JEE Main Archive	**DTS-1**

1.(C) $CH \equiv CH + HOCl \longrightarrow CHOH = CHCl \xrightarrow{HOCl} \underset{\underset{CHCl_2}{|}}{CH(OH)_2} \xrightarrow{-H_2O} \underset{\text{dichloroacetalhyde}}{CHCl_2CHO}$

2.(B) Double bond is broken to give ketone

3.(A) Acetylene reacts with the other three as :

$$CH_2 = CHCl \xleftarrow{HCl} CH \equiv CH \xrightarrow[\text{Liq. } NH_3]{Na} CH \equiv CNa$$

$$CH \equiv CH \xrightarrow{\text{Amm. } AgNO_3} AgC \equiv CAg + NH_4NO_3 + H_2O$$

(White ppt)

4.(B) $CH_3CH_2CH = CH_2 \xrightarrow{H_2/Pd} CH_3CH_2CH_2CH_3$

5.(B) $\underset{\text{(Neopentane)}}{CH_3-\overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}}-CH_3} \xrightarrow{Cl_2} \underset{\text{(Only one product)}}{CH_3-\overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}}-CH_2-Cl}$

6.(A) Boiling point order : Alkyne > Alkene > Alkane (for same number of carbons)

7.(B) $CH_3-\overset{\overset{CH_3}{|}}{CH}-\overset{\overset{CH_3}{|}}{CH}-CH_3$

Since it contains only two types of H-atoms hence it will give only two mono chlorinated compound viz.

$\underset{\text{1-Choro-2, 3-dimethylbutane}}{Cl-CH_3-\overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}}-\overset{\overset{CH_3}{|}}{C}-CH_3}$ and $\underset{\text{2-Chloro-2, 3-dimethylbutane}}{CH_3-\overset{\overset{H_3C}{|}}{\underset{\underset{Cl}{|}}{C}}-\overset{\overset{CH_3}{|}}{CH}-CH_3}$

8.(B) $CH_3-\overset{\overset{CH_3}{|}}{CH}-CH_2-CH_3 \xrightarrow{\text{Sun light}} \underset{\text{2-bromo-2-methyl butane}}{CH_3-\overset{\overset{CH_3}{|}}{\underset{\underset{Br}{|}}{C}}-CH_2CH_3}$

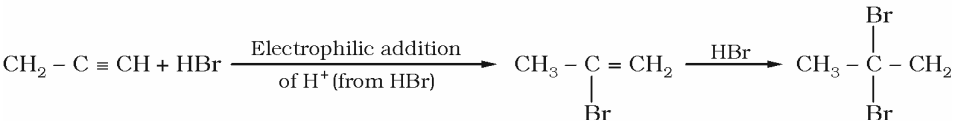
Ease of replacement of H-atom 3° > 2° > 1° i.e., tertiary H atom is more reactive.

9.(B) Thermodynamically controlled 1, 4-addition is preferred at elevated temperature where kinetically controlled 1, 2-addition is favoured at low temperature.

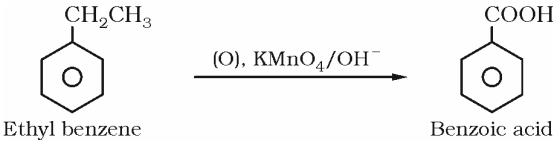
$$CH_2 = CH - CH = CH_2 + HBr \longrightarrow \underset{\text{At } -80°C \text{ the product is 1, 2 addition}}{CH_2 = CH - \overset{\overset{Br}{|}}{CH} - CH_3}$$

$$CH_2 = CH - CH = CH_2 + HBr \longrightarrow \underset{\text{At } 40°C \text{ the product is 1, 4-addition}}{\underset{\underset{Br}{|}}{CH_2 - CH} = CH - CH_3}$$

10.(A) The reaction follows Marknownikoff rule which states that when unsymmetrical reagent adds across unsymmetrical double or triple bond, the negative part adds to carbon atom having lesser number of hydrogen atoms.

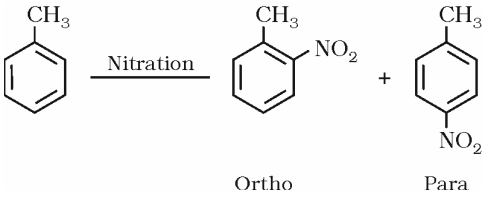


11.(C) Any aliphatic carbon with hydrogen attached to it, in combination with benzene ring, will be oxidized to benzoic acid by $KMnO_4 / H^+$.

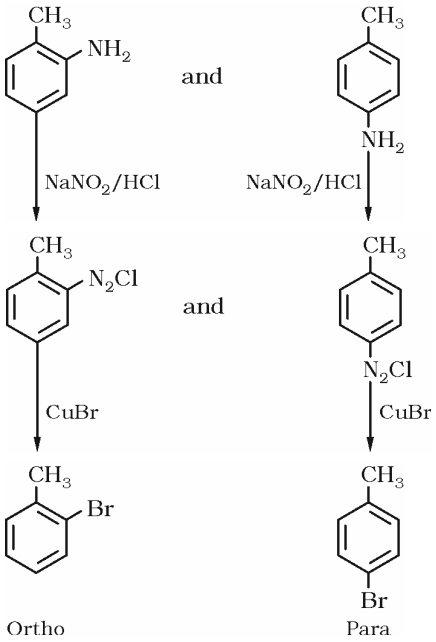


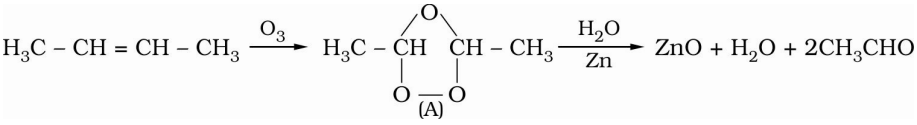
12.(A) Toluene contains $-CH_3$ group, which is ortho and para directing group.

Thus, on nitration of toluene the $-NO_2$ group will occupy ortho and para positions.



On reduction with Sn/HCl they will form corresponding anilines in which $-NO_2$ group will change to $-NH_2$. The mixture now contains



13.(D) 

14.(B) $CH_3CH_2 - C \equiv CH \xrightarrow[\Delta]{Na\,/\,Liq.NH_3} CH_3CH_2C \equiv \overset{\Theta}{C}\,Na^{\oplus} + \frac{1}{2}H_2(g)$

It is a terminal alkyne, having acidic hydrogen.

Note : Solve it as a case of terminal alkynes, otherwise all alkynes react with Na in liq. NH_3.

15.(D) $CH_3 - MgX + CH_3 - C \equiv C - H \longrightarrow CH_4 + CH_3 - C \equiv C - MgX$