



CHEMISTRY

BOOKS - MS CHOUHAN CHEMISTRY (HINGLISH)

IONIC REACTIONS (NUCLEOPHILIC SUBSTITUTION AND ELIMINATION REACTIONS OF ALKYL HALIDES)

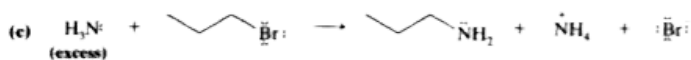
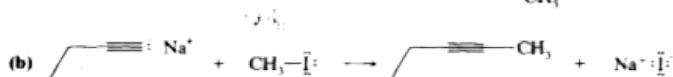
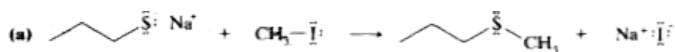
Solved Problem

1. (a) A solution containing methoxide ions, CH_3O^- ions (as $NaOCH_3$), in methanol can be prepared by adding sodium hydride (NaH) to methanol (CH_3OH). A flammable gas is the other product. Write the acidbase reaction that takes place. (b) Write the nucleophilic substitution that takes place when CH_3I is added and the resulting solution is heated.



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2. Write the following as net ionic equations and designate the nucleophile, substrate, and leaving group in each base.



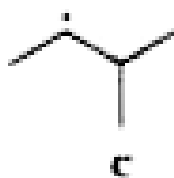
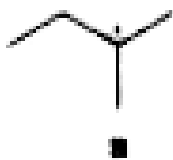
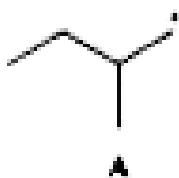
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3. Give the structure of the product that would be formed when trans-1-bromo-3-

methylcyclobutane undergoes as S_N2 reaction with NaI.

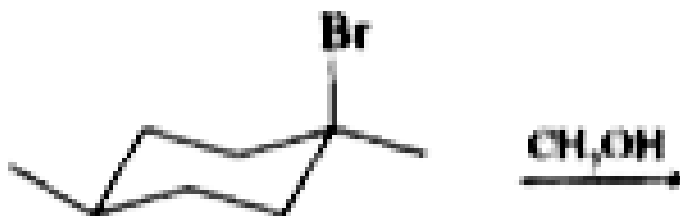
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4. Rank the following carbocations in order of increasing stability :



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5. What product(s) would you expect from the following solvolysis ?



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6. Rank the following alkyl bromides in order of decreasing reactivity (from fastest to

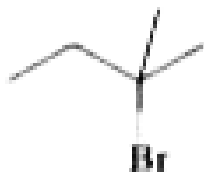
slowest) as a substrate in an S_N2 reaction.



A



B



C



D

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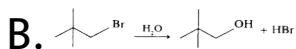
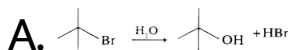
7. Explain why the following reactant is not feasible as a synthesis of butyl iodide.





Additional Objective Questions Single Correct Choice Type

1. Which of the following reaction is faster ?



C. Both are equally fast

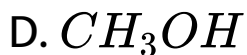
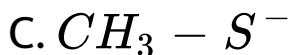
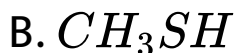
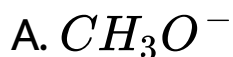
D. Reaction (a) is not possible

Answer: A



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2. Strongest nucleophile in polar-protic solvent is

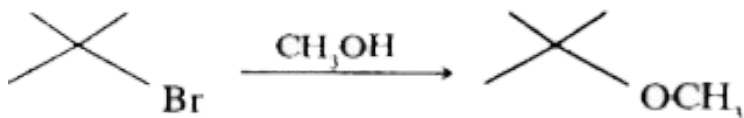


Answer: C



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3. Which of the following would be true for the reaction shown ?



A. The rate of the reaction depends only on the alkyl bromide concentration.

B. The rate of the reaction depends only on the methanol concentration.

C. The rate of the reaction depends on both the alkyl halide concentration and the methanol concentration.

D. The rate of the reaction depends on the concentration of neither reactant.

Answer: A



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4. Consider the compounds (I) R-I, (II) R-Br, (III) R-Cl, (IV) R-F. The rate of S_N1 reaction is

A. $I > II > III > IV$

B. $II > I > III > IV$

C. $I = II = III = IV$

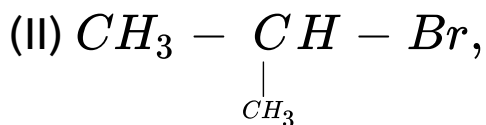
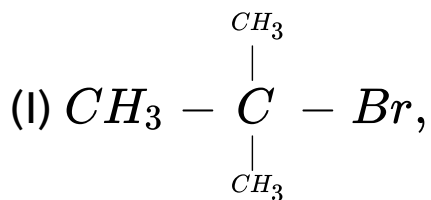
D. $IV > III > II > I$

Answer: A

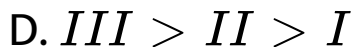


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5. Consider



The order of reactivity toward S_N1 reaction is

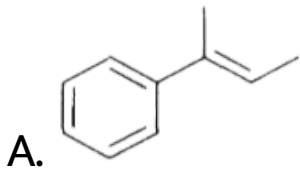
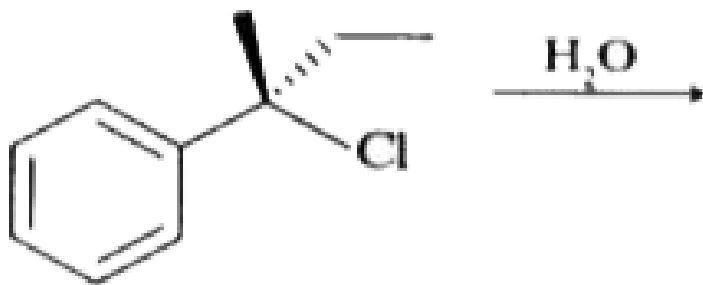


Answer: A

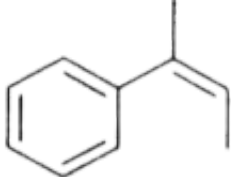


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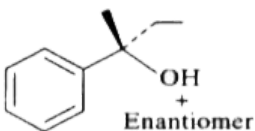
6. What is the major product of the following reaction ?



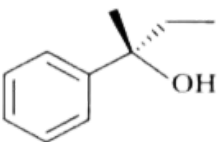
B.



C.



D.

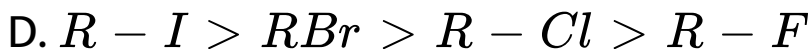
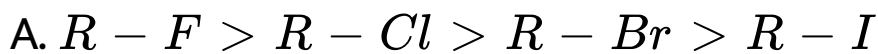


Answer: C



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7. The order of reactivity of the following alkyl halides for a S_N2 reaction is

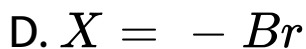
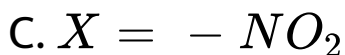
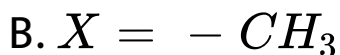
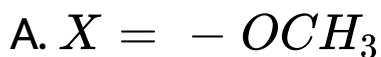
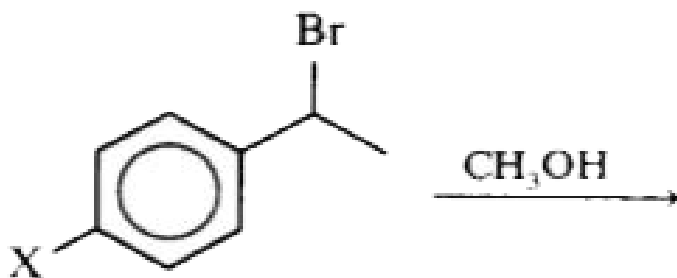


Answer: D



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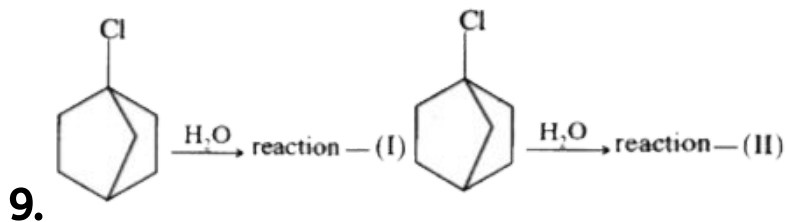
8. Rate of S_N1 is maximum when X is



Answer: A



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Reaction (I) and reaction (II) are respectively,

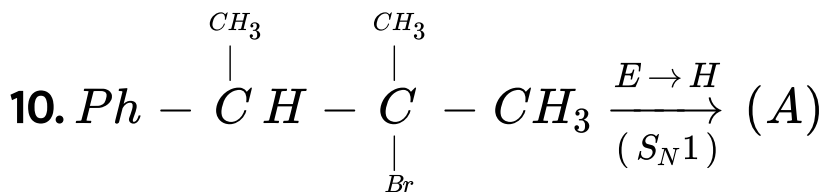
A. S_N1 , S_N1

B. S_N1 , S_N2

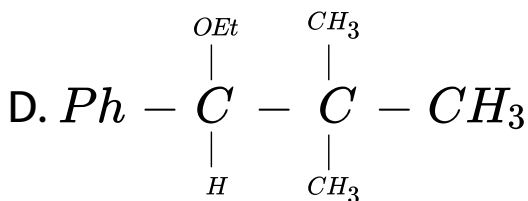
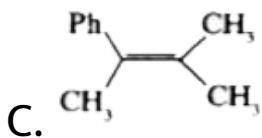
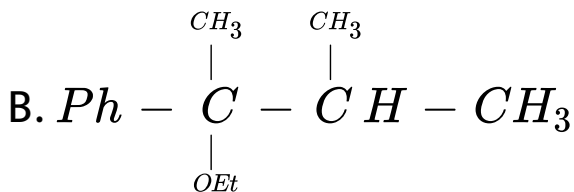
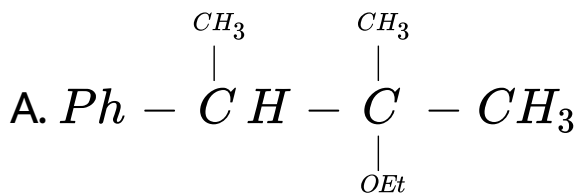
C. S_N2 , S_N1

D. S_N1 , no reaction

Answer: D



Major -product (A) is

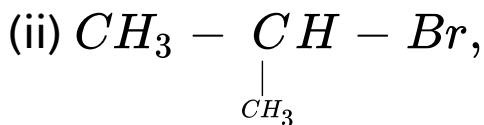
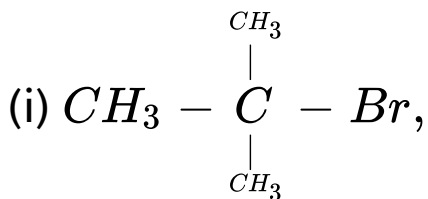


Answer: B

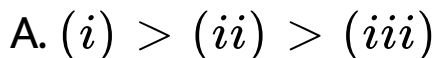


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11. Consider



The order of reactivity toward E2 reaction is



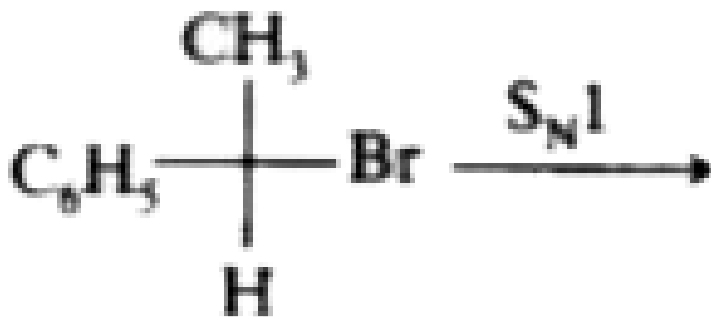
B. (ii) > (i) > (iii)

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

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

Answer: A

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Maximum racemization take place when

A. 100 % H_2O

B. 100% Acetone

C. 80% H_2O + 20% Acetone

D. 80% Acetone + 20% H_2O

Answer: C



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13. Best leaving group is

A. F^-

B. Cl^-

C. Br^-

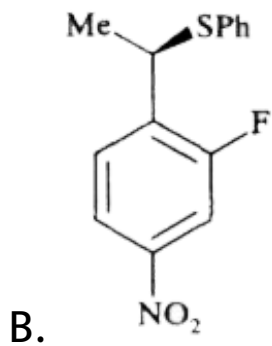
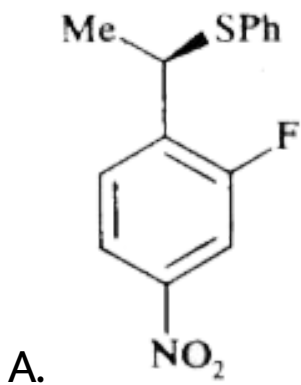
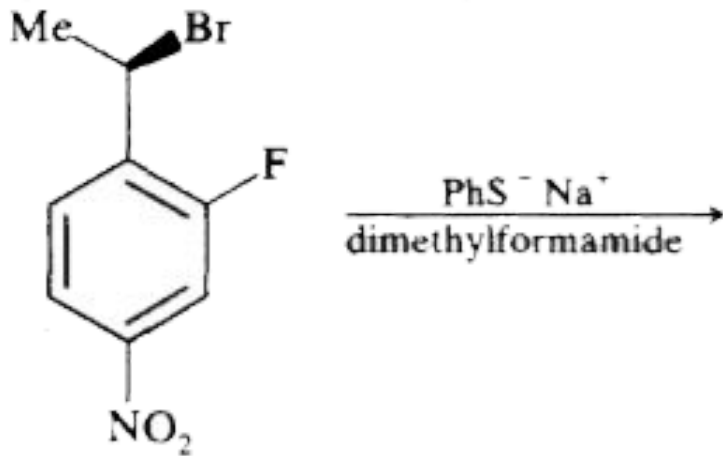
D. I^-

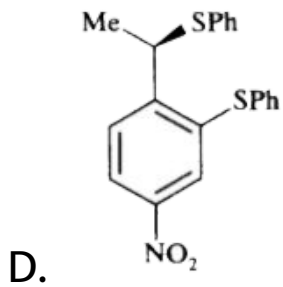
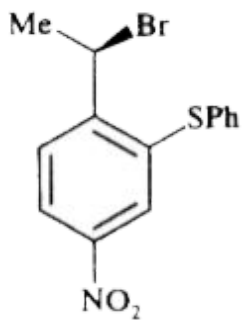
Answer: D



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14. The major product of the following reaction is

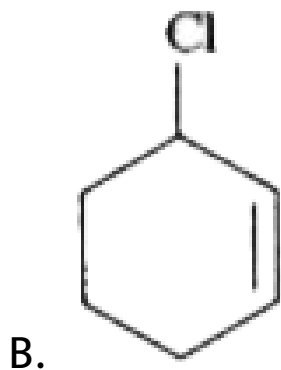
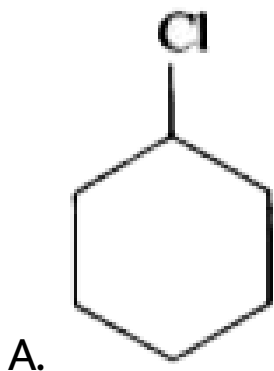


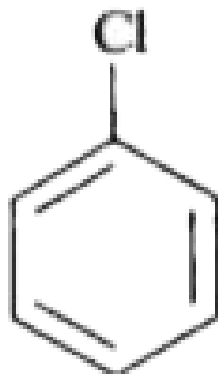
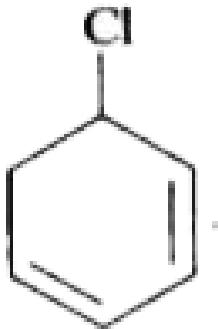


Answer: A

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15. Which of the following compound will not undergo nucleophilic substitution reaction ?



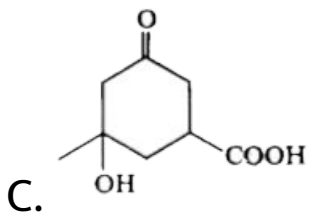
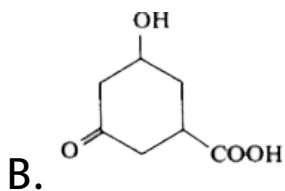
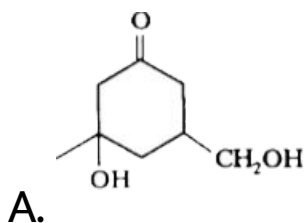
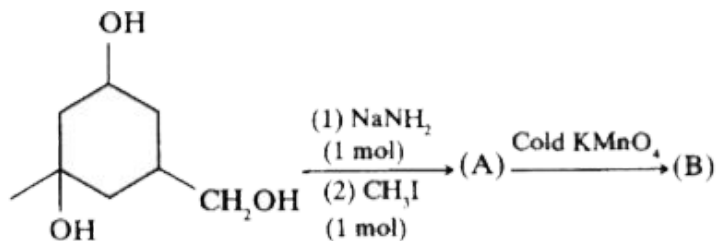


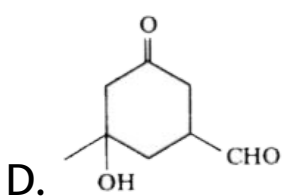
Answer: D



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16. Identify the final product (B) in the following reaction.





Answer: A

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17. The rate of an S_N2 reaction depends upon the

A. nucleophile

B. carbon skeleton

C. leaving group.

D. all

Answer: D



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18. Alcoholic solution of KOH is a specific reagent for

A. dehydration

B. dehydrogenation

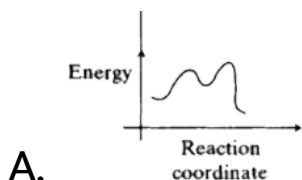
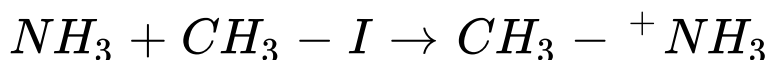
C. dehydrohalogenations.

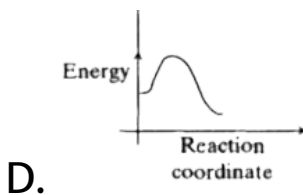
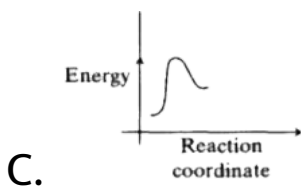
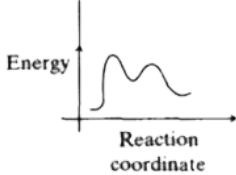
D. dehalogenation.

Answer: C

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19. Energy profile for the following reaction will be





Answer: D

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20. Best nucleophile in polar protic solvent is

A. F^-

B. Cl^-

C. Br^-

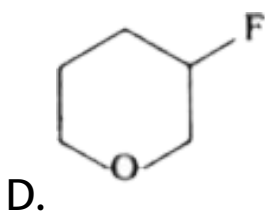
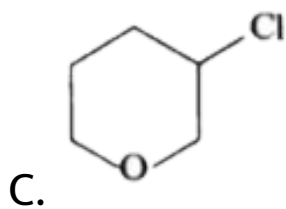
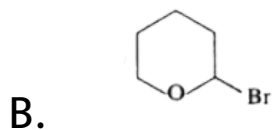
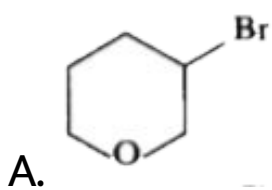
D. I^-

Answer: D



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21. Which of the following is the most reactive towards S_N1 ?



Answer: B

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22. The best leaving group produces a _____
base that is a (n) _____ anion.

A. weak, stable

B. strong, stable

C. weak, unstable

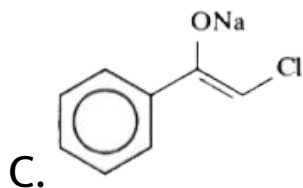
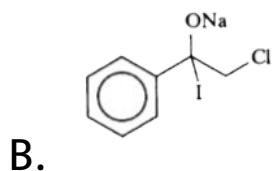
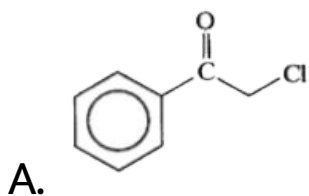
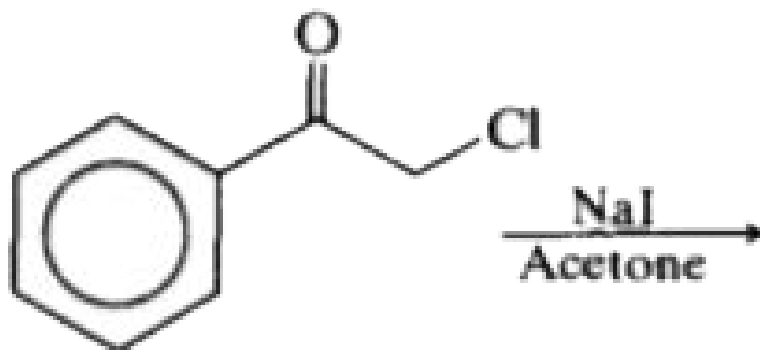
D. strong, unstable

Answer: A

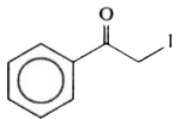


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23. What will be the final product ?



D.



Answer: D



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24. Best nucleophile in polar aprotic solvent is

A. F^-

B. Cl^-

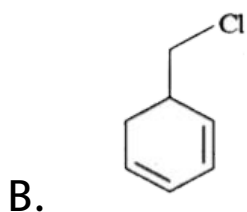
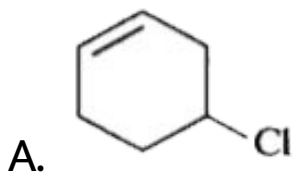
C. Br^-

D. I^-

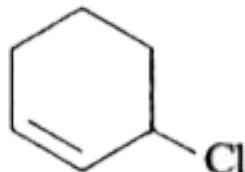
Answer: A

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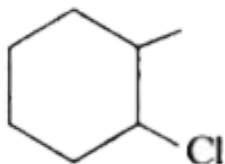
25. Which of following compounds given same S_N1 and S_N2 product ?



C.



D.

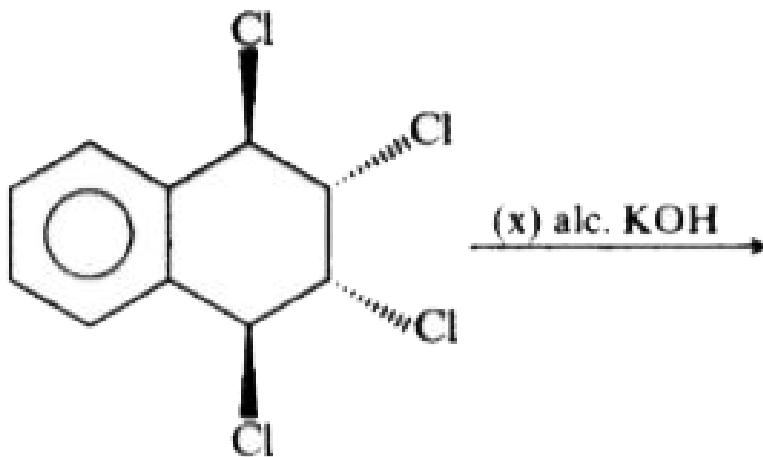


Answer: C



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Additional Objective Questions Integer Type



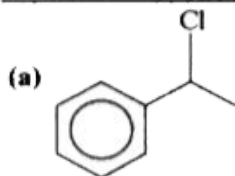
Find the number of moles of alc. KOH consumed in the above reaction.

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Additional Objective Questions Matrix Match Type

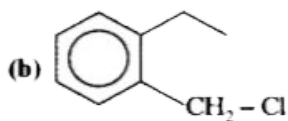
Column I

Column II

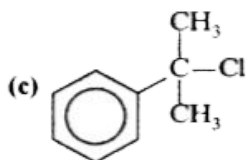


(p) It will undergo nucleophilic substitution reaction

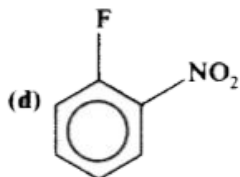
1.



(q) It will undergo E2 reaction



(r) It will undergo E1 reaction

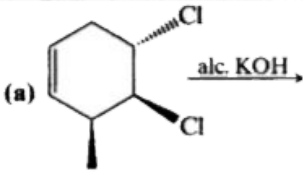
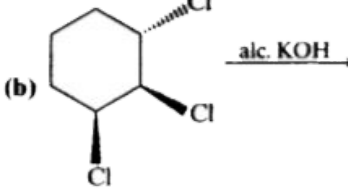
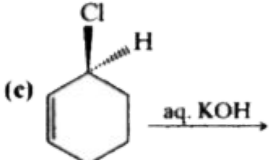
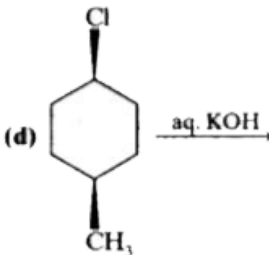


(s) It will undergo S_N2 reaction

(t) It will undergo S_N1 reaction



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Column I	Column II
<p>(a) </p>	(p) Optically active product
<p>(b) </p>	(q) Optically inactive product
<p>(c) </p>	(r) Second order reaction
<p>(d) </p>	(s) Unimolecular reaction

2.



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