**Q1) Which of the following halogenated compounds is most reactive towards nucleophilic substitution reaction?**

a) 1-chloro-2,2-dimethylpropane

b) 1-chlorobutane

c) 1-chloro-2-methylpropane

d) 1-chloro-3-methylbutane

Correct Answer: Option (c)

Explanation: The reactivity of a haloalkane towards nucleophilic substitution reaction depends on the steric hindrance around the carbon atom to which the halogen is attached. The more the steric hindrance, the less is the reactivity. 1-chloro-2-methylpropane has the least steric hindrance among the given options, and thus it is the most reactive towards nucleophilic substitution reaction.

Thus, the correct answer is option (c).

Difficulty Level- Hard

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**Q2) Which of the following haloarenes can undergo nucleophilic substitution reaction?**

a) Fluorobenzene

b) Chlorobenzene

c) Bromobenzene

d) All of the above

Correct Answer: Option (d)

Explanation: Haloarenes are generally less reactive towards nucleophilic substitution reactions compared to haloalkanes. However, among the given options, all of them can undergo nucleophilic substitution reaction under suitable conditions. Bromobenzene is more reactive than chlorobenzene, and fluorobenzene is the least reactive among the given options.

Thus, the correct answer is option (d).

Difficulty Level- Medium

$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$

**Q3) The order of boiling points of the following compounds is:**

a) 1-bromobutane < 1-bromo-3-methylbutane < 1-bromo-2-methylbutane

b) 1-bromobutane > 1-bromo-3-methylbutane > 1-bromo-2-methylbutane

c) 1-bromo-2-methylbutane > 1-bromo-3-methylbutane > 1-bromobutane

d) 1-bromo-2-methylbutane < 1-bromo-3-methylbutane < 1-bromobutane

Correct Answer: Option (c)

Explanation: The boiling point of a haloalkane increases with the increase in molecular weight and branching decreases the boiling point. Among the given options, 1-bromo-2-methylbutane has the highest molecular weight and is the most branched, thus it has the highest boiling point. 1-bromo-3-methylbutane has a lower molecular weight than 1-bromo-2-methylbutane, but it is more branched than 1-bromobutane, thus it has a higher boiling point than 1-bromobutane.

Thus, the correct answer is option (c).

Difficulty Level- Medium

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**Q4) The most reactive electrophile in Friedel-Crafts alkylation is:**

a) Alkyl halides

b) Alcohols

c) Alkenes

d) Carbocations

Correct Answer: Option (d)

Explanation: In Friedel-Crafts alkylation, a carbocation is generated as an intermediate, which is highly reactive and can react with the arene to form the alkyl substituted arene. Among the given options, carbocations are the most reactive electrophiles as they have a positive charge and are thus highly electron-deficient.

Thus, the correct answer is option (d).

Difficulty Level- Easy

$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$

**Q5) Which of the following haloalkanes is optically active?**

a) 1-bromo-3-methylbutane

b) 2-bromobutane

c) 1-chloro-2,2-dimethylpropane

d) 1-bromobutane

Correct Answer: Option (a)

Explanation: A molecule is optically active if it is not superimposable on its mirror image. A molecule with a chiral carbon atom is optically active. Among the given options, 1-bromo-3-methylbutane has a chiral carbon atom and is therefore optically active.

Thus, the correct answer is option (a).

Difficulty Level- Very Hard

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**Q6) Which of the following is a haloarene?**

a) 1-chlorobutane

b) Chlorobenzene

c) 1-chloro-2-methylpropane

d) 1-chloro-3-methylbutane

Correct Answer: Option (b)

Explanation: Haloarenes are aromatic compounds that contain at least one halogen atom attached to the ring. Chlorobenzene is a haloarene as it contains a chlorine atom attached to the benzene ring.

Thus, the correct answer is option (b).

Difficulty Level- Easy

$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$

**Q7) Which of the following is not a reaction of haloalkanes?**

a) Nucleophilic substitution

b) Elimination

c) Addition

d) Electrophilic substitution

Correct Answer: Option (d)

Explanation: Haloalkanes are organic compounds that contain at least one halogen atom (fluorine, chlorine, bromine, or iodine) bonded to a carbon atom. The most common reactions of haloalkanes are nucleophilic substitution, elimination, and addition reactions. Electrophilic substitution, on the other hand, is a type of reaction that occurs with aromatic compounds, such as benzene, and involves the replacement of an atom or group in the aromatic ring by an electrophile.

Thus, the correct answer is option (d).

Difficulty Level- Medium

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**Q8) Which of the following is the most reactive towards nucleophilic substitution reaction?**

a) 1-chlorobutane

b) 1-chloro-2-methylpropane

c) 1-chloro-2,2-dimethylpropane

d) 1-chloro-3-methylbutane

Correct Answer: Option (b)

Explanation: The reactivity of a haloalkane towards nucleophilic substitution reaction depends on the steric hindrance around the carbon atom to which the halogen is attached. The more the steric hindrance, the less is the reactivity. 1-chloro-2-methylpropane has the least steric hindrance among the given options, and thus it is the most reactive towards nucleophilic substitution reaction.

Thus, the correct answer is option (b).

Difficulty Level- Hard

$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$

**Q9) Which of the following is not a haloalkane?**

a) chlorobenzene

b) ethyl chloride

c) 1,2-dichloroethane

d) 1-bromobutane

Correct Answer: Option (a)

Explanation: Chlorobenzene is not a haloalkane, but a haloarene. Haloalkanes are compounds in which a halogen is attached to an alkyl group. The haloalkanes, also known as alkyl halides, are a group of chemical compounds comprised of an alkane with one or more hydrogens replaced by a halogen atom.

Thus, the correct answer is option (a).

Difficulty Level- Easy

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**Q10) Which of the following haloalkanes will undergo nucleophilic substitution most easily?**

a) 1-chloro-4-methylpentane

b) 1-bromo-4-methylpentane

c) 1-iodo-4-methylpentane

d) 1-fluoro-4-methylpentane

Correct Answer: Option (d)

Explanation: 1-fluoro-4-methylpentane will undergo nucleophilic substitution most easily. This is because fluorine is the smallest halogen and the carbon-fluorine bond is the strongest, making it the most reactive towards nucleophilic substitution.

Thus, the correct answer is option (d).

Difficulty Level- Hard

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**Q11) Which of the following haloalkanes is optically active?**

a) 1-bromo-3-chlorocyclohexane

b) 1-chloro-2-iodobutane

c) 2-bromo-3-chloropentane

d) 1-chloro-1-phenylethane

Correct Answer: Option (d)

Explanation: 1-chloro-1-phenylethane is optically active due to the presence of a chiral carbon. A chiral carbon is a carbon atom attached to four different groups, resulting in two non-superimposable mirror images.

Thus, the correct answer is option (d).

Difficulty Level- Very Hard

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**Q13) Which of the following haloalkanes will undergo elimination most easily?**

a) 1-bromo-3-methylbutane

b) 1-chloro-4-methylpentane

c) 1-iodo-2-methylpropane

d) 1-fluoro-2-methylbutane

Correct Answer: Option (c)

Explanation: 1-iodo-2-methylpropane will undergo elimination most easily. This is because the carbon-iodine bond is the weakest and the iodide ion is a good leaving group, making it the most reactive towards elimination.

Thus, the correct answer is option (c).

Difficulty Level- Medium

$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$

**Q14) Which of the following is a primary halide?**

a) CH3CH2Br

b) CH3CH2Cl

c) (CH3)2CHCl

d) (CH3)2CHBr

Correct Answer: Option (a)

Explanation: Primary halide is a compound in which the halogen atom is attached to a primary carbon atom, which is directly attached to only one other carbon atom. In option a), the halogen atom is attached to a primary carbon atom, making it a primary halide.

Thus, the correct answer is option (a).

Difficulty Level- Easy

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**Q15) Which of the following halogen compounds undergoes the fastest SN2 reaction?**

a) CH3Br

b) CH3Cl

c) CH3I

d) CH3F

Correct Answer: Option (c)

Explanation: The rate of SN2 reaction increases with the size of the halogen atom because the size of the halogen atom determines the strength of the bond between the halogen and the carbon atom. Since iodine is the largest halogen, it has the weakest bond with the carbon atom, making it easier for the nucleophile to attack and undergo the reaction.

Thus, the correct answer is option (c).

Difficulty Level- Hard

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**Q17) Which of the following compounds undergoes nucleophilic substitution more easily?**

a) Allyl chloride

b) Vinyl chloride

c) Ethyl chloride

d) Benzyl chloride

Correct Answer: Option (d)

Explanation: Benzyl chloride contains a benzene ring, which increases the electron density on the carbon atom to which the halogen is attached. This makes it easier for the nucleophile to attack and undergo the reaction. Allyl chloride and vinyl chloride have fewer electron-donating groups, making them less reactive, and ethyl chloride is a primary halide, which is less reactive than a secondary or tertiary halide.

Thus, the correct answer is option (d).

Difficulty Level- Medium

$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$

**Q18) Which of the following reactions converts a haloalkane into an alcohol?**

a) Reduction

b) Oxidation

c) Hydrolysis

d) Dehydration

Correct Answer: Option (c)

Explanation: Hydrolysis is a reaction in which a compound reacts with water to form two or more products, one of which is usually water. In the case of a haloalkane, hydrolysis with water results in the formation of an alcohol and a halogen acid. Reduction and oxidation involve a change in the oxidation state of the compound, and dehydration involves the removal of water from the compound.

Thus, the correct answer is option (c).

Difficulty Level- Hard

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**Q20) Which of the following haloalkanes is most reactive towards nucleophilic substitution?**

a) Chloroethane

b) Bromoethane

c) Iodoethane

d) Fluoroethane

Correct Answer: Option (d)

Explanation: Fluoroalkanes are the most reactive towards nucleophilic substitution reactions because the carbon-fluorine bond is the strongest bond in organic chemistry. Due to the high bond dissociation energy of the C-F bond, it is easier to break the C-F bond, making it easier for the nucleophile to attack the carbon atom. The reactivity of haloalkanes towards nucleophilic substitution reactions follows the trend: R-F > R-Cl > R-Br > R-I.

Thus, the correct answer is option (d).

Difficulty Level- Hard

$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$

**Q21) Which of the following statements is true about haloarenes?**

a) They contain a halogen atom bonded to a carbon atom.

b) They are more reactive than haloalkanes towards nucleophilic substitution reactions.

c) They have higher boiling points than their corresponding haloalkanes.

d) They are only used as pesticides.

Correct Answer: Option (a)

Explanation: Haloarenes are organic compounds that contain at least one halogen atom (fluorine, chlorine, bromine, or iodine) bonded to an aromatic ring. They are less reactive towards nucleophilic substitution reactions than haloalkanes due to the presence of the aromatic ring, which stabilises the molecule. The boiling point of haloarenes is higher than their corresponding haloalkanes due to the presence of the aromatic ring, which increases the London dispersion forces between the molecules. Haloarenes are used as intermediates in the synthesis of many organic compounds and are also used as pesticides.

Thus, the correct answer is option (a).

Difficulty Level- Hard

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**Q22) Which of the following reactions converts haloalkanes into alcohols?**

a) Nucleophilic substitution

b) Nucleophilic addition

c) Elimination

d) Reduction

Correct Answer: Option (d)

Explanation: Haloalkanes can be converted into alcohols by reduction using reducing agents such as lithium aluminium hydride (LiAlH4) or sodium borohydride (NaBH4). In this reaction, the halogen atom is replaced by a hydrogen atom, resulting in the formation of an alcohol. Nucleophilic substitution, nucleophilic addition, and elimination reactions do not convert haloalkanes into alcohols.

Thus, the correct answer is option (d).

Difficulty Level- Hard

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**Q23) Which of the following statements is true about haloalkanes?**

a) They are more reactive than alkanes

b) They are less reactive than alkanes

c) They are insoluble in water

d) They do not undergo substitution reactions

Correct Answer: Option (a)

Explanation: Haloalkanes have a polar C-X bond, where X is a halogen atom. This bond is weaker than the C-H bond in alkanes, making it more reactive. Haloalkanes undergo substitution reactions, where the halogen atom is replaced by another atom or group of atoms.

Thus, the correct answer is option (a).

Difficulty Level- Medium

$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$

**Q24) Which of the following halogen derivatives is used as a refrigerant?**

a) Chloromethane

b) Chloroform

c) Dichloromethane

d) Freon-12

Correct Answer: Option (d)

Explanation: Freon-12 or dichlorodifluoromethane is a haloalkane that is widely used as a refrigerant. It is a stable, non-flammable, and non-toxic gas that has excellent heat transfer properties. A refrigerant is a working fluid used in the refrigeration cycle of air conditioning systems and heat pumps.

Thus, the correct answer is option (d).

Difficulty Level- Hard

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**Q25) Which of the following is the most reactive haloarene towards nucleophilic substitution?**

a) Chlorobenzene

b) Bromobenzene

c) Iodobenzene

d) Fluorobenzene

Correct Answer: Option (c)

Explanation: The reactivity of haloarenes towards nucleophilic substitution follows the order: Fluorobenzene < Chlorobenzene < Bromobenzene < Iodobenzene. This is due to the decreasing electron-withdrawing effect of the halogen atom in the order mentioned.

Thus, the correct answer is option (c).

Difficulty Level- Easy

$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$

**Q28) Which of the following is the major product of the reaction between 2-bromopropane and alcoholic KOH?**

a) Propene

b) 1-Propanol

c) 2-Propanol

d) Propanone

Correct Answer: Option (c)

Explanation: The reaction between 2-bromopropane and alcoholic KOH is an example of an elimination reaction. The major product of this reaction is 2-propanol, which is formed through the elimination of HBr.

Thus, the correct answer is option (c).

Difficulty Level- Hard

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**Q33) Which of the following is a reaction that can be used to convert a haloalkane to an alcohol?**

a) Nucleophilic substitution

b) Elimination

c) Oxidation

d) Reduction

Correct Answer: Option (a)

Explanation: Nucleophilic substitution is a reaction that can be used to convert a haloalkane to an alcohol. In this reaction, a nucleophile replaces the halogen atom. The general equation for nucleophilic substitution is:

R-X + Nu- → R-Nu + X-

where R represents the organic group, X represents the halogen, and Nu- represents the nucleophile.

Thus, the correct answer is option (a).

Difficulty Level- Medium

$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$

**Q35) Which of the following is a common solvent used for haloalkanes?**

a) Water

b) Benzene

c) Ethanol

d) Dichloromethane

Correct Answer: Option (d)

Explanation: Dichloromethane (also known as methylene chloride) is a common solvent used for haloalkanes due to its ability to dissolve organic compounds and its low boiling point. Water is not a good solvent for haloalkanes, as they are generally insoluble in water.

Thus, the correct answer is option (d).

Difficulty Level- Easy

$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$

**Q39) Which of the following reactions does not involve the formation of a new carbon-halogen bond?**

a) Dehydrohalogenation

b) Nucleophilic substitution

c) Elimination

d) Electrophilic substitution

Correct Answer: Option (c)

Explanation: Elimination reactions involve the removal of a small molecule (such as water or a halide ion) from a molecule, resulting in the formation of a double bond. These reactions do not involve the formation of a new carbon-halogen bond.

Thus, the correct answer is option (c).

Difficulty Level- Hard

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**Q41) Which of the following is an example of nucleophilic substitution?**

a) Dehydrohalogenation of 2-chloropropane

b) Addition of hydrogen bromide to propene

c) Bromination of benzene

d) Reaction of ammonia with methyl chloride

Correct Answer: Option (d)

Explanation: Nucleophilic substitution reactions involve the replacement of a leaving group (such as a halide ion) with a nucleophile (such as ammonia or hydroxide ion). In this case, the reaction of ammonia with methyl chloride is an example of nucleophilic substitution.

Thus, the correct answer is option (d).

Difficulty Level- Hard

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**Q42) Which of the following is an example of electrophilic substitution?**

a) Dehydrohalogenation of 2-chloropropane

b) Addition of hydrogen bromide to propene

c) Bromination of benzene

d) Reaction of ammonia with methyl chloride

Correct Answer: Option (c)

Explanation: Electrophilic substitution reactions involve the substitution of a hydrogen atom on an aromatic ring with an electrophile (such as a halogen or a nitro group). In this case, the bromination of benzene is an example of electrophilic substitution.

Thus, the correct answer is option (c).

Difficulty Level- Hard

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**Q43) Which of the following is not a halogen-containing compound?**

a) CHCl3

b) HClO4

c) CH3Br

d) C2H5Cl

Correct Answer: Option (b)

Explanation: Halogen-containing compounds are those compounds that contain halogen atoms, such as fluorine (F), chlorine (Cl), bromine (Br), or iodine (I). HClO4 does not contain any halogen atoms; it is a strong oxidizing agent and a powerful acid.

Thus, the correct answer is option (b).

Difficulty Level- Hard

$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$

**Q44) Which of the following is not an example of a haloalkane?**

a) CH3Cl

b) CH2Cl2

c) C6H5Cl

d) CH3OH

Correct Answer: Option (d)

Explanation: Haloalkanes are organic compounds that contain at least one halogen atom, such as fluorine (F), chlorine (Cl), bromine (Br), or iodine (I). CH3OH is not a haloalkane; it is a type of alcohol.

Thus, the correct answer is option (d).

Difficulty Level- Easy

$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$

**Q45) Which of the following is not a characteristic of haloalkanes?**

a) They have a high boiling point.

b) They are non-polar.

c) They are often used as solvents.

d) They are not reactive towards nucleophiles.

Correct Answer: Option (a)

Explanation: Haloalkanes generally have lower boiling points than alkanes due to the presence of polar halogen atoms, which cause weaker intermolecular forces. Haloalkanes are often used as solvents because of their ability to dissolve both polar and non-polar substances. They are generally less reactive towards nucleophiles compared to other organic compounds due to the electron-withdrawing effects of the halogen atoms.

Thus, the correct answer is option (d).

Difficulty Level- Medium

$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$

**Q46) Which of the following is an example of a haloarene?**

a) CH3Cl

b) C6H5Cl

c) CH2Cl2

d) C2H5Cl

Correct Answer: Option (b)

Explanation: Haloarenes are organic compounds that contain at least one halogen atom attached to an aromatic ring, such as benzene. C6H5Cl is an example of a haloarene, also known as chlorobenzene.

Thus, the correct answer is option (b).

Difficulty Level- Easy

$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$

**Q47) Which of the following is not a method of preparation of haloalkanes?**

a) Halogenation of alkanes

b) Addition of halogens to alkenes

c) Nucleophilic substitution of alcohols

d) Hydrolysis of alkenes

Correct Answer: Option (d)

Explanation: Haloalkanes can be prepared by the halogenation reaction of alkanes, the addition reaction of halogens to alkenes, and the nucleophilic substitution of alcohols. Hydrolysis of alkenes does not produce haloalkanes.

Thus, the correct answer is option (d).

Difficulty Level- Hard

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**Q48) Which of the following is not a characteristic of haloarenes?**

a) They are often used as solvents.

b) They have a lower boiling point than haloalkanes.

c) They are generally less reactive than haloalkanes.

d) They are more stable than haloalkanes.

Correct Answer: Option (b)

Explanation: Haloarenes generally have higher boiling points than haloalkanes due to the presence of the aromatic ring, which causes stronger intermolecular forces. They are often used as solvents and are generally less reactive towards nucleophiles compared to haloalkanes. Haloarenes are more stable than haloalkanes due to the resonance stabilisation of the aromatic ring.

Thus, the correct answer is option (b).

Difficulty Level- Medium

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**Q49) Which of the following statements is true about haloalkanes?**

a) They are polar compounds

b) They are highly reactive towards nucleophiles

c) They have higher boiling points than alkanes

d) They cannot undergo elimination reactions

Correct Answer: Option (c)

Explanation: Haloalkanes have higher boiling points than alkanes due to the polar nature of the carbon-halogen bond. This results in stronger intermolecular forces of attraction. Option a) is incorrect because haloalkanes are nonpolar. Option b) is incorrect because haloalkanes are less reactive towards nucleophiles than other organic compounds due to the electron-withdrawing nature of the halogen atom. Option d) is incorrect because haloalkanes can undergo elimination reactions.

Thus, the correct answer is option (c).

Difficulty Level- Medium

$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$

**Q50) Which of the following is not a method for the preparation of haloarenes?**

a) Sandmeyer's reaction

b) Gattermann reaction

c) Wurtz-Fittig reaction

d) Williamson's synthesis

Correct Answer: Option (d)

Explanation: Williamson's synthesis is a method for the preparation of ethers and does not involve the formation of haloarenes. Sandmeyer's reaction, Gattermann reaction, and Wurtz-Fittig reaction are methods for the preparation of haloarenes.

Thus, the correct answer is option (d).

Difficulty Level- Easy