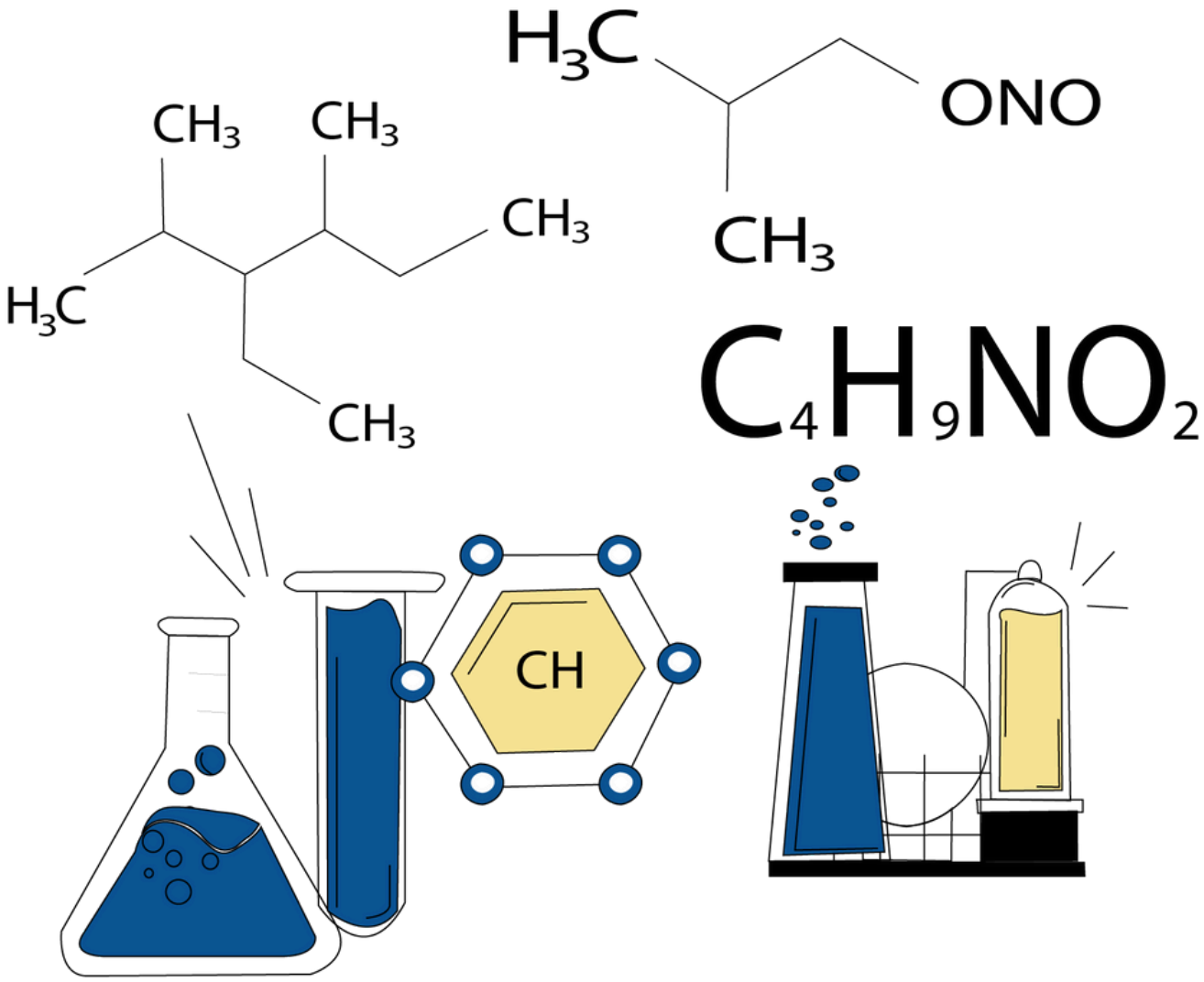
PreMed.PK

ALKYL HALIDES



PUNJAB BOARD

PUNJAB BOARD TOPPER PERSPECTIVE

INTRODUCTION

- Alkyl halides can undergo a variety of reactions that can result in the formation of new molecules with different properties. These reactions may involve processes such as nucleophilic substitution, elimination, and addition, and understanding the mechanisms behind these processes can be challenging. As it's a short chapter it is also quite easy to cover.

1. HOW TO APPROACH THE TEXTBOOK?

1.Practice MCQs:

- Practising questions and watching videos are effective ways to learn and retain information, especially when you are short on time. Active learning is more effective than passive learning, and solving practice questions is an excellent way to apply the knowledge you have learned. Keep in mind that 90% of your understanding will be formed by practicing questions.

2.Reading of Text

- However, reading the book can provide a more in-depth and comprehensive understanding of the subject matter, but given how huge the syllabus is, it is unwise to spend so much time trying to read and understand the book.Reading the book can provide a more comprehensive understanding of the subject matter.

3.Video Lectures

- If you feel compelled to cover the book, first watch videos to gain a solid conceptual understanding, then skim through the bulk of the text.

2. CHAPTER CONTENT:

10.1 Introduction:

- Alkyl halides, also called haloalkanes or halogenoalkanes, are chemical compounds that are often derived from alkanes that contain one or more halogens.
- Alkyl halides or haloalkanes are formed by the replacement of hydrogen atoms in an aliphatic hydrocarbon by halogen atoms (fluorine, chlorine, bromine or iodine).
- Alkyl halides contain hydrogen atoms attached to the sp3 hybridized carbon atom of alkyl groups.

10.2 Nomenclature of Alkyl Halides:

- The common names of alkyl halides consist of two parts: the name of the alkyl group plus the stem of the name of the halogen, with the ending -ide.
- The IUPAC system uses the name of the parent alkane with a prefix indicating the halogen substituents, preceded by a number indicating the substituent's location.

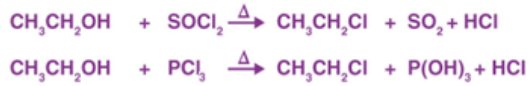
Types of Alkyl Halides:

1. Primary ⇒ primary carbon attached to one carbon atom.
2. Secondary ⇒ primary carbon attached to two carbon atoms.
3. Tertiary ⇒ primary carbon atom attached to three carbon atoms.

10.3 Preparation of Alkyl Halides:

- Alkyl Halides can be prepared form;

1. Alkenes
2. Alcohols



3.Free Radical Halogenation

10.4 Reactivity of Alkyl Halides:

- Bond Polarity:

The molecule of alkyl halide is polarized due to greater electronegativity of halogens.

R-F > R-Cl > R-Br > R-I

- Bond Energy:

This reactivity order is considered the most valid.

R-I > R-Br > R-Cl > R-F

10.5 Reactivity of Alkyl Halides:

- Alkyl halides undergo;

1. Nucleophilic Substitution Reaction
2. Elimination Reaction

- Nucleophile:

- Nucleophile is a word used to refer to substances that tend to donate electron pairs to electrophiles in order to form chemical bonds with them.

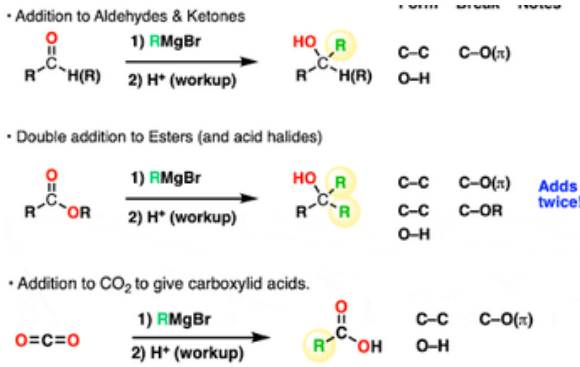
- Electrophile:

- Electrophile is an atom or a molecule that in chemical reaction seeks an atom or molecule containing an electron pair available for bonding.

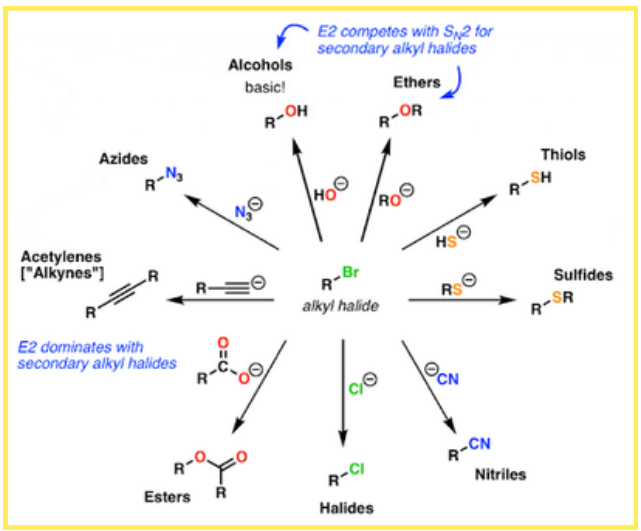
10.6 Grignard Reagent:

- Grignard reagent is an organomagnesium halide having a formula of RMgX, where X is a halogen (-Cl, -Br, or -I), and R is an alkyl or aryl (based on a benzene ring) group.

- Following are the reactions given by grignard reagent.;



3. IMPORTANT DIAGRAMS:



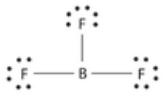
4. SAMPLE MCQS:

Q. Which of the following is not a nucleophile? (NTS 2010)

- ○ HO-
- ○ NH3
- ✓ BF3
- ○ CN-

Explanation:

- Nucleophiles are electron donors as they have an extra pair of electrons to attack an electron deficient electrophile. All of the options above are nucleophiles, having an extra pair of electrons except BF3.



Q. Alkyl-Halides involving -C-X bond breakage and -C-Nu bond formation simultaneously would follow the mechanism: (PMC 2020)

- ○ SN1
- ✓ SN2
- ○ E1
- ○ E2

Explanation:

- SN2 reactions is a type of reaction mechanism that is common in organic chemistry. In this reaction one bond if broken and one bond is formed simultaneously, i.e. in one step. It is a bimolecular reaction because the attacking nucleophile and leaving group are both involved in the rate determining step.

5. SOME HELPFUL RESOURCES:

1.YouTube's Videos:

- Physics in Seconds
- Physics ka Manjan
- PhysicsWallah
- Muhammad Kamran Khattak
- Friends Physics
- Gaurav Gupta (unacademy)

2.Guidebooks and notes:

- You should primarily use the textbook to build your concepts but you can practice as much as you can from the following books:
  a. CliffsNotes AP Physics 2
  b. KIPS prep book for physics
  c. Nearpeer physics notes
  d. Barron's SAT Subject Test Physics E/M
  e. Redspot Physics

6. TOPICAL QUESTIONS ON PREMED.PK:

- The more you practice, the more you will be able to know your strengths and weaknesses. Start solving maximum entry test past papers and mcqs guides to better grasp the questions and paper pattern. Certain questions are repeated every year. To solve these questions visit PreMed.PK which offers an extensive question bank. With this practice, you will also

7. IMPORTANT TOPICS:

- 10.3 Preparation of Alkyl Halides
- 10.4 Reactivity of Alkyl Halides
- 10.5 Reactions of Alkyl Halides
- 10.6 Grignard Reagent

8. STUDY HACKS:

1.Key points/shortlisting:

- After you've finished reading the chapter, shortlist points that you keep forgetting and those which you think are important on a single sheet of paper and revise it after every few days.

2.Mistake Notebook:

- keep a notebook titled “MISTAKE NOTEBOOK” with you whenever you are solving MCQs, and note down the MCQs which you find difficult (weak concepts). Next time, when you practice questions from this chapter, go through the notebook first so you can have a grip on these questions too.

3.Practice active recall:

- Instead of just reading over your notes, actively test yourself by reciting or explaining the information out loud. This helps reinforce your memory.

4.Flashcards:

- Organic chemistry is all about learning chemical structures and reactions.There is also a lot of vocabulary that is specific to the subject. It is very difficult to understand the material if you don’t know what all of the words mean.

9. REVISION TIPS FOR LAST MINUTE:

1.Read your shortlisted notes:

- Go through your formulae sheet and notes that you made while you were studying for the respective chapter. This will help reduce the time required for revision.

2.Manage your workflow:

- Optimize your study area and focus on your weak spots. Manage the ways in which you study and make a healthy schedule on a daily basis.

3.Read key points at the end:

- The key points at the end of the chapter are essential and contain crucial points for MCQs and short questions.

10. CONCLUSION:

- Everyone learns very differently, and knowing your learning style is important: you can make learning easy by reading, by taking notes, by talking, by watching, by doing, or by a combination of some or all of these.
- Regardless of your learning style, you'll still need to solve the physics problems in each textbook. Solving problems is the only way to really understand how the laws of physics work. There's no way around it. Even though it can feel tedious at times, there's nothing more rewarding than figuring out a really difficult physics problem and realizing that you figured it all out yourself.

Authored by

Fateh Alam Bhatty

190/200

King Edward Medical University

A little about the author

Success is a milestone that one can easily achieve if one receives fruitful guidance and has awesome resources at his disposal. PreMed has helped many MDCAT aspirants through their amazing platform. I have assembled these guides to contribute from my end, and make prep easier for future MDCAT aspirants so they may secure a place in their dream med school!