

QB365 Question Bank Software

12th Chemistry CBSE Case Study Questions Haloalkanes and Haloarenes For - 2024

12th Standard

Chemistry

SECTION-A

2 x 4 = 8

1) Read the passage given below and answer the following questions:

Consider the given sequence of reactions:

The following questions are multiple choice questions. Choose the most appropriate answer:

(i) Identify w.



(ii) When X reacts with CH_3COCl in presence of anhy. AlCl_3 , the reaction is known as

(a) Fittig reaction (b) Ullmann reaction (c) Wurtz-Fittig reaction (d) Friedel-Crafts acylation reaction.

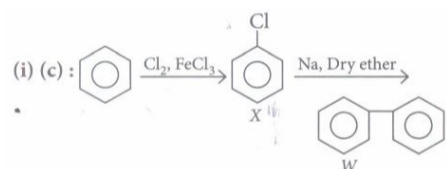
(iii) When X is treated Ni-Al / NaOH the product obtained is

(a) benzene (b) phenol (c) p-chlorophenol (d) triphenyl.

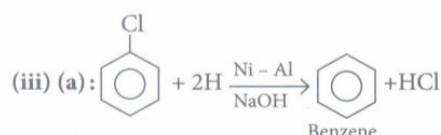
(iv) Compound Z is

(a) phenol (b) p-chlorophenol (c) p-nitrophenol (d) nitrobenzene

Answer :



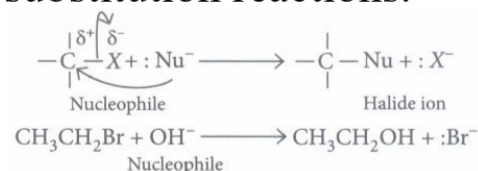
(ii) (d)



(iv) (c)

2) Read the passage given below and answer the following questions:

In haloalkanes, when a nucleophile stronger than the halide ion approaches the positively charged carbon atom of an alkyl halide, the halogen atom along with its bonding electron pair gets displaced and a new bond with the carbon and the nucleophile is formed. These reactions are called nucleophilic substitution reactions.



In these reactions the atom or group of atoms which loses its bond from carbon and takes on an additional pair of electrons is called leaving group. Halide ions are good leaving groups. Some important nucleophilic substitution reactions of haloalkanes with common nucleophiles are given in the table below.

	Reagent	Nucleophile (Nu ⁻)	Substitution product R-Nu	Class of main product
1.	NaOH or KOH or moist Ag ₂ O	-OH	ROH	Alcohol

2. H ₂ O	H ₂ O	ROH	Alcohol
3. NaI	I ⁻	R-I	Alkyl iodide
4. R'NH ₂	$R'\ddot{N}H_2$	RNHR'	Sec. amine
5. KCN	$\overline{C} \equiv N :$	RCN	Nitrile (cyanide)
6. KNO ₂	O=N-O ⁻	R-O-N=O	Alkyl nitrite

In these questions (i-iv), a statement of assertion followed by a statement of reason is given.

Choose the correct answer out of the following choices.

- (a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
 (b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
 (c) Assertion is correct statement but reason' is wrong statement.
 (d) Assertion is wrong statement but reason is correct statement.

(i) Assertion: Alkyl halides are hydrolysed to alcohols by moist silver oxide.

Reason: RCl is hydrolysed to ROH easily but reactions slow down on addition of KI.

(ii) Assertion : Alkyl halides form alkenes when heated above 300°C.

Reason: CH₃CH₂I reacts slowly with strong base as compared to CD₃CH₂I.

(iii) Assertion : RBr reacts with AgNO₂ to give nitro alkane.

Reason: Silver nitrite (AgNO₂) is an ionic compound, therefore the negative charge on nitrogen is the attacking site.

(iv) Assertion: The nucleophilic substitution of vinyl chloride is difficult than ethyl chloride.

Reason: Vinyl group is electron donating group.

Answer : (i) (c) : KI reacts with RCl to form RI. This RI molecule now hydrolysed easily to give ROH because alkyl iodide are more reactive than alkyl chloride. Thus, reaction becomes faster on addition of KI.

(ii) (c): CH₃CH₂I reacts more rapidly with strong base in comparison to CD₃CH₂I. The elimination of HI (or DI) in presence of strong base shows E₂ elimination. The rate determining step involves the breaking up of C - H (or C - D) bond. The C - D bond being stronger than C - H bond is difficult to break.

(iii) (c) : Silver nitrite is a covalent compound and the bond between Ag - O is covalent. Therefore, it does not have a negative charge on the oxygen atom. Hence, the nucleophilic attack occurs through the lone pair on nitrogen forming nitro alkanes (R - NO₂).

(iv) (c): The carbon-halogen bond in vinyl halides has some double bond character and hence little difficult to break.