

Indian School Muscat

Chemistry IIT - JEE

HALOALKANES AND HALOARENES

- Which one of the following is not formed when a mixture of methyl bromide and bromobenzene is heated with sodium metal in the presence of dry ether?
 - Diphenyl
 - Propane
 - Toluene
 - Ethane
- Number of monochloro derivatives obtained when *neo*-pentane is chlorinated, is
 - one
 - two
 - three
 - four
- In S_N2 reactions, the correct order of reactivity for the following compounds CH_3Cl , CH_3CH_2Cl , $(CH_3)_2CHCl$ and $(CH_3)_3CCl$ is
 - $CH_3Cl > (CH_3)_2CHCl > CH_3CH_2Cl > (CH_3)_3CCl$
 - $CH_3Cl > CH_3CH_2Cl > (CH_3)_2CHCl > (CH_3)_3CCl$
 - $CH_3CH_2Cl > CH_3Cl > (CH_3)_2CHCl > (CH_3)_3CCl$
 - $(CH_3)_2CHCl > CH_3CH_2Cl > CH_3Cl > (CH_3)_3CCl$
- Which reagents would you use to carry out the reaction Ethyl benzene \rightarrow 2 and 4-chloro-1-ethyl benzene?
 - Cl_2 , light and heat
 - Cl_2 , $FeCl_3$
 - $SOCl_2$
 - C_2H_5Cl , $AlCl_3$
- An incorrect statement with respect to S_N1 and S_N2 mechanisms of alkyl halide is
 - A strong nucleophile in an aprotic solvent increases the rate or favors S_N2 reaction
 - competing reaction for a S_N2 reaction is rearrangement
 - S_N1 reactions can be catalyzed by some Lewis acids
 - a weak nucleophile and aprotic solvent increase the rate of favors S_N1 reaction
- Anti-Markownikoff's addition of HBr is observed in
 - propane
 - but-2-ene

- C. pent-2-ene
D. All of the above
7. Ethyl iodide when heated with sodium in dry ether gives pure
A. C₄H₁₀
B. C₂H₆
C. C₃H₈
D. C₂H₅OH
8. The product of reaction between alcoholic silver nitrite with ethyl bromide is
A. ethene
B. ethane
C. ethyl nitrile
D. nitro ethane
9. Which halide does not get hydrolyzed by sodium hydroxide?
A. vinyl chloride
B. methyl chloride
C. ethyl chloride
D. *iso*-propyl chloride
10. Following is the substitution reaction in which -CN replaces -Cl

$$R-Cl + KCN \xrightarrow{\Delta} R-CN + KCl$$
 To obtain propane nitrile, R-Cl should be
A. chloroethane
B. 1-chloropropane
C. chloromethane
D. 2-chloropropane
11. Which of the following is not true for the hydrolysis of *t*-butyl bromide with aqueous NaOH?
A. Reaction occurs through the S_N1 mechanism
B. The intermediate formed is a carbocation
C. Rate of the reaction doubles when the concentration of alkali is doubled
D. Rate of the reaction doubles when the concentration of *t*-butyl bromide is doubled
12. Which one of the following forms propane nitrile as the major product?
A. Ethyl bromide + alcoholic KCN
B. Propyl bromide + alcoholic KCN
C. Propyl bromide + alcoholic AgCN
D. Ethyl bromide + alcoholic AgCN
13. Grignard reagent is not prepared in aqueous medium but prepared in ether medium, because
A. the reagent is highly reactive in ether
B. the reagent does not react with water

- C. the reagent becomes inactive in water
 - D. the reagent reacts with water
14. Which of the following compounds has the highest boiling point?
- A. $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}$
 - B. $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{Cl}$
 - C. $\text{CH}_3\text{CH}(\text{CH}_3)\text{CH}_2\text{Cl}$
 - D. $(\text{CH}_3)_3\text{CCl}$
15. The organic chloro compound, which shows complete stereochemical inversion during an $\text{S}_{\text{N}}2$ reaction is
- A. $(\text{C}_2\text{H}_5)_2\text{CHCl}$
 - B. $(\text{CH}_3)_3\text{CCl}$
 - C. $(\text{CH}_3)_2\text{CHCl}$
 - D. CH_3Cl
16. *t*-butyl chloride preferably undergo hydrolysis by
- A. $\text{S}_{\text{N}}1$ mechanism
 - B. $\text{S}_{\text{N}}2$ mechanism
 - C. Any of (a) and (b)
 - D. None of the above
17. Alkyl halides are less soluble in water because
- A. they ionize in water
 - B. they do not form H-bonds with water
 - C. they are highly viscous
 - D. they have very strong C-X bond
18. An alkyl halide reacts with alcoholic ammonia in a sealed tube, the product formed will be
- A. a primary amine
 - B. a secondary amine
 - C. a tertiary amine
 - D. All of the above
19. Maximum number of molecules of CH_3I that can react with a molecule of CH_3NH_2 are
- A. 3
 - B. 4
 - C. 2
 - D. 1
20. In a group of isomeric alkyl halides, the order of boiling point is
- A. primary < secondary < tertiary
 - B. primary > secondary < tertiary
 - C. primary < secondary > tertiary
 - D. primary > secondary > tertiary

21. Reaction of *trans*-2-phenyl-1-bromo cyclopentane on reaction with alcoholic KOH produces
- 4-phenyl cyclopentene
 - 2-phenyl cyclopentene
 - 1-phenyl cyclopentene
 - 3-phenyl cyclopentene
22. $RX + A \rightarrow RNC$, A is
- AgCN
 - KCN
 - NaCN
 - HCN
23. Which of the following statements regarding the S_N1 reaction shown by alkyl halide is not correct?
- The added nucleophile plays no kinetic role in S_N1 reaction
 - The S_N1 reaction involves the inversion of configuration of the optically active substrate
 - The S_N1 reaction on the chiral starting material ends up with racemization of the product
 - The more stable the carbocation intermediate the faster the S_N1 reaction
 - Polar protic solvent increases the rate of S_N1 reaction
24. On treating a mixture of two alkyl halides with sodium metal in dry ether, 2-methyl propane was obtained. The alkyl halides are
- 2-chloropropane and chloromethane
 - 2-chloropropane and chloroethane
 - chloromethane and chloroethane
 - chloromethane and 1-chloropropane
25. $CH_3Br + OH^- \rightarrow CH_3OH + Br^-$ reaction proceeds by S_N2 mechanism. Its rate is dependent on the concentration of
- CH_3Br, OH^-
 - Only CH_3Br
 - Only OH^-
 - CH_3Br, CH_3OH
26. Tertiary alkyl halides are practically inert to substitution by S_N2 mechanism because of
- steric hinderance
 - inductive effect
 - instability
 - insolubility
27. Elimination of bromine from 2-bromobutane results in the formation of

- A. predominantly 2-butyne
 - B. predominantly 1-butene
 - C. predominantly 2-butene
 - D. equimolar mixture of 1 and 2-butene
28. Ethyl chloride on heating with AgCN forms a compound X. The functional isomer of X is
- A. C_2H_5NC
 - B. $C_2H_5NH_2$
 - C. C_2H_5CN
 - D. None of these
29. Compound 'A' reacts with alcoholic KOH to yield compound 'B', which on ozonolysis followed by reaction with Zn/H₂O gives methanol and propanal. Compound 'A' is
- A. 1-propanol
 - B. 1-butanol
 - C. 1-chlorobutane
 - D. 1-chloropentane
30. The order of reactivities of methyl halides in the formation of Grignard reagent is
- A. $CH_3I > CH_3Br > CH_3Cl$
 - B. $CH_3Cl > CH_3Br > CH_3I$
 - C. $CH_3Br > CH_3Cl > CH_3I$
 - D. $CH_3Br > CH_3I > CH_3Cl$
31. Which of the following that cannot undergo dehydrohalogenation is
- A. *iso*-propyl bromide
 - B. ethanol
 - C. ethyl bromide
 - D. None of these
32. An equimolar mixture of toluene and chlorobenzene is treated with a mixture of conc. H₂SO₄ and conc. HNO₃. Indicate the correct statement from the following
- A. p-nitrotoluene is formed in excess
 - B. equimolar amounts of p-nitrotoluene and p-nitrochlorobenzene are formed
 - C. p-nitrochlorobenzene is formed in excess
 - D. m-nitrochlorobenzene is formed in excess
33. Four compounds, toluene (I), *o*-dichlorobenzene (II), *m*-dichlorobenzene (III) and *p*-dichlorobenzene (IV) are arranged in order of increasing dipole moment. The correct order is
- A. $IV < I < III < II$

- B. I < II < III < IV
C. II < IV < III < I
D. IV < III < II < I
34. In the preparation of chlorobenzene from aniline, the most suitable reagent is
A. chlorine in the presence of ultraviolet light
B. chlorine in the presence of AlCl₃
C. nitrous acid followed by heating with Cu₂Cl₂
D. HCl and Cu₂Cl₂
35. Among the following which one has weakest carbon-halogen bond?
A. Benzyl bromide
B. Bromobenzene
C. Vinyl bromide
D. Benzyl chloride
36. The reaction of toluene with Cl₂ in presence of FeCl₃ gives predominantly
A. benzoyl chloride
B. benzyl chloride
C. *p*-chlorotoluene
D. *m*-chloroethane
37. Decomposition of benzene diazonium chloride by using Cu₂Cl₂/HCl to form chlorobenzene is
A. Raschig reaction
B. Sandmeyer's reaction
C. Kolbe's reaction
D. Cannizzaro's reaction
38. Fluorobenzene (C₆H₅F) can be synthesized in the laboratory
A. by heating phenol with HF and KF
B. from aniline by diazotization followed by heating the diazonium salt with HBF₄
C. by direct fluorination of benzene with F₂ gas
D. by reacting bromobenzene with NaF solution
39. *p*-nitrobromobenzene can be converted to *p*-nitroaniline by using NaNH₂. The reaction proceeds through the intermediate named
A. carboncation
B. carbanion
C. benzyne
D. dianion
40. Chlorination of toluene in the presence of light and heat followed by treatment with aqueous NaOH gives
A. *o*-cresol
B. *p*-cresol

- C. mixture of *o*-cresol and *p*-cresol
 - D. benzoic acid
 - E. 1,3,5-trihydroxy toluene
41. For the preparation of *p*-nitroiodobenzene from *p*-nitroaniline, the best method is
- A. NaNO_2/HCl followed by KI
 - B. NaNO_2/HCl followed by CuCN
 - C. LiAlH_4 followed by I_2
 - D. NaBH_4 followed by I_2
42. Reaction of alkyl halides with aromatic compounds in presence of anhy. AlCl_3 is known as
- A. Friedel-Craft reaction
 - B. Hofmann degradation
 - C. Kolbe's synthesis
 - D. Beckmann rearrangement
43. Which of the following compounds is not formed in iodoform reaction of acetone?
- A. $\text{CH}_3\text{COCH}_2\text{I}$
 - B. $\text{ICH}_2\text{COCH}_2\text{I}$
 - C. $\text{CH}_3\text{COCHI}_2$
 - D. CH_3COCI_3
44. When chloroform is treated with chlorine in the presence of sunlight, it yields
- A. urotropin
 - B. pyrene
 - C. chloropicrin
 - D. chloritone
45. Which of the following does not answer iodoform test?
- A. *n*-butyl alcohol
 - B. Acetophenone
 - C. Acetaldehyde
 - D. Ethylmethyl ketone
46. On warming with silver powder, chloroform is converted into
- A. acetylene
 - B. hexachloroethane
 - C. 1,1,2,2-tetrachloroethane
 - D. ethylene
47. Which of the following will not respond to iodoform test?
- A. Ethyl alcohol
 - B. Propan-2-ol

- C. Propan-1-ol
 - D. Ethanal
48. What happens if CCl_4 is treated with AgNO_3 ?
- A. A white ppt of AgCl will form
 - B. NO_2 will be evolved
 - C. CCl_4 will dissolve in AgNO_3
 - D. Nothing will happen
49. Chloroform gives trichloro derivative of an alcohol on reaction with
- A. concentrated nitric acid
 - B. aqueous alkali
 - C. acetone and alkali
 - D. a primary amine and an alkali
50. Which one of the following will not form a yellow precipitate on heating with an alkaline solution of iodine?
- A. $\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$
 - B. $\text{CH}_3\text{CH}_2\text{CH}(\text{OH})\text{CH}_3$
 - C. CH_3OH
 - D. $\text{CH}_3\text{CH}_2\text{OH}$