## HYDROCARBON

## ALKANE

- 52. In given alkanes, which one have only primary hydrogens ?
  - (1) Isobutane

(3) Neohexane

(2) Isopentane

(3)

- (4) 2, 2, 3, 3-Tetramethylbutane
- **53.** 2 Cl  $\xrightarrow{2Na/Dry ether}$  Product is













**55.** Which of the following can be produced by Wurtz reaction in good yield.



## ALKENES





- X, Y, Z reaction are
- (1) Simple hydration reaction
- (2) Hydroboration oxidation, hydration and oxymercuration demercuration
- (3) Hydroboration oxidation, oxymercuration demercuration and hydration
- (4) Oxymercuration demercuration, hydroboration oxidation and hydration
- **77.** What is the major product of the following reaction?



- **78.** Which of the following statemeths is not correct about ethyne ?
  - (1) It belongs to the homologous series with general formula  $C_nH_{2n\ -\ 2}$  where n=2,3 etc
  - (2) It is a linear molecule with bond angles of  $180^{\circ}$
  - (3) It has a triple bond in which the two carbon atoms share 6 electrons
  - (4) It undergoes electrophilic addition more readily than ethene

**79.** 
$$Q \xleftarrow{BH_3 THF}_{H_2O_2, OH^-} CH_3 - C \equiv CH \xrightarrow{HgSO_4/H_2SO_4}_{H_2O} P$$
  
P and Q are -  
(1)  $CH_3CH_2CHO$ ,  $CH_3COCH_3$  (2)

$$CH_{3}CH_{2}CHO, CH_{3}COCH_{3}$$

$$CH_{3}CH_{2}CHO (both)$$

$$(2) CH_{3}COCH_{3}, CH_{3}CH_{2}CHO (both)$$

$$(4) CH_{3}COCH_{3} (both)$$

**80.** Which of the following reagents cannot be used to locate the position of triple bond in  $C_4H_6$ ?

(1) 
$$\text{Br}_2/\text{CCl}_4$$
 (2)  $\text{O}_3/\text{Zn}/\text{H}_2\text{O}$  (3)  $\text{Cu}_2/\text{NH}_4\text{OH}$  (4)  $\text{KMnO}_4/\text{H}^4$ 

**81.** A mixture of  $CH_4$ ,  $C_2H_4$  and  $C_2H_2$  gases are passed through a Woulf bottle containing ammonical cuprous chloride. The gas coming out is -

(2) Acetylene

(1) Methane

(3)

(3) Mixture of methane and ethylene (4) Original mixture

**82.**  $\operatorname{CaC}_2 \xrightarrow{H_2O} (A) \xrightarrow{\operatorname{Red hot Fe tube}} (B).$ 

Product (B) of the reaction is :

(1) Toluene

(2) Ethyl-benzene (3) Benzene (4) Butyne

**83.** Arrange the following compounds in the order of decreasing reactivity towards electrophilic substitution reaction.



(1) V > IV > III > II > I (2) I > II > III > V > IV (3) I > II > IV > III > V (4) I > III > IV > II > VIdentify the cite where electrophilic promotic substitution takes place 2

84. Identify the site where electrophilic aromatic substitution takes place ?



**86.** Ring nitration of dimethyl benzene results in the formation of only one nitro dimethyl benzene. The dimethyl benzene is:



(4) None of these

(4) Both B and C

**87.** A particular form of Tribromobenzene forms three possible mononitro Bromo-benzenes. The structure of the compound is :

(3)

ĊH₂



(2)

**88.** In the sulphonation, acetylation and formylation of benzene the group of effective electrophiles would be:

(1)  $SO_3^+, CH_3 \equiv \overset{+}{O}, \overset{+}{HCO}$ (2)  $SO_3, CH_3 - C \equiv \overset{+}{O}, \overset{+}{HCO}$ (3)  $SO_3, CH_3CHO, CO + HCl$ (4)  $HSO_3, CH_3CO, HCO$ 

 $CH_2$ 

Br



## SOLUTION

**51.** Most stable form have min energy. So more stable conformer of n-butane is anti-staggered.

**52.** 
$$CH_{3}CH_{3}$$
  
 $I$   $I$   
 $CH_{3}-C-C-CH_{3}$   
 $I$   $I$   
 $CH_{3}CH_{3}$ 

All hydrogen are 1° (primary) (2, 2, 3, 3-Tetra methyl/butane)

![](_page_6_Figure_4.jpeg)

**55.** In wurtz reaction, we form symmetrical alkane with even-number of carbon.

⇒ Yield of product formed by  $\frac{1^{\circ} > 2^{\circ} > 3^{\circ}}{\text{Alkyl halide}}$ B & D are symmetrical & even number of [C] but yeild of D is max. b/c it is formed by  $1^{\circ}$ alkyl halide.

![](_page_6_Figure_7.jpeg)

**60.**  $\Rightarrow$  B.P  $\alpha$  number of carbon in alkane  $\Rightarrow$  If molecular formula same then more branching less B.P. due to less surface area. So answer is n-octane. **61.** Like dissolved like

polar solvent dissolved polar compound and non-polar solvent dissolved non-polar compound  $\rightarrow$  Alkane is non-polar so it dissolved non-polar compound.

**63.** In this reaction benzene ring is formed so minimum six carbon is required in alkane.

$$\bigwedge \qquad \underbrace{Al_2O_3 + Cr_2O_3}_{\Delta} \qquad \bigcirc \qquad \\$$

**64.** Breaking of higher alkane to small alkane is known as cracking.

**65.** 
$$C_n H_{2n+2} + \left(\frac{3n+1}{2}\right) O_2 \rightarrow n CO_2 + (n+H) H_2O$$

- **66.**  $\rightarrow$  Li AlH<sub>4</sub> & NaBH<sub>4</sub> in general don't reduce alkene .
  - $\rightarrow$  H<sub>2</sub>-Pd/BaSO<sub>4</sub> reduce alkyne but no Alkene.
- **67.**  $\Rightarrow$  H<sub>2</sub>-Pd/BaSO<sub>4</sub> or H<sub>2</sub>-Pd/CaCO<sub>3</sub> reduce alkyne into cis-alkene.
- **68.**  $\Rightarrow$  H<sub>2</sub>Pd/CaCO<sub>3</sub> is known as lindlar's catalyst. It reduce alkyne into cis-alkene.
  - $\Rightarrow$  Na/Liq NH<sub>3</sub> reduce internal alkyne into trans-alkene
- **69.**  $\Rightarrow$  Less stability more hydrogenation of alkene
  - $\Rightarrow$  Less hindrance across double bond more hydrogenation.
- 70. In (A) three type of alkane possible (structural)  $\land \land \land$ / , in (B) only two type of Alkene is possible

$$\succ \checkmark \And$$

**71.** Rats of dehydration of Alcohol a stability of cation. Stability of carbo cation  $\Rightarrow$  3° > 2° > 1° So rate of dehydration of Alcohol =

$$3^\circ > 2^\circ > 1^\circ$$

**72.** 
$$C -C = C \xrightarrow{H^{+}T^{-}} C \xrightarrow{\oplus} C \xrightarrow{\oplus}$$

Stability of P > QSo P give major product.

Alkene or Alkyne can decolourine  $(Br_2 + H_2O)$ 74. solution due to presence of  $\pi$  bond.

**75.** 
$$Cl_2 + H_2O \rightarrow HOCl$$

$$\begin{array}{c} \mathrm{CH}_{2} = \mathrm{CH}_{2} + \mathrm{HOCl} \rightarrow \begin{array}{c} \mathrm{CH}_{2} - \mathrm{CH}_{2} \\ I \\ \mathrm{OH} \\ \mathrm{OH} \\ \end{array} \\ \begin{array}{c} \mathrm{OH} \\ \mathrm{OH} \end{array} \\ \end{array}$$

77. 
$$\underbrace{N.B.S.}_{N.B.S.}$$

N.B.S. substitute Allylic & benzylic hydrogen by Br free radical.

**78**. Alkene is more reactive than alkyne due to stability of formed intermidiate.

$$\begin{array}{ccc} R & - CH = CH_{2} \\ \downarrow E^{+} \\ R & - CH - CH_{2} \\ (P) \\ E \\ \end{array} \begin{array}{c} R & \oplus \\ E \\ (Q) \\ E \end{array} \begin{array}{c} R & - CH = CH \\ \oplus \\ R & - C = CH \\ (Q) \\ E \end{array}$$

CU

Stabilits of P > Q

$$CH_{3} - C \equiv CH \underbrace{O.M.D.M.}_{O.M.D.M.}$$

$$CH_{3} - C - CH_{3} \underbrace{tautomers}_{O} CH_{3} - C = CH_{2}$$

$$H_{3} - C = CH_{2}$$

(i) 
$$BH_3/T.H.F.$$
  
(ii)  $H_2O_2/OH^{\odot}$   $CH_3-C=CH$ 

$$CH_{3} - C = CH$$

$$\downarrow \qquad \qquad \underbrace{tautomers}_{H \quad OH} \qquad CH_{3} - CH_{2} - C - H$$

$$Q$$

**80.** 
$$[Br_2 + CCl_4]$$
 or  $[Br_2 + H_2O]$  is used to test of unsaturation but not for location of  $\pi$ -bonds:

**81.** In CH<sub>4</sub>, C<sub>2</sub>H<sub>4</sub> & CH = CH only CH = CH react with ammonical cuprous chloride by acid base reaction and give red P.P.T.

**82.** 
$$\operatorname{CaC}_2 \xrightarrow{\operatorname{H}_2\operatorname{O}} \operatorname{CH} = \operatorname{CH} \xrightarrow{\operatorname{Red}/\operatorname{hot}} \bigcirc$$

**83.** More [E.D.G.] on benzene ring, more reactivity towards E.A.S. reaction.

**84.** +h.c. 
$$\downarrow \bigcirc \bigcirc \bigcirc \downarrow +M$$

+M dominent over +H.C. So R.H.S. ring is more electron rich (more activates)  $\rightarrow$  due to +M effect of [O] electrophile attack

on R.H.S. ring and ortho & Para position.

![](_page_8_Figure_4.jpeg)

![](_page_8_Figure_5.jpeg)

![](_page_8_Figure_6.jpeg)

![](_page_8_Figure_7.jpeg)

only one position is possible

![](_page_8_Figure_9.jpeg)

91. CH<sub>2</sub> = CH - Cl not give friedel-craft alkylation reaction.
Because C - Cl bond aquare partial double bond

characters so C – Cl bond is not break by AlCl<sub>3</sub>.

![](_page_8_Figure_13.jpeg)