	INDIAN SCHOOL AL WADI AL KABIR	
Class: XI	**DEPARTMENT: SCIENCE 2021-22** **SUBJECT: CHEMISTRY**	**Date of completion:** **30.11.2021**
Worksheet No: 07 **with answers**	**TOPIC: Hydrocarbons**	**Note:** **A4 FILE FORMAT**
NAME OF THE STUDENT	**CLASS & SEC:**	**ROLL NO.**

Objective Type Questions

1. Which of the following has least boiling point?
   (a) n-hexane (b) n-pentane (c) 2-methyl butane (d) 2,2-dimethyl propane

2. Benzene molecule has
   (a) 6 σ and 6 Π bonds
   (b) 16 σ and 6 Π bonds
   (c) 12 σ and 3 Π bonds
   (d) 6 σ and 3 Π bonds

3. The ozonolysis of $(CH_3)_2C=C(CH_3)_2$ followed by treatment with Zinc and water will give

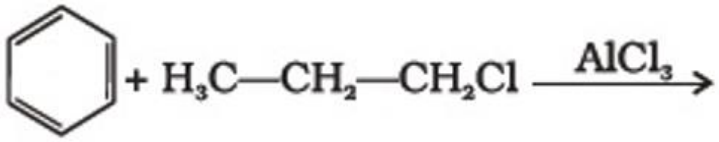
   a. Propanone
   b. Ethanal and Propanone
   c. Ethanoic acid
   d. Methanal

4. Benzene reacts with Acetyl chloride in the presence of $AlCl_3$ to give
   a. Acetophenone
   b. Toluene
   c. Benzophenone
   d. Ethyl benzene

5. Nitrobenzene on reaction with conc. HNO_3/H_2SO4 at 80 – 100°C forms which one of the following products?
   (a) 1, 2-Dinitrobenzene
   (b) 1, 3-Dinitrobenzene
   (c) 1, 4-Dinitrobenzene
   (d) 1, 2, 4-Trinitrobenzene

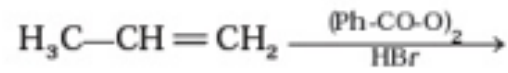
Short Answer Type Questions

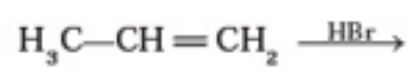
6. What will be the product obtained as a result of the following reaction?



7. Suggest a route for the preparation of Nitrobenzene from Acetylene

8. Predict the major products and explain the formation of the products

A 

B 

9. Give the structure of the alkene (C_4H_8) which adds on HBr in the presence and in the absence of peroxide to give the same product C_4H_9Br.

10 out of Ethene and Ethyne which is more acidic and why?

***Assertion Reason* type questions**

a. If both *Assertion* and *Reason* are correct and *Reason* is the correct explanation of *Assertion*.
b. If both *Assertion* and *Reason* are correct but *Reason* is not the correct explanation of *Assertion*.
c. If *Assertion* is correct and *Reason* is wrong.
d. If *Assertion* is wrong and *Reason* is correct.

11. Assertion: For alkanes, there is a steady increase in boiling point with increase in molecular mass
Reason: Intermolecular van der Waals forces increase with increase of the molecular size or the surface area of the molecule.
a) Both A and R are correct statements, and reason is the correct explanation of the assertion.
b) Both A and R are correct statements, but reason is not the correct explanation of the assertion.
c) A is correct, but R is wrong statement.
d) A is wrong, but R is correct statement

12. Assertion (A): Toluene on Friedel Crafts methylation gives o– and p–xylene.
Reason (R): CH3-group bonded to benzene ring increases electron density at o– and p– position.

(a) Both A and R are correct and R is the correct explanation of A.
(b) Both A and R are correct but R is not the correct explanation of A.
(c) Both A and R are not correct.
(d) A is not correct but R is correct.

13. Assertion (A): Nitration of benzene with nitric acid requires the use of concentrated sulphuric acid.
Reason (R): The mixture of concentrated sulphuric acid and concentrated nitric acid produces the electrophile, NO_2^+.
(a) Both A and R are correct and R is the correct explanation of A.
(b) Both A and R are correct but R is not the correct explanation of A.
(c) Both A and R are not correct.
(d) A is not correct but R is correct.

Case study-based Questions

Alkanes contain carbon-carbon sigma (σ) bonds. Electron distribution of the sigma molecular orbital is symmetrical around the internuclear axis of the C–C bond which is not disturbed due to rotation about its axis. This permits free rotation about C–C single bond. Rotation around a C-C single bond is not completely free. It is hindered by a small energy barrier due to weak repulsive interaction between the adjacent bonds. Such a type of repulsive interaction is called torsional strain. This rotation results into different spatial arrangements of atoms in space which can change into one another. Such spatial arrangements of atoms which can be converted into one another by rotation around a C-C single bond are called conformations or conformers or rotamers

1. What are skew conformations?

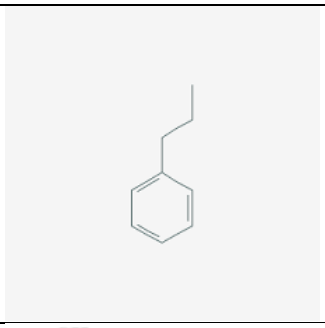
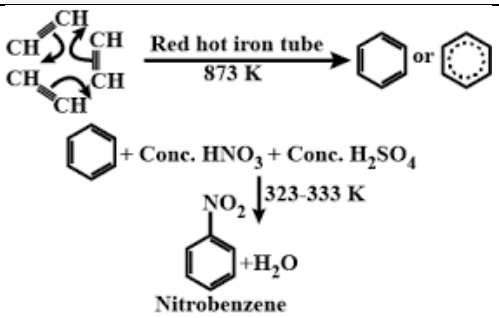
2. Draw Newman projections of eclipsed and staggered conformations of Ethane.

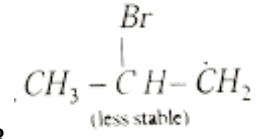
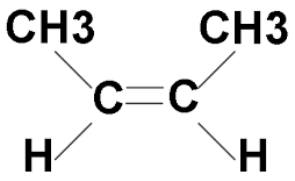
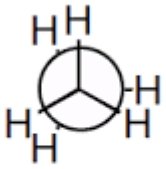
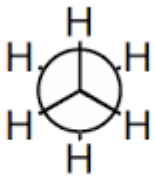
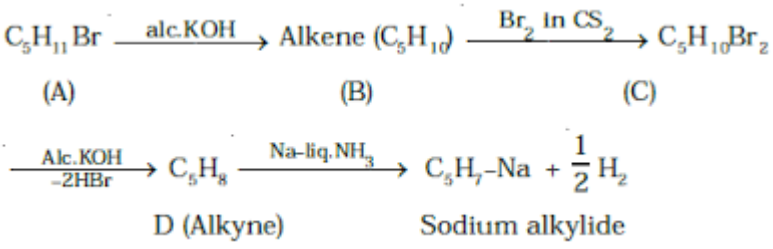
3. What do you mean by torsional strain?

Long Answer Questions

14. An alkyl halide C5H11Br(A) reacts with ethanolic KOH to give an alkene 'B', which reacts with Br_2 to give a compound 'C', which on dehydrobromination gives an alkyne 'D'. On treatment with sodium metal in liquid ammonia one mole of 'D' gives one mole of the sodium salt of 'D' and half a mole of hydrogen gas. Identify A, B, C and D. Give the, reactions involved.

Answers

1.	d
2.	a
3.	a
4.	b
5.	b
6.	
7.	
8.	A. $CH_3 - \dot{C}H - CH_2Br$ (more stable)

	 B
9.	
10	Ethyne is more acidic as the Carbon present in Ethyne is sp hybridised and is more electronegative
11	a
12	a
13	a
	Case study based Questions
1	Any intermediate conformations other than eclipsed and staggered are called skew conformations.
2	 eclipsed  staggered
3	Rotation around a C-C single bond is not completely free. It is hindered by a small energy barrier due to weak repulsive interaction between the adjacent bonds. Such a type of repulsive interaction is called torsional strain.
14	

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