HYDROCARBON

1. The major product of the following reaction is:

$$CH_3CH_2CH=CH_2 \xrightarrow[Rh\ catalyst]{H_2/CO}$$

(1) $CH_3CH_2CH=CH-CHO$

(2) $CH_3CH_2\underset{\underset{CHO}{|}}{C}=CH_2$

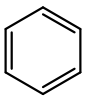
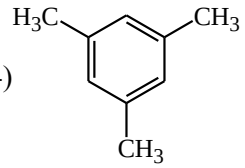
(3) $CH_3CH_2CH_2CH_2CHO$

(4) $CH_3CH_2CH_2CHO$

2. For the given reaction :

$$HC\equiv CHBr \underset{\underset{CH_3}{|}}{} \xrightarrow[2.\ Red\ hot\ iron\ tube\ ,\ 873\ K]{1.\ NaNH_2} \textcircled{A}\ (major\ product)$$

(1) $CH_3CH_2CH_2NH_2$ (2) $\underset{\underset{CH_3}{|}}{CH}=CH-NH_2$

(3)  (4) 

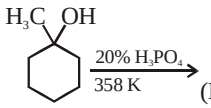
3. Which of the following is Lindlar catalyst ?

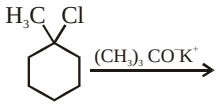
(1) Zinc chloride and HCl

(2) Cold dilute solution of $KMnO_4$

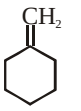
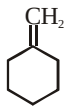
(3) Sodium and Liquid NH_3

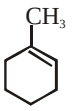
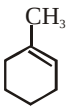
(4) Partially deactivated palladised charcoal

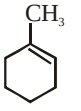
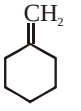
4.  "A" (Major Product) ,

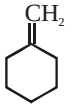
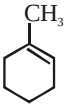
 "B" (Major Product) ,

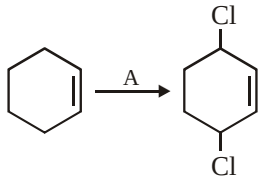
The product "A" and "B" formed in above reactions are :

(1) A-  B- 

(2) A-  B- 

(3) A-  B- 

(4) A-  B- 

5. 

Identify the reagent(s) 'A' and condition(s) for the reaction :

(1) A = HCl; Anhydrous $AlCl_3$

(2) A = HCl, $ZnCl_2$

(3) A = Cl_2; UV light

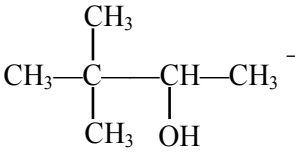
(4) A = Cl_2; dark, Anhydrous $AlCl_3$

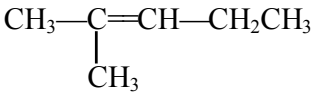
6. An unsaturated hydrocarbon X on ozonolysis gives A. Compound A when warmed with ammonical silver nitrate forms a bright silver mirror along the sides of the test tube. The unsaturated hydrocarbon X is :

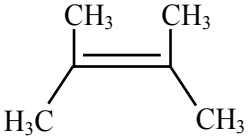
(1) $CH_3-\underset{\underset{CH_3}{|}}{C}=\underset{\underset{CH_3}{|}}{C}-CH_3$ (2) 

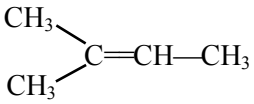
(3) $HC\equiv C-CH_2-CH_3$ (4) $CH_3-C\equiv C-CH_3$

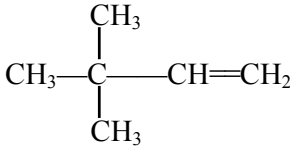
7. The major product formed in the following reaction is :

 $\xrightarrow[a\ few\ drops]{conc.\ H_2SO_4}$ Major product

(1) 

(2) 

(3) 

(4) 

8. Experimentally reducing a functional group **cannot** be done by which one of the following reagents

(1) Pt-C/H_2 (2) Na/H_2

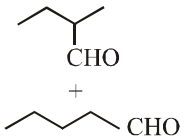
(3) Pd-C/H_2 (4) Zn/H_2O

SOLUTION

1. Official Ans. by NTA (3)

Sol. OXO PROCESS (Hydroformylation) :

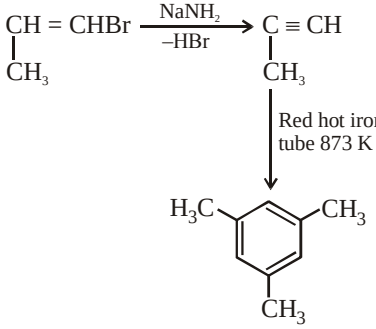
$$CH_3-CH_2-CH=CH_2+CO+H_2 \xrightarrow[\text{catalyst}]{Rh}$$



(Major)

2. Official Ans. by NTA (4)

Sol.

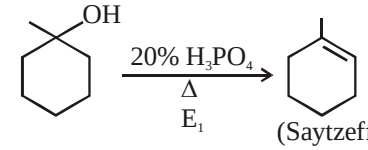


3. Official Ans. by NTA (4)

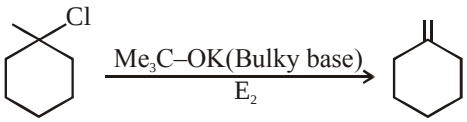
Sol. Partially deactivated palladised charcoal (H_2/pd/$CaCO_3$) is lindlar catalyst.

4. Official Ans. by NTA (3)

Sol.



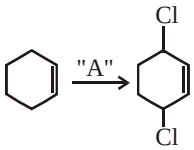
(Saytzeff product)



(Hoffmann product)

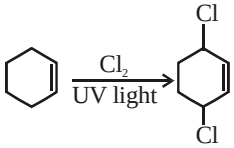
5. Official Ans. by NTA (3)

Sol.



For substitution at allylic position in the given compound, the reagent used is Cl_2/uv light.

The reaction is free radical halogenation.



6. Official Ans. by NTA (3)

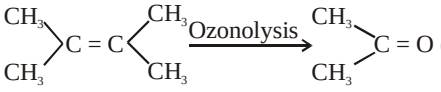
Sol. (X) Unsaturated Hydrocarbon $\xrightarrow{\text{Ozonolysis}}$ (A) $\xrightarrow[AgNO_3]{\text{Ammonical}}$ (Tollen's regent) $Ag\downarrow$ silver mirror

As (A) compound given positive tollen's test hence it may consist –CHO (aldehyde group). or it can be HCOOH

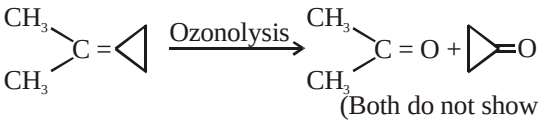
So for the given option :

(3) $CH_3-CH_2-C\equiv CH \xrightarrow{\text{Ozonolysis}} \underset{\text{(A)}}{CH_3CH_2COOH} + HCOOH$ (+ve tollen's test)

and for other compounds (options):

(1) 

(Does not show tollen's Test)

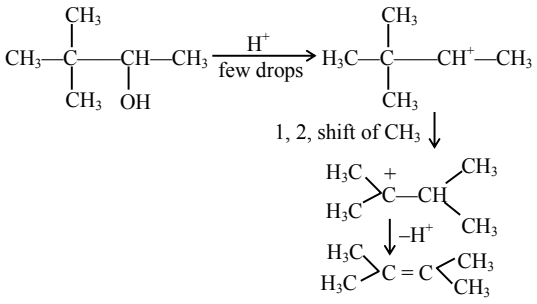
(2) 

(Both do not show tollen's test)

(3) $CH_3-C\equiv C-CH_3 \xrightarrow{\text{Ozonolysis}} 2CH_3-COOH$ (Does not show tollen's test)

7. Official Ans. by NTA (2)

Sol.



8. Official Ans. by NTA (2)

Sol. Solution NaH_2 is not reducing agent