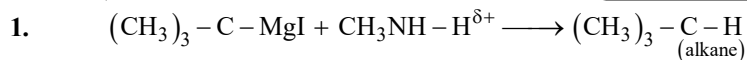


# SOLUTIONS

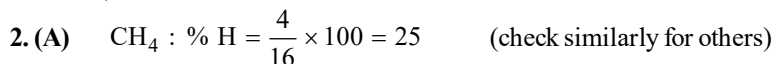
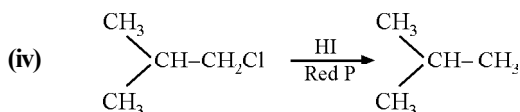
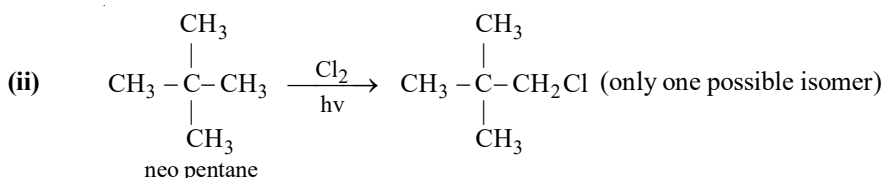
## Module - 3 / JEE-2022

IN-CHAPTER EXERCISES	Chemistry	Hydrocarbons
----------------------	-----------	--------------

### EXERCISE-A

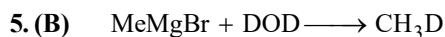


(i) Grignard reagent as base.



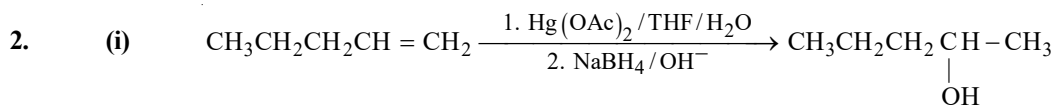
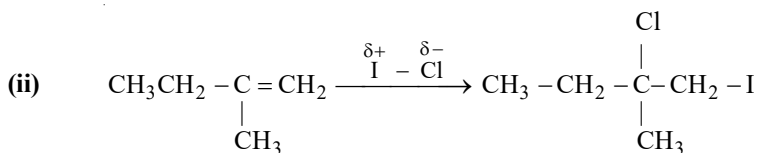
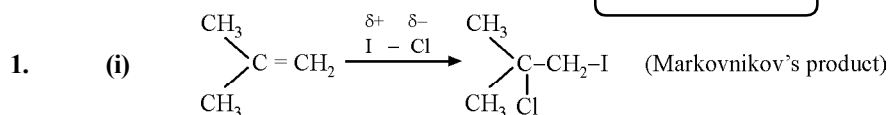
3. (A) Alkylhalide on reduction with Zn-Cu couple in ethanol form alkane.

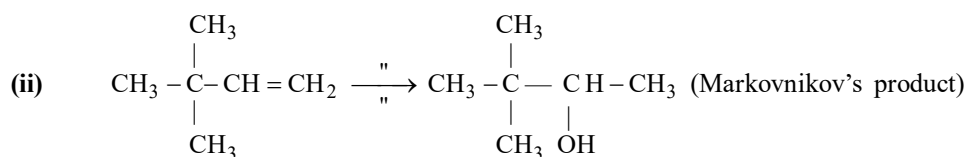
4. (A) Excess of  $\text{C}_2\text{H}_6$  when reacts with  $\text{Cl}_2$  in presence of UV light gives maximum yield of  $\text{C}_2\text{H}_5\text{Cl}$ . Excess of  $\text{Cl}_2$  form polyhalides.



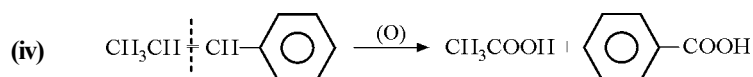
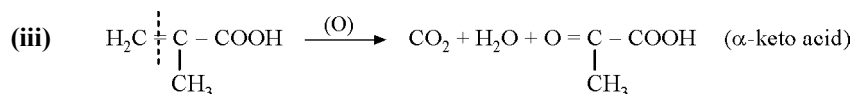
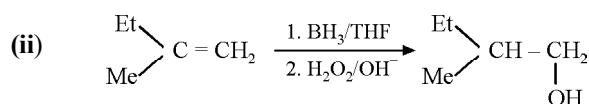
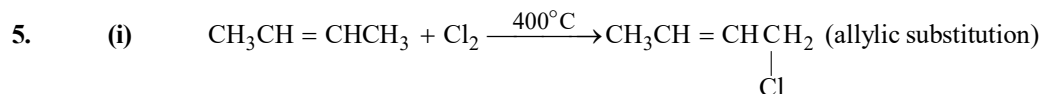
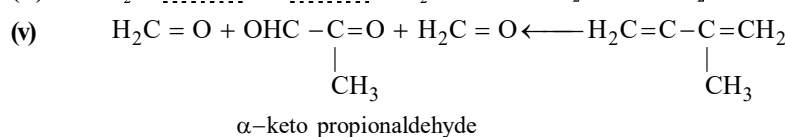
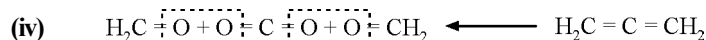
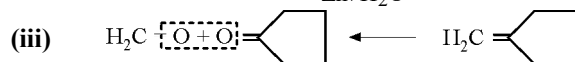
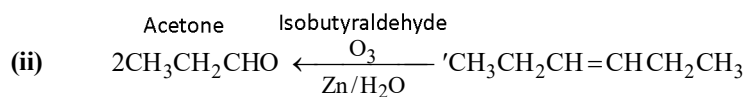
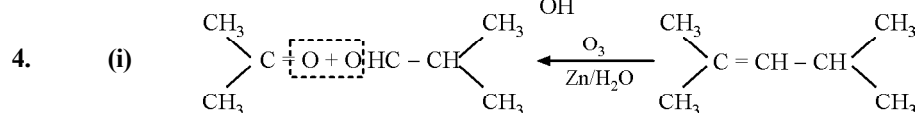
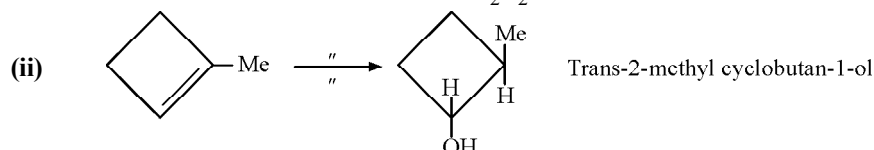
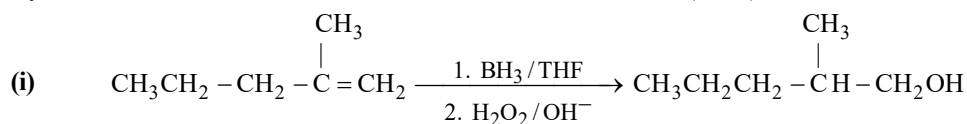
6. (ACD) Reduction of ketones by HI/Red P will not produce ethane.

### EXERCISE-B

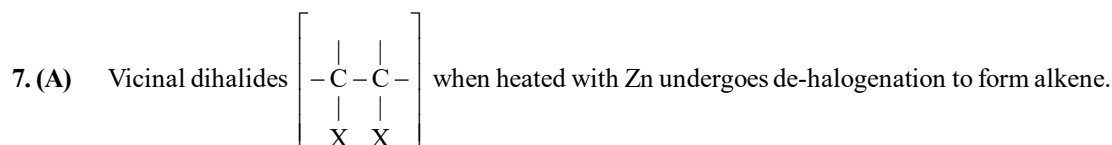


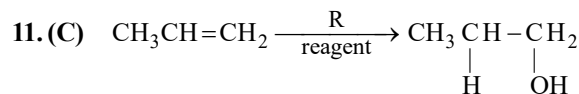
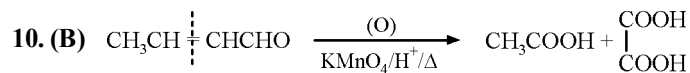
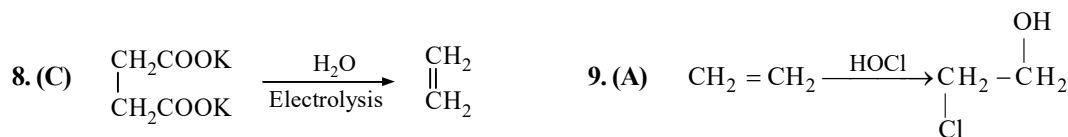


3. Hydroboration oxidation follows Anti - Markovnikov's addition (HBO)

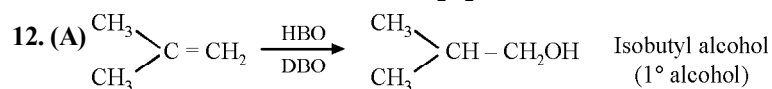


6. (C) Symmetric alkenes give same product with reference to Markovnikov's and Anti-Markovnikov's addition.

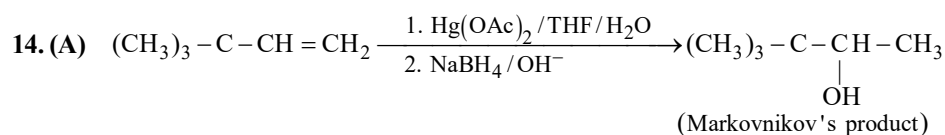




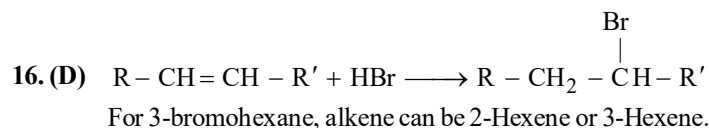
Reagent (R) = ? is clearly  $\xrightarrow[\text{H}_2\text{O}_2/\text{OH}^-]{\text{B}_2\text{H}_6 \text{ or } \text{BH}_3}$  Anti-Markovnikov's addn.



13. (C)  $\text{CH}_2 = \text{CH}_2$  is least stable alkene (Saytzeff's rule)

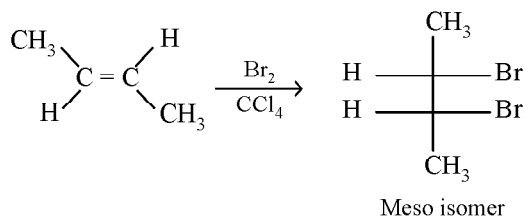
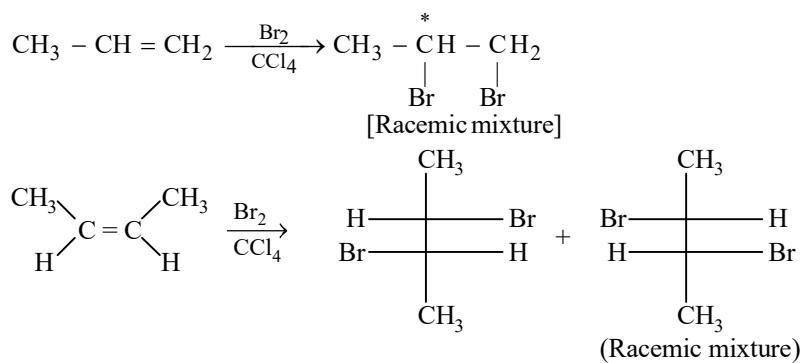


15. (D)  $\left. \begin{array}{l} \text{A : Test of unsaturation} \\ \text{B : Test of unsaturation} \end{array} \right\} \text{All being unsaturated will respond positively}$   
C : Test for Terminal alkynes ( $\text{R} - \text{C} \equiv \text{CH}$ )



17. (B) Compare stabilities of given alkenes. The one which is least stable will show hydrogenation most easily. Observe  $\text{RCH} = \text{CHR}$  is least stable among all.

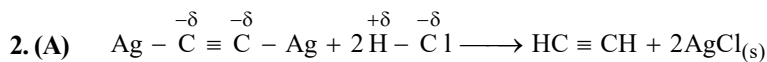
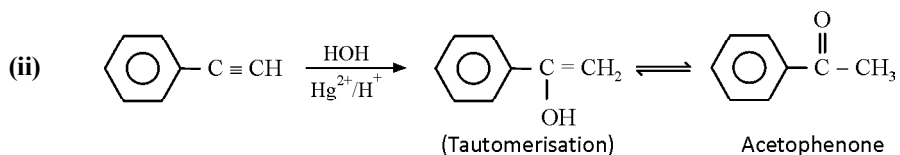
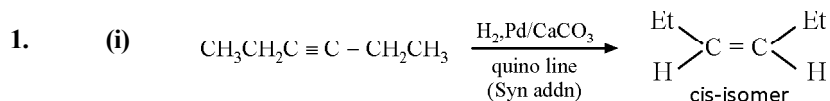
18. (B) 2-Butanol on acid catalyzed dehydration produces a mixture of 1-Butene, cis-2-Butene and Trans-2-Butene.



Total five isomeric product.

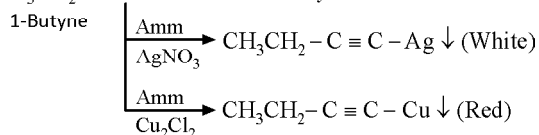
- 19.(D) Addition of HCl on alkene takes place according to Markovnikov's rule by electrophilic addition reaction mechanism.
- 20.(A) Due to presence of chiral carbon atom.

### EXERCISE-C



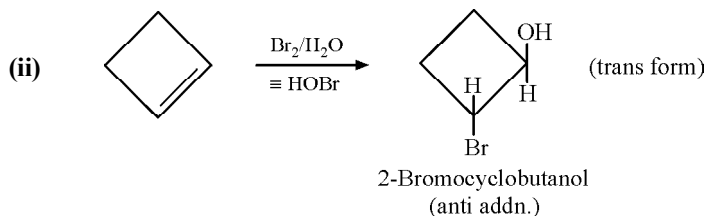
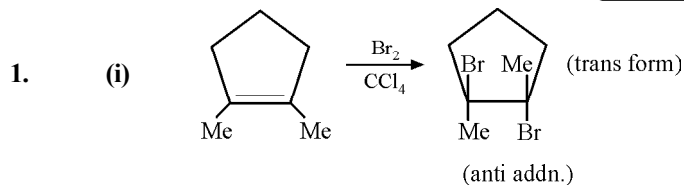
- 3. (A)** Terminal alkyne on oxymercuration form methyl ketone.

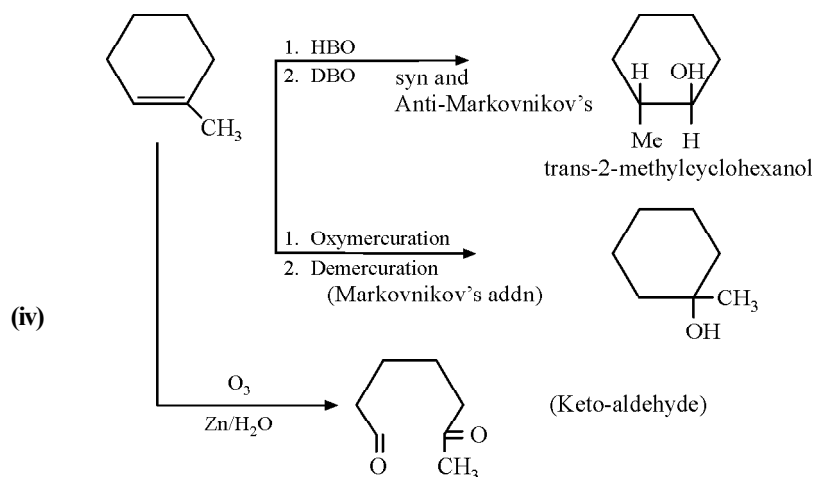
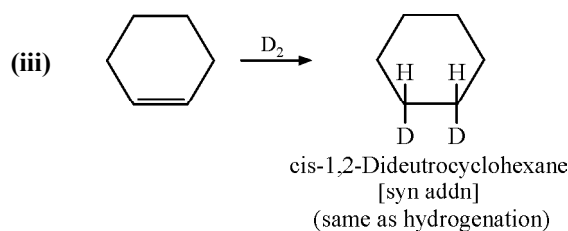
4. (D)  $\text{CH}_3\text{CH}_2\text{C}\equiv\text{CH}$  is a Terminal alkyne.



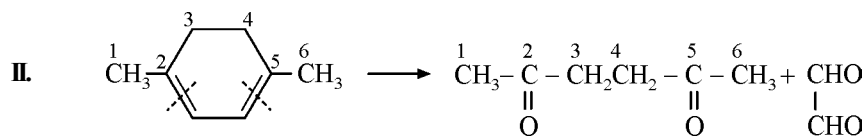
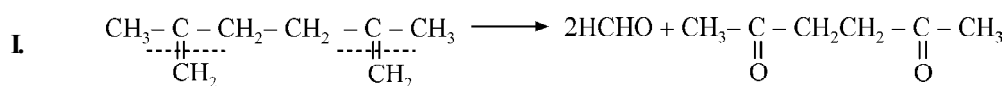
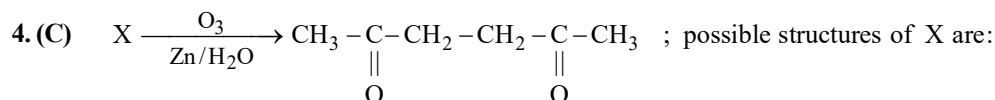
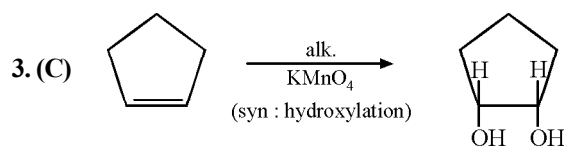
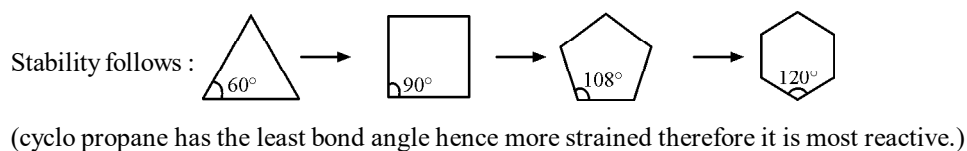
Non-terminal alkynes do not respond to above tests.

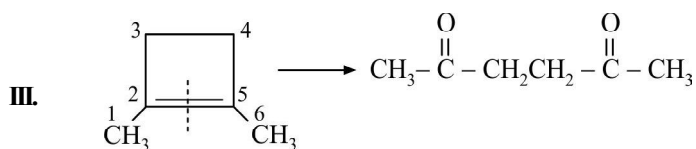
### EXERCISE-D





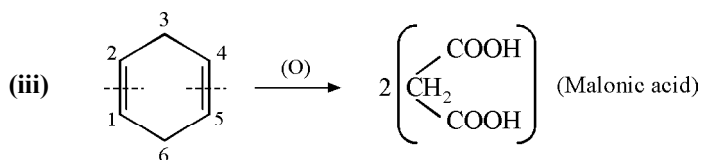
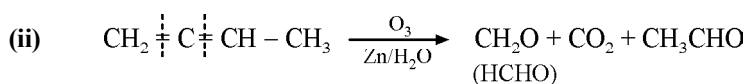
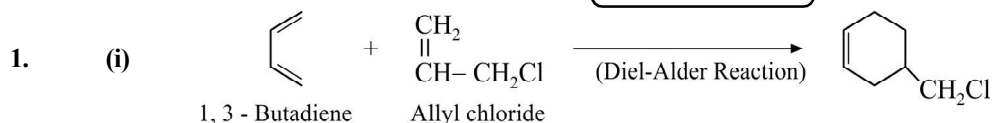
2. (A) Reactivity of cycloalkanes is inversely proportional to stability.





Observe that IV does not give the desired product.

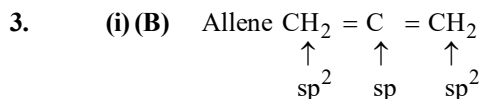
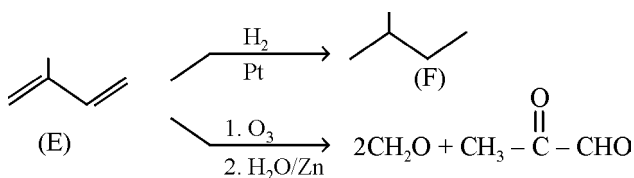
**EXERCISE-E**



(iv) Lindlar's catalyst catalyze hydrogenation of only  $\text{C} \equiv \text{C}$  upto  $\text{C} = \text{C}$  stage

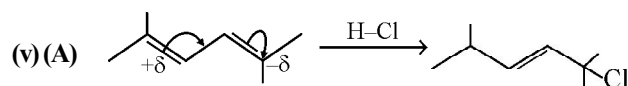
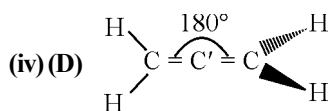


2. As compound (E) forms formaldehyde on ozonolysis hence it is terminal alkene. Degree of unsaturation equal to two also indicate two double bonds in (E)

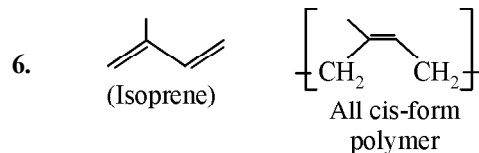
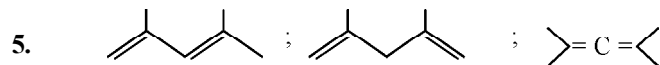
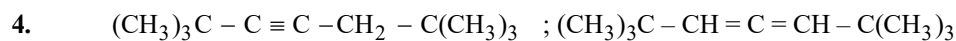
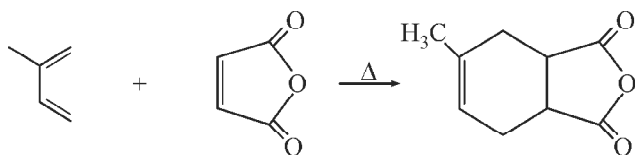


(ii) (C) Cumulated diene is non planar, dissymmetric compound and it is also called as allene or substituted allene.

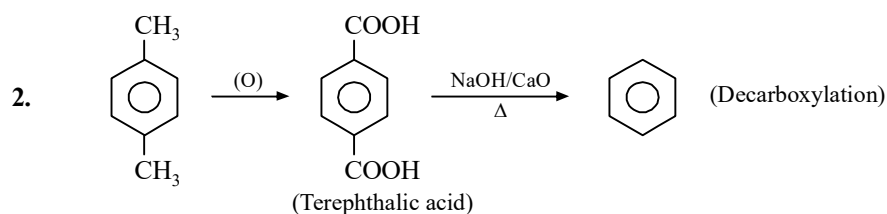
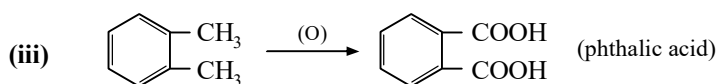
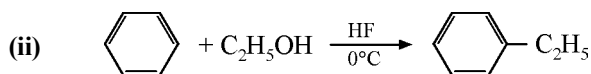
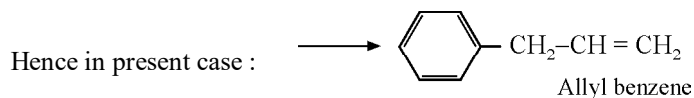
(iii) (A) 1,3-cyclohexadiene is conjugated diene and it is resonance stabilized. Hence its observed heat of hydrogenation is less than 240 kJ/mol.

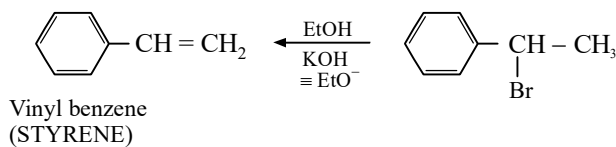
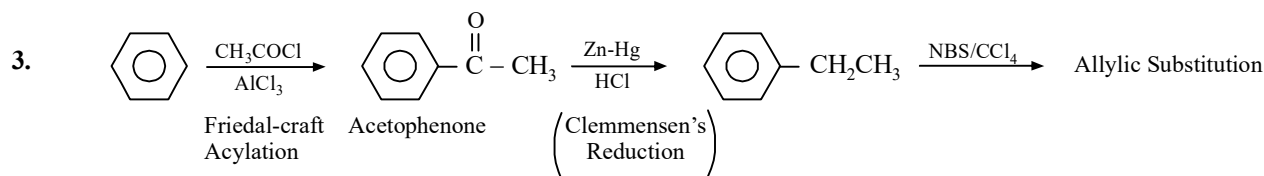


(vi) (C) It is an example of Diels - alder reaction.

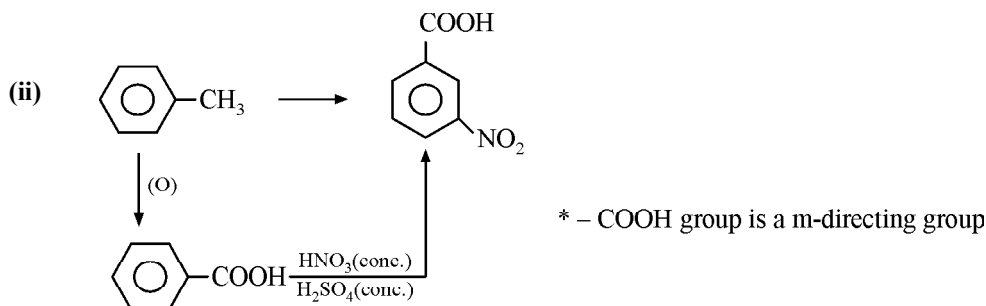


**EXERCISE-F**





4. (i) Refer to Notes.



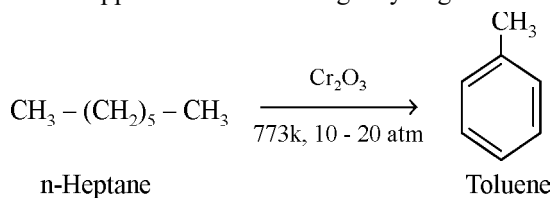
5. (C)  is a weakly activating group, hence it shows Electrophilic substitution ( $S_E$ ) quite easily as compared to others.

6. (A) It undergoes free radical halogenation of side chain to form benzotrichloride ( $\text{C}_6\text{H}_5\text{CCl}_3$ )

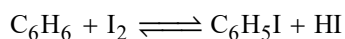
7. (A) Learn as a fact.    OH and  $\text{NH}_2$  : strong o/p directing (strongly activating)       $\text{NO}_2$  : strongly deactivating (poor for substitution)

8. (C) Because in alkylation, polyalkylation also takes place.

9. (C) n-Alkanes having six or more carbon atoms on heating to 773 K at 10–20 atm pressure in vanadium pentoxide or chromium oxide supported over alumina get hydrogenated and cyclized to benzene and its homologue.



10. (B) Iodination of benzene is reversible reaction therefore resulting  $\text{C}_6\text{H}_5\text{I}$  is reduced to  $\text{C}_6\text{H}_6$  by HI.



11. (A) Benzene sulphonic acid on treatment with steam under pressure gives benzene.

