Quiz: ARINES 1

Q1: What is the general formula of a haloarene?

A) CnH2n+2X
B) Ar-X
C) CnH2nX
D) CnH2n-2X

Q2: Which hybridisation does the carbon to which halogen is bonded in haloarenes have?

A) sp
B) sp2
C) sp3
D) sp3d

Q3: Why are haloarenes less reactive towards SN1 and SN2 substitution than haloalkanes?

A) Better leaving group
B) Resonance stabilisation of C-X bond
C) Lower polarity
D) Higher boiling point

Q4: Which reagent converts diazonium salt to an aryl chloride?

A) NaBH4
B) CuCl (Sandmeyer)
C) LiAlH4
D) H2/Pd

Q5: Which reaction introduces fluorine into an aromatic ring from diazonium salt?

A) Sandmeyer
B) Finkelstein
C) Balz-Schiemann
D) Cannizzaro

Q6: Halogenation of benzene is an example of:

A) SN2
B) Electrophilic aromatic substitution
C) Free-radical substitution
D) Nucleophilic addition

Q7: Which catalyst is commonly used for chlorination of benzene?

A) FeCl3
B) AlCl3
C) Both FeCl3 and AlCl3
D) NaOH

Q8: Chlorobenzene reacts with hot aqueous KOH to give:

A) Phenol
B) Aniline
C) Benzaldehyde

D) Benzoic acid

Q9: In electrophilic aromatic substitution, chlorine on the ring directs new substitution to which positions?

A) Ortho, para
B) Meta
C) Only para
D) Only meta

Q10: Which reaction converts benzene diazonium chloride to benzene?

A) Sandmeyer
B) Reduction with hypophosphorous acid
C) Finkelstein
D) Wurtz

Q11: Which reaction involves replacement of a halide by a nitro group on an aromatic ring?

A) Electrophilic nitration
B) Nucleophilic aromatic substitution
C) Finkelstein
D) Wurtz

Q12: Why does chlorobenzene not undergo simple SN2 substitution?

A) Strong C-Cl bond
B) Resonance stabilization
C) High activation energy
D) All of the above

Q13: Which of the following is an aryl halide?

A) C6H5Br
B) CH3CH2Br
C) CH2Br2
D) C6H5CH2Cl

Q14: The Finkelstein reaction is primarily used to:

A) Convert aryl halides to alcohols
B) Exchange halogens in alkyl halides
C) Nitrate benzene
D) Form Grignard reagents

Q15: Aryl halides typically show which reactivity in electrophilic substitution?

A) Activate benzene ring significantly
B) Deactivate ring but direct ortho/para
C) Meta directing and deactivating
D) No reaction

Q16: Which of the following will undergo nucleophilic aromatic substitution most easily?

A) Chlorobenzene
B) 2,4-Dinitrochlorobenzene
C) Bromobenzene

D) Fluorobenzene

Q17: Which reagent forms aryl iodides from diazonium salts?

A) CuI
B) CuCl
C) CuBr
D) HCl

Q18: In electrophilic aromatic substitution, which orientation does a nitro group direct?

A) ortho/para
B) meta
C) para only
D) none

Q19: Which halogenation occurs via electrophilic aromatic substitution without requiring diazonium intermediates?

A) Bromination of benzene
B) Finkelstein
C) Sandmeyer
D) Balz-Schiemann

Q20: Which reaction sequence converts aniline to chlorobenzene?

A) Diazotisation, then Sandmeyer with CuCl
B) Nitration then reduction
C) Finkelstein
D) Cannizzaro

Q21: Which of the following is a *deactivating group* in electrophilic aromatic substitution?

A) -OH
B) -NO2
C) -NH2
D) -OCH3

Q22: The carbon-halogen bond in haloarenes is usually:

A) weaker than in haloalkanes
B) stronger than in haloalkanes
C) the same strength
D) not present

Q23: Which mechanism is *not common* for haloarenes under normal conditions?

A) SN1
B) SN2
C) Electrophilic aromatic substitution
D) Sandmeyer

Q24: Which reaction forms aryl bromides from diazonium salts?

A) Sandmeyer with CuBr
B) Balz-Schiemann
C) Finkelstein

D) Wurtz

Q25: Which of these does *not* easily undergo benzyne mechanism?

A) Fluorobenzene
B) 2-Chloronitrobenzene
C) Chlorobenzene with strong base
D) Bromobenzene with NaNH2

Q26: Which reagent introduces cyanide on aromatic ring via diazonium salt?

A) CuCN
B) NaCN only, no catalyst
C) HCl
D) Zn

Q27: Which of the following halogen substituents is *ortho/para directing* on benzene?

A) Cl
B) NO2
C) CN
D) SO3H

Q28: Aryl diazonium salts are typically formed from:

A) Anilines with nitrous acid
B) Arenes with HNO3
C) Phenols with HCl
D) Alkyl halides with NaNO2

Q29: Which of the following is used to create aryl fluorides from diazonium salts?

A) CuF
B) BF4- thermal decomposition
C) NaF in water
D) H2F2

Q30: Which aromatic substitution avoids reformation of aromaticity directly?

A) Electrophilic aromatic substitution
B) Nucleophilic aromatic substitution
C) Radical substitution
D) All of the above

Q31: In the Sandmeyer reaction, what role does the copper(I) salt play?

A) Leaving group
B) Catalyst for substitution
C) Base
D) Oxidising agent

Q32: Which process would not normally occur with an aryl halide?

A) Free radical addition across double bonds
B) Electrophilic substitution
C) Substitution via benzyne
D) Sandmeyer conversion

Q33: Nucleophilic aromatic substitution is more likely if the ring has strong electron withdrawing groups at:

A) ortho/para positions
B) meta only
C) any position
D) no substituents

Q34: The Finkelstein reaction is best for which type of halides?

A) Aryl halides
B) Alkyl halides
C) Vinyl halides
D) None

Q35: Which type of aromatic substitution involves formation of arenium ion intermediate?

A) Electrophilic aromatic substitution
B) SN2
C) SN1
D) Free radical substitution

Q36: Which is true about leaving group ability in nucleophilic aromatic substitution?

A) Iodide always best
B) Fluoride often best if EWG present
C) Chloride always best
D) No leaving group effects

Q37: Which of these processes is used to make aryl halides from benzene directly?

A) Electrophilic aromatic halogenation
B) Sandmeyer
C) Finkelstein
D) Cannizzaro

Q38: In electrophilic aromatic substitution, a deactivating substituent typically:

A) Increases rate
B) Decreases rate
C) No effect
D) Reverses direction

Q39: Which reagent is commonly used to halogenate benzene?

A) Br2/FeBr3
B) HCl
C) NaOH
D) HNO3

Q40: Which of the following statements about haloarenes is true?

A) They undergo SN2 reactions readily
B) They have sp2 carbon attached to halogen
C) They are more reactive than haloalkanes in substitution
D) They easily eliminate HX

Q41: Which substituent on a haloarene increases its reactivity toward nucleophilic aromatic substitution?

A) -CH3
B) -NO2
C) -OCH3
D) -NH2

Q42: In the Sandmeyer reaction, an aryl diazonium salt gives an aryl chloride when treated with:

A) CuCN
B) CuCl
C) HCl
D) NaCl

Q43: The Balz-Schiemann reaction is used to prepare which of the following?

A) Aryl fluorides
B) Aryl chlorides
C) Aryl bromides
D) Aryl iodides

Q44: Which statement is true for chlorobenzene in electrophilic aromatic substitution?

A) Strongly activating
B) Meta-directing
C) Deactivating but ortho/para directing
D) Does not undergo EAS

Q45: Which reagent converts aniline to chlorobenzene via diazonium salt?

A) NaNO2 + HCl then CuCl
B) NaCl
C) Cl2/FeCl3
D) HCl alone

Q46: Which of the following is a radical nucleophilic aromatic substitution?

A) SN2 on benzene
B) SN1 on benzene
C) Sandmeyer reaction
D) Finkelstein reaction

Q47: Which mechanism does NOT normally occur for haloarenes under standard conditions?

A) Electrophilic aromatic substitution
B) SN1
C) Sandmeyer
D) Balz-Schiemann

Q48: Which group is strongly deactivating for electrophilic aromatic substitution?

A) -OH
B) -NO2
C) -OCH3
D) -CH3

Q49: Which position does a halogen direct in electrophilic aromatic substitution?

A) Ortho/para
B) Meta
C) Para only
D) Meta only

Q50: Which compound is most likely to undergo nucleophilic aromatic substitution?

A) Chlorobenzene
B) 2-Nitrochlorobenzene
C) Toluene
D) Fluorobenzene

Q51: Which halogen has greatest ability to leave in Sandmeyer reaction?

A) F
B) Cl
C) Br
D) I

Q52: Which intermediate is formed in electrophilic aromatic substitution?

A) Arenium ion
B) Carbocation
C) Free radical
D) Carbanion

Q53: Which reaction is commonly used to prepare aryl cyanides from diazonium salts?

A) Sandmeyer with CuCN
B) Balz-Schiemann
C) Finkelstein
D) Cannizzaro

Q54: Which reagent is NOT typically used for electrophilic aromatic halogenation?

A) $FeCl_3$
B) $AlCl_3$
C) $FeBr_3$
D) NaOH

Q55: Halogenation of toluene in excess produces which major dichlorobenzene isomers?

A) Ortho and meta
B) Ortho and para
C) Meta only
D) Para only

Q56: Which reagent helps diazotize an aromatic amine to prepare diazonium salt?

A) $NaNO_2 + HCl$
B) $Br_2/FeBr_3$
C) H_2/Pd
D) NaOH

Q57: Which of the following enhances nucleophilic aromatic substitution by stabilizing intermediate?

A) Electron-withdrawing groups at ortho/para
B) Electron-donating groups
C) Halogen itself
D) High temperature only

Q58: Why are haloarenes less reactive than haloalkanes in SN1/SN2?

A) C-X bond stronger due to resonance
B) Ring stabilises transition
C) Carbon is sp hybridized
D) They do not form diazonium salts

Q59: Which of the following is a *nucleophilic aromatic substitution* mechanism involving benzyne?

A) Addition-elimination
B) Elimination-addition
C) Sandmeyer
D) Balz-Schiemann

Q60: Which functional transformation forms aryl iodide most efficiently from aniline?

A) Diazotisation + CuI
B) CuCl
C) Br2/FeBr3
D) Finkelstein

Q61: In electrophilic aromatic substitution, which condition is commonly used for halogenation of benzene?

A) FeCl3, dark room
B) FeCl3, sunlight
C) No catalyst
D) Hot base

Q62: Which of the following is an example of meta-directing deactivator?

A) -NO2
B) -Cl
C) -OH
D) -OCH3

Q63: Which reagent is used to make aryl bromides from diazonium salts?

A) CuBr
B) CuCl
C) CuI
D) NaBr

Q64: Aryl fluorides are generally prepared through which method?

A) Electrophilic fluorination
B) Balz-Schiemann
C) Finkelstein

D) Wurtz

Q65: Which group deactivates benzene most toward electrophilic substitution?

A) -Br
B) -Cl
C) -NO2
D) -F

Q66: Which of the following is a strong pi-donating substituent on benzene?

A) -OH
B) -NO2
C) -CN
D) -COOH

Q67: Which reagent is used to test for halide ions as precipitates?

A) AgNO3
B) BaCl2
C) Ag2O
D) FeCl3

Q68: Which substituent directs electrophilic substitution to meta position?

A) -NO2
B) -OH
C) -Cl
D) -CH3

Q69: Which mechanism involves an aryl radical intermediate during halide substitution?

A) Sandmeyer
B) SN1
C) SN2
D) E2

Q70: Which halogenation of benzene requires a Lewis acid catalyst?

A) Chlorination
B) Br2 addition without catalyst
C) Free radical iodination
D) Fluorination

Q71: Which reaction is used to prepare aryl iodides from aromatic amines?

A) Sandmeyer with CuI
B) Balz-Schiemann
C) Finkelstein
D) Claissen rearrangement

Q72: Which of the following increases the rate of SNAr on an aryl chloride?

A) Strong base
B) Electron-withdrawing group ortho/para
C) High temperature only
D) No substituents

Q73: Which is an example of directing effect in electrophilic aromatic substitution?

A) Ortho/para by -Cl
B) Meta by -NO_2
C) Both A and B
D) None

Q74: Which of these will NOT undergo nucleophilic aromatic substitution easily?

A) 2,4-Dinitrochlorobenzene
B) Chlorobenzene
C) 2-Nitrochlorobenzene
D) 4-Nitrochlorobenzene

Q75: Which reagent is used for nitration of benzene?

A) $HNO_3 + H_2SO_4$
B) $FeCl_3$
C) $NaNO_2$
D) $ZnCl_2$

Q76: Which reagent is used for electrophilic chlorination of benzene?

A) $FeCl_3$
B) NaOH
C) HNO_3
D) NaCl

Q77: In electrophilic aromatic substitution, the formation of which intermediate is key?

A) Carbanion
B) Arenium ion
C) Free radical
D) Carbocation with sp hybridisation

Q78: Which reagent converts aromatic amines to diazonium salts?

A) $NaNO_2 + HCl$
B) $FeCl_3$
C) NaOH
D) HNO_3

Q79: Which reaction is used to prepare aryl fluorides?

A) Sandmeyer with CuF
B) Balz-Schiemann
C) Finkelstein
D) Free radical fluorination

Q80: Which of the following is the best condition for electrophilic aromatic substitution?

A) UV light
B) Room temperature with Lewis acid
C) Cold & dark
D) Strong base

Q81: Which group deactivates the benzene ring most strongly in electrophilic substitution?

A) -OH
B) -NO2
C) -OCH3
D) -CH3

Q82: Which of the following is a directing group for ortho/para positions in electrophilic substitution?

A) -NO2
B) -Cl
C) -CN
D) -COOH

Q83: Which halogenated aromatic compound is most deactivated toward electrophilic substitution?

A) Fluorobenzene
B) Chlorobenzene
C) Bromobenzene
D) Iodobenzene

Q84: Which of the following will undergo nucleophilic aromatic substitution most readily?

A) Chlorobenzene
B) 2-Nitrochlorobenzene
C) Toluene
D) Bromobenzene

Q85: Which of the following mechanisms involves benzyne formation?

A) Addition-elimination SNAr
B) Elimination-addition SNAr
C) SN1
D) Sandmeyer

Q86: Aryl diazonium salts can undergo replacement of diazonium by which of these to form aryl bromides?

A) CuBr
B) CuCl
C) CuI
D) AgNO3

Q87: Which of these transformations uses diazonium salt intermediate?

A) Preparation of phenol
B) Free radical halogenation
C) Hydrogenation of benzene
D) Oxidative cleavage

Q88: Which electrophile is generated in chlorination of benzene?

A) Cl+
B) Cl-
C) Cl2

D) Cl radical

Q89: The substitution pattern influenced by -NO2 group is mostly:

A) Ortho/para directing
B) Meta directing
C) Para only
D) Ortho only

Q90: Which reagent is used to nitrate benzene?

A) HNO3 + H2SO4
B) FeCl3
C) Br2/FeBr3
D) NaNO2

Q91: Which of the following is least reactive toward electrophilic aromatic substitution?

A) Benzene
B) Chlorobenzene
C) Toluene
D) Phenol

Q92: Which of the following will not support a typical SN1 reaction on the aromatic ring?

A) Chlorobenzene
B) 2-Nitrochlorobenzene
C) p-Nitrochlorobenzene
D) 3-Nitrochlorobenzene

Q93: Which reaction forms aryl cyanides from diazonium salts?

A) Sandmeyer with CuCN
B) Balz-Schiemann
C) Finkelstein
D) Cannizzaro

Q94: Which of these halogen substituents on benzene is most deactivating for electrophilic substitution?

A) -F
B) -Cl
C) -Br
D) -I

Q95: In electrophilic aromatic substitution, which group increases the reactivity of benzene ring?

A) -NO2
B) -OH
C) -Cl
D) -COOH

Q96: Which reagent catalyses bromination of benzene?

A) FeBr3
B) NaBr
C) HBr
D) KBr

Q97: Which condition does NOT favour electrophilic aromatic substitution?

A) Presence of Lewis acid
B) Electron-donating substituents
C) High concentrations of base
D) Moderate temperature

Q98: Which type of substitution is observed in nitration of chlorobenzene?

A) Ortho/para
B) Meta
C) SN1
D) SN2

Q99: Which reagent pair is used for bromination of benzene?

A) Br2/FeBr3
B) Cl2/FeCl3
C) I2/FeI2
D) HBr/Peroxides

Q100: Which of the following increases the rate of nucleophilic aromatic substitution?

A) Electron-donating groups
B) Electron-withdrawing groups
C) Weak base
D) No substituents

Q101: Which statement correctly describes haloarenes?

A) Undergo SN2 readily
B) Strongly activated toward EAS
C) Less reactive in nucleophilic substitution
D) Hydrophilic

Q102: In a Sandmeyer reaction, which of these can be used to introduce Cl into the aromatic ring?

A) CuCl
B) CuBr
C) CuI
D) AgNO3

Q103: Which aromatic substitution is called electrophilic aromatic substitution?

A) Halogenation
B) Nitration
C) Friedel-Crafts alkylation
D) All of the above

Q104: Which catalyst is used for chlorination in electrophilic aromatic substitution?

A) $FeCl_3$
B) NaCl
C) HCl
D) NaOH

Q105: Which of the following is a meta-directing group?