



CHEMISTRY

BOOKS - MS CHOUHAN CHEMISTRY (HINGLISH)

ALKENES AND ALKYNES II

Solved Problem

1. Write a mechanism that explains the following reaction



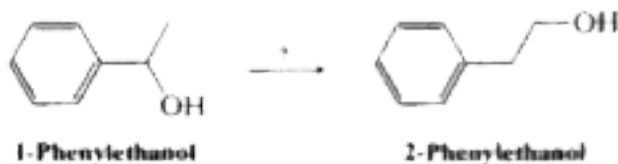
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2. Write a mechanism that will explain the course of the following reaction



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3. Outline a method for carrying out the following conversion .



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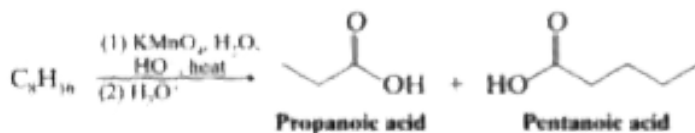
4. Explain the following facts : Treating (Z) -2-butene with OsO_4 in pyridine and then $NaHSO_3$ in water give a diol that is optically inactive and cannot be resolved Treating (E) -2-butene with the same reagents gives a diol

that is optically inactive but can be resolved into enantiomers.



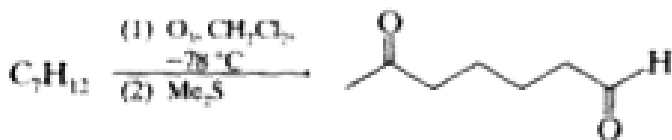
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5. An unknown alkene with the formula C_8H_{16} was found, on oxidation with hot basic permanganate, to yield a three-carbon carboxylic acid (propanoic acid) and a five-carbon carboxylic acid (pentanoic acid). What was the structure of this alkene?

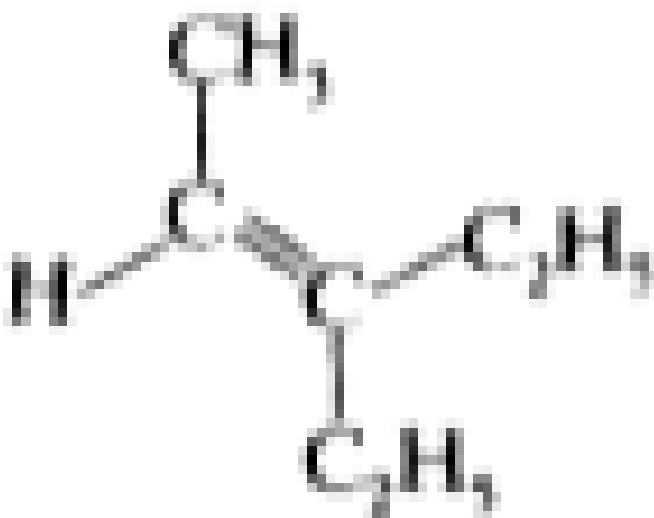


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6. Give the structure of an unknown alkene with the formula C_7H_{12} that undergoes ozonolysis to yield, after acidification, only the following product :

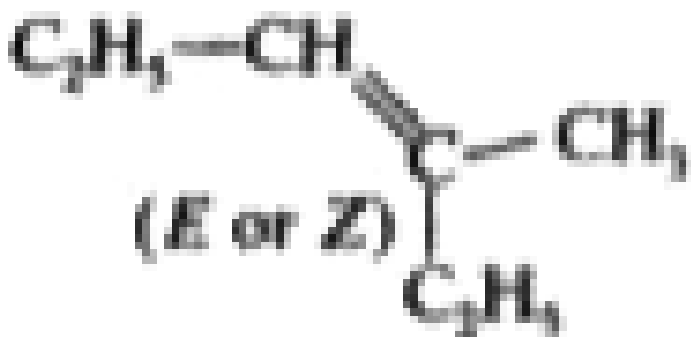
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7. Give the reaction for the ozonolysis of the following reactant



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8. Give the reaction for the ozonolysis of the following reactant



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9. Give the reaction for the ozonolysis of the following reactant



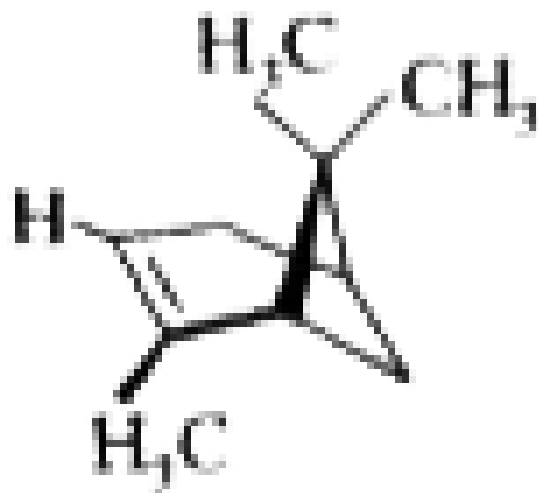
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10. Give the reaction for the ozonolysis of the following reactant



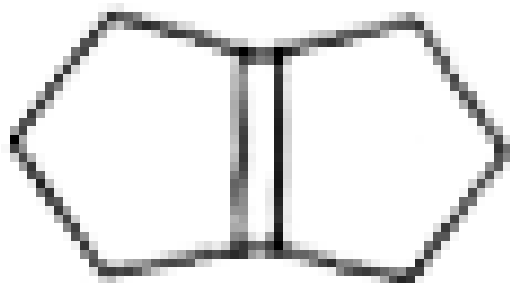
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11. Give the reaction for the ozonolysis of the following reactant



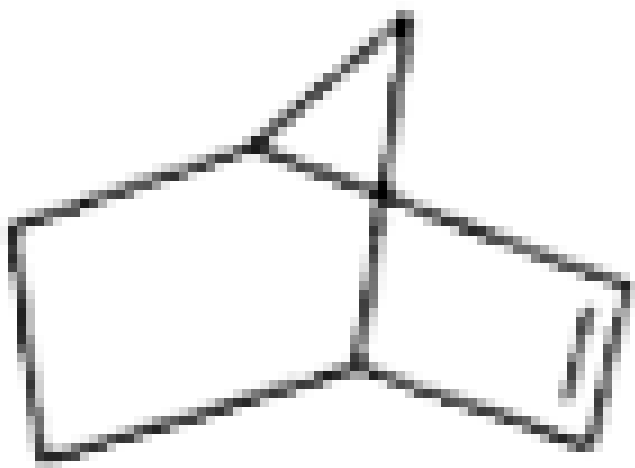
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12. Give the reaction for the ozonolysis of the following reactant



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13. Give the reaction for the ozonolysis of the following reactant



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14. Give the reaction for the ozonolysis of the following reactant



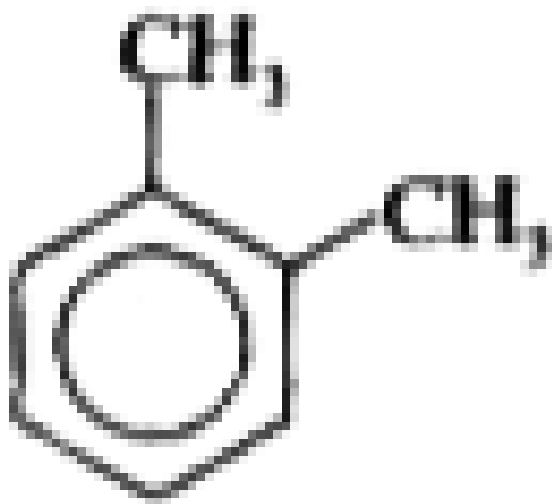
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15. Give the reaction for the ozonolysis of the following reactant



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16. Give the reaction for the ozonolysis of the following reactant



(*o*-Xylene)



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17. Starting with compounds of two carbon atoms or fewer , outline a stereospecific synthesis of meso -3,4 - dibromohexane .



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18. Consider the reaction of an alkene with HBr.
Write the mechanism of the reaction.



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19. Consider the reaction of an alkene with HBr.

Why do the π -bond electrons attack the hydrogen end of HBr ?



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20. Consider the reaction of an alkene with HBr.

Briefly explain why the addition of HBr gives the product as shown instead of a primary alkyl halide.





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21. Give the structures of product A and B and write the mechanism for the formation of each



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22. Should an alkyne react with HBr in the same manner as an alkene ? Briefly explain why or why not.



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23. Consider the reaction of a non-conjugated diene with aqueous sulfuric acid :

Give the major product for the reaction and provide a detailed mechanism for the reaction

.



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24. Consider the reaction of a non-conjugated diene with aqueous sulfuric acid :

Give the products if a second equivalent of H_2O is added.



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25. Consider the reaction of a non-conjugated diene with aqueous sulfuric acid :

What happens if no acid catalyst is added ?



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26. Show how the following transformations may be carried out ? Include your retrosynthetic reasoning ?



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27. Consider the following reaction :



- (a) Write the mechanism for this reaction.
- (b) Draw the transition state for the rate determining step of this reaction.

(c) Briefly explain the choice for the rate determining step.

(d) Write reaction that is clearly faster than the reaction shown above.

(e) Briefly explain why this reaction is faster.



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28. Convert the following 



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29. Consider the following reaction :



Write a detailed curved arrow mechanism that shows how the major product is formed.



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30. Consider the following reaction :



Briefly explain why this isomer, instead of others, is formed.





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31. Convert the following 



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32. Consider the following reaction :



Provide a complete curved arrow mechanism that shows how the major product is formed.



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33. Consider the following reaction :



Briefly explain the choice of the major product.



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34. Convert the following 



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35. Consider the following reaction.



- (a) Identify the major product of this reaction.
- (b) Write a detailed mechanism showing how the major product is formed.
- (c) Clearly explain your choice of major product.
- (d) Write a reaction that is similar to the one shown above, but obviously occurs at a faster rate. Support your reasoning.



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36. Convert the following 



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37. Consider reactions (E)- (G) :



(a) Which reaction is the fastest ? Briefly explain.

(b)

What is the major product of the fastest reaction ? Briefly explain.

(c) Write a detailed curved arrow mechanism that shows how the major product is formed.

Write "rds" above the arrow in the rate determining step of the mechanism.

(d) Provide an explanation for the choice of the rate determining step.



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38. Convert the following



There may be more than one solution to each synthesis .



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39. For each reactant given below, categorize its reaction with a $C=C$ π bond as "electrophilic addition" or "other ". Write the reaction of each reactant with isobutylene, and any other reagents commonly used or required with that reactant.





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40. Draw a complete curved arrow mechanism that shows how the major product is formed in the reaction given below. Briefly explain the choice of the major product.



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41. Write a detailed mechanism for the following reactions. Be sure that your

mechanisms account for the given product .



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42. Write a detailed mechanism for the following reactions Be sure that your mechanisms account for the given product .



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43. Write a detailed mechanism for the following reactions Be sure that your mechanisms account for the given product .



View Text Solution

44. Write a detailed mechanism for the following reactions Be sure that your mechanisms account for the given product .





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45. Write a detailed mechanism for the following reactions. Be sure that your mechanisms account for the given product.



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46. Briefly explain why BH_3 and $Hg(OAc)_2$ are electrophiles.



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47. Provide the organic product for the following reaction. If more than one products are possible , indicate which product (if any) is the major one . If no reaction occurs, write "NR" . Pay careful attention to the stereochemistry of the reactants and products.



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48. Provide the organic product for the following reaction. If more than one products are possible , indicate which product (if any) is the major one . If no reaction occurs, write "NR" . Pay careful attention to the stereochemistry of the reactants and products.



View Text Solution

49. Provide the organic product for the following reaction. If more than one products are possible , indicate which product (if any) is the major one . If no reaction occurs, write "NR" . Pay careful attention to the stereochemistry of the reactants and products.



View Text Solution

50. Provide the organic product for the following reaction. If more than one products are possible , indicate which product (if any) is the major one . If no reaction occurs, write "NR" . Pay careful attention to the stereochemistry of the reactants and products.



View Text Solution

51. Provide the organic product for the following reaction. If more than one products are possible , indicate which product (if any) is the major one . If no reaction occurs, write "NR" . Pay careful attention to the stereochemistry of the reactants and products.



View Text Solution

52. Provide the organic product for the following reaction. If more than one products are possible , indicate which product (if any) is the major one . If no reaction occurs, write "NR" . Pay careful attention to the stereochemistry of the reactants and products.



View Text Solution

53. Provide the organic product for the following reaction. If more than one products are possible , indicate which product (if any) is the major one . If no reaction occurs, write "NR" . Pay careful attention to the stereochemistry of the reactants and products.



View Text Solution

54. Provide the organic product for the following reaction. If more than one products are possible , indicate which product (if any) is the major one . If no reaction occurs, write "NR" . Pay careful attention to the stereochemistry of the reactants and products.



View Text Solution

55. Provide the organic product for the following reaction. If more than one products are possible , indicate which product (if any) is the major one . If no reaction occurs, write "NR" . Pay careful attention to the stereochemistry of the reactants and products.



View Text Solution

56. Provide the organic product for the following reaction. If more than one products are possible , indicate which product (if any) is the major one . If no reaction occurs, write "NR" . Pay careful attention to the stereochemistry of the reactants and products.



View Text Solution

57. Provide the organic product for the following reaction. If more than one products are possible , indicate which product (if any) is the major one . If no reaction occurs, write "NR" . Pay careful attention to the stereochemistry of the reactants and products.



View Text Solution

58. Provide the organic product for the following reaction. If more than one products are possible , indicate which product (if any) is the major one . If no reaction occurs, write "NR" . Pay careful attention to the stereochemistry of the reactants and products.



View Text Solution

59. Provide the organic product for the following reaction. If more than one products are possible , indicate which product (if any) is the major one . If no reaction occurs, write "NR" . Pay careful attention to the stereochemistry of the reactants and products.



View Text Solution

60. Provide the organic product for the following reaction. If more than one products are possible , indicate which product (if any) is the major one . If no reaction occurs, write "NR" . Pay careful attention to the stereochemistry of the reactants and products.



View Text Solution

61. Provide the organic product for the following reaction. If more than one products are possible , indicate which product (if any) is the major one . If no reaction occurs, write "NR" . Pay careful attention to the stereochemistry of the reactants and products.



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62. List two significant similarities between alkenes and alkynes. Clearly illustrate each similarity with a figure or reaction.



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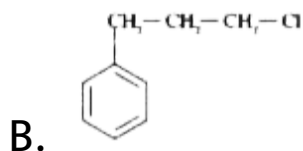
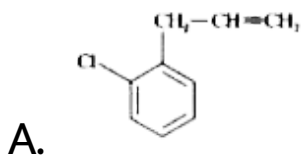
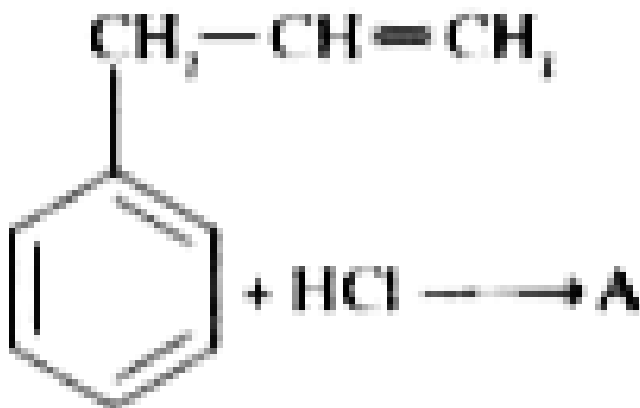
63. List two significant differences between alkenes and alkynes. Clearly illustrate each difference with a figure or reaction.



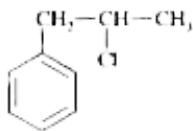
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Additional Objective Questions Single Correct Choice Type

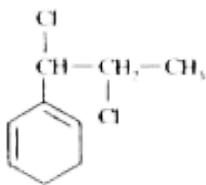
1. What is A in the following reaction?



C.



D.



Answer: C

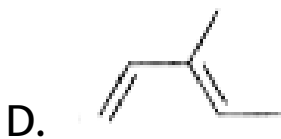
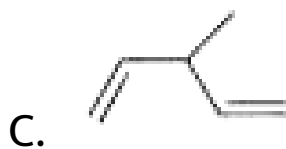
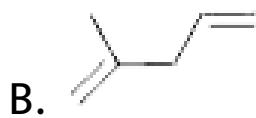
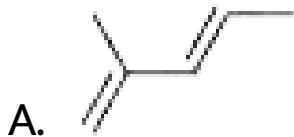


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2. Ozonolysis of an unknown compound gave

$CH_2 = O$, CH_3CHO and CH_3COCHO .

What is the possible structure for the unknown compound ?

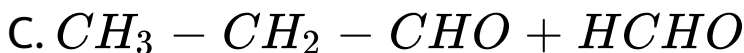
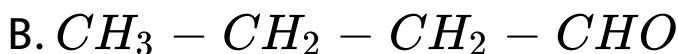
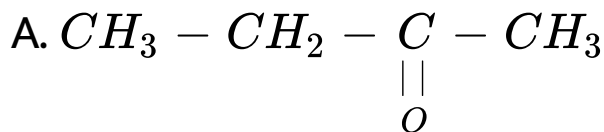


Answer: A



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3. The product(s) obtained via oxymercuration
($HgSO_4 + H_2SO_4$) of 1-butyne would be



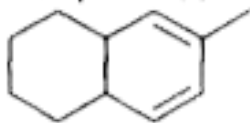
Answer: A



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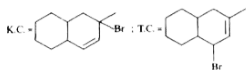
4. Find the product (s) :

Find the product(s):

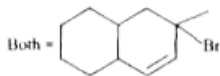


Kinetically controlled +
Thermodynamically
controlled products

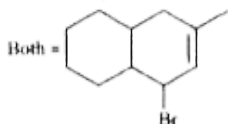
A.



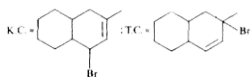
B.



C.



D.



Answer: A



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5. Propyne and propene can be distinguished by

A. conc. H_2SO_4

B. Br_2 in CCl_4

C. dil $KMnO_4$

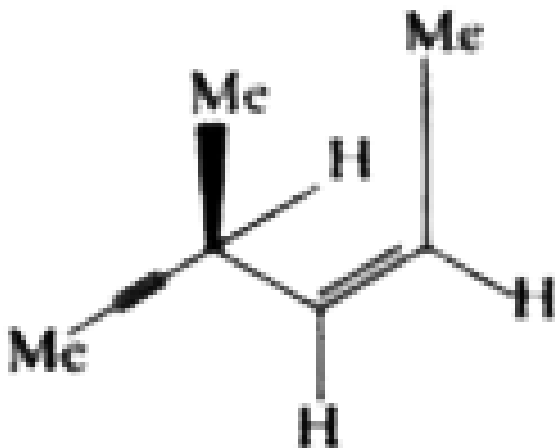
D. $AgNO_3$ in NH_3

Answer: D



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6. Hydrogenation of the following compound in the presence of poisoned palladium catalyst gives



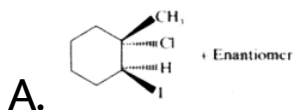
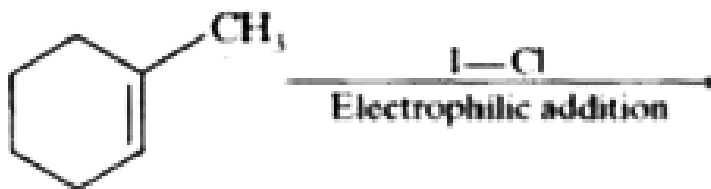
- A. an optically active compound
- B. an optically inactive compound.
- C. a racemic mixture

D. a diastereomeric mixture

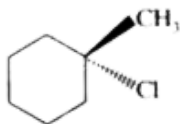
Answer: B

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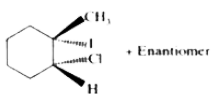
7. Give the major product (s) of the reaction shown :



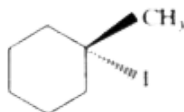
B.



C.



D.



Answer: A



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8. The reaction of propene with HOCl proceeds via the addition of

A. H^+ in first step

B. Cl^- in first step

C. OH^- in first step

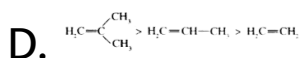
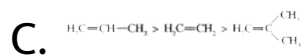
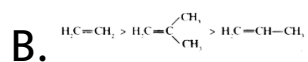
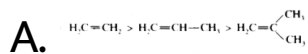
D. Cl^- and OH^- in single step

Answer: B



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9. Choose the correct order of reactivity (most reactive on the left) for the following alkenes with HI :

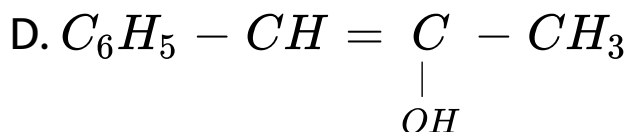
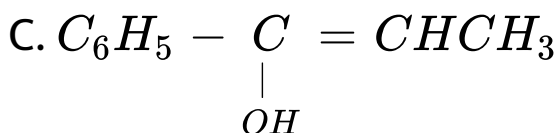
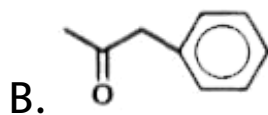
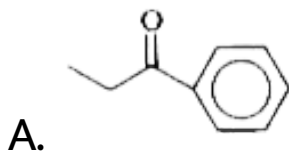


Answer: D



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10. For the following reaction , the product P is

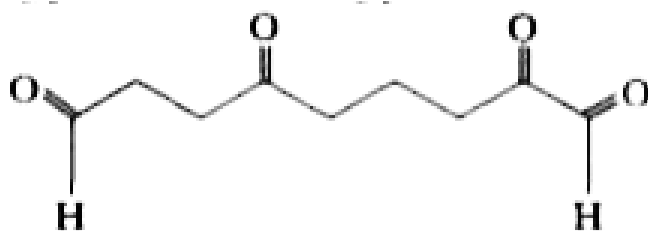


Answer: A

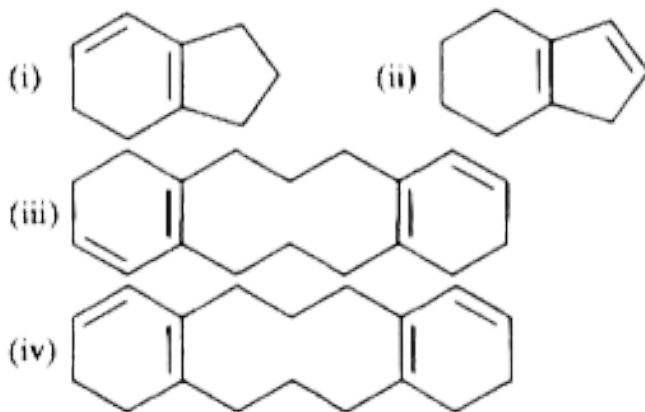


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11. An unknown compound was treated with ozone followed by $(CH_3)_2S$ and the following product was obtained.



Which of the following compounds might have been the unknown ?



A. (i)

B. (ii)

C. (i) or (iii)

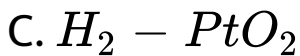
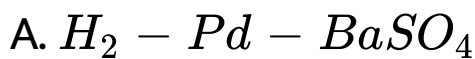
D. (ii) or (iv)

Answer: C



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12. 2-Hexyne can be converted into trans-2-hexene by the action of



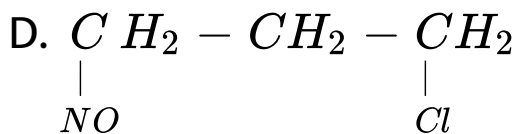
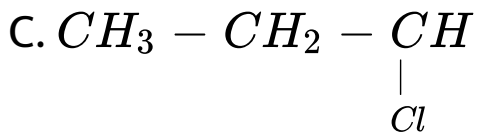
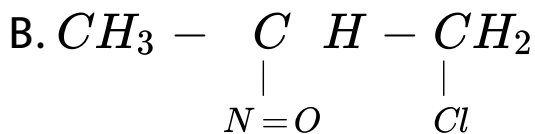
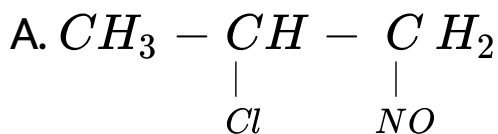
Answer: B



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Identify the adduct P .



Answer: A



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14. The Hydroboration-Oxidation reaction produces a addition

A. Markovnikov

B. Anti-Markovnikov

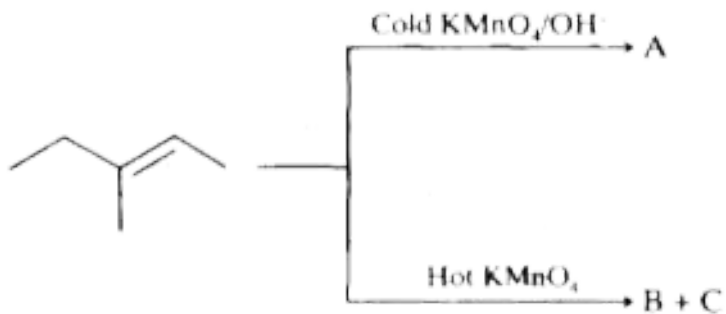
C. Syn addition

D. (b) and (c)

Answer: D

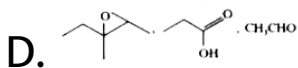
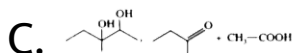
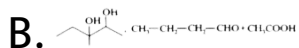
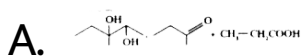


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15.

A, B and C are respectively are



Answer: C

16. Find out the X (reactant) of the given reaction :



D. All of these

Answer: A



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17. Which one of the following compounds does not form an ozonide ?

A. Ethane

B. Propyne

C. Propene

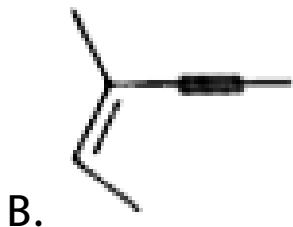
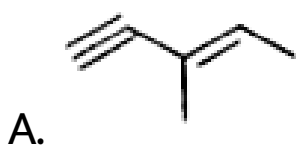
D. Propane

Answer: D

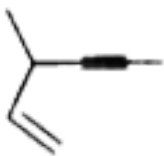


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18. Which of the following produces a chiral molecule after treatment with Lindlar's catalyst ?



C.



D.



Answer: C



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19. Ethylene reacts with Baeyer's reagent to give

A. ethane

B. ethyl alcohol

C. ethylene glycol

D. none of these

Answer: C



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20. The value of x is

Cis -2-butene $\xrightarrow[\text{CCl}_2]{\text{Br}_2}$ (x) products

A. 0

B. 1

C. 2

D. 3

Answer: C

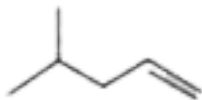


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21. In which of the following alkenes will a hydrogen shift occur upon addition of HCl ?



B.



C.



D.



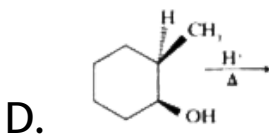
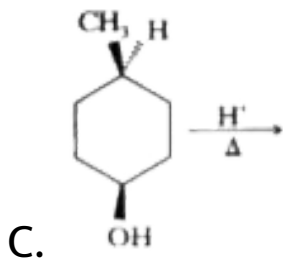
Answer: D



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22. In which of the following reaction ,
formation of racemic mixture occurs ?





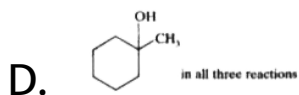
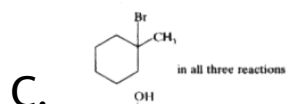
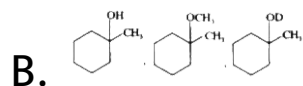
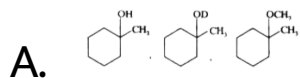
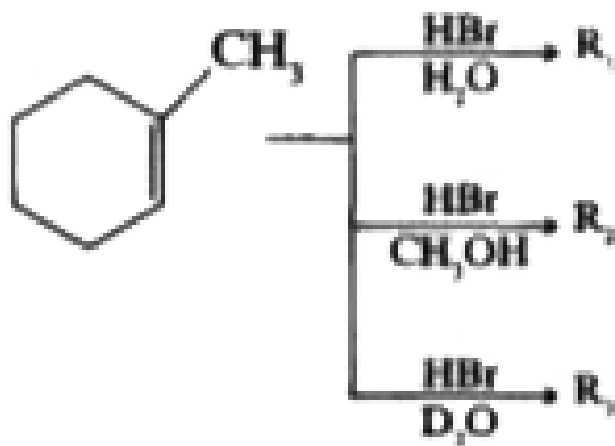
Answer: C



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23. The major products obtained R_1 , R_2 and R_3 in the following reactions,

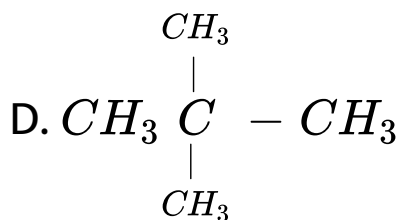
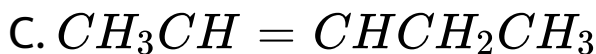
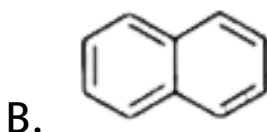
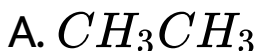
respectively is



Answer: C



24. The compound most likely to decolorize a solution of potassium permanganate is

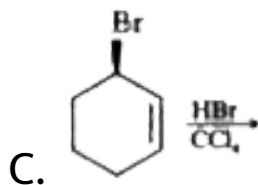
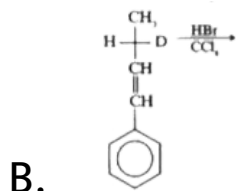
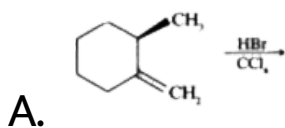


Answer: C



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25. In which of the following reactions ,
diastereomers will be formed ?



D. All of these

Answer: D



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Additional Objective Questions Matrix Match Type

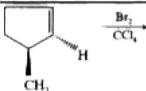
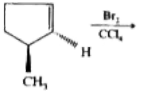
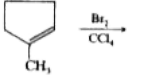
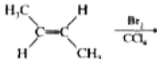
1. Match the following

Column I	Column II
(a) $\text{CH}_3-\text{C}\equiv\text{C}-\text{CH}_3$	(p) <i>cis</i> -product with $\text{H}_2/\text{Pd}-\text{BaSO}_4$
(b) $\text{CH}_3-\text{CH}_2-\text{C}\equiv\text{CH}$	(q) <i>trans</i> -product with $\text{Na}/\text{liq. NH}_3$
(c) $\text{CH}_3-\text{C}\equiv\text{CH}$	(r) white with amins. AgNO_3
(d) $\text{CH}_3-\text{C}\equiv\text{C}-\text{Et}$	(s) H_2 gas with Na



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2. Match the following

Column I Reaction	Column II Nature of products formed	Column III Number of chiral center present in product. (Consider only one isomer in case of racemic mixture of diastereomer)
 $\xrightarrow[\text{CCl}_4]{\text{Br}_2}$	(p) Racemic mixture	(w) 0
 $\xrightarrow[\text{CCl}_4]{\text{Br}_2}$	(q) Meso	(x) 1
 $\xrightarrow[\text{CCl}_4]{\text{Br}_2}$	(r) Diastereomer	(y) 2
 $\xrightarrow[\text{CCl}_4]{\text{Br}_2}$	(s) Vicinal dihalide	(z) 3



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