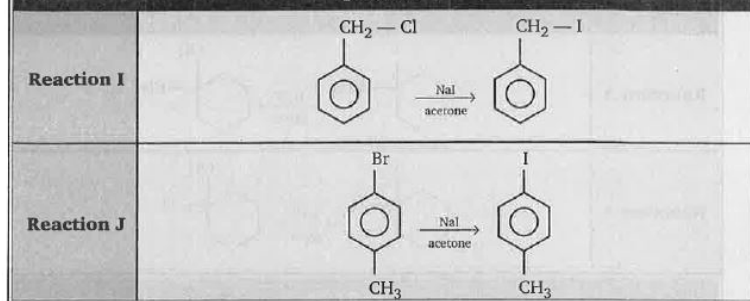
32. Select which reaction from the following reaction pairs will occur faster.








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



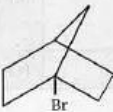

33. Select which reaction from the following reaction pairs will occur faster.

PART - 5


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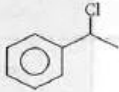
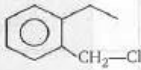
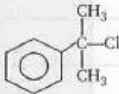
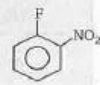
34. Tick your answer in the given box.

Alkyl Halide		2-D Structure	Expect S_N2 (at a reasonable rate)	
(a)	1-Bromobutane		<input type="checkbox"/>	Yes
			<input type="checkbox"/>	No
(b)	1-Chlorobutane		<input type="checkbox"/>	Yes
			<input type="checkbox"/>	No
(c)	2-Bromobutane		<input type="checkbox"/>	Yes
			<input type="checkbox"/>	No
(d)	2-Chlorobutane		<input type="checkbox"/>	Yes
			<input type="checkbox"/>	No
(e)	2-Chloro-2-methyl propane		<input type="checkbox"/>	Yes
			<input type="checkbox"/>	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

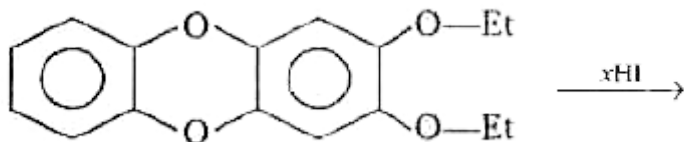
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35. Match the column :

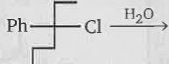
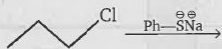
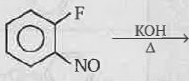
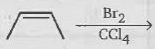
	Column-I		Column-II
(a)		(p)	It will undergo Nucleophilic Substitution reaction
(b)		(q)	It will undergo E_2 reaction
(c)		(r)	It will undergo E_1 reaction
(d)		(s)	It will undergo S_N2 reaction
		(t)	It will undergo S_N1 reaction

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36.



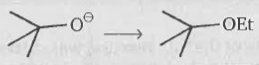
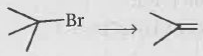
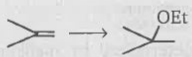
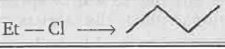
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Column (I)		Column (II)	
(a)		(p)	S_N1
(b)		(q)	S_N2
(c)		(r)	Carbocation is intermediate
(d)		(s)	Carbanion is intermediate

37.



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Column (I)		Column (II)	
(Reaction sequence)		(Reagent required)	
(a)		(p)	EtO^-
(b)		(q)	EtBr
(c)		(r)	EtOH/H^+
(d)		(s)	Et-Cl/Na ether

38.



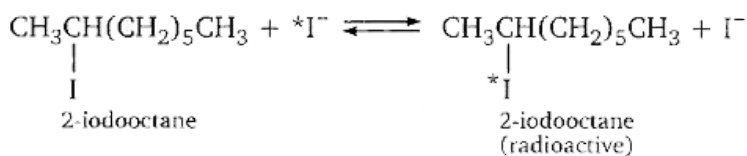
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39. Choose the one compound within each set that meets the indicated criterion :

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40. Comprehension

The first demonstration of the stereochemistry of the S_N2 reaction was carried out in 1934 by Prof. E.D Hughes and his colleagues at the University of London. They allowed (R) -2- iodoctane to react with radioactive iodide ion ($^*I^-$)



The rate of substitution (rate constant K_s) was determined by measuring the rate of incorporation of radioactivity into the alkyl halide. The rate of loss of optical activity 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

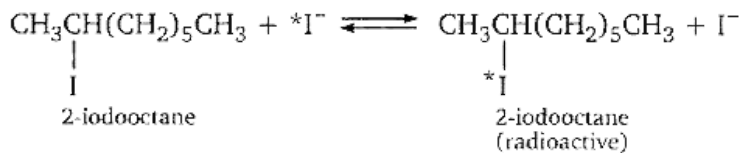
Answer:



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41. Comprehension

The first demonstration of the stereochemistry of the S_N2 reaction was carried out in 1934 by Prof. E.D Hughes and his colleagues at the University of London. They allowed (R) -2- iodoctane to react with radioactive iodide ion ($^*I^-$)



The rate of substitution (rate constant K_s) was determined by measuring the rate of incorporation of radioactivity into the alkyl halide. The rate of loss of optical activity 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. $\frac{K_0}{K_s} = 1$

B. $\frac{K_0}{K_s} < 1$

C. $\frac{K_0}{K_s} > 1$

D. can not be predicted

Answer:



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