



## What are the chapters in organic chemistry class 11

1.1 IntroductionBerzelius coined the term "Organic Chemistry" in 1807 to describe the study of compounds derived from natural sources. This was based on the vitalism theory, which stated that all living systems possessed a 'vital force' that non-living systems lacked. Organic compounds were thought to be fundamentally different from inorganic compounds because they were derived from living natural sources. (image will be uploaded soon) Philosophically, the vital force could be thought of as the mysterious force that God instilled in living systems. Friedrich Wohler became Berzelius' student in 1823. Wohler made a discovery in 1828 that changed the definition of organic chemistry. Wohler carried out the following experiment. (image will be uploaded soon) Wohler was able to successfully synthesize an organic compounds. As a result, the theory of vitalism and the definition of organic chemistry became meaningless. The presence of carbon, however, was shared by all of the compounds synthesized above. Catenation), as well as with atoms of many other elements in the periodic table (cross-catenation). As a result, carbon can form a wide range of compounds. The vital force is probably explained by the fact that most of the life-giving and life-sustaining functions are performed by proteins, respiration is possible because of hemoglobin, information in our genes is carried out in the form of DNA/RNA, and so on. The detailed study of the fundamental concepts and factors that govern the progression and outcome of reactions is known as general organic chemistry. Note: Before transforming into products, bonds are typically formed and broken in a series of discrete steps. The mechanism of the reaction is a detailed sequential description of all the steps. 1.2 Sigma and Pi bondPropertySigma BondPi BondOverlapAxial/Head-onParallel/Lateral/Side-waysElectron CloudAlong the inter - nuclear axisPerpendicular to the inter - nuclear axis FormulasLewis structures are used to represented by a pair of dots.1.3.2 Condensed formulas. A lone pair of dots.1.3.2 Condensed formulas. A lone pair of dots.1.3.2 Condensed formulas. Formulas These are also referred to as skeletal structures or stick figures. Line-angle formulas are frequently used for cyclic compounds, and carbon atoms are implied in these drawings.1.3.4 Tetrahedral RepresentationThis is the three-dimensional (3-D) representation of molecules in general. Bonds projecting behind the plane (towards the observer) are denoted by a dashed Wedge or a solid Wedge, respectively. Bonds in the plane of paper are represented by a normal line (-).(image will be uploaded soon)2. Degrees of CarbonIt is defined as the number of carbons attached to the carbon under study.(image will be uploaded soon)2.1 HybridizationHybridisation is a process in which two or more atomic orbitals of comparable energy in the valence-shell of an atom (central atom of a molecule or ion) mix together and give rise to the formation of new degenerate orbitals known as hybrid orbitals.2.2 Applications of Hybrid OrbitalsThe size of the orbital is: sp3 > sp2 > sp2.2.2 Electronegativity of the Hybrid Orbitals As the percentage of s-character increases, so does the electronegativity of the Hybrid Orbital is sp > sp2 > sp32.3 DienesDienes are organic compounds that have two double bonds in them. Dienes are classified into three types: Isolated Conjugated and Cumulated2.3.1 Isolated DieneIn this case, double bonds are separated by atleast one sp3 carbon.(image will be uploaded soon)Molecule\$\sigma\$\$\pi\$L.PHybridizationShape\$\mathrm{CH} {2} \ddot{\mathrm{O}}\$202TetrahedralV-shape orbent\$\mathrm{CH} {2}=\mathrm{CH} {2}\$310Trigonal PlanarTrigonal Plana bonds are located on the same carbon atom. $CH = mathrm{CH} - mathrm{C$ graphite (c) carbides.(d) Fullerenes(e) CharcoalNote:Each C in a diamond is sp3. The solid is tetrahedral.Each C in graphite is sp2. Solid layers with weak van der Waal forces between them. 3. Breaking of Bonds:The bond that is important for the study of reactions in organic chemistry is the covalent bond. As a result, we investigate how a covalent bond can be broken.(a) Homolytic Fission by Heterolysis3.1 Homolytic Fission or Homolytic CleavageEach atom separates with one electron in this type of bond breaking, resulting in the formation of highly reactive species known as radicals.(image will be uploaded soon)Two half-headed or fishhook arrows represent bond breaking. One electron's movement is depicted by a half-headed arrow. Radicals are odd electron species that are neutral.3.1 Heterolytic Fission or Homolytic CleavageThe shared pair of electrons are transferred to the more electronegative part in this type of covalent bond breaking. As a result of this fission, a cation and an anion are formed (ionpair).(image will be uploaded soon)A full-headed arrow represented by curved arrows, either half-headed or full-headed or full-headed arrow depicts the movement of two electrons. In organic chemistry, electron movement is always represented by curved arrows, either half-headed or full-headed or full-headed arrow depicts the movement is always represented by curved arrows, either half-headed or full-headed or full-headed or full-headed arrow depicts the movement is always represented by curved arrows, either half-headed or full-headed or fulle or full-head forms the sigma bond is never shared equally between the two atoms, but is shifted slightly towards the more electronegative than H, the difference in electronegativity is small, and the bond is generally considered non-polar.4.1 Nature of Inductive Effect is a permanent effect that is directly proportional to the dipole moment. It is a minor effect that is directly proportional to the inductive effect that selfexplanatory.(image will be uploaded soon)4.3 Electron Donating and Electron withdrawing Groups The inductive effect can be caused by a single atom or by a group of atoms. The relative inductive effects are measured in relation to hydrogen. carbon chain and are said to exert a +I effect. Electron-withdrawing groups (EWG) are those that withdraw electrons from the carbon chain and are said to exert the -I effect. In general, the number of carbons in an alkyl group increases the +I effect. 3. To solve the problem, we assume that the electronegativity of sp hybridized carbon is greater than that of sp3 hybridized nitrogen.4.4 Applications of Inductive Effect 4.4.1 Effect on Acidic/Basic strength. ERG reduces acidic strength while decreasing basic strength. ERG reduces acidic strength while decreasing basic strength. soon)Solution: An alkyl group will only donate if no other EWG is present. As a result, electron withdrawing groups such as -CH2Cl and -CH2F form.Order of Acidic Strength III > II > I 4.4.2 Effect of Distance The inductive effect decreases as the ERG/EWG moves away. (image will be uploaded soon)4.4.3 Basicity of Amines The order in gaseous or liquid phase is: 3° > 2° > 1° > NH3 To ascertain the basic strength is thus experimental in the aqueous state because we cannot prioritize the stability provided by any single factor. For the aqueous phase, two results are critical: (a)  $\left(\frac{R}-3\right)\right(b) \$  (b)  $\left(\frac{3}\right)^{3}\right(b) \$  $\label{therm} \end{tabular} \label{therm} \end{tabular} \label{therm} \end{tabular} \label{therm} \end{tabular} \label{therm} \end{tabular} \label{therm} \end{tabular} \label{tabular} \label{tabuar} \label{tabular} \labe$ represent molecules, but some molecules cannot be represented by a single Lewis structure. As a result, the concept of resonance was discovered. The delocalization of electrons) is referred to as resonance. 5.1 Conjugated Systems 5.1.1 Pi alternate Pi(image will be uploaded soon)5.1.2 Pi alternate Positive Charge Example - 4 (image will be uploaded soon)5.1.3 Pi alternate Lone Pair Since lone pair and negative charge are treated similarly, this case is similar to 'pi alternate negative charge. Example - 5 (image will be uploaded soon)5.1.5 Pi alternate Codd Electron Example - 6 (image will be uploaded soon)5.1.5 Pi alternate Codd Electron Example - 6 (image will be uploaded soon)5.1.5 Pi alternate Negative charge are treated similarly, this case is similar to 'pi alternate Negative charge. uploaded soon)5.1.6 Lone Pair and Positive Charge on Adjacent Atoms Example - 8 (image will be uploaded soon)5.2 Rules for Validity of Lewis structures must be in the same position. Only the electrons are in motion. Rule-3: All resonating structures must have the same number of paired and unpaired electrons, that is, the sum of bond pairs and lone pairs must be constant. Rule-4: All of the atoms in a molecule that participate in resonance must be constant. Rule-4: All of the atoms in a molecule that participate in resonance must be constant. Rule-4: All of the atoms in a molecule that participate in resonance must be constant. Rule-4: All of the atoms in a molecule that participate in resonance must be constant. Rule-4: All of the atoms in a molecule that participate in resonance must be constant. Rule-4: All of the atoms in a molecule that participate in resonance must be constant. Rule-4: All of the atoms in a molecule that participate in resonance must be constant. Rule-4: All of the atoms in a molecule that participate in resonance must be constant. Rule-4: All of the atoms in a molecule that participate in resonance must be constant. 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Rule-4: All of the atoms in a molecule that participate in resonance must be constant. Rule-4: All of the atoms in a molecule that participate in resonance must be constan Contributors The following criteria, in the following order, can be used to compare resonance forms: 1. Use as many bonds as possible. 3. The presence of a negative charge on a more electronegative atom is stable. 4. The separation of charges(a) Similar charges - Keep them as far away from each other as possible to reduce repulsion and instability. (b) Opposite charges should be kept as close together as possible to maximize attraction and stability. Example - 9 Which of the following structures is more stable? (image will be uploaded soon)Solution: II is more stable as all the octets are complete. 6. Mesomeric Effect The permanent polarization caused by a group conjugated with a pi bond or a set of alternate bonds is transmitted through the system's electrons, resulting in a different electron distribution in the unsaturated compounds conjugated with electron-releasing or electron-Releasing Groups (+R or +M effect) (image will compounds conjugated with drawing Groups (+R or +M effect) (image will compound conjugated with drawing Groups (+R or +M effect) (image will compound conjugated with drawing Groups (+R or +M effect) (image will compound conjugated with drawing Groups that release or withdrawing Groups (+R or +M effect) (image will compound conjugated with drawing Groups (+R or +M effect) (image will compound conjugated with drawing Groups (+R or +M effect) (image will compound conjugated with drawing Groups (+R or +M effect) (image will compound conjugated with drawing Groups (+R or +M effect) (image will compound conjugated with drawing Groups (+R or +M effect) (image will compound conjugated with drawing Groups (+R or +M effect) (image will compound conjugated with drawing Groups (+R or +M effect) (image will compound conjugated with drawing Groups (+R or +M effect) (image will compound conjugated with drawing Groups (+R or +M effect))). be uploaded soon)The atom connected with the conjugated system has a lone pair to donate, which is shared by all of the groups listed have one thing in common: the atom connected with the conjugated system has a bond with another more electronegative atom that either withdraws electrons or directly has a positive charge on them. As a result, a generic representation can be represented - Y=Z (ENZ > ENY) 6.1.3 Dual Behaviour As shown, some groups are both electron-releasing and electrondrawing. Example - 12 As electron releasing group (image will be uploaded soon)As electron withdrawing group (image will be uploaded soon)Which behaviour dominates and which is used in a particular context will be discussed later in Electrophilic Aromatic Substitution later. Resonance Effect does NOT depend upon distance unlike inductive effect. 6.2 Applications of Mesomeric Effect 6.2.1 Effect on Acidic Strength of Carboxylic acid results in a charge-delocalized carboxylate ion. As a result, carboxylic acid results in a charge-delocalized carboxylate ion. Similarly, in phenol, resonance causes charge separation, which increases the rate of ionization and results in the formation of phenoxide ion, which is stabilized by charge delocalization. 6.2.2 Effect on Reactivity of Carboxylic Acid Derivatives A typical nucleophilic reaction is represented as : The stronger is the bond between C and Z, the more difficult it is for a nucleophile to break a bond and therefore, lower reactivity. Reactivity order of carboxylic acid derivatives towards nucleophilic acyl substitution is : Acyl Chloride > Acid Anhydride > Ester > Amide6.2.3 Effect of ERG/EWG on Acidic/Basic Strength EWG increases the acidic strength and decreases the basic strength. ERG decreases the acidic strength and increases the acidic strength. Some Basic Concepts of Organic Chemistry Class 11 Chemistry organic chemistry organic chemistry Chapter 12 NotesOrganic chemistry is the branch which studies carbon compounds obtained from living organisms. It is a very important discipline of chemical science. Carbon exhibits a unique self-linking property to form chains, layers and space lattices. with carbon, hydrogen and other atoms. Because of these properties, carbon is able to form a huge number of compounds is done in accordance with the rules laid down by IUPAC which stands for the International Union of Pure and Applied Chemistry. This body formulates rules for the naming of Organic compounds. Certain Important Concepts of Organic ChemistryFunctional Groups: Functional groups can be defined as an atom or a group of atoms which replace hydrogen in an organic compound. Homologous series is a sequence of organic compounds having the same functional groups and chemical properties in which the member of the series successively differ by - CH2Organic Compounds and Their ClassificationOrganic compounds and Their ClassificationOrganic compounds can be classified as given in chemistry Class 11 can be of two types-Structural Isomerism: Structural Isomerism: Structural arrangement of atoms in space. Stereoisomerism is space. Stereoisomerism is space. of two types- Geometrical Isomerism and Optical Isomerism. Attacking Reagents The attacking Reagents mentioned in notes of chemistry Class 11 Chapter 12 are as follows: Attacking Reagents are chemical species which bring about a chemical reaction. They may be electrophiles. Electrophiles: Species which accept electron pairs are known as electrophiles meaning 'electron seeking'. Nucleophiles: Species which donate or provide electron pairs are known as nucleophiles meaning 'nucleus seeking'. Reaction Intermediates of Class 11 Chapter 12 Chemistry NotesCarbocations, Carbocations, intermediates with a positive charge and have six electrons in the valence shell. It has sp<sup>2</sup> hybridization. Carbanions: Carbanions: Carbanions: Carbanions: Carbanions are carbon intermediates with a negative charge. They have eight electrons in the outermost shell. Their hybridization is sp<sup>3</sup>. Free Radicals: Carbon-free radicals are intermediates with a negative charge. have seven electrons in the valence shell and have hybridization as sp<sup>2</sup>. Electron Displacement occurs in an organic compound either under the influence of an atom or substituent group in the ground state or in presence of a suitable attacking reagent There are certain effects visible. These are-Inductive Effect: Bond formed between unlike species will have the electron pair shifted towards the more electronegative atom. This is known as Inductive Effect: Bond formed between unlike species will have the electronegative atom. dot structure then a number of structures are required to show the structure of the molecule. This occurs because of the delocalization of pi electrons. This is again a permanent effect. Hyperconjugation with adjacent pie electrons. Electromeric Effect: Electromeric effect is the shifting of electron pairs towards more electronegative atoms in a double-bonded system in presence of a reagent. This is a temporary effect. Methods of Purification: In this a temporary effect. Methods of Purification of Organic Concepts of Organ process, a solvent is selected for preparation of a solution in which one of the elements crystallizes out in the form of a compound. Sublimation: In this process, a liquid is converted into vapour and the vapour is transferred to another place and recovered by condensation. Fractional Distillation: This process, a liquid is converted into vapour and the vapour is transferred to another place and recovered by condensation. Chromatography: In this process, the mixture is passed through a solution or suspension where it has different rates of moving. There are various types of chromatography, paper chromatography, paper chromatography, paper chromatography, paper chromatography, etc. Qualitative analysis of organic compounds, we find out the elements present in the compounds in addition to carbon and hydrogen. There are various tests and methods for qualitative Analysis of organic compounds. Quantitative Analysis in Ch 12 Chemistry Class 11 Notes The Quantitative Analysis of an organic compound is the proper study of the relative Analysis of an organic compound is the proper study of the relative Analysis in Ch 12 Chemistry Class 11 Notes The Quantitative Analysis of an organic compound is the proper study of the relative Analysis of an organic compound is the proper study of the relative Analysis in Ch 12 Chemistry Class 11 Notes The Quantitative Analysis of an organic compound is the proper study of the relative Analysis of an organic compound is the proper study of the relative Analysis of an organic compound is the proper study of the relative Analysis of an organic compound is the proper study of the relative Analysis of an organic compound is the proper study of the proper compounds. Chapter 12 chemistry Class 11 notes are written precisely yet are enough for revision before the examination. It is very well curated in a systematic manner. The organic Chemistry Some Basic Principles and Techniques Class 11 notes is very important for the NEET and JEE aspirants as mentioned earlier. There have been important and conceptual questions from the chapter in the examinations.