# Worksheet

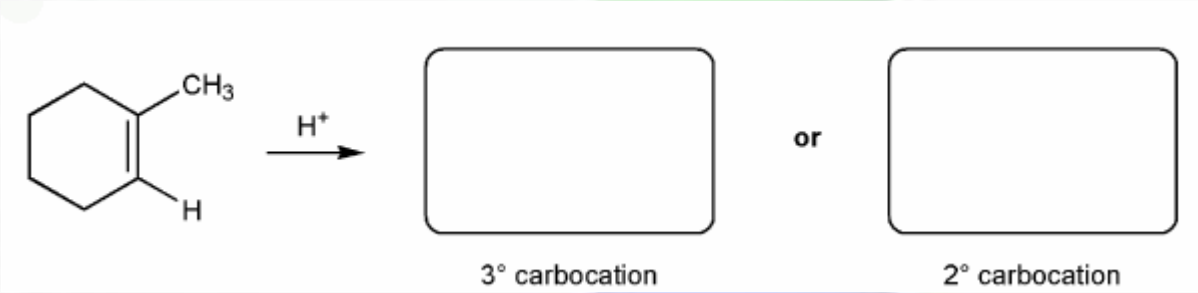
## Topics: Electrophilic addition Alkene and Alkynes


## Designed by
## Dr. Anuradha Mukherjee

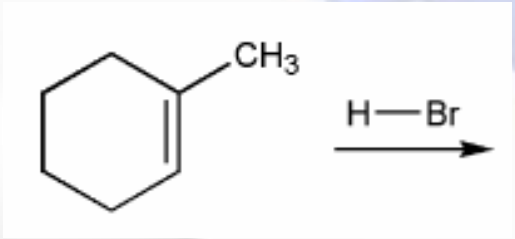

## Chemistry Affinity

**Conceptual, Real World, Happy Learning**

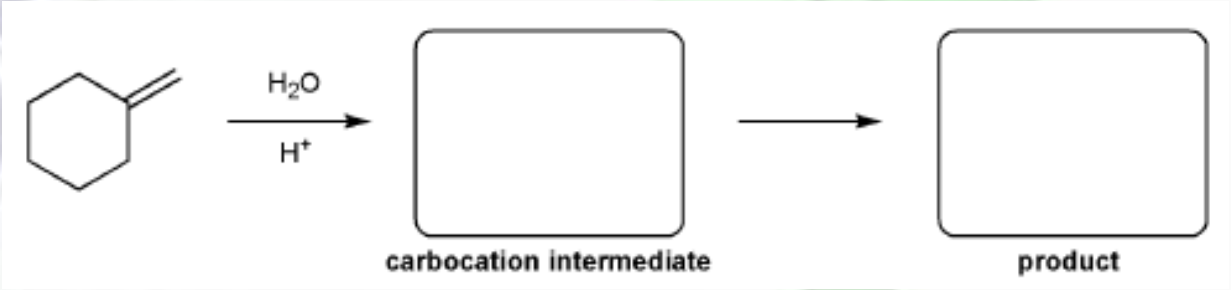
**1. Write down the carbocations which will generate from the below mentioned alkene. Use curved arrows to show the two carbocations that can from from 1-methylcyclohexene.**




**2. Predict the product(s) of the reaction below, and used curved arrows to show a mechanism**

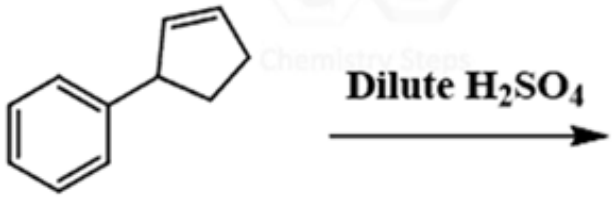


**3. For the reaction below, draw the structures of the carbocation intermediate and the final product**

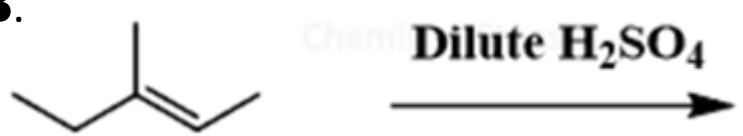



**4. Write down the major product with the reaction mechanism**

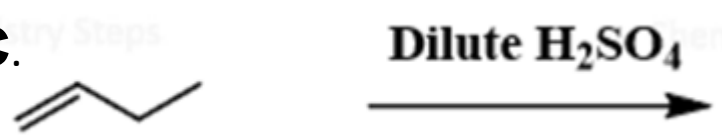
**A.**




**B.**

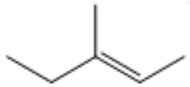


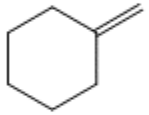

**C.**

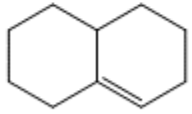


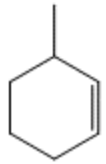
# 5. Write down all the products

a)  HBr →

b)  HCl →

c)  HBr →

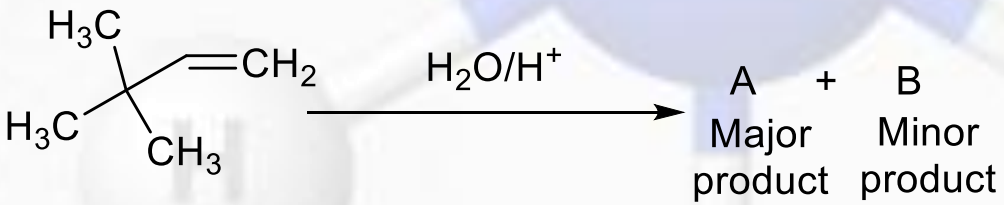
d)  HI →

e)  HCl →

**6. What happens when propene reacts with methanol in the presence of sulphuric acid?**

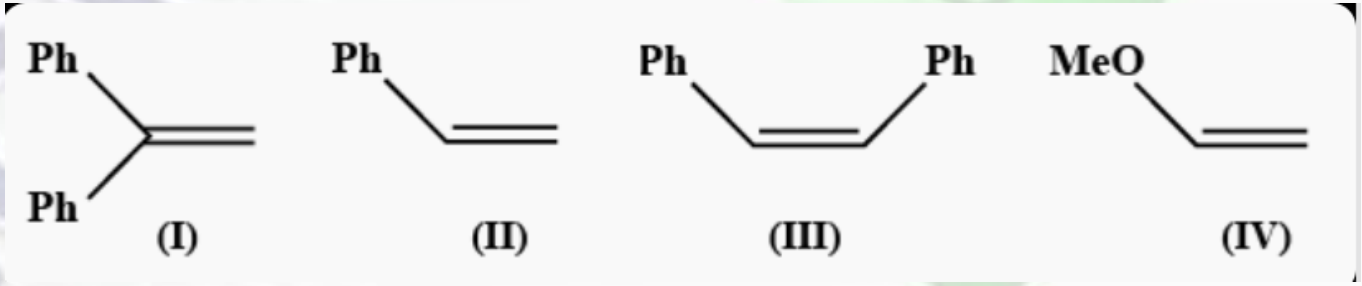
**7. What is the significance of adding $H_2SO_4$ during the addition of $H_2O$ to an alkene?**

**8. Write down both major and minor products of the below reaction?**

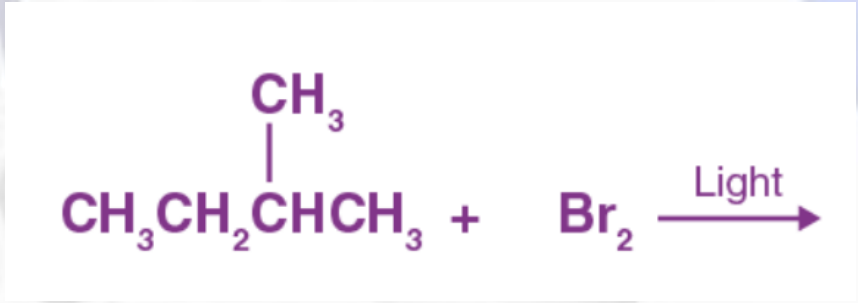



**[NEET 2012]**

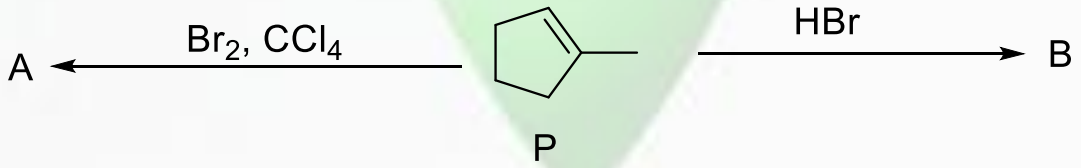
**9. The order of rate of electrophilic addition reaction with HBr is :**




**10. Predict the major product of the following reaction:**



**11. Write down A and B.**
**Mention the type of alkyl halides A and B are.**




**12. If P undergoes reaction with hot alkaline $KMnO_4$ and cold alkaline $KMnO_4$ which products will form?**

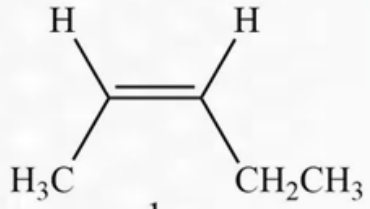
**13. P undergoes ozonolysis.**
**Write down the products of ozonolysis after reductive and oxidative workup respectively.**

**14. (a) Cyclohexene reacts with hydrogen gas in the presence of a palladium catalyst. Write down the reaction and the product?**

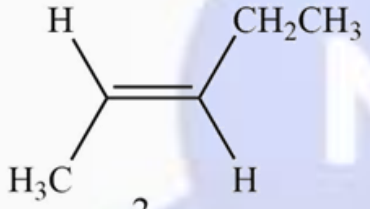
**(b) Cyclohexene reacts with Ozone followed by reductive work up. Write down the reaction and the IUPAC nomenclature of the product.**

**15. Which is the more stable alkene in each pair?**

A)

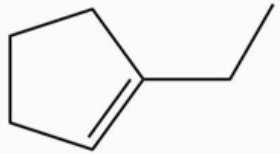



1

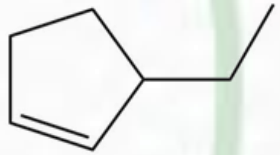



2

**(B)**



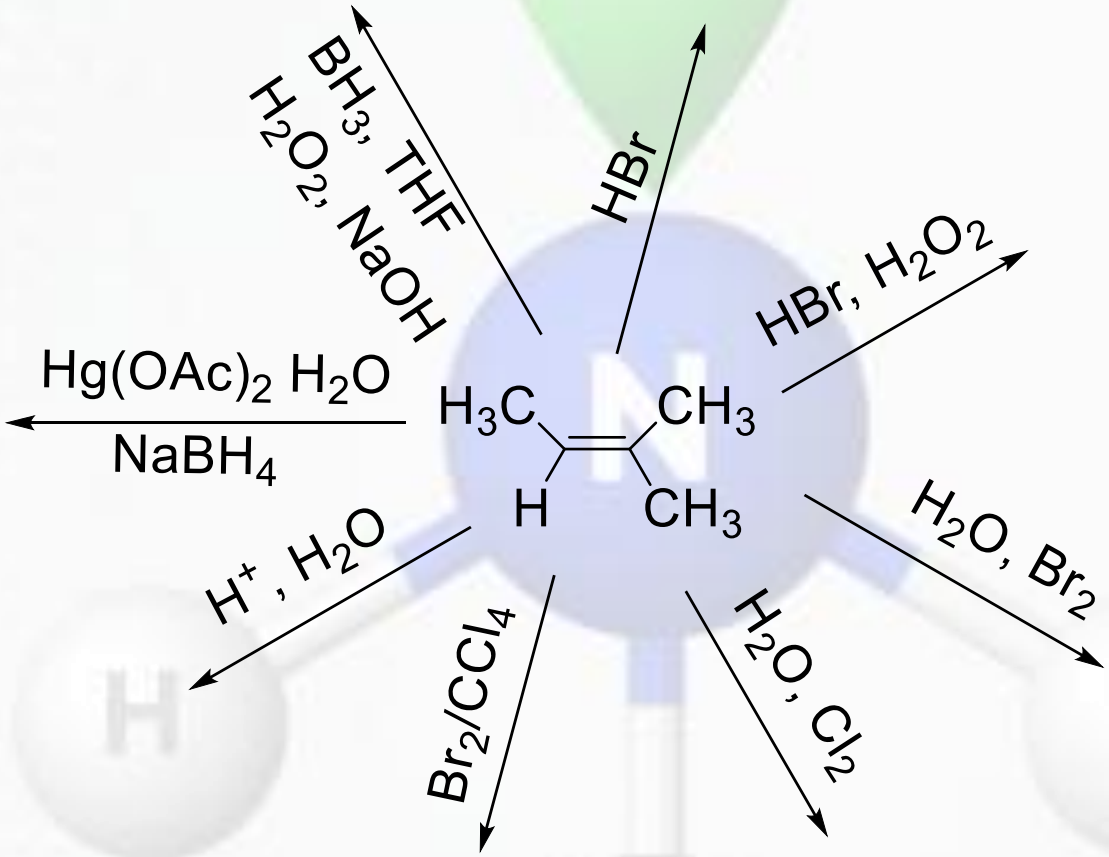
1



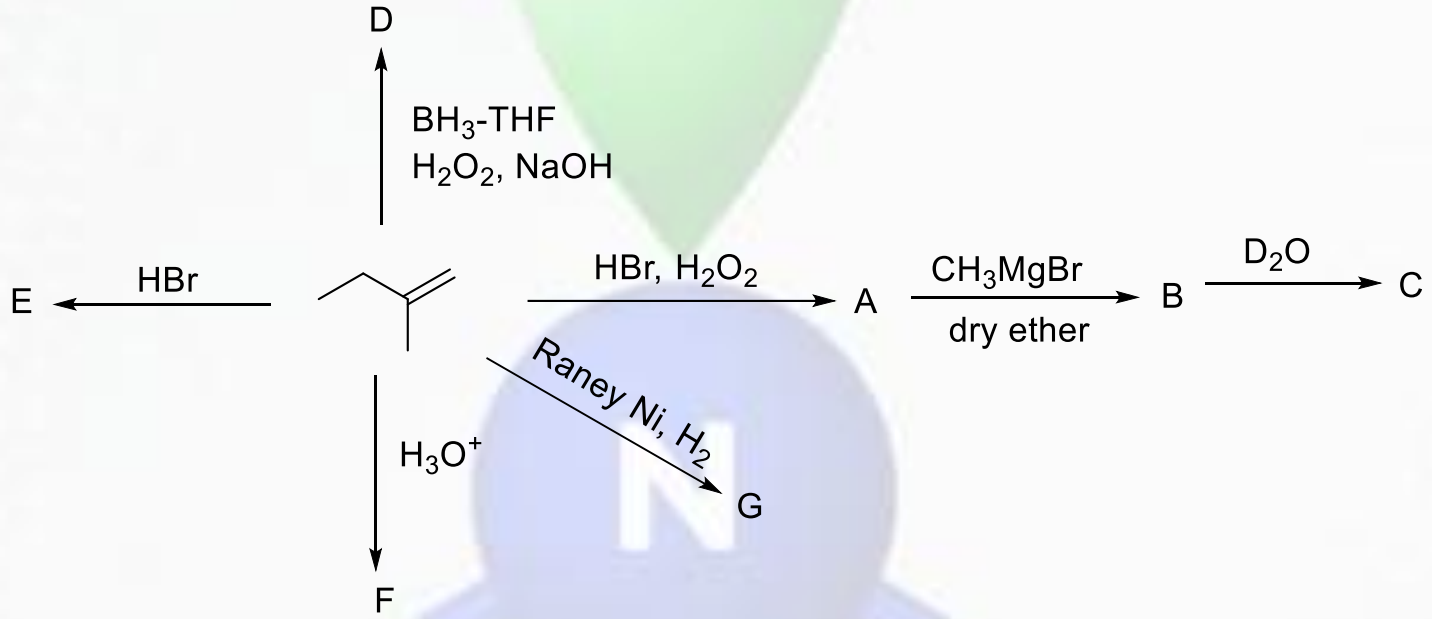
2

**16. Show how 1-butyne could be synthesized from each of the following (i)1-Butene, (ii) 1-chloro-1-butene, (iii) 1, 1-dichlorobutane**

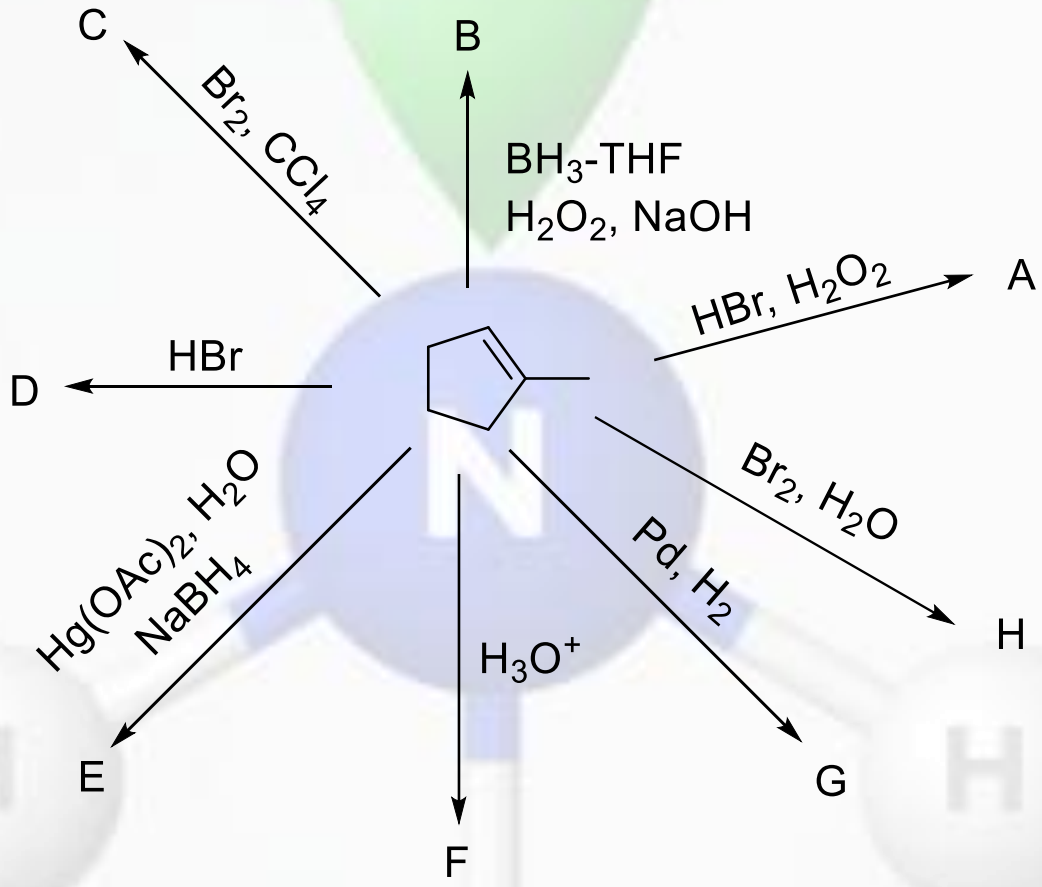
# 17. Write down all the products



# 18. Write down all the products



# 19. Write down all the products



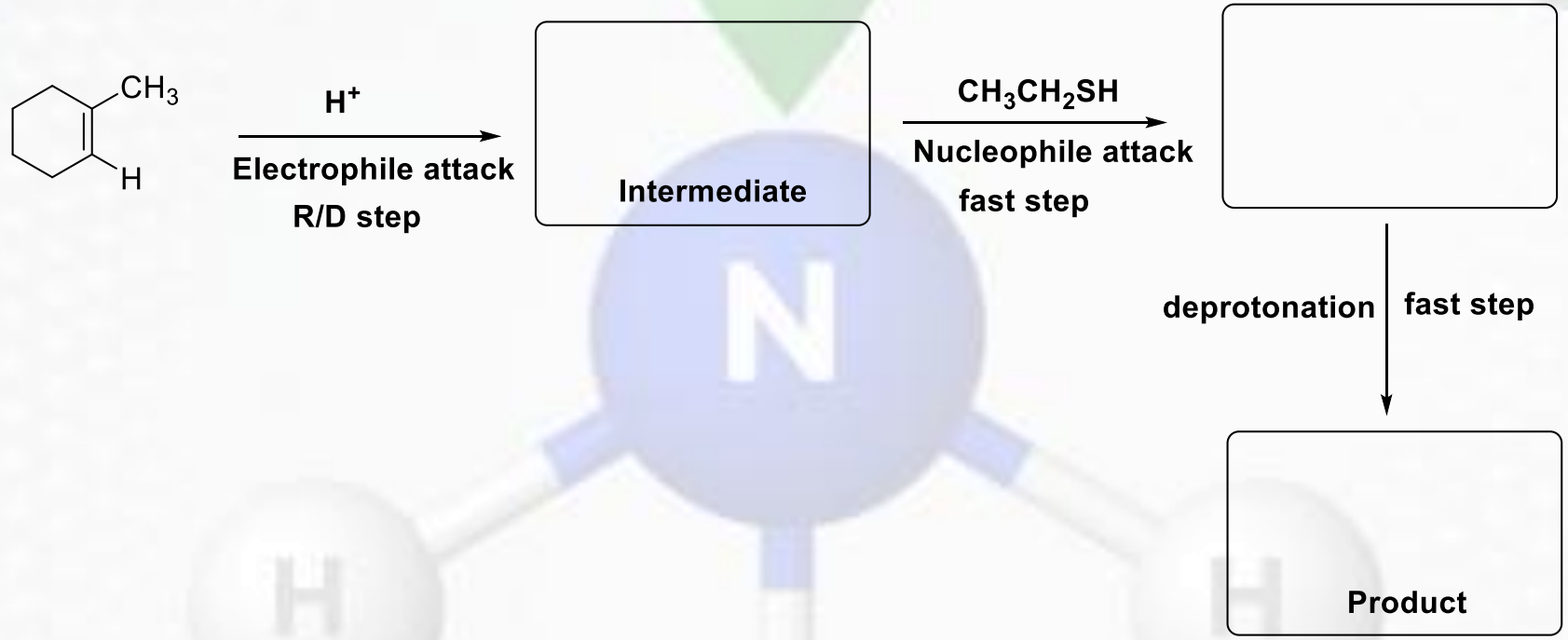
**20. (a) Compound A ($C_4H_9Br$) reacts with Alc. KOH gives compound B which decolorizes bromine water and gives a compound C. Compound C gives a compound D ($C_4H_6$) reacting with Na/Liq $NH_3$. Compound D reacts with sodium and yields hydrogen gas. Identify all compounds and write down all reactions.**

**(b) Find out the percentage of hydrogen in compound D [C =12, H =1]**

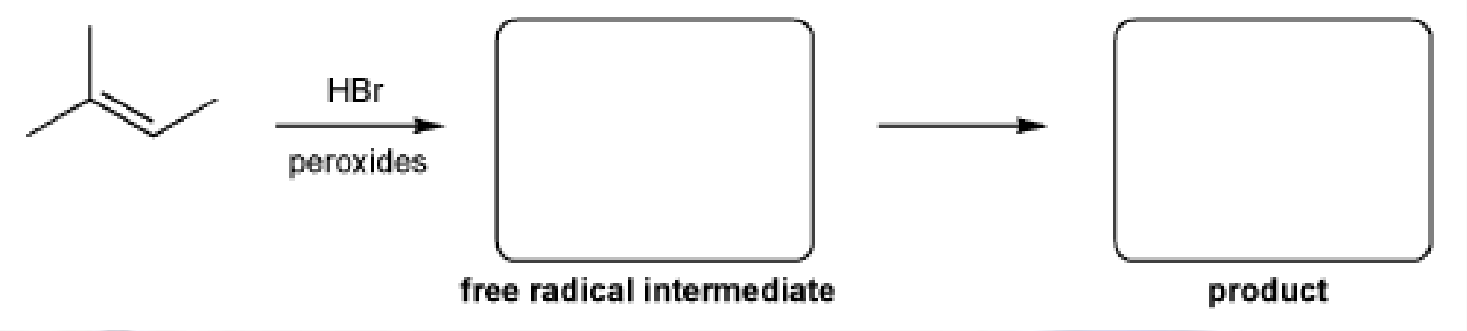
**21. When 3-phenylpropene reacts with HBr in the presence of peroxide, what is the major product formed? Write down the product with the reaction.**

**22. Draw the structures for each of the species in the three boxes below. Also draw curved arrows to show electron movement.**

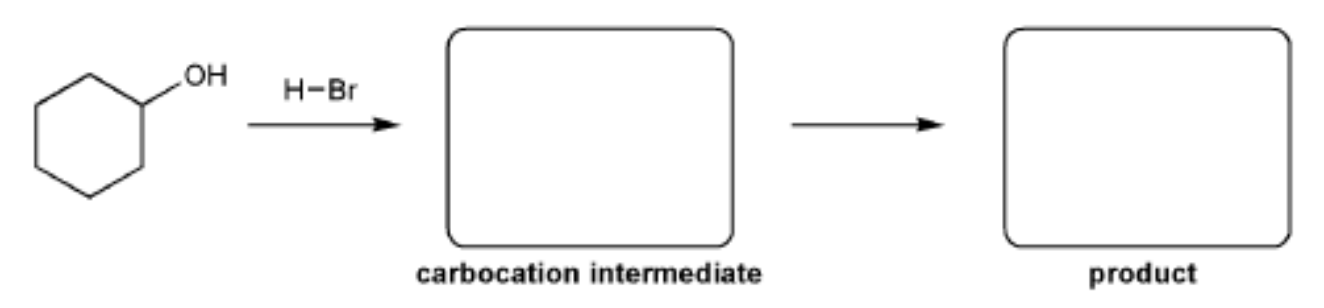
**Note: thiol = RSH, like an alcohol, but with sulfur instead of oxygen.**



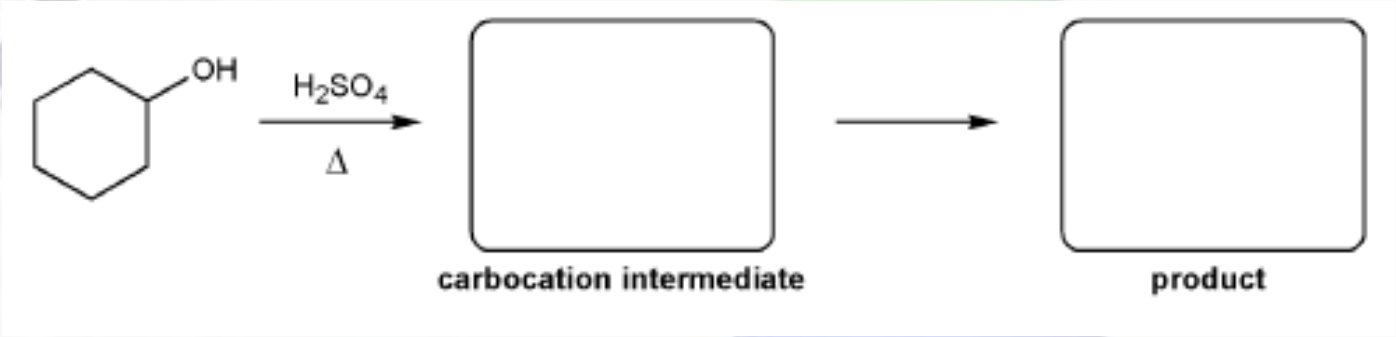
**23. For the reaction below, draw the structures of the radical intermediate and the final product.**




**24. For the reaction below, draw the structures of the carbocation intermediate and the final product.**



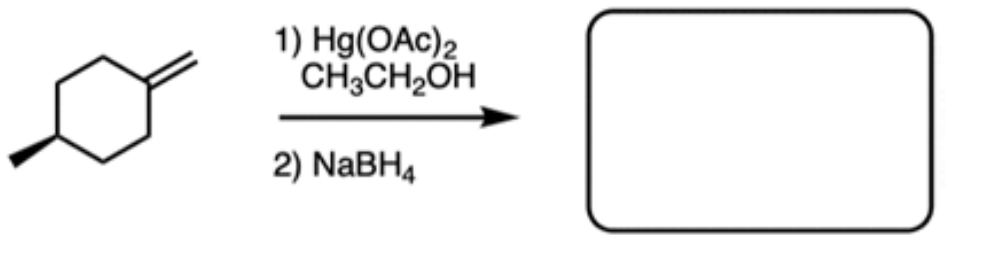
**25. For the reaction below, draw the structures of the carbocation intermediate and the final product.**




**26. An alkene A on ozonolysis gives a mixture of propanal and acetophenone. What is A?**

**27. The product will be**

**(A) A single achiral product (B) A mixture of constitutional isomer (C) A racemic mixture of enantiomers, (D) A mixture of diastereomers**




**28. The product will be**

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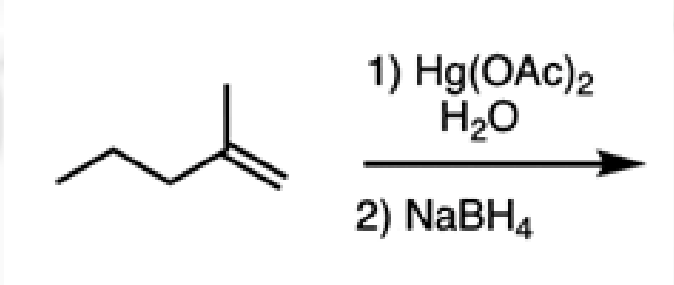
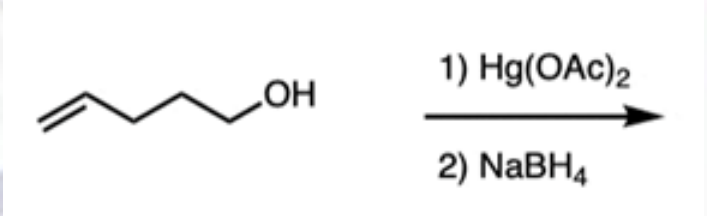
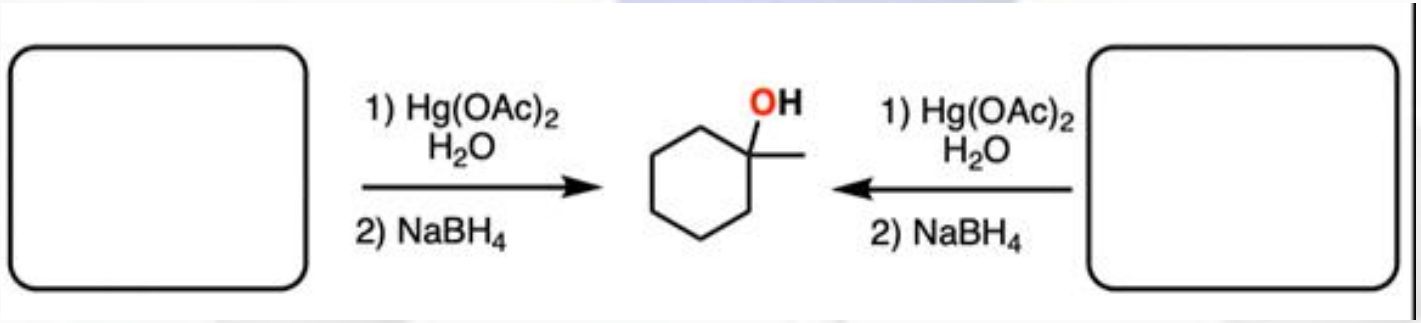


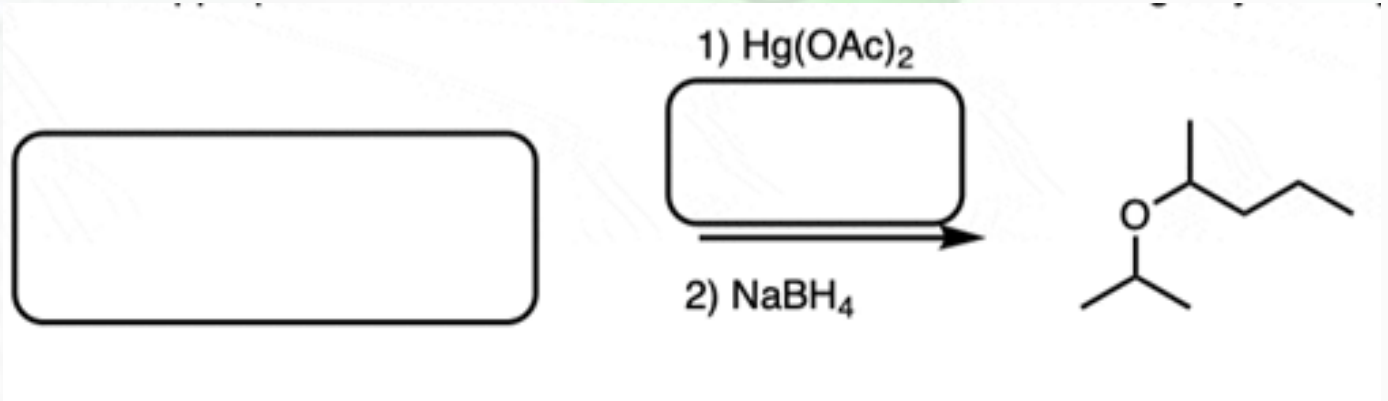
**29. Write down the product. Is it an enantiomer or diastereomer?**




**30. Below tertiary alcohol can be prepared from two different alkenes. Find out two different alkenes**

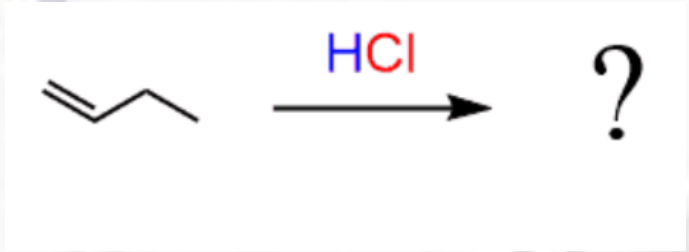


**31. Show an appropriate alcohol and alkene which can give the following ether by oxymercuration-demercuration**

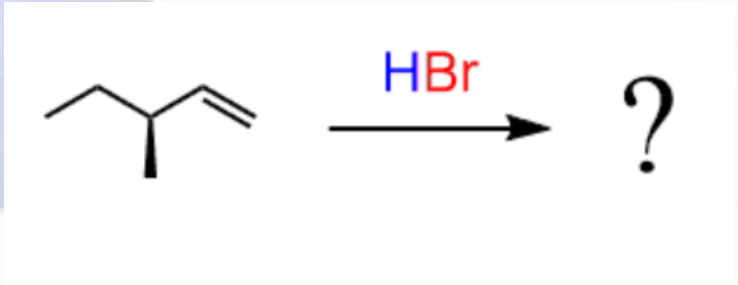



**32. Write down correct products**

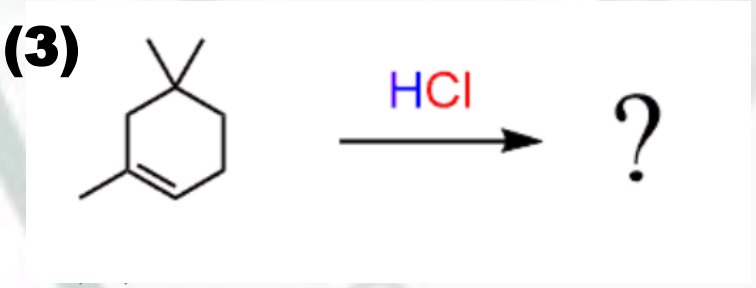
**(1)**



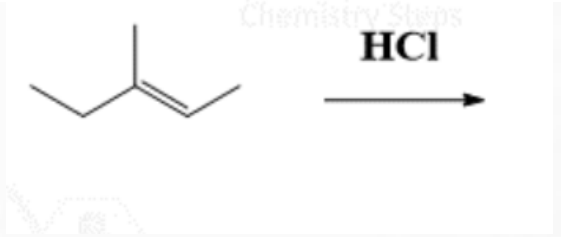

**(2)**

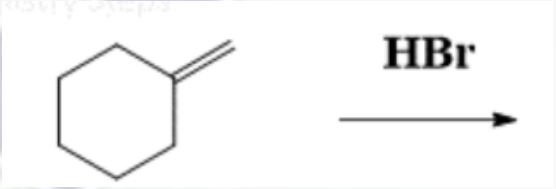


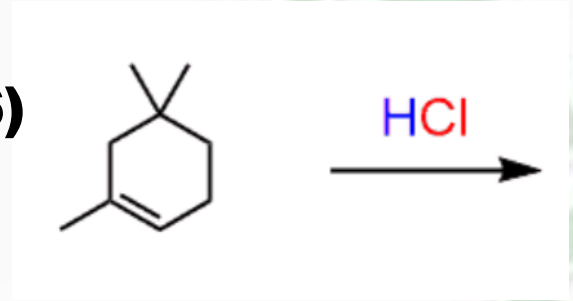

**(3)**

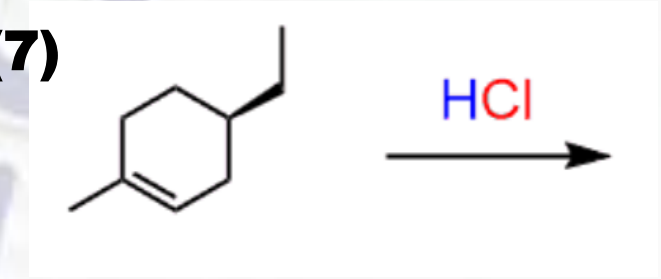


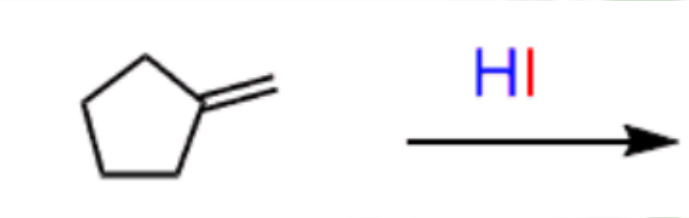

**(4)**

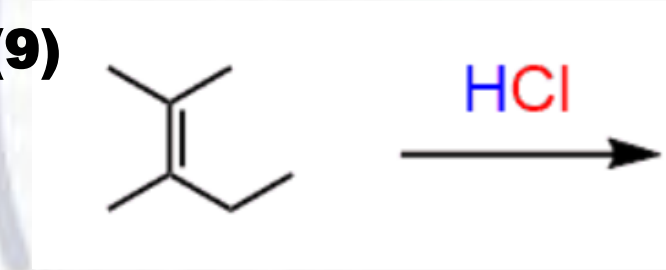


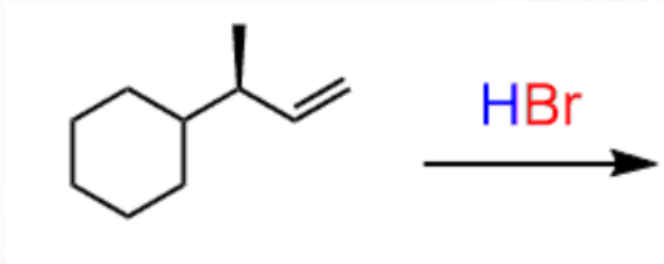
(5) 

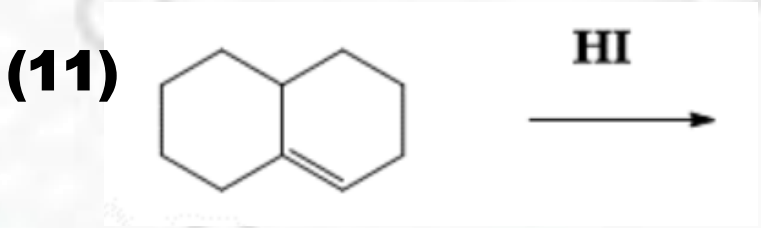

(6) 

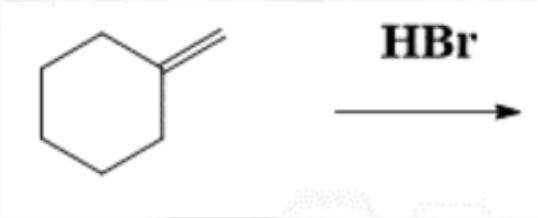

(7) 

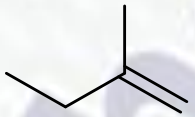

(8) 

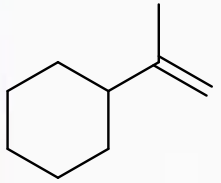

(9) 

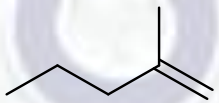

(10) 

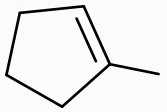

(11) 

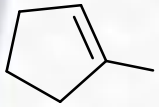

(12) 

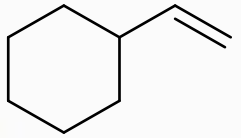
(13)  $HBr, H_2O_2$ →

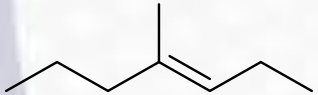
(14)  $HBr, H_2O_2$ →

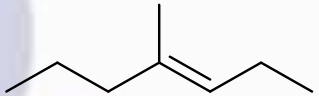
(15)  $Br_2, CCl_4$ →

(16)  $Br_2, CCl_4$ →

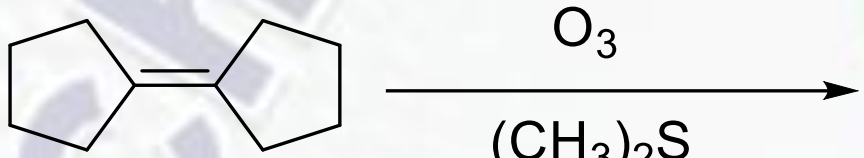
(17)  $Br_2, H_2O$ →

(18)  $Br_2, H_2O$ →

(19)  $Br_2, H_2O$ →

(20)  $Br_2, H_2O_2$ →

# 33. Write down ozonolysis products



$$\xrightarrow[(CH_3)_2S]{O_3}$$

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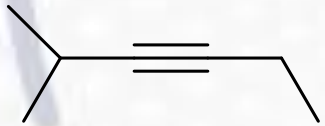
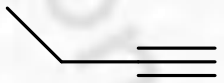
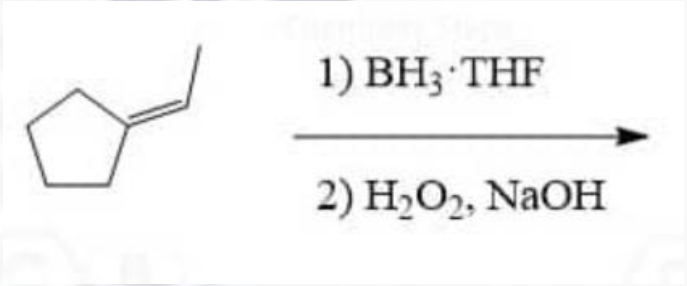


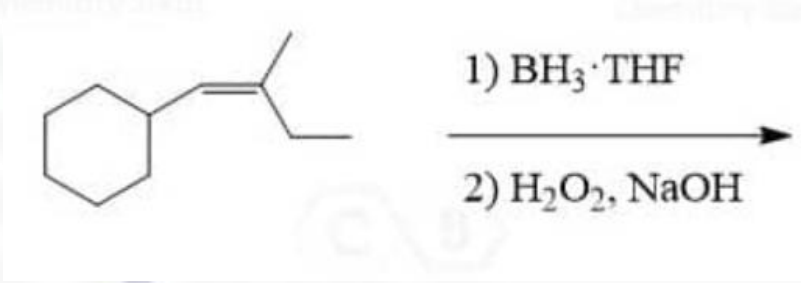
$$\xrightarrow[2.\ H_2O]{1.\ O_3}$$

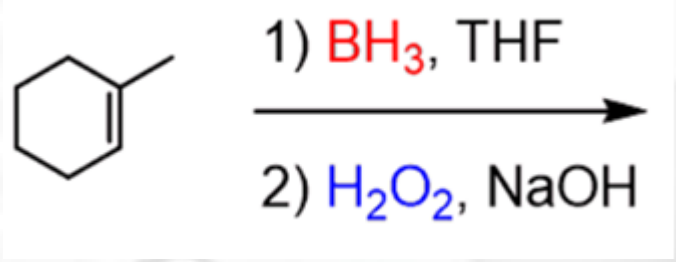


$$\xrightarrow[2.\ H_2O]{1.\ O_3}$$

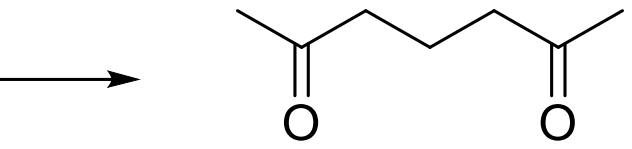
# 34. Write down hydroboration-oxidation products



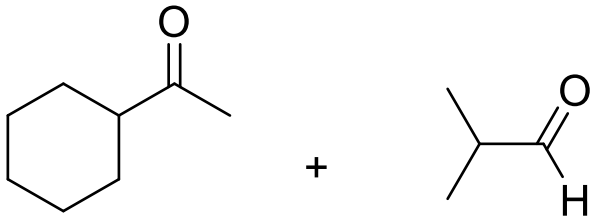



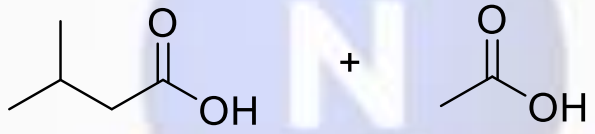
**35.** What is starting material ?



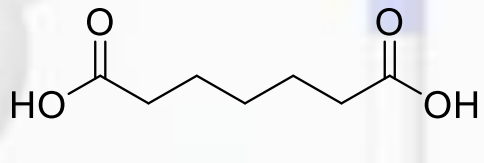

**36.** What is starting material ?




**37.** **Reactant**




**38.** **Reactant**

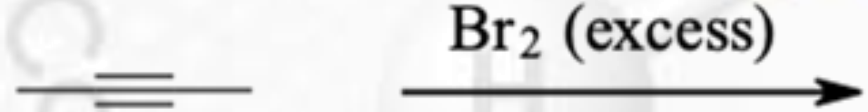


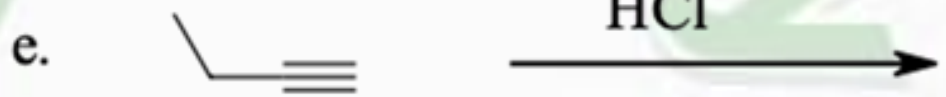
**39. Draw the structure and give the IUPAC name of the product formed in each of the reactions listed below**

a. 

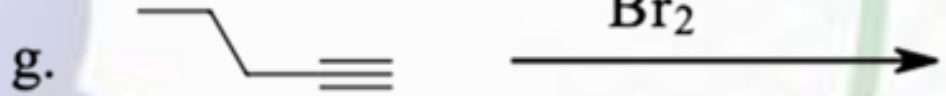
b. 

c. 

d. 

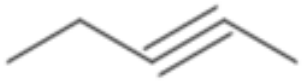
e. 

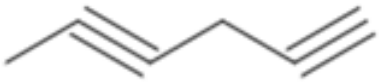
f. 

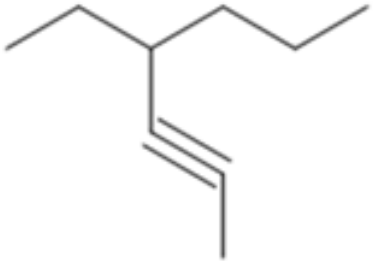
g. 

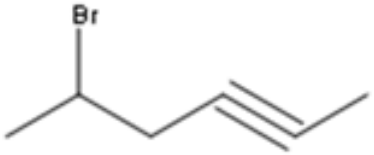
h. 

# 40. Write down all the products maintaining the stereochemistry

1)  Lindlar's Catalyst / $H_2$

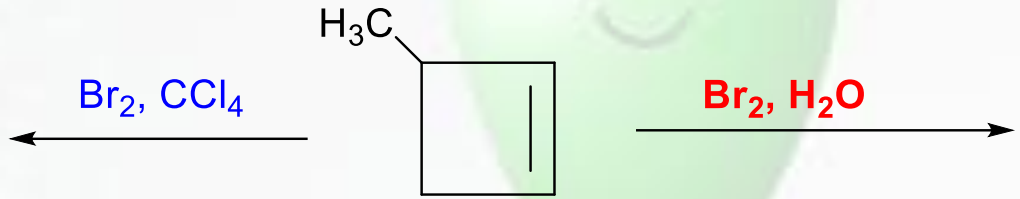
2)  Lindlar's Catalyst / Excess $H_2$

3)  $Na^{\bullet}$ / $NH_3$ then $H^+$

4) 

1) NaOH
2) Lindlar's Catalyst $H_2$

**41. Write down all the products and mention both major and minor products**



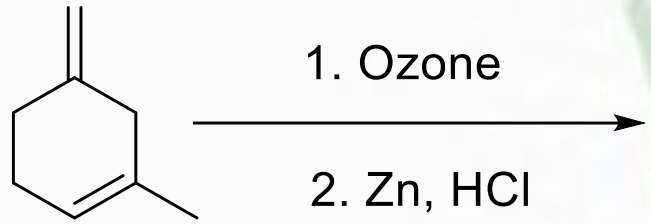

**42. 1-cyclohexyl-4-methylhexa-1.3-diene upon ozonolysis gave cyclohexancarbaldehyde as one major product. What will be another product? Write down the equation.**

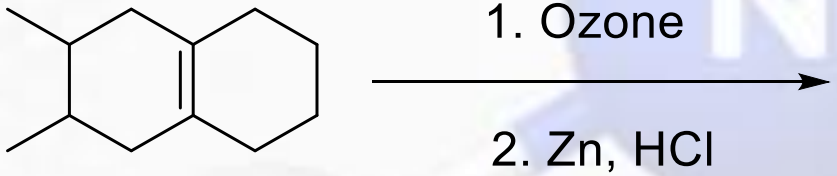
**43. When but-1-yne is treated with aqueous $H_2SO_4$ in presence of $HgSO_4$, what will be the major product? Write the reaction.**

**44. (i) Propyne is treated with aqueous $H_2SO_4$ in presence of $HgSO_4$, Write down the intermediate and the final product. (ii) If same reagent is added to propene, what will be the final product?**

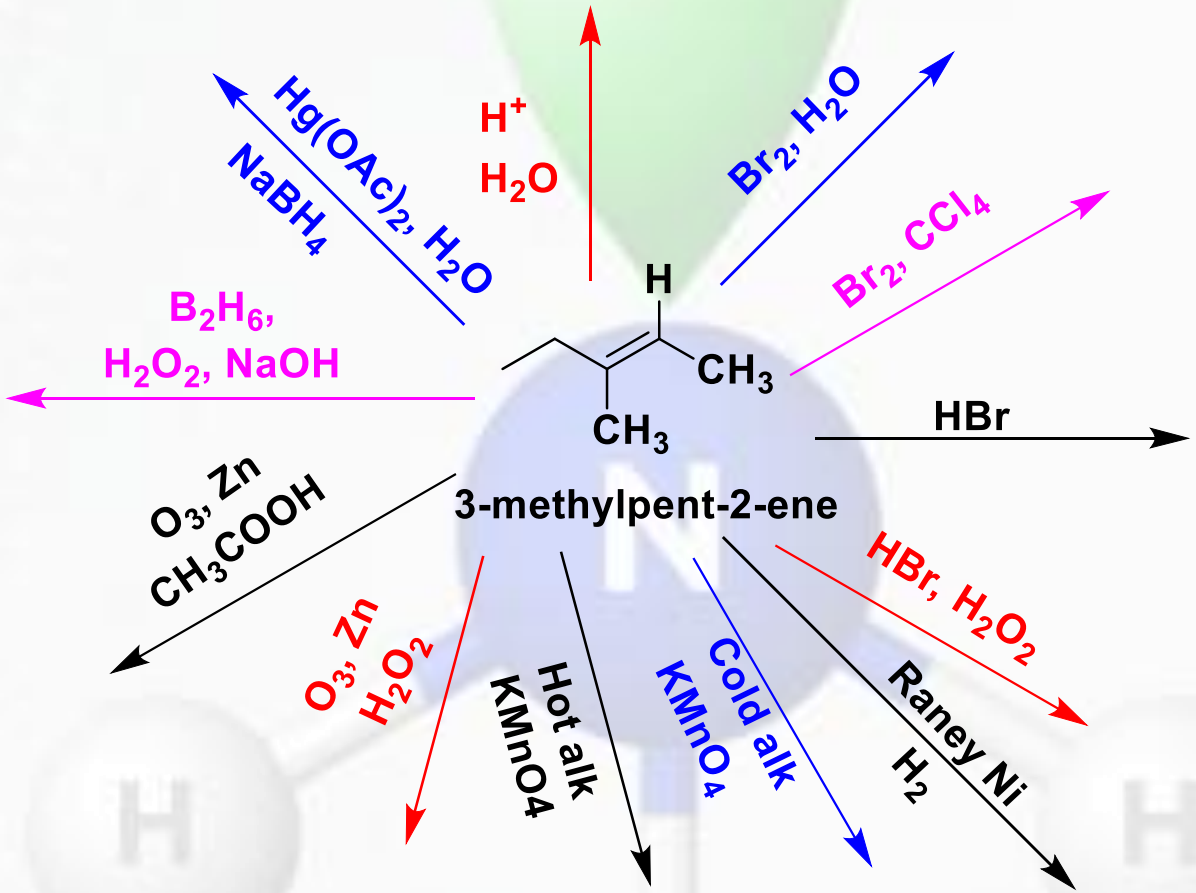
**45. (i) 3-methylpent-2-ene on reaction with HBr in presence of peroxide forms an addition product. Write down the product with appropriate equation. (ii) the number of possible stereoisomers of the product is possible**

**46. Write down ozonolysis product**

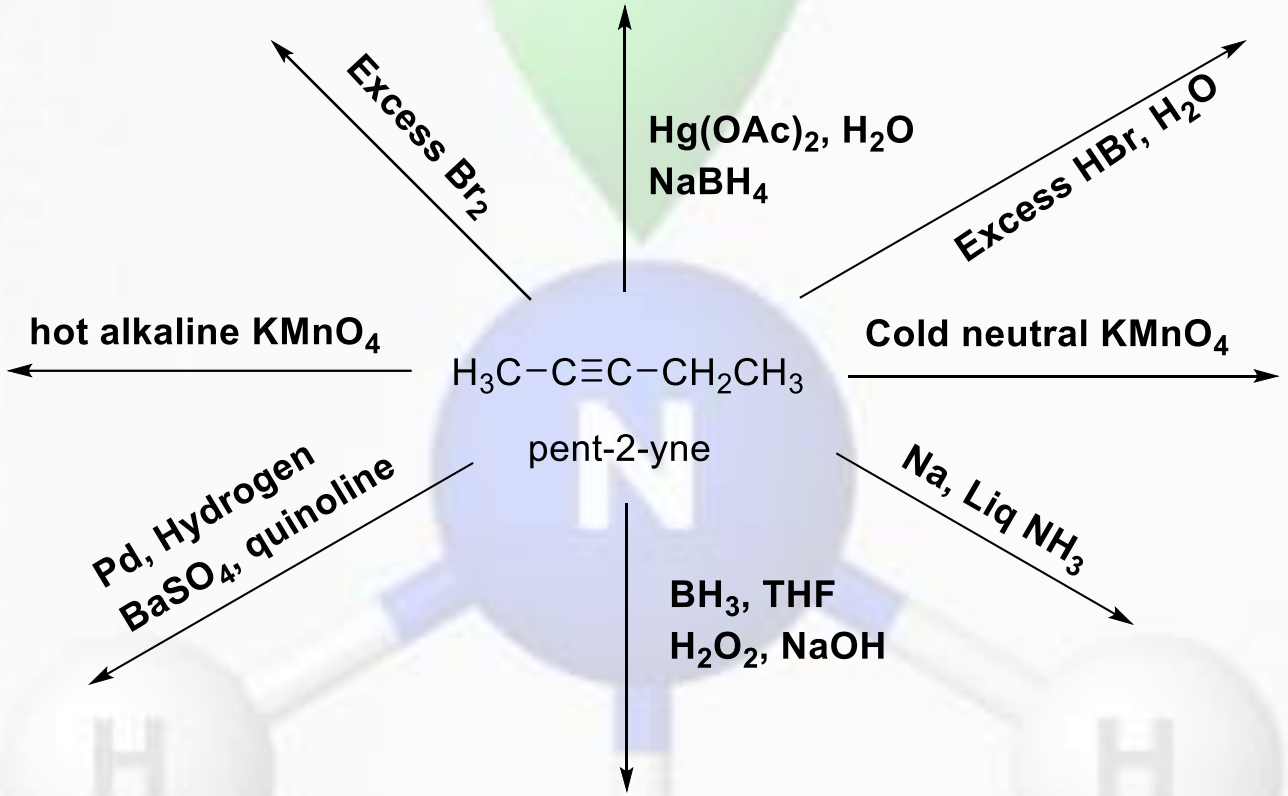


# 48. Complete the reaction map

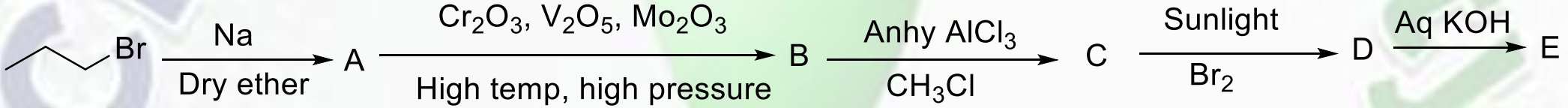


# 49. Complete the reaction map

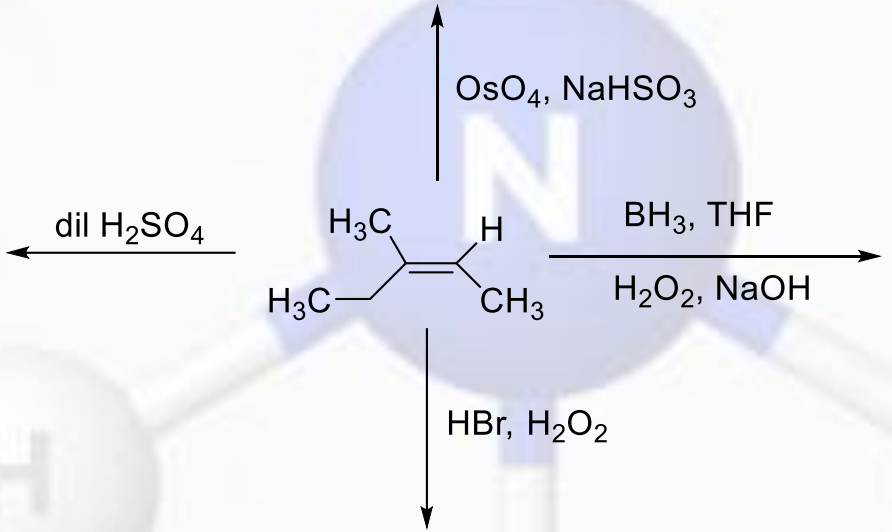


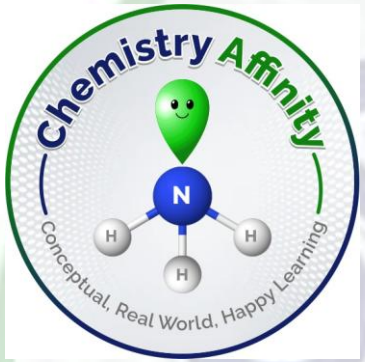
# 50. Write down all the products

**(a)**




**(b)**

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# All the best