

Chemistry - 12th Class Chemistry Chapter 9 Short Questions Preparation

Q1. How benzene is converted into malic acid by catalytic oxidation?

Ans 1: Benzene ring is determined when it is strongly heated with air in the presence of V_2O_5 as a catalyst and maleic acid is obtained.

Q2. What is meant by the terms: i) Aromatic ii) Oxidation

Ans 1: Aromatic: The term aromatic was derived from the Greek word aroma meaning fragrant and was used in organic chemistry for a special class of compounds. These compounds have a low hydrogen to carbon ratio in their molecular formula and have a characteristic odour. These are often produced by benzene or derivatives of benzene.

Ans 2: Oxidation: The addition of oxygen, removal of hydrogen or electrons is called oxidation. Oxidation process is carried out by some oxidizing agent like $KMnO_4$, $K_2Cr_2O_7$ or V_2O_5 etc. which can provide oxygen to a compound.

Q3. What are monocyclic and polycyclic aromatic Hydrocarbons?

Ans 1: Monocyclic: Aromatic hydrocarbons containing one benzene ring in their molecules are called monocyclic aromatic hydrocarbons e.g. benzene, toluene, phenol, aniline, benzoic acid, benzaldehyde and benzene sulphonic acid.

Ans 2: Polycyclic: Aromatic hydrocarbons containing two or more benzene rings in their molecules are called polycyclic aromatic hydrocarbons.

Q4. What are the major products when chlorine reacts with Toluene in the presence of sunlight?

Ans 1: When alkyl benzenes are treated with chlorine or bromine in the presence of sunlight, only the alkyl groups are substituted.

Q5. Define two reactions which confirm the presence of three double bonds in the benzene ring.

Ans 1: 1. Benzene is reduced to cyclohexane on heating at high temperature with hydrogen in the presence of Pt in an acidic solvent or Ni at 200 degrees as a catalyst.
2. Benzene reacts with chlorine and bromine in the presence of sunlight to give addition products, hexachlorobenzene or hexabromobenzene.

Q6. What are aromatic hydrocarbons? Give two examples.

Ans 1: The carbocyclic compounds containing at least one benzene ring, six carbon atoms with three alternate double and single bonds are called aromatic hydrocarbons. These bonds are usually shown in the form of a circle.
Examples: Toluene, Phenol and Nitrobenzene.

Q7. What is resonance?

Ans 1: The possibility of different pairing schemes of valence electrons of atom is called resonance and the different thus arranged are called "Resonance Structure".

Q8. What is meant by directing group?

Ans 1: The groups which withdraw the electrons of the benzene ring towards themselves and reduce the availability to the electrophiles are called meta directing groups. The result is the decrease chemical reactivity of benzene. In their presence incoming electrophiles will prefer to attack on meta position rather than ortho and para position.

Q9. Justify that Ethene is more reactive than C_6H_6 .

Ans 1: The highly stable, delocalized electron of benzene ring not readily available for the nucleophilic attack like the electron of alkenes, therefore the electrons of benzene ring do not assist in the attack of weak electrophiles.

Q10. What information are obtained about structure of benzene from X-ray studies?

Ans 1: The X-ray studies of benzene have confirmed the hexagonal structure of it. These studies have also revealed that all the carbon and hydrogen atoms are in the same plane. All the angles are of 120° . All C-C and C-H bonds lengths are 1.397 \AA and 1.09 \AA respectively.
