

SRIGAYATRI EDUCATIONAL INSTITUTIONS

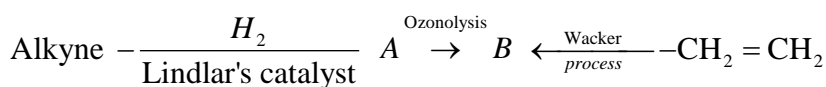
INDIA

ALKYNES (UT-05 QB)

1. 1-butene on oxidation with hot alkaline KMnO_4 would yield

- 1) $\text{CH}_3\text{CH}_2\text{COOH} + \text{HCOOH}$ 2) $\text{CH}_3\text{CH}_2\text{COOH} + \text{CO}_2 + \text{H}_2\text{O}$
 3) $\text{CH}_3\text{CH}_2\text{COOH}$ 4) $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$

2. Identify the alkyne in the following sequences of reactions



- 1) $\text{HC} \equiv \text{C} - \text{CH}_2 - \text{C} \equiv \text{CH}$ 2) $\text{H}_2\text{C} = \text{CH} - \text{C} \equiv \text{CH}$
 3) $\text{H}_3\text{C} - \text{CH}_2 - \text{C} \equiv \text{CH}$ 4) $\text{H}_3\text{C} - \text{C} \equiv \text{C} - \text{CH}_3$

3. Match the following.

- | Set 1 | Set 2 |
|--|--------------|
| a) $\text{C}_2\text{H}_5\text{OH} \xrightarrow[170^\circ\text{C}]{\text{Conc. HCl}}$ | 1. Methane |
| b) $\text{CHI}_3 \xrightarrow[\text{Ag(Power)}]{\Delta}$ | 2. Ethylene |
| c) $\text{CH}_3\text{COONa}_{(aq)} \xrightarrow{\text{Electrolysis}}$ | 3. Benzene |
| d) $\text{CH}_3\text{COONa}_{(aq)} \xrightarrow[\text{CaO} \cdot \Delta]{\text{NaOH}}$ | 4. Acetylene |
| | 5. Ethane |

The correct matching

- 1) A-2, B-4, C-5, D-1 2) A-2, B-4, C-5, D-3 3) A-4, B-2, C-5, D-1 4) A-4, B-2, C-5, D-3

4. In the reactions, $\text{B} \xleftarrow[\text{Lindlar catalyst} + \text{H}_2]{\text{RC} \equiv \text{CR}} \xrightarrow[\text{Na/NH}_3]{\text{A}}$. A and B are geometrical isomers. Then

- 1) A is trans and B is cis 2) A and B are trans
 3) A and B are cis 4) A is cis and B is trans

5. An organic compound reacts with Cu_2Cl_2 and also decolourise Br_2 water is

- 1) $\text{CH}_3 - \text{CH}_3$ 2) $\text{CH}_2 = \text{CH} - \text{CH}_3$
 3) $\text{CH}_3 - \text{C} \equiv \text{CH}$ 4) $\text{CH}_3 - \text{C} \equiv \text{C} - \text{CH}_3$

6. $[\text{A}] \xleftarrow[\text{catalyst}]{\text{Lindlar's}} \text{CH}_3 - \text{C} \equiv \text{C} - \text{CH}_3 \xrightarrow[\text{liq} \cdot \text{NH}_3]{\text{Na}} [\text{B}]$ [A] and [B] are respectively

- 1) cis, trans-2-butene 2) trans, cis-2-butene 3) Both cis-2-butene 4) Both trans-2-butene

7. The product(s) obtained via oxymercuration ($\text{HgSO}_4 + \text{H}_2\text{SO}_4$) of 1-butyne would be

- 1) $\text{CH}_3\text{CH}_2\text{COOH} + \text{HCOOH}$ 2) $\text{CH}_3 - \text{CH}_2 - \text{CHO} + \text{HCHO}$
 3) $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CHO}$ 4) $\begin{matrix} \text{O} \\ || \\ \text{CH}_3 - \text{CH}_2 - \text{C} - \text{CH}_3 \end{matrix}$

8. $\begin{array}{c} CH \\ ||| \\ \end{array} \xrightarrow{O_3/NaOH} X \xrightarrow{Zn/CH_3COOH} Y, Y \text{ is}$
- $\begin{array}{c} CH \\ | \\ CH_2OH \\ | \\ CH_2OH \end{array}$
- 1) $\begin{array}{c} | \\ | \\ CH_2OH \\ | \\ CH_2OH \end{array}$ 2) CH_3COOH 3) CH_3CH_2OH 4) CH_3OH
9. When propyne reacts with aqueous H_2SO_4 in the presence of $HgSO_4$, the major product is
- 1) Propanal 2) Acetone 3) Propyl hydrogen sulphate 4) Propanol
10. $R-CH_2-CCl_2-R \xrightarrow{\text{Reagent}} R-C \equiv C-R$. The reagent is
- 1) KOH in C_2H_5OH 2) Na 3) HCl and H_2O 4) Zn
11. The structure of the product (Z) in the reactions given below
- $HC \equiv CH \xrightarrow[H^+]{NaNH_2 \cdot CH_3COCH_3} X \xrightarrow[H_2O]{Hg^{+2} \cdot H_3O^+} Z$
- 1) $\begin{array}{c} O \\ || \\ CH_3-CH_2-CH_2-C-CH_2OH \end{array}$ 2) $\begin{array}{c} CH_3 \\ | \\ CH_3-C-CH-CH_2OH \\ || \\ O \end{array}$
- 3) $\begin{array}{c} CH_3 \\ | \\ CH_3=C-C-CH_3 \\ || \quad | \\ O \quad OH \end{array}$ 4) $\begin{array}{c} CH_3 \\ | \\ CH_3-CHOH-CH-CHO \end{array}$
12. Which of the following order of reagent is chosen to prepare 1,3-butadiene from C_2H_2 ?
- 1) Cu_2Cl_2 / NH_4Cl and $H_2 / Pd(BaSO_4)$ 2) $NH_4Cl / CuCl$ and $H_2 / Pd(BaSO_4)$
- 3) $H_2 / Pd(BaSO_4)$ and $CuCl / NH_4Cl$ 4) $H_2 / Pd(BaSO_4)$ and $NH_4Cl / CuCl$
13. A gas decolourises bromine in CCl_4 and forms a precipitate with ammoniacal silver nitrate.
- The gas is
- 1) C_2H_2 2) C_2H_6 3) CH_4 4) C_2H_4
14. Ozonolysis of acetylene gives
- 1) Glycol 2) Formaldehyde 3) Glyoxal, formic acid 4) None
15. Which of the following used for the conversion of 2-hexyne into trans-2-hexane?
- 1) $Li-NH_3 / C_2H_5OH$ 2) H_2, PtO_2 3) $H_2 / Pd / BaSO_4$ 4) $NaBH_4$
16. Which of these will not react with acetylene?
- a) $NaOH$ b) Ammonical $AgNO_3$ c) Na d) HCl
17. What is the product when acetylene reacts with hypochlorous acid?

(a) CH_3COCl (b) ClCH_2CHO (c) Cl_2CHCHO (d) ClCHCOOH

18. 2-Hexyne gives trans-2-Hexene on treatment with

(a) Pt / H_2 (b) Li/NH_3 (c) Pd/BaSO_4 (d) LiAlH_4

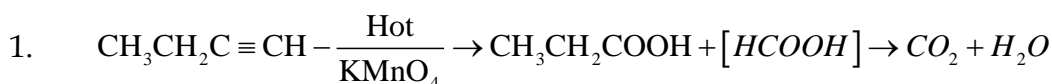
19. The major product of the following reaction $\text{CH}_3\text{C}\equiv\text{CH} \xrightarrow[\text{(ii) DI}]{\text{(i) DCl (1equiv.)}}$

a) $\text{CH}_3\text{CD}(\text{I})\text{CHD}(\text{Cl})$ b) $\text{CH}_2\text{CD}(\text{C})\text{CHD}(\text{I})$ c) $\text{CH CD CH}(\text{Cl})(\text{I})$ d) $\text{CH C}(\text{I})(\text{Cl})\text{CHD}$

KEY

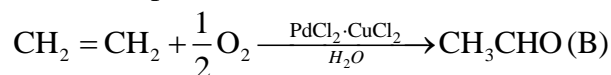
1) B	2) D	3) A	4) A	5) C	6) A	7) D	8) A	9) B	10) A
11) C	12) A	13) A	14) C	15) A					
16) A	17) C	18) B	19) D						

SOLUTIONS

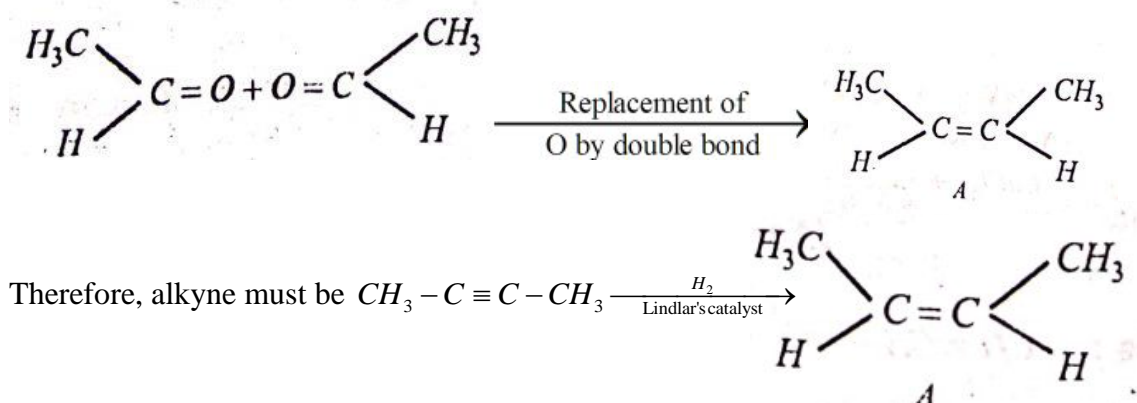


1- butyne

2. In Wacker process, alkene is oxidised into aldehyde.

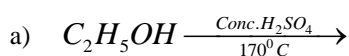


Since on ozonolysis, only alkenes produce aldehydes, 'A' must be an alkene. To decide the structure of alkene that undergoes ozonolysis, bring the products together in such a way that O-atoms are face to face and, replace O by double (=) bond. Thus,

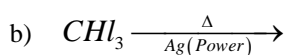


3. Set 1

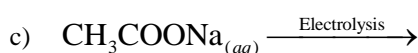
Set 2



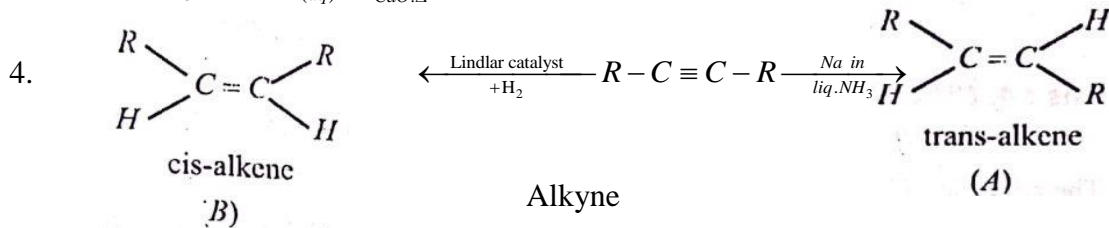
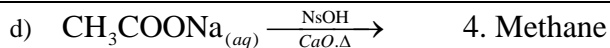
1. Ethylene



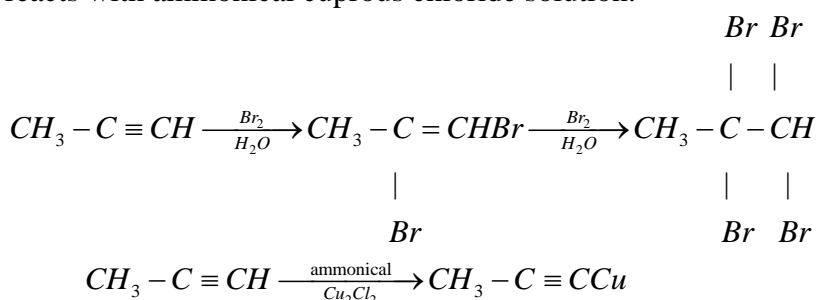
2. Acetylene



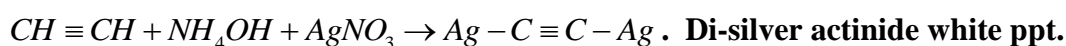
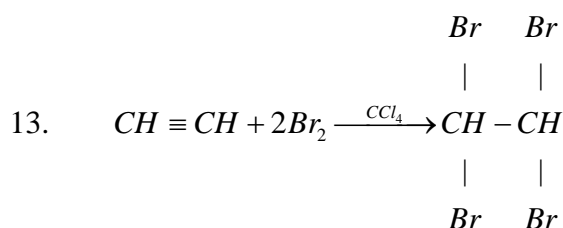
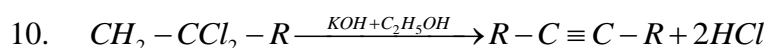
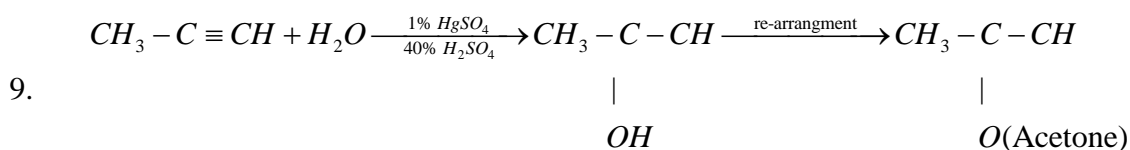
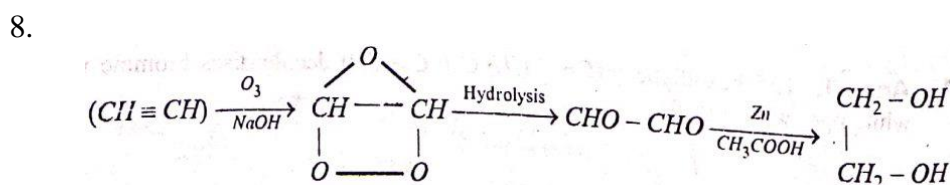
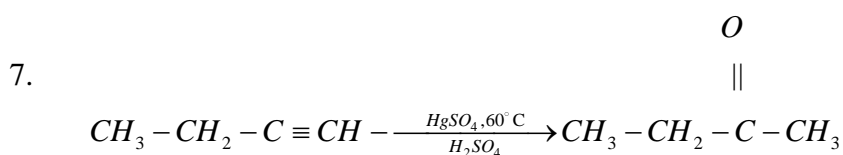
3. Ethane



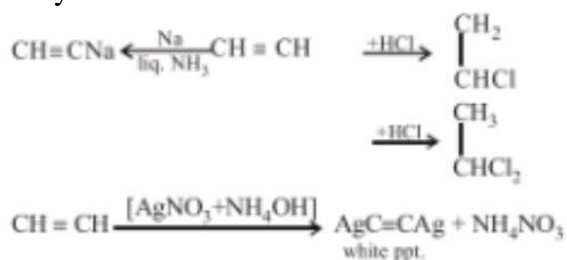
5. Alkenes and alkynes both decolourise bromine water. But only alkynes, containing terminal H atom reacts with ammoniacal cuprous chloride solution.



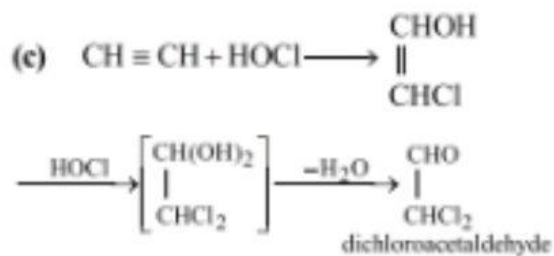
6. Alkynes give different products with different reducing agents catalyst ($\text{Pd} / \text{BaSO}_4$) or Ni powder, cis-alkenes are formed whereas with Na in liquid ammonia (Birch reduction), trans-alkenes are formed.



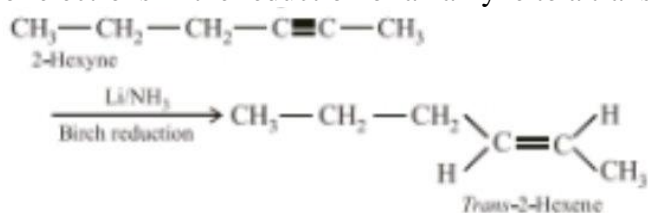
15. The partial reduction of alkynes by active metal in liquid ammonia takes place through trans vinylic anion which ultimately produces trans alkene.
16. Acetylene reacts with the other three as.



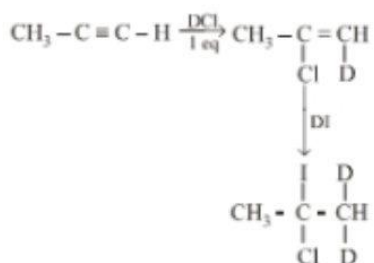
17.



18. Anti addition of hydrogen atoms to the triple bond occurs when alkynes are reduced with sodium or lithium metal in ammonia, ethylamine, or alcohol at low temperatures. This reaction called, a dissolving metal reduction, produces an (E) - or trans-alkene. Sodium in liq. NH₃ is used as a source of electrons in the reduction of an alkyne to a trans alkene.



19.



Both additions follow Markovnikov's rule.