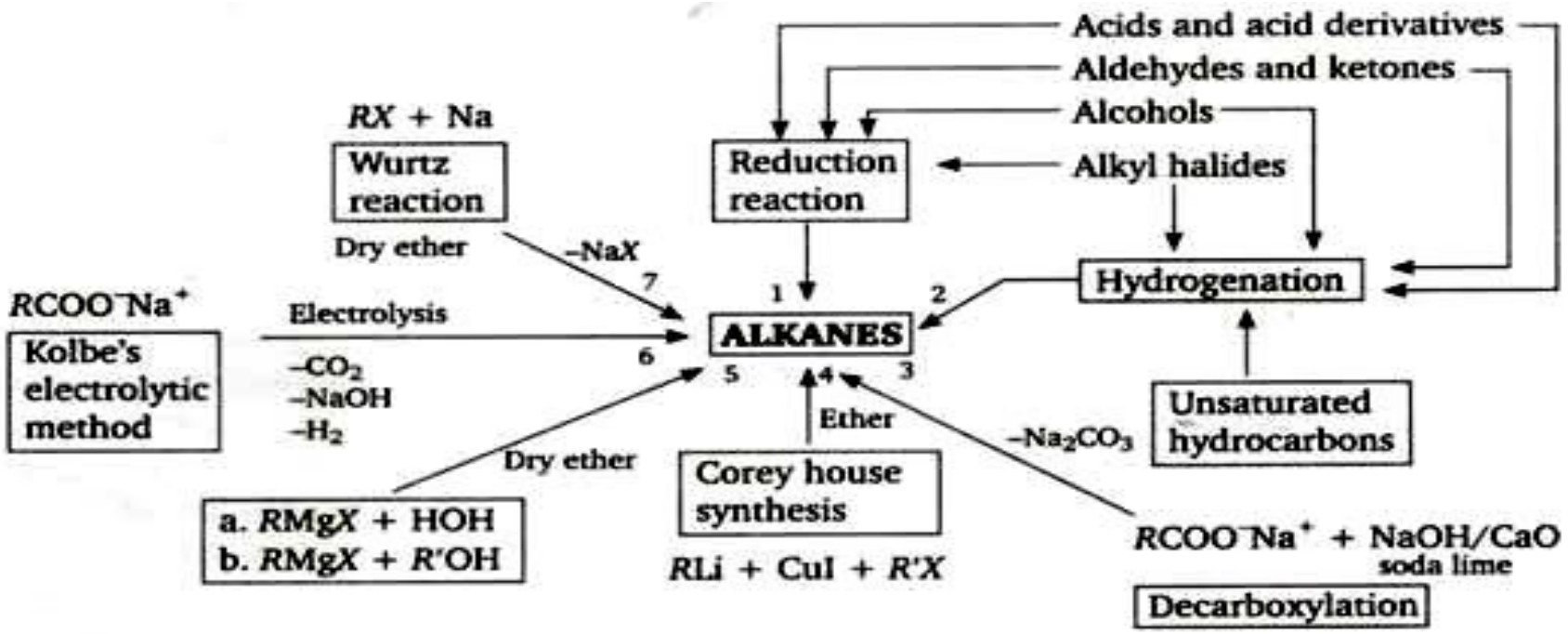
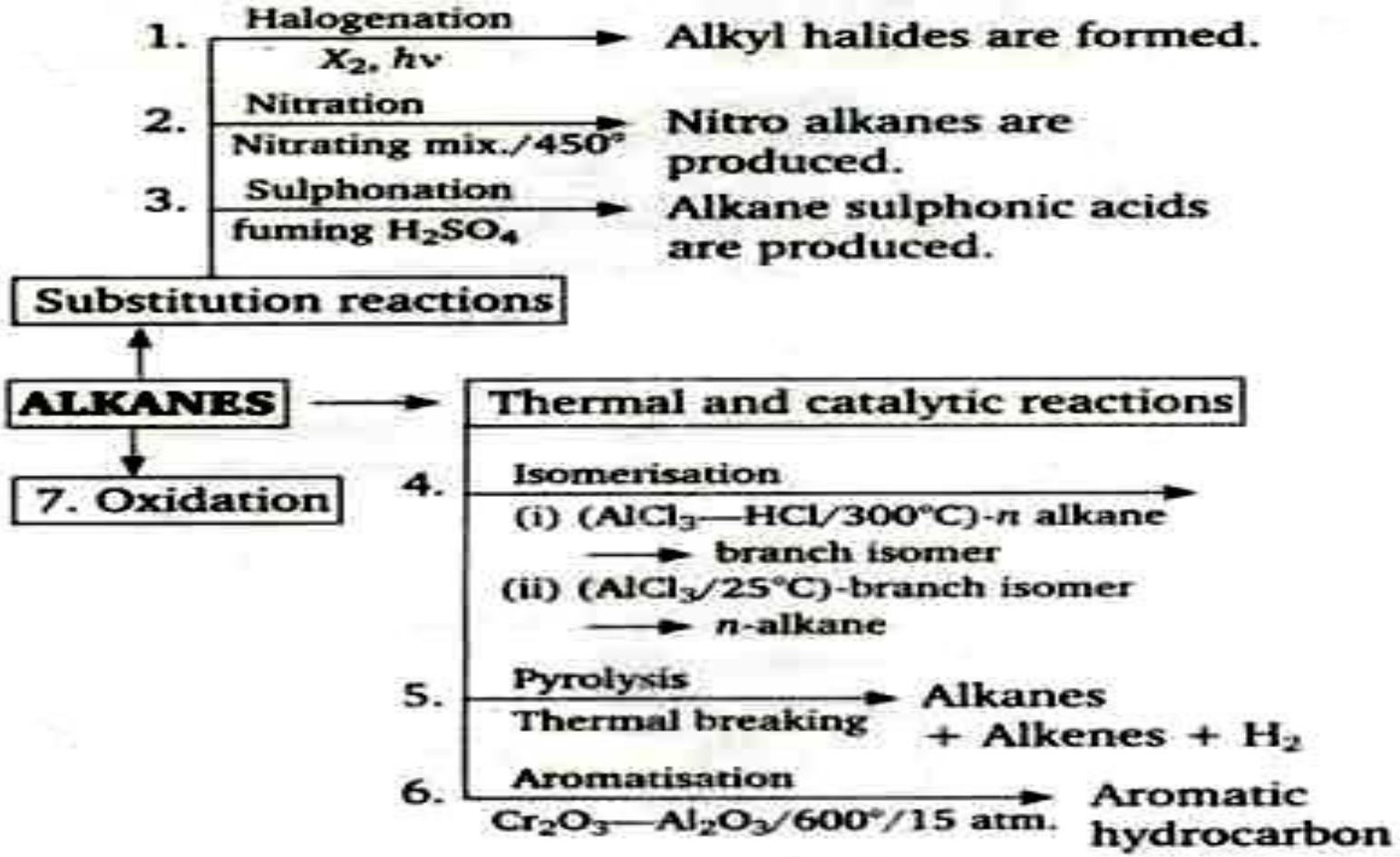
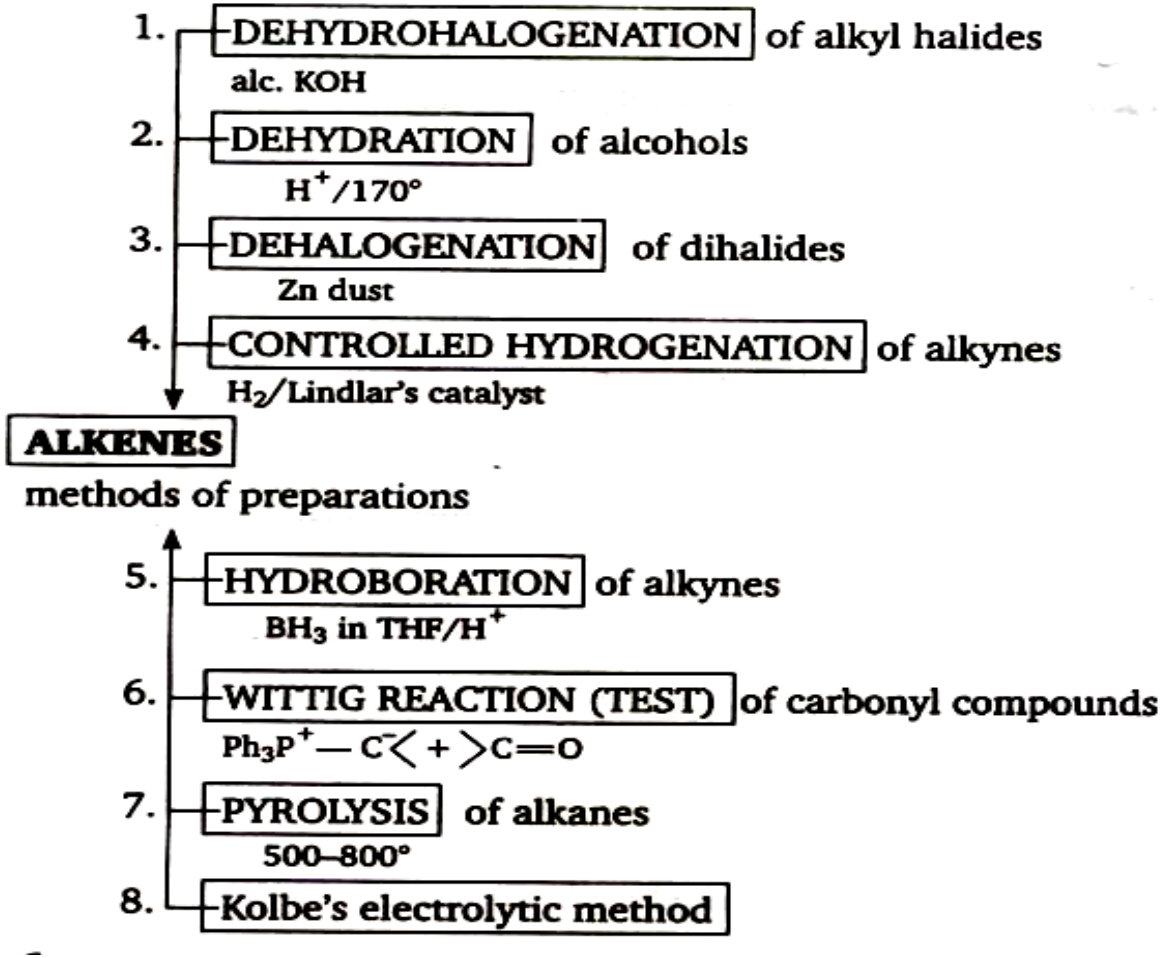
Methods of Prepration of Alkanes :



Properties of alkanes:



Methods of Prepration of Alkenes :



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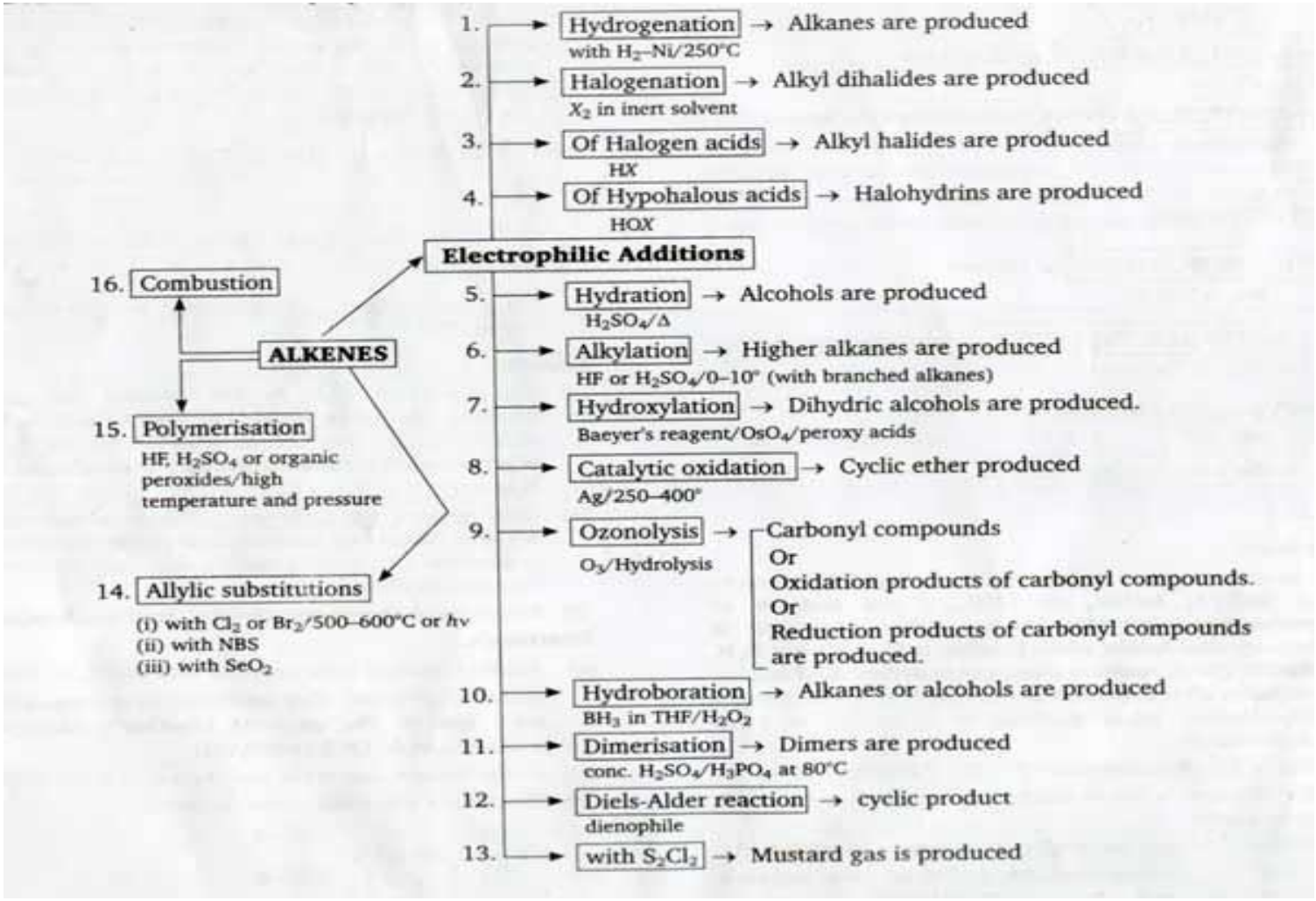
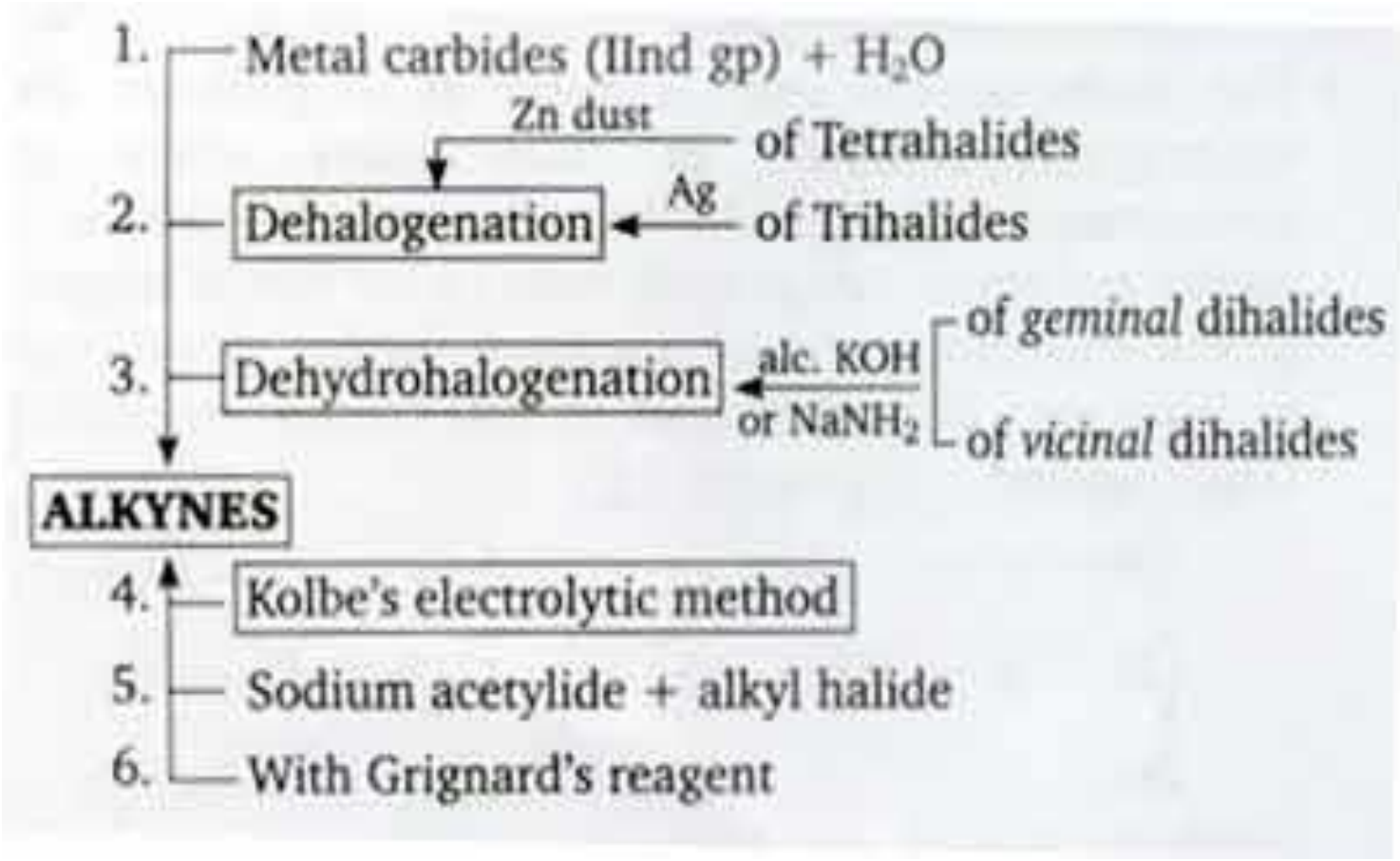
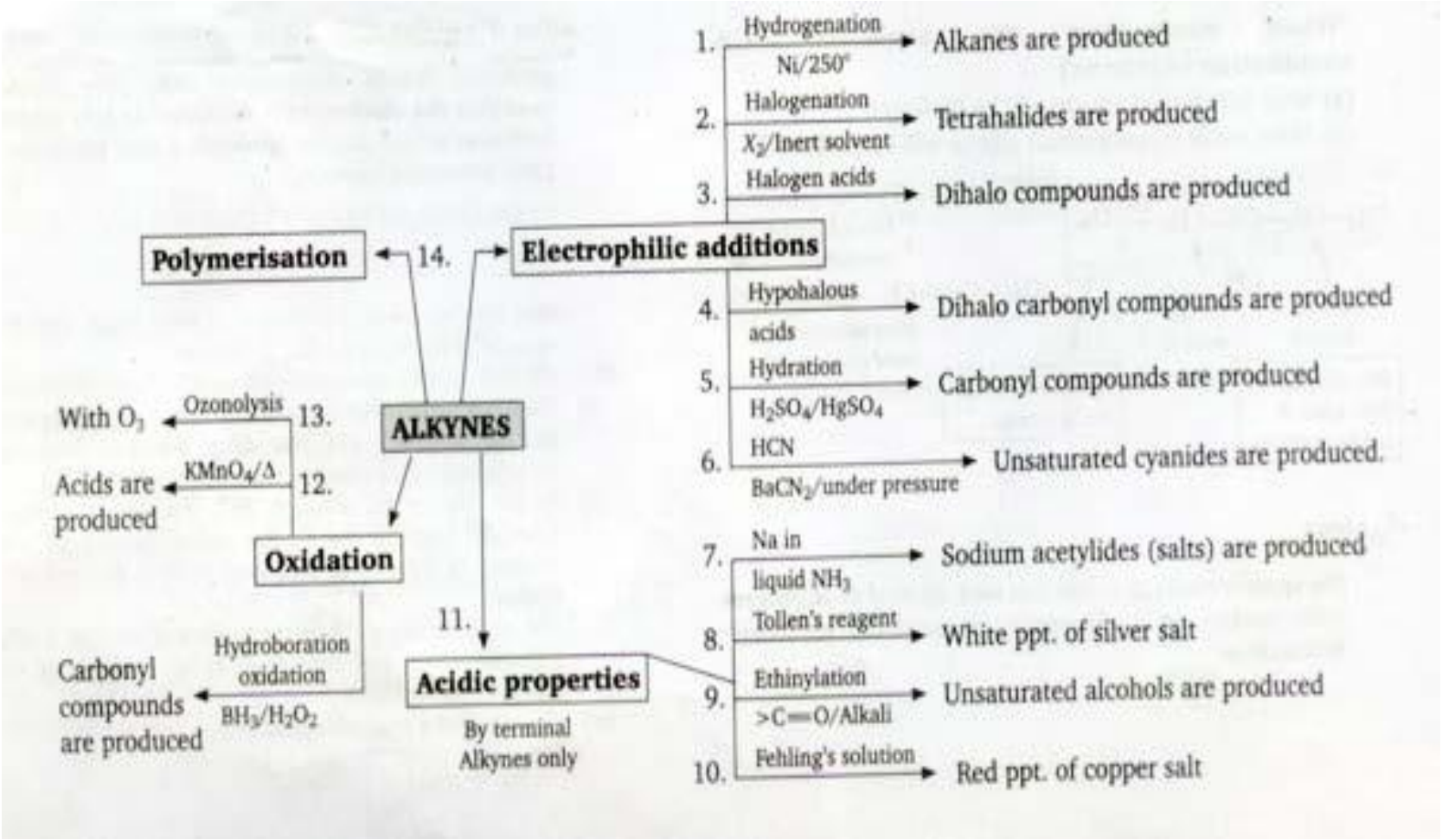


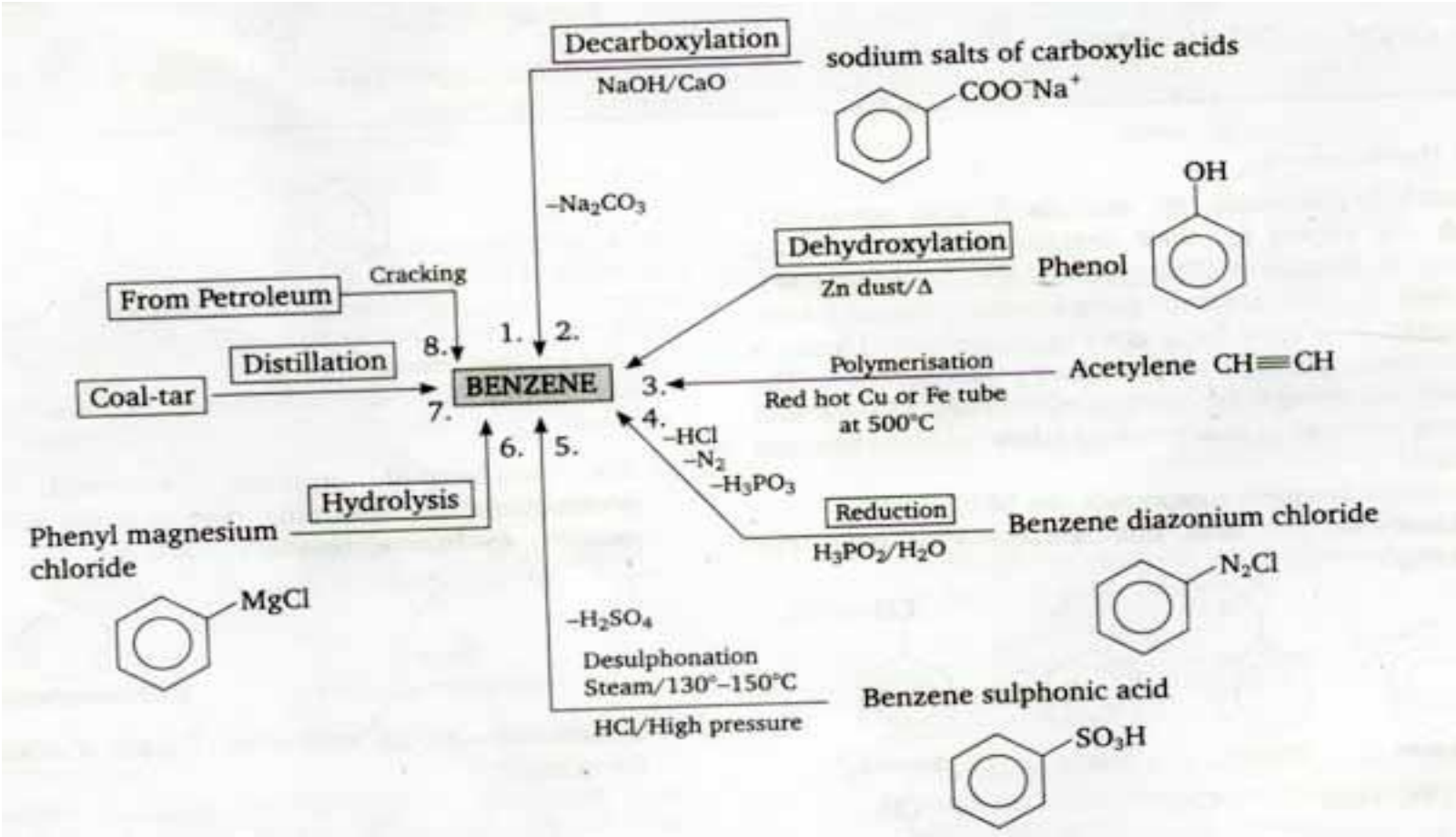
Methods of Prepration of Alkynes :



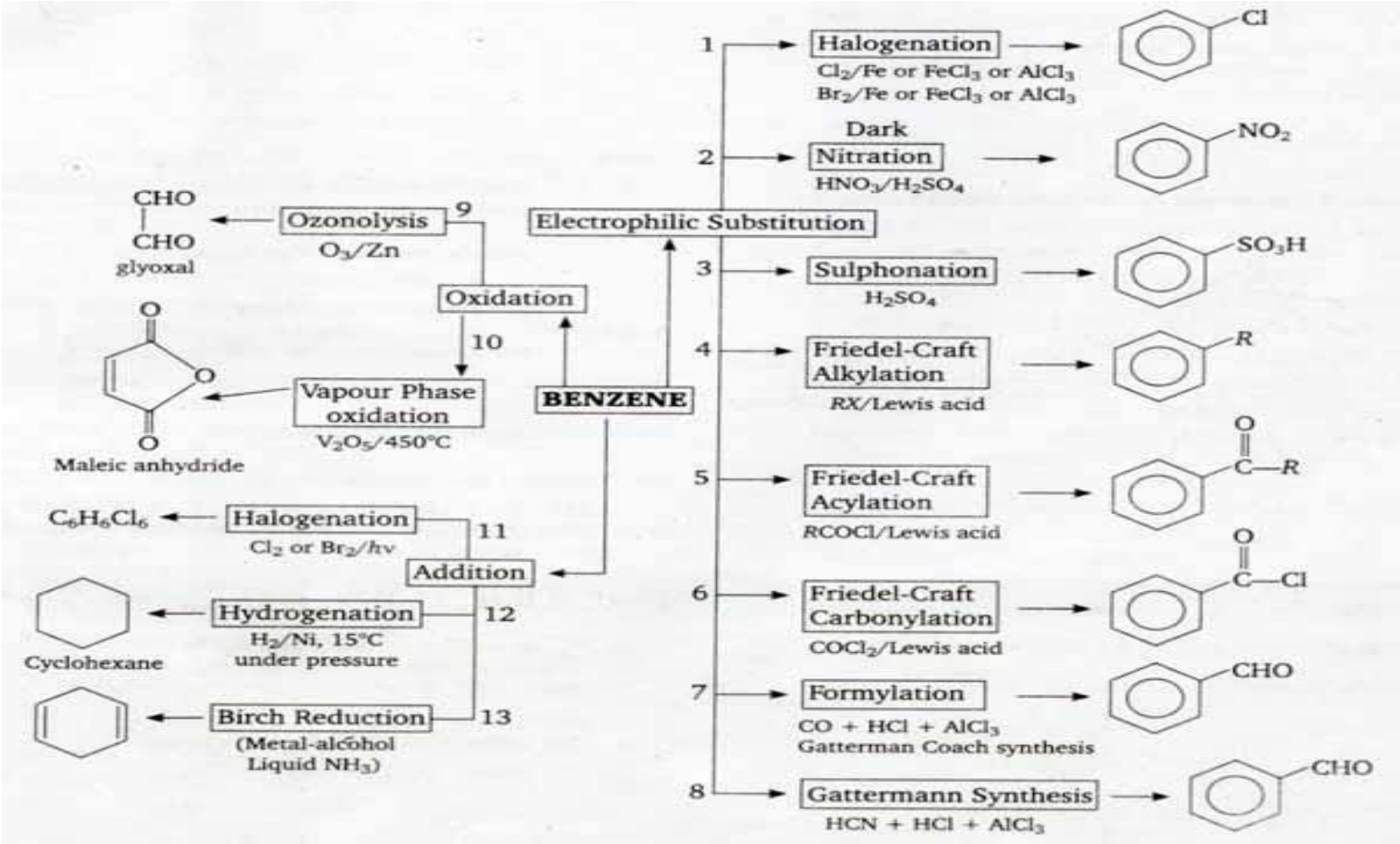
Properties of Alkynes :



Methods Of Prepration of Benzene :



Chemical Properties of Benzene :



Problem 1: When acetylene reacted with hydrochloric acid in presence of $HgCl_2$ the product obtained is

(a) Methyl chloride (b) Acetaldehyde

(c) Vinyl chloride (d) Methanol.

Solution: $CH \equiv CH + HCl \xrightarrow{HgCl_2} CH_2 = CH - Cl$

$\therefore$ **(c)**

Problem 2: When propyne is treated with aqueous H_2SO_4 in presence of $HgSO_4$, the major product is

(a) Propanol (b) Propyl hydrogen sulphate

(c) Acetone (d) Propanol.

Solution: $CH_3 - C \equiv CH \xrightarrow{H_2SO_4/H_2SO_4} CH_3 - COCH_3$

$\therefore$ **(c)**

Problem 3: Which one of the following does not dissolve in conc. H_2SO_4?

(a) $CH_3—C \equiv C—CH_3$ (b) $CH_3—CH_2—C \equiv CH$

(c) $CH \equiv CH$ (d) $CH_2 = CH_2$.

Solution: If $CH \equiv CH$ is dissolved in H_2SO_4 a bisulphate salt of vinyl carbocation $H_2C = C^+H$ would be formed. The more s-character in the positively charged `C' less stable is the carbocation and less likely to be formed.

$\therefore$ **(c)**

Problem 4: Which one of the following compounds will give in the presence of peroxide a product different from that obtained in the absence of peroxide?

(a) 1-butane HCl (b) 1-butene, HBr

(c) 2-butene, HCl (d) 2-butene, HBr.

Solution: Peroxide effect is observed when unsymmetrical alkene is treated with HBr only (and not with HCl and Hl).

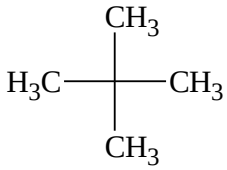
$\therefore$ **(b)**

Problem 5: Which of the following compounds yields only one product on monobromination?

(a) Neopentane (b) Toluene

(c) Phenol (d) Aniline.

Solution:



has twelve equivalent 1°H. Hence H forms only one product on monobromination.

∴ **(a)**

Problem 6: $CH_3 - C \equiv C - CH_3 \xrightarrow{NaNH_2} 'X'$, What is X

(a) $CH_3CH_2CH = CH_2$ (b) $CH_3CH_2C \equiv CH$

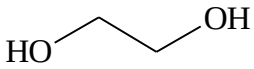
(c) $CH_3—CH \equiv CH—CH_3$ (d) $CH2=C=CH—CH_3$.

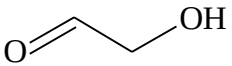
Solution: Isomerisation occurs, when 2-butyne is treated with $NaNH_2$, it converts into terminal alkyne (1-butyne).

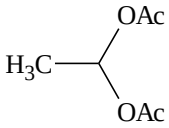
∴ **(b)**

Problem 7: Identify the compound `Y' in the following sequence of reaction

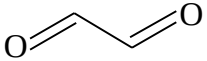
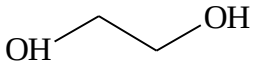
$$HC \equiv CH \xrightarrow[ii)\ H_2O/Zn]{i)\ O_3} X \xrightarrow{Zn/CH_3COOH} Y$$

(a) 

(b) 

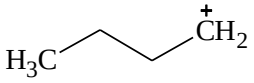
(c) 

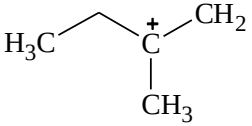
(d) CH_3COOH.

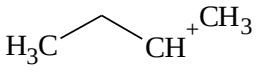
Solution: $HC \equiv CH \xrightarrow{\text{Ozonolysis}}$  $\xrightarrow{\text{Reduction}}$ 

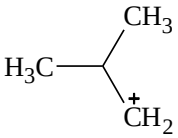
$\therefore$ **(a)**

Problem 8: Dehydration of 1-butanol gives 2-butene as a major product, by which of the following intermediate the compound 2-butene obtained.

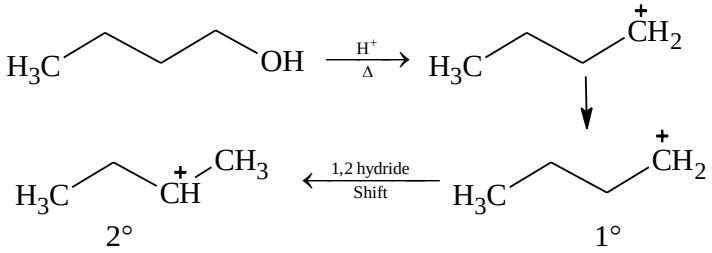
(a) 

(b) 

(c) 

(d) 

Solution:



$\therefore$ **(c)**

Problem 9: The principal-organic compound formed in the reaction

$$CH_2=CH(CH_2)COOH + HBr \xrightarrow{\text{Peroxide}} .... \text{ is}$$

(a) $CH_3-\underset{\underset{Br}{|}}{CH}-(CH_2)_8COOH$ (b) $CH_2=CH(CH_2)_8COBr$

(c) $\underset{\underset{Br}{|}}{CH_2}-CH_2(CH_2)_8COOH$ (d) $CH_2=CH(CH_2)_7-\underset{\underset{Br}{|}}{CH}-COOH$

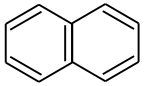
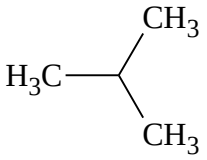
Solution: Follows the peroxide effect

$$CH_2=CH(CH_2)_8COOH \xrightarrow[\text{Peroxide}]{HBr} \underset{\underset{Br}{|}}{CH_2}-CH_2(CH_2)_8COOH$$

$\therefore$ **(c)**

Problem 10: The compound most likely to decolourise a solution of potassium permanganate is

(a) $H_2C=CH_2$ (b) 

(c)  (d) 

Solution: It is a test for unsaturation. As benzene and naphthalene is also unsaturated, but they are stabilized due to resonance, and thus does not give Bayer's test.

$\therefore$ **(a)**

LEVEL – I

1. On heating CH_3COONa with soda lime the gas evolved will be
   (a) C_2H_2 (b) CH_4
   (c) C_2H_6 (d) C_2H_4.

2. Which of the following will have least hindered rotation about carbon-carbon bond ?
   (a) Ethane (b) Ethylene
   (c) Acetylene (d) hexachloro ethane.

3. A sample of 1.79 mg of a compound of molar mass 90 g mol^{-1} when treated with CH_3MgI releases 1.34 ml of a gas at STP. The number of active hydrogen in the molecule is
   (a) 1 (b) 2
   (c) 3 (d) 4.

4. The addition of Br_2 to trans-2-butene produces

(a) (+) 2, 3-dibromobutane (b)(–) 2, 3-dibromobutane

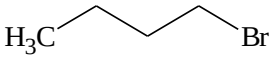
(c) rac –2, 3-dibromobutane (d)meso-2, 3-dibromobutane

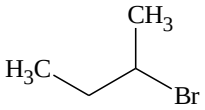
5. The treatment of $CH_3C(CH_3)= CHCH_3$ with $NalO_4$ or boiling $KMnO_4$ produces

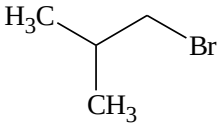
(a) $CH_3COCH_3 + CH_2O$ (b) $CH_3CHO + CH_3CHO$

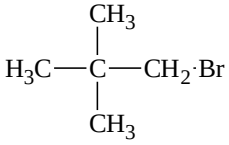
(c) $CH_3COCH_3 + CO_2$ (d) $CH_3COCH_3 + HCOOH$.

6. What is the chief product obtained when n-butane is treated with bromine in the presence of light at 130°C ?

(a) 

(b) 

(c) 

(d) 

7. The olefin, which on ozonolysis gives CH_3CH_2CHO and CH_3CHO.

(a) But-1-ene (b) But-2-ene

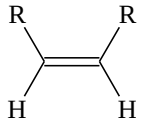
(c) Pent-1-ene (d) Pent-2-ene.

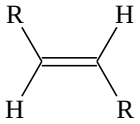
8. Addition of halogen acid (HX) is least in

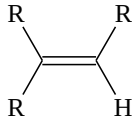
(a) $CH_2 = CHCl$ (b) $CH_2 = CH_2$

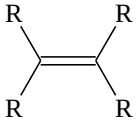
(c) $CH_3 — CH = CH_2$ (d) $(CH_3)_2C = CH_2$.

9. Which of the following alkene will react fastest with H_2 under catalytic hydrogenation condition?

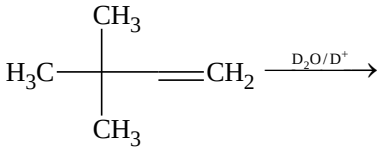
(a) 

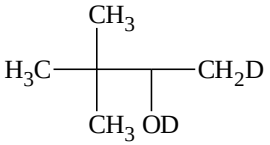
(b) 

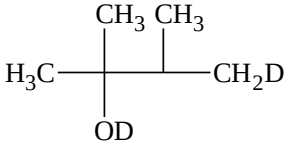
(c) 

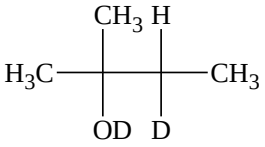
(d) 

10. Products of the reaction,

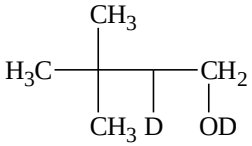


(a) 

(b) 



(c)

(d) 

LEVEL – II

1. Point out (A) in the given reaction sequence:

$$(A) \xrightarrow{O_3/H_2O} (B) \xrightarrow{\Delta} 2CH_3COOH + CO_2$$

(a) 

(b) 

(c) 

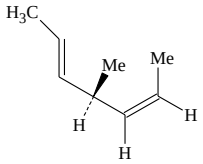
(d) 

2. End product of the following sequence is:

$$CaO + C \xrightarrow{Heat} (A) \xrightarrow{H_2O} (C) \xrightarrow[H_2SO_4]{Hg^{2+}} (C)$$

(a) Ethanol (b) Ethyl hydrogen sulphate
(c) Ethanal (d) Ethylene glycol.

3. Hydrogenation of the compound

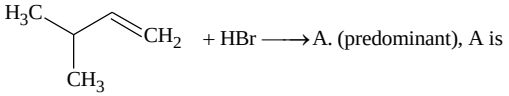


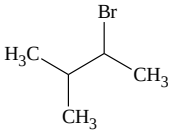
In the presence of poisoned palladium catalyst gives:
(a) An optically active compound (b) An optically inactive compound
(c) A racemic mixture (d) A diastereomeric mixture.

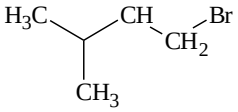
4. The treatment of C_2H_5MgI with water produces

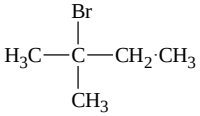
(a) Methane (b) Ethane

(c) Ethanal (d) Ethanol.

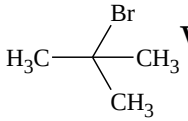
5.  + HBr ⟶ A. (predominant), A is

(a) 

(b) 

(c) 

(d) None of these.

6. When isobutene is brominated, the percentage of  would be

(a) 0% (b) 83%

(c) 10% (d) 100%

7. Which of the following is used for aromatization of n-hexane?

(a) $AlCl_3$ (b) Na in liquid NH_3

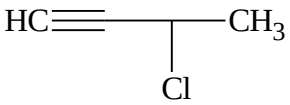
(c) Cr_2O_3/Al_2O_3 with heat (d) Wilkinson's catalyst

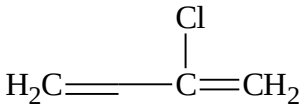
8. Identify (B) in the following sequence of reactions.

$CH \equiv CH \xrightarrow{Cu_2Cl_2 + NH_4Cl} (A) \xrightarrow{HCl} (B)$

(a) CH_3CH_2Cl

(b) $CH_2 = CH - CH_2CH_2Cl$

(c) 

(d) 

9. Propene can be converted into 1-propanol by oxidation. Which set of the reagents is used to effect the conversion?

(a) $OsO_4 - CHCl_3$ (b) $O_3/Zn - H_2O$

(c) Alkaline and cold $KMnO_4$ (d) B_2H_6 and alk. H_2O_2.

10. In the following sequence of reactions, identify the product (D).

$CH \equiv CH \xrightarrow{HBr} (A) \xrightarrow{HBr} (B) \xrightarrow{alk.\,KOH} (C) \xrightarrow{NaNH_2} (D)$

(a) Ethanol (b) Ethyne

(c) Ethanal (d) Ethene

LEVEL - I

1.	**b**	2.	**d**
3.	**c**	4.	**c**
5.	**c**	6.	**b**
7.	**d**	8.	**b**
9.	**d**	10.	**b**

LEVEL - II

1.	**c**	2.	**c**
3.	**b**	4.	**b**
5.	**c**	6.	**d**
7.	**c**	8.	**d**
9.	**d**	10.	**b**