

HYDROCARBONS

Alkanes

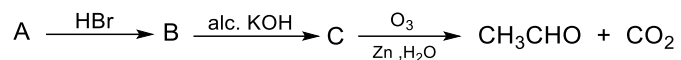
- Write structure of all the alkenes which on hydrogenation give 2-methylbutane.
- Staggered conformation of ethane is more stable than eclipsed conformation. Justify.
- Which of the following has the highest boiling point?
a) 2-Methylpentane b) 2,3-dimethylpentane
c) 2,2-dimethylpentane
- Sodium salt of which acid will be needed for the preparation of propane? Write chemical equation for the reaction.
- Name the two extreme type of conformation of ethane.
- Out of boat and chair form of cyclohexane, which is more stable?
- Arrange the following in decreasing order of boiling points:
a) n-pentane b) iso-pentane
c) neo-pentane
- Name the products which may be obtained when a mixture of methyl bromide and ethyl bromide is treated with sodium metal in ether.
- Which salt on treatment with soda lime gives ethane?
- Draw Newman and Sawhorse projections for the eclipsed and staggered conformation of ethane. Which of these conformations is more stable?

- Write combustion reaction for:
i) butane ii) hexane

Alkenes

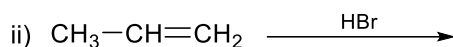
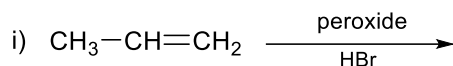
- Draw the geometrical isomer of but-2-en-1,4-dioic acid. Which of the will have higher dipole moment?
- Draw *cis* and *trans* isomer of the following compounds and write their IUPAC names.
a) $\text{CHCl}=\text{CHCl}$ b) $\text{C}_2\text{H}_5\text{C}(\text{CH}_3)=\text{C}(\text{CH}_3)\text{C}_2\text{H}_5$
- The reductive ozonolysis of an alkene gave butanone and propanal. Write the structure of the alkene.
- Propanal and pentan-3-one are the ozonolysis products of an alkene. What is the structural formula and IUPAC name of alkene.
- Arrange the following alkene in the decreasing order of stability:
i) $\text{CH}_3-\overset{\text{CH}_3}{\text{C}}=\text{CHCH}_2$ ii) $\text{CH}_3-\overset{\text{CH}_3}{\text{CH}}-\text{CH}=\text{CH}_2$
iii) $\text{CH}_2=\overset{\text{CH}_3}{\text{C}}\text{CH}_2\text{CH}_3$
- Which of the following compounds will show geometrical isomerism?
i) $\text{CH}_2=\text{CH}_2$ ii) $(\text{H}_3\text{C})_2\text{C}=\text{CHCH}_3$
iii) $\text{CH}_3\text{CH}_2\overset{\text{CH}_3}{\text{C}}=\text{CHCH}_2\text{CH}_3$ iv) $\text{C}_6\text{H}_5\text{CH}=\text{CHCH}_3$
- What alkanes would you start with and what reagent would you use to prepare
a) cis-but-2-ene b) trans-pent-2-ene

19. In the following reaction:



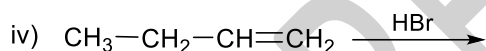
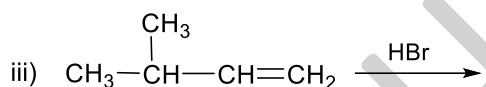
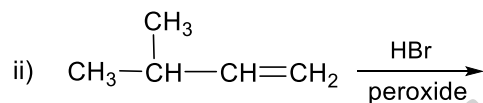
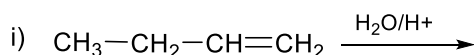
the compound A is

20. Predict the major product(s) of the following reactions and explain their formation.



21. Write the product for the ozonolysis of 2,3-dimethylpent-2-ene followed by reaction with $\text{Zn} + \text{H}_2\text{O}$

22. Write the major product for the following reaction:



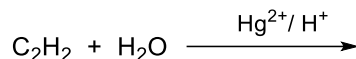
23. Ozonolysis of an alkene X followed by decomposition with water and reducing agent gave a mixture of two isomers of the formula $\text{C}_3\text{H}_6\text{O}$. give the structure of the alkene and its IUPAC name.

24. Propanal and pentan-3-one are the ozonolysis products of an alkene. What is the structural formula and IUPAC name of alkene.

25. What is the formula of Teflon?

Alkynes

26. Write the product of the following reaction:



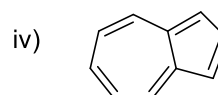
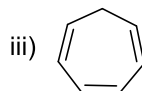
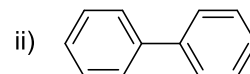
27. When _____ is passed through red hot iron tube at 873 K, benzene is formed.

28. Which of the following is acidic:
but-2-ene but-2-yne but-1-yne but-1-ene

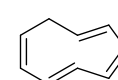
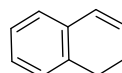
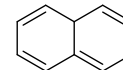
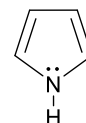
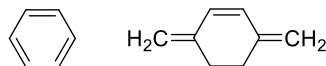
Benzene compounds

29. What are the necessary conditions for any system to be aromatic?

30. Predict which of the following systems would be aromatic?



31. Prove following compounds to be aromatic or not according to Huckel rule?

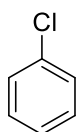
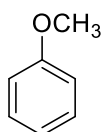
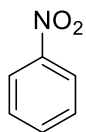


32. How will you convert benzene into:

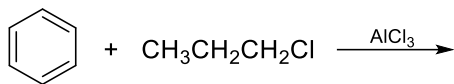
- i) p-nitrobromobenzene ii) p-nitrotoluene
iii) m-nitrochlorobenzene iv) acetophenone

33. Arrange the following set of compounds in the order of decreasing reactivity with an

electrophile. Give reasons



34. What will be the product obtained as a result of following reaction and why?



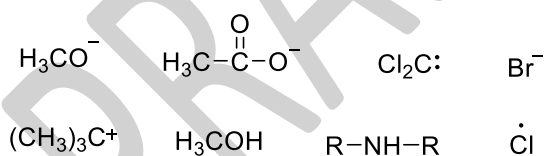
35. Arrange the following set of compounds in order of their decreasing relative reactivity with an electrophile E^+

- i) chlorobenzene 2,4-dinitrobenzene
p-nitrobenzene
- ii) Toluene p-nitrotoluene p-nitrobenzene

36. Why does presence of a nitro group make the benzene ring less reactive in comparison to the unsubstituted benzene ring? Explain.

37. Suggest a route for the preparation of nitrobenzene starting from acetylene.

38. Nucleophiles and electrophiles are reaction intermediates having electron rich and electron deficient centres respectively. Hence, they to attack electron deficient and electron rich centres respectively. Classify the following species as electrophiles and nucleophiles



39. In Friedel Crafts synthesis of toluene, reactants in addition to anhydrous AlCl_3 are

- a) $\text{C}_6\text{H}_6 + \text{CH}_4$ b) $\text{C}_6\text{H}_6 + \text{CH}_3\text{Cl}$
c) $\text{C}_6\text{H}_5\text{Cl} + \text{CH}_3\text{Cl}$ d) $\text{C}_6\text{H}_5\text{Cl} + \text{CH}_4$

40. Which of the following is less reactive than benzene towards electrophilic substitution reaction?

- a) nitrobenzene b) aniline
c) bromobenzene d) chlorobenzene