Chemistry Worksheets Class 12 on Chapter 10 Haloalkanes and Haloarenes with Answers - Set 2

Q1. A Grignard reagent can be prepared by reacting magnesium with
(a) Methylamine
(b) Diethyl ether
(c) Ethyl iodide
(d) None of the above

Answer:

(c) A Grignard reagent can be prepared by reacting magnesium with ethyl iodide.

Q2. The reactivity order of halide ion in alkyl halide is
(a) F > Cl > Br > I
(b) Cl > F > Br > I
(c) I > Br > Cl > F
(d) Br > I > Cl > F

Answer:

(c) The reactivity order of halide ion in alkyl halide is I > Br > Cl > F.

Q3. Non-sticking fry pans are coated with
(a) Tetra fluoro ethylene (Teflon)
(b) Chloro fluoro methane
(c) Ethylene
(d) None of the above

Answer:

(a) Non-sticking fry pans are coated with tetra fluoro ethylene (Teflon).

Q4. Choose the correct statement about alkyl halide
(a) They show hydrogen bonding.
(b) They are soluble in water.
(c) They are soluble in organic solvents.
(d) They do not contain any polar bonds.

Answer:

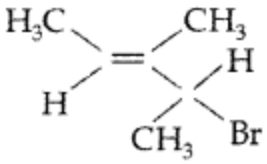
(c) Alkyl halides are soluble in organic solvents.

Q5. 20% aqueous solution of sodium chloride containing ethyl alcohol on electrolysis gives
(a) Ethyl chloride
(b) Chloral
(c) Chloroform
(d) None of the above

Answer:

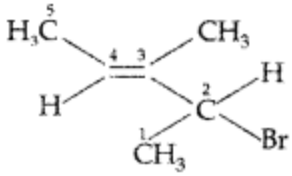
(c) 20% aqueous solution of sodium chloride containing ethyl alcohol on electrolysis gives chloroform.

Q6. Write the IUPAC name of the following compound.



Answer:

The IUPAC name of the above compound is 2 - Bromo - 3 - methyl pent - 3 - ene.



Q7. Write any chemical test that is used to distinguish between C_2H_5Br and C_6H_5Br.

Answer:

We can differentiate between C_2H_5Br and C_6H_5Br by heating them with aqueous sodium hydroxide. Ethyl bromide reacts with aqueous sodium hydroxide to give ethanol and sodium bromide. Sodium bromide reacts with silver nitrate to produce a yellow precipitate of silver bromide.

$C_2H_5Br + NaOH \rightarrow C_2H_5OH + NaBr$

$NaBr + AgNO_3 \rightarrow AgBr + NaNO_3$

In contrast, bromobenzene does not react with aqueous sodium hydroxide.

$C_6H_5Br + NaOH \rightarrow$ No reaction

Q8. What happens when methyl bromide reacts with potassium cyanide?

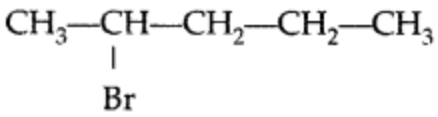
Answer:

Methyl bromide reacts with potassium cyanide to give a double displacement reaction.
$CH_3Br + KCN \rightarrow CH_3CN + KBr$

Q9. Draw the structure of Bromo pentane.

Answer:

The structure of Bromo pentane is drawn below.



Q10. How will you convert benzyl chloride to benzyl alcohol?

Answer:

We can convert benzyl chloride to benzyl alcohol by hydrolysing it with aqueous potassium hydroxide.
$C_6H_5CH_2Cl_2 + Aq\ KOH \rightarrow C_6H_5CH_2OH + KCl$

Q11. Why do haloalkanes undergo nucleophilic substitutions, whereas haloarenes undergo electrophilic substitutions?

Answer:

Haloalkanes are more polar than haloarenes. Thus, the carbon atom carrying halogen in haloalkane is more electron deficient than in haloarenes. As a result, haloalkane undergoes nucleophilic substitution more readily than haloarenes.
In contrast, haloarenes contain a benzene ring. Since the typical reaction of benzene is an electrophilic substitution thus, haloarenes undergo electrophilic substitution quickly.

Q12. How will you differentiate an S_N^1 reaction from an S_N^2 reaction?

Answer:

S. No.	S_N^1 reaction	S_N^2 reaction

1.	**It is a unimolecular reaction.**	**It is a bimolecular reaction.**
2.	**The order of stability of the carbocation is $3^o > 2^o > 1^o$.**	**The order of stability of the carbocation is $1^o > 2^o > 3^o$.**
3.	**It is favourable in the polar protic solvent.**	**It is favourable in the apolar protic solvent.**
4.	**It is independent of the strength of the nucleophile.**	**It is dependent on the strength of the nucleophile.**
5.	**During the S_N1 reaction, a mixture of retention and inversion is formed.**	**During the S_N2 reaction, an inversion product is formed.**

Q13. Why is haloalkane insoluble in water?

Answer:

Haloalkane is insoluble in water because the energy required to overcome the attraction between the haloalkane molecules and break the hydrogen bonds between water molecules to dissolve a haloalkane in water is significant. New attractions between the haloalkane and the water molecules release less energy since they are weaker than the initial hydrogen bonds in water leading to the insolubility of haloalkanes in water.

Q14. Why does allyl chloride gets hydrolysed readily and n-propyl chloride doesn't?

Answer:

Allyl chloride has a high reactivity because the carbocation generated by the hydrolysis of allyl chloride is stabilised by resonance. In contrast, the carbocation formed by the n-propyl chloride has no stabilisation. Moreover, n-propyl chloride does not undergo ionisation to form an n-propyl carbocation. Thus, allyl chloride is more readily hydrolysed than n-propyl chloride.

Q15. What is wurtz- fittig reaction?

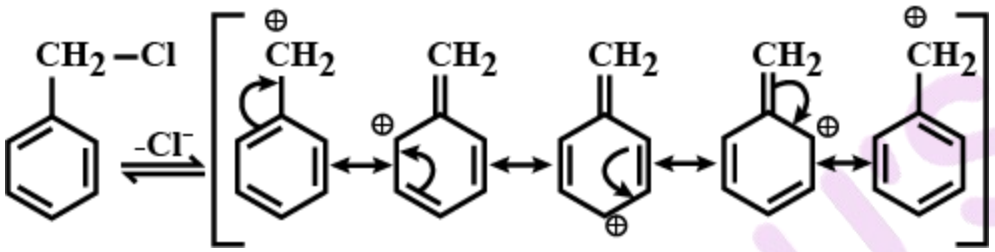
Answer:

Wurtz-Fittig reaction is a coupling reaction between an aryl halide and an alkyl halide in the presence of sodium metal and dry ether to form alkylbenzene.
Example: Bromobenzene reacts with methyl bromide in the presence of sodium metal and dry ether to form toluene.
$C_6H_5Br + CH_3Br$ 2 Na + Dry Ether $\rightarrow C_6H_5 - CH_3 + 2$ NaBr

Q16. Why is benzyl chloride highly reactive toward the S_N^1 reaction?

Answer:

Benzyl chloride is highly reactive toward the SN1 reaction because the intermediate benzyl carbocation formed in the slowest step is stabilised through resonance.



Q17. What is an enantiomer?

Answer:

Enantiomers are stereoisomers having non-superimposable mirror images. They have proximate melting and boiling points and can be distinguished by passing plane polarised light on them. Based on their absolute configuration, we can classify them as "left-handed" and "right-handed".
Example: d - Lactic acid and l - Lactic acid.

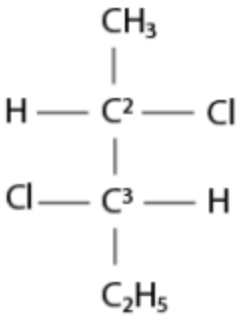
(+) ***d***-lactic acid
(I)

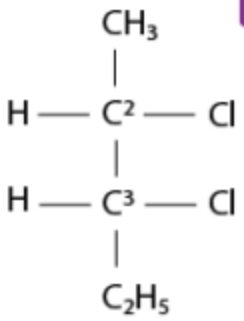
(-) ***l***-lactic acid
(II)

Q18. What is a diastereomer?

Answer:

Diastereomers are stereoisomers having non-superimposable non-mirror images. They have distinct melting and boiling points.





Q19. Why are pentahalides more covalent than trihalides?

Answer:

The oxidation state of + 5 in pentahalides is more than the + 3 oxidation state in trihalides. Due to the higher positive oxidation state of the central atom in the pentahalide state, these atoms will have more considerable polarising power than the halogen atom attached to them.
But in the case of trihalides, due to the + 3 oxidation state, the central atom will polarise the halogen atom to a lesser extent than the pentahalide state.
Hence, Due to the more significant polarisation of bonds in pentahalides than in the trihalide state, the pentahalides are more covalent than trihalides.

Q20. What will happen if
(i) Ethyl bromide reacts with silver nitrate solution.
(ii) Methyl bromide reacts with sodium metal in the presence of dry ether.
(iii) Ethyl bromide reacts with sodium ethoxide.
(iv) Ethyl bromide reacts with magnesium metal.

Answer:

(i) Ethyl bromide reacts with silver nitrate solution.
$C_2H_5Br + AgNO_2 \longrightarrow C_2H_5NO_2 + AgBr$
(ii) Methyl bromide reacts with sodium metal in the presence of dry ether.
$CH_3Br + 2\ Na + CH_3Br + \text{Dry Ether} \longrightarrow CH_3{-}CH_3 + 2\ NaBr$
(iii) Ethyl bromide reacts with sodium ethoxide.
$C_2H_5Br + C_2H_5ONa \longrightarrow C_2H_5{-}O{-}C_2H_5 + NaBr$
(iv) Ethyl bromide reacts with magnesium metal.
$C_2H_5Br + Mg \longrightarrow C_2H_5MgBr$