CBSE TEST PAPER 02

CLASS XI CHEMISTRY (Hydrocarbons)

General Instruction:

- All questions are compulsory.
- Marks are given alongwith their questions.

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1. What is hydrogenation? [1]

2. How would you convert ethene to ethane molecule? [1]

3. Give the IUPAC name of the lowest molecular weight alkane that contains a quaternary carbon. [1]

4. Methane does not react with chlorine in dark. Why? [1]

5. Sodium salt of which acid will be needed for the preparation of propane? Write chemical equation for the reaction. [2]

6. Cyclobutane is less reactive than cyclopropane. Justify. [2]

7. How will you prepare isobutane? [2]

8. N – pentane has higher boiling point than neopentane but the melting point of neopentane is higher than that of n – pentane. [3]

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[ANSWERS]

Ans 01. Dihydrogen gas is added to alkenes and alkynes in the presence of finely divided catalysts like Pt, Pd or Ni to form alkanes. This process is called hydrogenation.

Ans 02 . Conversion of ethene to ethane can be done as follows-

$$\underset{ethene}{CH_2=CH_2} + H_2 \xrightarrow[hydrogenation]{Pt/Pd/Ni} \underset{ethane}{CH_3-CH_3}$$

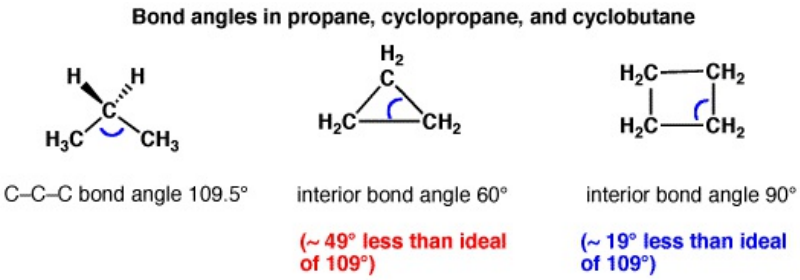
Ans 03. 2, 2-dimethyl propane (Neopentane).

Ans 04. Chlorination of methane is a free radical substitution reaction. In dark, chlorine does not gives free radicals, hence the reaction does not occur.

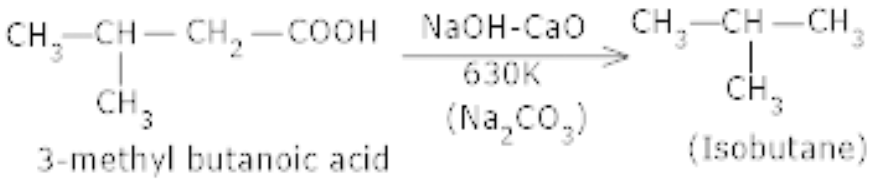
Ans 05. Sodium salt of Butanoic acid is needed to prepare propane as-

$CH_3CH_2CH_2COO\text{-}Na + NaOH \xrightarrow{Cao} CH_3CH_2CH_3 + Na_2CO_3$.

Ans 06. In cyclobutane molecule, the C-C-C bond angle is 90^0 while it is 60^0 in cyclopropane. This shows that the deviation from the tetrahedral bond angle ($109^0\ 28'$) in cyclobutane is less than in cyclopropane. In other words, cyclopropane is under great strain as compared with cyclobutane and is therefore more reactive.



Ans 07. Isobutane is obtained by decarboxylation of 3-methyl butanoic acid with soda lime at 630K.



Ans 08. Because of the presence of branches in neo-pentane the surface area and van der walls forces of attraction are very weak in neopentane than in n-pentane. Therefore the b.p of neopentane is lower than that of n-pentane.

M.P depends upon the packing of the molecules in the crystal lattice. Since neopentane are more symmetrical than n-pentane therefore, it packs much more closely in the crystal lattice than n-pentane and hence neopentane has much higher m.p than n-pentane.