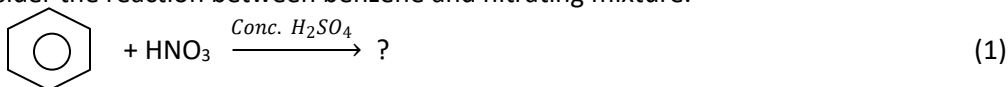


PREVIOUS HSE QUESTIONS FROM THE CHAPTER "HYDROCARBONS"

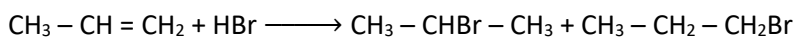
1. a) Consider the reaction between benzene and nitrating mixture.



- b) What is the reacting species in the above reaction? (1)
 c) How is the species formed in the system? (1) [June 2008]
2. a) How will you prepare ethane by Kolbe's electrolytic method? (2)
 b) Explain the Markovnikov's rule for the addition reaction using a suitable example. (3) [March 2009]
3. a) The spatial arrangements of atoms which can be converted into one another by rotation around a C – C single bond are called conformations.

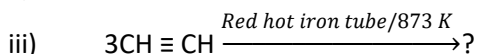
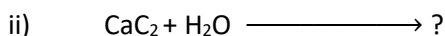
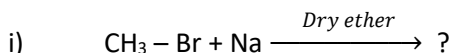
- i) Represent Sawhorse and Newman projection formulae of staggered and eclipsed conformations of ethane. (2)
 ii) Compare the stabilities of staggered and eclipsed conformations. (1)

- a) Consider the reaction given below:



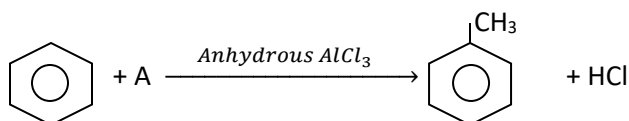
- i) Identify the major product obtained. (1)
 ii) Name the rule governing the formation of the major product. (1) [March 2010]
4. In a special condition, addition of HBr to unsymmetrical alkene takes place contrary to Markovnikov's rule.
 b) What is the special condition? (1)
 c) Give the mechanism of anti Markovnikov's addition of HBr to propene. (4) [September 2010]

5. a) Complete the following reactions:



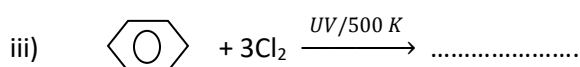
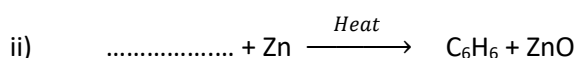
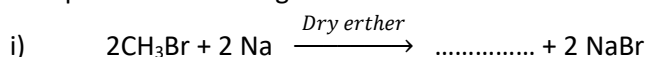
(3 x 1 = 3)

- b) Illustrate Markovnikov's rule taking the example of propene. (2) [March 2011]
6. The higher homologue of benzene can be prepared by the following reaction.



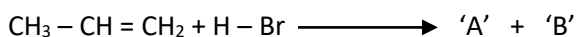
- a) Identify the reagent A. (1)
 b) Which named reaction is this? (1)
 c) Write the reaction mechanism of this reaction. (3) [October 2011]
7. Hydrocarbons are organic compounds containing carbon and hydrogen only.

- a) Complete the following chemical reactions:



(3 x 1 = 3)

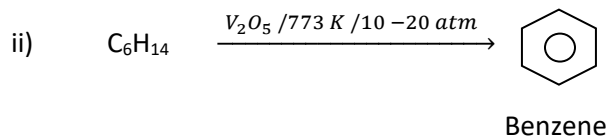
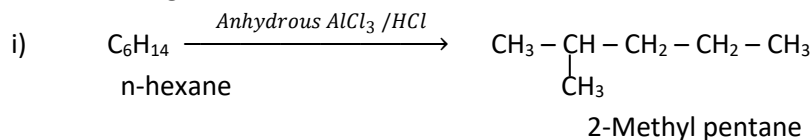
- b) Analyze the following reaction:



If 'A' is the major product and 'B' is the minor product, identify 'A' and 'B'. also name the related rule. (2)

[March 2012]

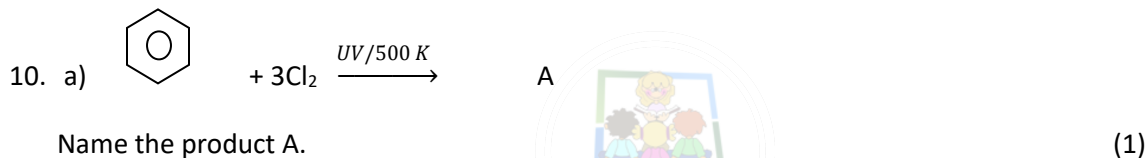
8. a) Name the following reactions:



b) Naphthalene is an aromatic compound. Explain its aromaticity using Huckel's rule. (2) [September 2012]

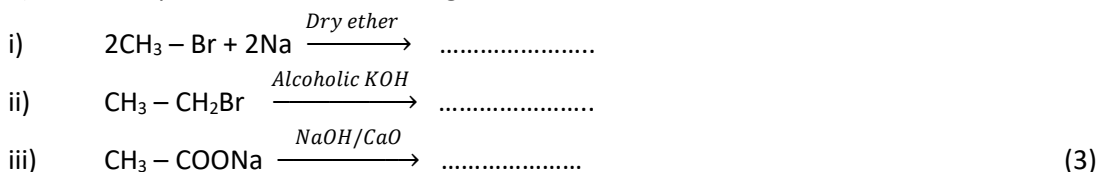
9. Free rotation is possible with respect to a C – C bond in the case of alkanes.

- a) The repulsive interaction between the adjacent bonds in a conformation is called (1)
 b) Draw Newman's projections of the two conformers of ethane. Which among these is more stable? Justify. (2)
 c) An alkene on ozonolysis followed by reduction of the ozonide formed with zinc and water gave a mixture of ethanal and methanal.
 i) Identify the alkene. (1)
 ii) Illustrate the above mentioned reaction using the chemical equation. (1) [March 2013]



- b) Draw the Newman's projections for the eclipsed and staggered conformations of n-butane. (2)
 c) What is Baeyer's reagent? Write the chemical equation of its reaction with ethylene (CH₂=CH₂). (2) [Sept. 2013]

11. a) Write the products of the following chemical reactions and also name them.

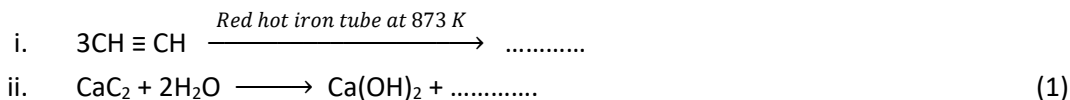


b) An alkene 'A' on ozonolysis gave two molecules of formaldehyde. Write the name of 'A' and the chemical equation of ozonolysis. (2) [March 2014]

12. a) Draw the cis and trans isomers of the following compound:



b) Complete the following reactions.



c) Draw the sawhorse projections for eclipsed and staggered forms of an ethane molecule. (2)

13. a) How is alkane prepared by Kolbe's electrolytic method? (2)

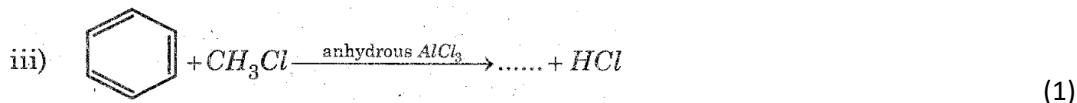
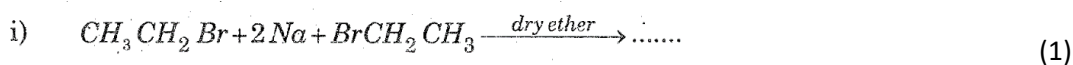
b) Select the activating groups from the following: (1)



c) What is ozonolysis? Write the names of the products obtained when propene undergoes ozonolysis? (2)

[August 2014]

14. a) Complete the following chemical equations:



b) Explain the geometrical isomerism taking 2-Butene as an example. (2) [March 2015]

15. Controlled oxidation of alkanes in the presence of suitable catalysts give a variety of products.

a) Complete the following reaction :

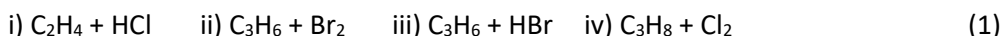


b) Free rotation about a carbon-carbon single bond is permitted in an alkane molecule.

What are conformers? Draw the structure of the eclipsed and staggered conformers of ethane in Sawhorse and Newman projections and explain their relative stability. (4) [October 2015]

16. a) 1-Alkynes are weakly acidic in nature. Give any two reactions to show the acidic character of ethyne. (2)

b) From the following, select the one in which Markownikoff's rule is best applicable.

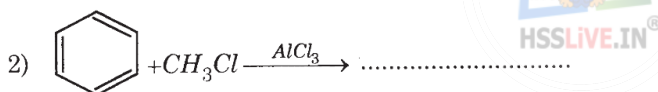
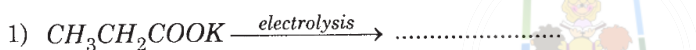


c) Hydrocarbons exhibit isomerism.

i) Name the type of isomerism exhibited by 2-Butene.

ii) Draw the structure of the isomers of 2-butene and select the one which is more polar. (2) [March 2016]

17. a) i) Complete the following reactions:



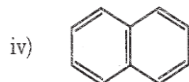
ii) Write the names of the above reactions? (2)

b) Baeyer's reagent is used to find whether the compound is unsaturated or not. What is Baeyer's reagent? (1)

c) What is the product formed when ethylene is treated with Baeyer's reagent? (2) [September 2016]

18. Benzene and benzenoid compounds show aromatic character.

a) Select the aromatic compounds from the following:



(1)

b) Suggest a method to convert ethyne to benzene. (2)

c) Give the products formed when benzene reacts with the following:



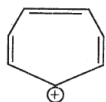
19. a)



(-) Cyclopentadienyl anion is aromatic. Why?

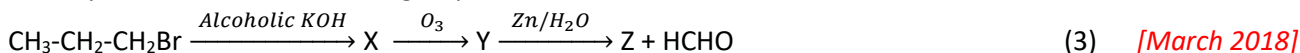
(1)

- b) explain the following reactions: i) Substitution ii) Addition (2)
 c) Ethyne is acidic in nature. Explain. (2) [July 2017]
 20. What is Wurtz reaction? Give an example. (2)
 21. Cycloheptatrienyl cation is given below :

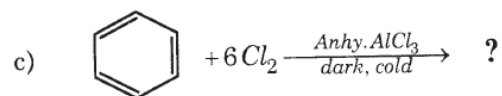
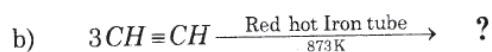
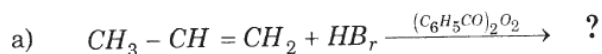


Is this ion aromatic or not? Justify the answer. (2)

22. Identify X, Y and Z in the following sequence of reactions :

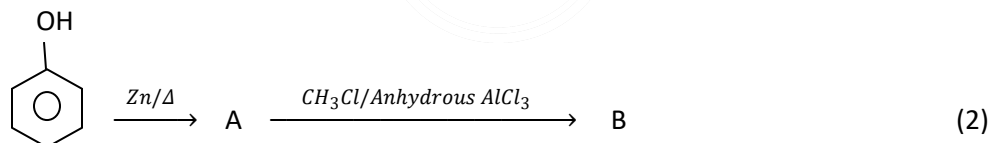


23. Draw the 'sawhorse' projections of the eclipsed and staggered conformations of ethane. (2)
 24. Give the chemical equation for the conversion of hexane to benzene. Write the name of the process. (2)
 25. Predict the Products :

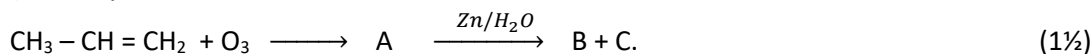


(3) [August 2018]

26. Draw the Newman Projections of the eclipsed and staggered conformations of ethane molecule. (2)
 27. Give the chemical equations for the steps involved in the ozonolysis of propene. (2)
 28. Alkynes can be converted selectively into cis-alkenes and trans-alkenes. Explain with suitable examples. (3)
 29. Identify A and B in the following reaction :



30. An alkene on ozonolysis gives two molecules of ethanal. Identify the alkene. Draw its geometrical isomeric forms. (2)
 31. Briefly describe the following with suitable chemical equations :
 (a) Wurtz reaction (b) Kharash effect (3) [July 2019]
 32. The class of organic compound differ by a > CH₂ group between adjacent members are called _____. (1)
 33. Draw the Newman projections for staggered and eclipsed conformations of ethane. (2)
 34. (a) What is Lindlar's catalyst ? (½)
 (b) Identify A, B and C.

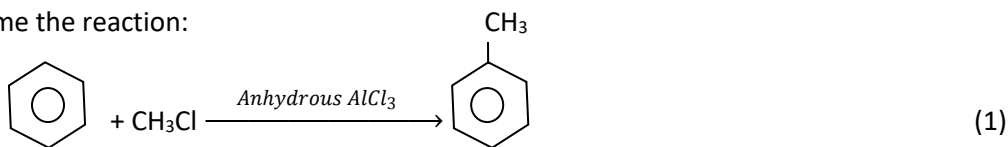


- (c) Complete the reaction.



35. The cold dilute aqueous solution of potassium permanganate is generally known as ---- (1)
 36. (a) Explain Wurtz reaction. (1)

(b) Name the reaction:

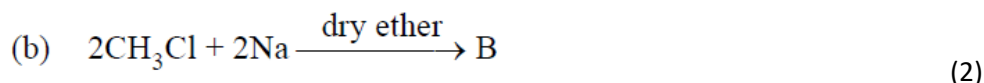
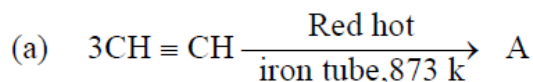
37. (a) $\text{CH}_3\text{-CH=CH}_2 + \text{HBr} \longrightarrow \text{A} + \text{B}$

(i) Identify A and B

(ii) Which is the major product and why? (2)

(b) State Huckel rule of aromaticity. (1) [December 2020]

38. Write A and B in the following reactions :



39. Write the geometrical isomers of But-2-ene. (2)

40. $\text{CH}_3\text{-CH=CH}_2 + \text{HBr} \longrightarrow \text{A} + \text{B}$

(Propene)

(a) Identify A and B. (1)

(b) Which is the major product in the above reaction ? (1)

(c) Name and state the rule which decides the major product in the above reaction. (2)

41. (i) Draw Newman's projection formula for the conformers of ethane molecule. (2)

(ii) Which conformer of ethane is more stable ? Give reason. (2) [March 2021]

42. Draw the Newman projections for the eclipsed and staggered conformations of ethane. (2)

43. Draw the geometrical isomers of but-2-ene. (2)

44. Explain the following :

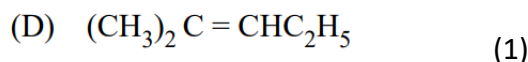
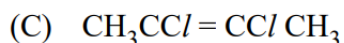
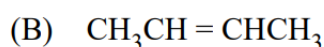
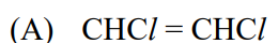
(i) Wurtz reaction

(ii) Kharash effect (2 x 2 = 4)

45. (i) Which gas is formed when water is added to Calcium carbide (CaC_2) ? (1)

(ii) What are electrophilic substitution reactions ? Explain any one electrophilic substitution reaction of benzene with necessary chemical equations. (3) [December 2021]

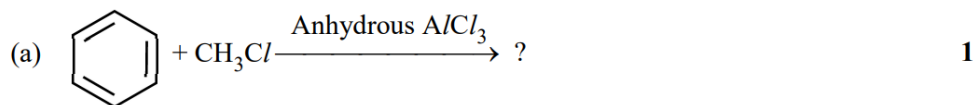
46. (i) Which of the following compound does not show cis-trans isomerism ?



(ii) Draw the Newman projections of eclipsed and staggered conformations of ethane. (2)

47. (i) Propene reacts with HBr to form a mixture of two products. Identify and write the major and minor product in the mixture. (2)

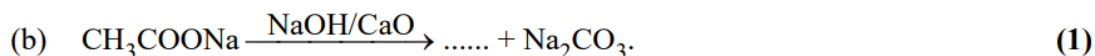
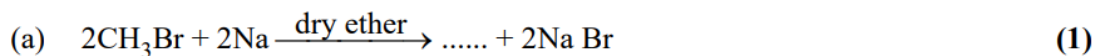
(ii) Complete the following equations :



[March 2022]

48. Draw Newman's projection for the eclipsed and staggered conformers of ethane. Which conformer is more stable ? (3)

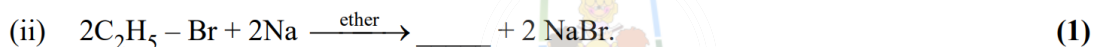
49. (i) Complete the following reaction :



(ii) What is Baeyer's reagent ? Write the chemical equation when Baeyer's reagent is reacted with ethylene (CH₂ = CH₂). (2) [October 2022]

50. Among the possible conformations of ethane, the most stable form is _____. (1)

51. Complete the following reactions :



52. (i) What is the major product formed when HBr is added to propene ? (1)

(ii) Name the rule used to choose the major product and state the rule. (2)

53. Explain the following reactions of alkanes :

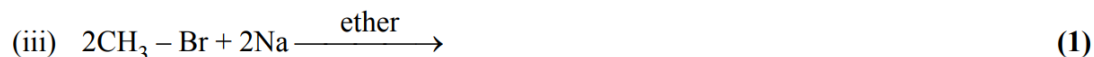
(i) Isomerisation (1)

(ii) Aromatization (1)

(iii) Pyrolysis (1) [March 2023]

54. The cold dilute aqueous solution of KMnO₄ is known as _____.

55. Write the name of the products formed in the following chemical reaction :



56. An alkene on ozonolysis gives two molecules of ethanal.

(i) Identify the alkene. (1)

(ii) Write the chemical equation of this reaction. (1)

(iii) Draw the geometrical isomeric forms of this alkene. (1) [October 2023]

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