QUIZIZZ Worksheets

Name

Exploring Haloalkanes and Haloarenes

Total questions: 20

Worksheet time: 10mins

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Class

Date

1. What is the IUPAC name for CH3CH2Cl?

a) ethyl chloride

b) 1-chloroethane

c) chloroethanol

d) 1-chloropropane

2. How do you name a haloalkane with a branched chain?

a) Ignore halo groups when naming

b) Count all carbon atoms in the molecule

c) Use only the longest branch for naming

d) Identify the longest chain, number it, name halo groups and branches, combine into a single name.

3. What type of reaction do haloalkanes typically undergo with nucleophiles?

a) Nucleophilic substitution

b) Elimination reaction

c) Radical substitution

d) Electrophilic addition

4. What is the mechanism of nucleophilic substitution in haloalkanes?

a) Nucleophilic substitution only occurs via the E1 mechanism.
b) Haloalkanes undergo elimination reactions exclusively.
c) Nucleophilic substitution in haloalkanes occurs via SN1 and SN2 mechanisms.
d) Nucleophilic substitution is a photochemical process.

5. Which haloalkane is most reactive in nucleophilic substitution reactions?

a) Alkyl halides
b) Tertiary haloalkanes
c) Secondary haloalkanes
d) Primary haloalkanes

6. What is the effect of the carbon chain length on the boiling point of haloalkanes?

a) The boiling point of haloalkanes is unaffected by carbon chain length.
b) The boiling point of haloalkanes remains constant regardless of carbon chain length.
c) The boiling point of haloalkanes decreases with increasing carbon chain length.
d) The boiling point of haloalkanes increases with increasing carbon chain length.

7. What is the primary product when 1-bromopropane reacts with sodium hydroxide?

a) propanol
b) propane
c) sodium bromide
d) 1-bromopropane

8. How does the presence of halogens affect the acidity of haloarenes?

a) Halogens decrease the acidity of haloarenes by destabilizing the conjugate base.

b) Halogens have no effect on the acidity of haloarenes.

c) Halogens increase the acidity of haloarenes by stabilizing the conjugate base.

d) Halogens increase the acidity of haloarenes by forming stronger bonds with hydrogen.

9. What is the main characteristic of electrophilic aromatic substitution?

a) The addition of a nucleophile to an aromatic ring.

b) The removal of an electrophile from an aromatic compound.

c) The substitution of a hydrogen atom on an aromatic ring with an electrophile.

d) The rearrangement of the aromatic ring structure.

10. Which reagent is commonly used in electrophilic aromatic substitution reactions?

a) Reducing agents like lithium aluminum hydride ($LiAlH_4$)

b) Electrophiles such as bromine (Br_2) with a Lewis acid catalyst.

c) Oxidizing agents such as potassium permanganate ($KMnO_4$)

d) Nucleophiles like sodium hydroxide (NaOH)

11. What is the role of a catalyst in electrophilic aromatic substitution?

a) A catalyst increases the reactivity of the electrophile in electrophilic aromatic substitution.
b) A catalyst is not necessary for electrophilic aromatic substitution.
c) A catalyst decreases the stability of the aromatic ring.
d) A catalyst acts as a nucleophile in the reaction.

12. How do haloarenes differ from haloalkanes in terms of reactivity?

a) Haloarenes are more reactive than haloalkanes.
b) Haloarenes react only with nucleophiles.
c) Haloalkanes are less stable than haloarenes.
d) Haloarenes are less reactive than haloalkanes.

13. What is the significance of ortho and para positions in haloarenes?

a) The ortho and para positions are only relevant in aliphatic compounds.
b) The ortho and para positions are less reactive due to steric hindrance.
c) The ortho and para positions in haloarenes are more reactive for electrophilic substitution due to stabilization of the carbocation intermediate.
d) Electrophilic substitution is favored at the meta position in haloarenes.

14. What is a common application of haloalkanes in the pharmaceutical industry?

a) Synthesis of pharmaceuticals
b) Solvent for chemical reactions
c) Fuel for combustion engines
d) Preservative in food products

15. How are haloalkanes used in refrigeration?

a) Haloalkanes are primarily used as fuels in engines.
b) Haloalkanes are used as solvents in paint.
c) Haloalkanes are utilized in the production of plastics.
d) Haloalkanes are used as refrigerants in refrigeration systems.

16. What is the environmental impact of using haloalkanes?

a) Haloalkanes have negative environmental impacts, including ozone depletion, bioaccumulation, and greenhouse gas emissions.
b) Haloalkanes have no significant impact on climate change.
c) Haloalkanes promote biodiversity and ecosystem health.
d) Haloalkanes are used to enhance air quality.

17. What is the difference between primary, secondary, and tertiary haloalkanes?

a) Tertiary haloalkanes have one carbon attached to the halogen.
b) Primary haloalkanes have two carbons attached to the halogen.
c) Secondary haloalkanes have three carbons attached to the halogen.
d) Primary haloalkanes have one carbon attached to the halogen, secondary have two, and tertiary have three.

18. What is the expected product when chlorobenzene undergoes nitration?

a) Chloronitrobenzene
b) Ortho-nitrochlorobenzene and para-nitrochlorobenzene
c) Benzene
d) Nitrobenzene

19. How do you determine the stability of carbocations formed during nucleophilic substitution?

a) The presence of halogens increases carbocation stability.
b) The stability is solely based on the molecular weight of the carbocation.
c) The stability of carbocations is determined by hybridization, substituent effects, resonance, and steric factors.
d) Carbocation stability is determined by the temperature of the reaction.

20. What is the effect of solvent on the rate of nucleophilic substitution reactions?

a) The solvent affects the rate of nucleophilic substitution reactions by stabilizing reactants and transition states, influencing nucleophilicity.
b) Polar protic solvents always increase the reaction rate.
c) Nucleophilicity is solely determined by the substrate.
d) The solvent has no effect on the reaction rate.

Answer Keys

1. b) 1-chloroethane
2. d) Identify the longest chain, number it, name halo groups and branches, combine into a single name.
3. a) Nucleophilic substitution
4. c) Nucleophilic substitution in haloalkanes occurs via SN1 and SN2 mechanisms.
5. b) Tertiary haloalkanes
6. d) The boiling point of haloalkanes increases with increasing carbon chain length.
7. a) propanol
8. c) Halogens increase the acidity of haloarenes by stabilizing the conjugate base.
9. c) The substitution of a hydrogen atom on an aromatic ring with an electrophile.
10. b) Electrophiles such as bromine (Br2) with a Lewis acid catalyst.
11. a) A catalyst increases the reactivity of the electrophile in electrophilic aromatic substitution.
12. d) Haloarenes are less reactive than haloalkanes.

13. c) The ortho and para positions in haloarenes are more reactive for electrophilic substitution due to stabilization of the carbocation intermediate.

14. a) Synthesis of pharmaceuticals

15. d) Haloalkanes are used as refrigerants in refrigeration systems.

16. a) Haloalkanes have negative environmental impacts, including ozone depletion, bioaccumulation, and greenhouse gas emissions.

17. d) Primary haloalkanes have one carbon attached to the halogen, secondary have two, and tertiary have three.

18. b) Ortho-nitrochlorobenzene and para-nitrochlorobenzene

19. c) The stability of carbocations is determined by hybridization, substituent effects, resonance, and steric factors.

20. a) The solvent affects the rate of nucleophilic substitution reactions by stabilizing reactants and transition states, influencing nucleophilicity.