



ARIHANTAM ACADEMY

Faith Strength Education

CLASS 12 CHEMISTRY — BIHAR BOARD (BSEB)

HALOALKANES AND HALOARENES — DPP 48 TO 52

Student Workbook + Teacher Answer Key

Arihantam Academy • Faith Strength Education

Bihar Board Class 12 Chemistry: board-oriented daily practice for Haloalkanes and Haloarenes.



ARIHANTAM ACADEMY

Faith Strength Education

CLASS 12 CHEMISTRY — BIHAR BOARD (BSEB)

DAILY PRACTICE PROBLEM — DPP 48

Haloalkanes and Haloarenes | Classification, nomenclature and preparation of haloalkanes

Student Name: _____	Roll No.: _____
DPP No.: 48 Chapter: Haloalkanes and Haloarenes	Date: _____
Topic: Classification, nomenclature and preparation of haloalkanes	Score: ____ / 30

Instructions: Answer all objective questions. Attempt any 3 short-answer questions and any 1 long-answer question.

Section A — Objective Questions (15 × 1 = 15)

- General formula of monohaloalkane:
(A) $C_nH_{2n+1}X$ (B) $C_nH_{2n}X$ (C) $C_nH_{2n-1}X$ (D) $C_nH_{2n-2}X$
- In alkyl halide, halogen is attached to:
(A) sp^2 C (B) sp^3 C (C) O (D) N
- Vinyl chloride:
(A) CH_2Cl (B) $CH=CHCl$ (C) CH_2CHCl (D) $CHCl$
- Allyl chloride:
(A) $CH_2=CHCH_2Cl$ (B) $CH=CHCl$ (C) CH_2CHCl (D) CH_2CH_2CHCl
- Benzyl chloride:
(A) C_6H_5Cl (B) $C_6H_5CH_2Cl$ (C) $CH_2=CHCl$ (D) CH_2Cl
- IUPAC halogen use:
(A) suffix (B) prefix (C) infix (D) none
- Highest bp:
(A) CH_3F (B) CH_3Cl (C) CH_3Br (D) CH_3I
- C-X bond strength:
(A) $C-I > C-Br > C-Cl > C-F$ (B) $C-F > C-Cl > C-Br > C-I$ (C) same (D) $C-Cl > C-F > C-I > C-Br$
- SN reactivity:
(A) $RF > RCl > RBr > RI$ (B) $RI > RBr > RCl > RF$ (C) $RCl > RI > RBr > RF$ (D) same
- Alcohol $\rightarrow$ chloride with $SOCl_2$:
(A) Finkelstein (B) Darzens (C) Swarts (D) Wurtz
- Finkelstein reagent:
(A) NaI /acetone (B) AgF (C) Na /dry ether (D) KOH
- Swarts reaction makes:
(A) RI (B) RF (C) RCl (D) alkane
- Alkane halogenation gives:
(A) haloalkane (B) alcohol (C) aldehyde (D) amine
- HBr +propene without peroxide gives:
(A) 1-bromopropane (B) 2-bromopropane (C) propanol (D) propane
- HBr +alkene with peroxide follows:
(A) Markovnikov (B) anti-Markovnikov (C) no addition (D) elimination

Section B — Short Answer (Attempt any 3) (3 × 2 = 6)

- Classify haloalkanes by number of halogen atoms.
- Differentiate alkyl, allylic, vinylic and aryl halides.
- Why does boiling point increase from RCl to RI ?
- Write Finkelstein and Swarts equations.
- Convert ethanol to chloroethane using $SOCl_2$.

Section C — Long Answer (Attempt any 1) (1 × 5 = 5)

- Explain preparation methods of haloalkanes.
- Explain nomenclature and classification with examples.

Teacher record: MCQ ____/15 | Short ____/6 | Long ____/5 | Presentation/Homework ____/4 | Total ____/30



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CLASS 12 CHEMISTRY — BIHAR BOARD (BSEB)

TEACHER ANSWER KEY — DPP 48

Haloalkanes and Haloarenes | Classification, nomenclature and preparation of haloalkanes

MCQ answers: 1-A, 2-B, 3-B, 4-A, 5-B, 6-B, 7-D, 8-B, 9-B, 10-B, 11-A, 12-B, 13-A, 14-B, 15-B

Short-answer marking points

16. Mono-, di- and polyhaloalkanes.
17. Alkyl: X on sp^3 C; allylic: adjacent to $C=C$; vinylic: on $C=C$; aryl: directly on aryl ring.
18. Mass/polarisability and dispersion forces increase down the group.
19. $RI + NaI/acetone \rightarrow RI + NaI$; $RI + AgF/SbF_6 \rightarrow RF$.
20. $CH_3CH_2OH + SOCl_2 \rightarrow CH_3CH_2Cl + SO_2 + HCl$.

Long-answer marking points

21. From alcohols, hydrocarbons, addition to alkenes and halide-exchange reactions with equations.
22. Use chain selection, locants and halo prefixes; explain each class.

Remedial rule: Score below 15/26: revise mechanisms, conversions and named reactions; take a 10-MCQ re-test.



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CLASS 12 CHEMISTRY — BIHAR BOARD (BSEB)

DAILY PRACTICE PROBLEM — DPP 49

Haloalkanes and Haloarenes | SN1 and SN2 nucleophilic substitution mechanisms

Student Name: _____	Roll No.: _____
DPP No.: 49 Chapter: Haloalkanes and Haloarenes	Date: _____
Topic: SN1 and SN2 nucleophilic substitution mechanisms	Score: ____ / 30

Instructions: Answer all objective questions. Attempt any 3 short-answer questions and any 1 long-answer question.

Section A — Objective Questions (15 × 1 = 15)

- SN1 intermediate:
(A) carbanion (B) carbocation (C) radical (D) concerted TS
- SN2 has:
(A) two steps (B) one step (C) three steps (D) no TS
- SN1 rate:
(A) $k[RX][Nu]$ (B) $k[RX]$ (C) $k[Nu]$ (D) k only
- SN2 rate:
(A) $k[RX]$ (B) $k[RX][Nu]$ (C) $k[Nu]$ (D) kT
- SN1 favoured by:
(A) methyl (B) tertiary (C) primary (D) vinyl
- SN2 favoured by:
(A) tertiary (B) primary (C) aryl (D) neopentyl
- SN1 solvent:
(A) polar protic (B) nonpolar (C) dry ether (D) solid
- SN2 solvent:
(A) polar aprotic (B) strong acid water (C) nonpolar (D) metal
- SN2 stereochemistry:
(A) racemisation (B) inversion (C) retention (D) none
- SN1 optical outcome:
(A) inversion (B) racemisation (C) retention (D) no product
- Carbocation stability:
(A) $1^\circ > 2^\circ > 3^\circ$ (B) $3^\circ > 2^\circ > 1^\circ$ (C) methyl $> 3^\circ$ (D) same
- Best leaving group:
(A) F $\blacksquare$ (B) Cl $\blacksquare$ (C) Br $\blacksquare$ (D) I $\blacksquare$
- RX + aq KOH gives:
(A) alkene (B) alcohol (C) ether (D) amine
- RX + alc KOH gives:
(A) alcohol (B) alkene (C) aldehyde (D) ketone
- SN2 attack from:
(A) front (B) back (C) both (D) random

Section B — Short Answer (Attempt any 3) (3 × 2 = 6)

- Define SN1 and SN2.
- Write SN1 and SN2 rate laws.
- Why is 3° RX favoured in SN1?
- Why is 1° RX favoured in SN2?
- Define Walden inversion.

Section C — Long Answer (Attempt any 1) (1 × 5 = 5)

- Compare SN1 and SN2 mechanisms.
- Explain SN1 hydrolysis of tert-butyl bromide.

Teacher record: MCQ ____/15 | Short ____/6 | Long ____/5 | Presentation/Homework ____/4 | Total ____/30



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Faith Strength Education

CLASS 12 CHEMISTRY — BIHAR BOARD (BSEB)

TEACHER ANSWER KEY — DPP 49

Haloalkanes and Haloarenes | SN1 and SN2 nucleophilic substitution mechanisms

MCQ answers: 1-B, 2-B, 3-B, 4-B, 5-B, 6-B, 7-A, 8-A, 9-B, 10-B, 11-B, 12-D, 13-B, 14-B, 15-B

Short-answer marking points

16. SN1 unimolecular via carbocation; SN2 bimolecular concerted substitution.

17. $SN1 = k[RX]$; $SN2 = k[RX][Nu^-]$.

18. Stable tertiary carbocation forms.

19. Less steric hindrance permits backside attack.

20. Inversion caused by backside attack.

Long-answer marking points

21. Compare rate law, steps, intermediate, substrate, solvent, nucleophile, stereochemistry and rearrangement.

22. Slow: $(CH_3)_3CBr \rightarrow (CH_3)_3C^+ + Br^-$; fast OH^- attack produces tert-butanol.

Remedial rule: Score below 15/26: revise mechanisms, conversions and named reactions; take a 10-MCQ re-test.



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CLASS 12 CHEMISTRY — BIHAR BOARD (BSEB)

DAILY PRACTICE PROBLEM — DPP 50

Haloalkanes and Haloarenes | Elimination, named reactions and polyhalogen compounds

Student Name: _____	Roll No.: _____
DPP No.: 50 Chapter: Haloalkanes and Haloarenes	Date: _____
Topic: Elimination, named reactions and polyhalogen compounds	Score: ____ / 30

Instructions: Answer all objective questions. Attempt any 3 short-answer questions and any 1 long-answer question.

Section A — Objective Questions (15 × 1 = 15)

- Dehydrohalogenation product:
(A) alcohol (B) alkene (C) ether (D) amine
- Reagent for dehydrohalogenation:
(A) aq KOH (B) alc KOH (C) dil HCl (D) NaCl
- Zaitsev major product:
(A) least substituted alkene (B) more substituted alkene (C) ethene only (D) alcohol
- Wurtz reagent:
(A) Na/dry ether (B) NaI/acetone (C) AgF (D) aq KOH
- Wurtz-Fittig product:
(A) alkane from RX (B) alkylbenzene (C) aryl halide (D) alcohol
- Fittig couples:
(A) alkyl halides (B) aryl halides (C) alcohols (D) amines
- Grignard reagent:
(A) RMgX (B) RXMg (C) R⁺Mg⁻ (D) MgX⁺
- RMgX is prepared in:
(A) water (B) dry ether (C) alcohol (D) aq KOH
- Chloroform:
(A) CH₃Cl (B) CHCl₃ (C) CCl₄ (D) CH₂Cl₂
- Iodoform:
(A) CHI₃ (B) CHCl₃ (C) CH₂I₂ (D) C₂H₅I
- Freon-12:
(A) CCl₂F₂ (B) CCl₄ (C) CF₄ (D) CHCl₃
- DDT is:
(A) insecticide (B) fertiliser (C) antibiotic (D) detergent
- BHC means:
(A) benzene hexachloride (B) bromohexane (C) butyl chloride (D) boron hydride
- CCl₄ old use:
(A) solvent/fire extinguisher (B) food (C) fertiliser (D) sweetener
- Ozone depletion agent:
(A) CFCs (B) CO₂ only (C) O₃ (D) N₂

Section B — Short Answer (Attempt any 3) (3 × 2 = 6)

- Define dehydrohalogenation.
- State Zaitsev rule.
- Write Wurtz and Wurtz-Fittig reactions.
- What is RMgX? Why dry ether?
- State one harmful effect of CFCs.

Section C — Long Answer (Attempt any 1) (1 × 5 = 5)

- Explain E2 elimination and Zaitsev orientation.
- Write notes on CHCl₃, CCl₄, Freon-12 and DDT/BHC.

Teacher record: MCQ ____/15 | Short ____/6 | Long ____/5 | Presentation/Homework ____/4 | Total ____/30



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CLASS 12 CHEMISTRY — BIHAR BOARD (BSEB)

TEACHER ANSWER KEY — DPP 50

Haloalkanes and Haloarenes | Elimination, named reactions and polyhalogen compounds

MCQ answers: 1-B, 2-B, 3-B, 4-A, 5-B, 6-B, 7-A, 8-B, 9-B, 10-A, 11-A, 12-A, 13-A, 14-A, 15-A

Short-answer marking points

16. Removal of HX using alcoholic KOH to form alkene.

17. More substituted/stable alkene is major.

18. $2RX + 2Na \rightarrow R-R + 2NaX$; $ArX + RX + 2Na \rightarrow Ar-R + 2NaX$.

19. RMgX, formed with Mg/dry ether; water destroys it.

20. CFC radicals damage stratospheric ozone.

Long-answer marking points

21. One-step β -elimination by strong base; more substituted alkene normally major.

22. State formulae, uses and environmental/toxic effects.

Remedial rule: Score below 15/26: revise mechanisms, conversions and named reactions; take a 10-MCQ re-test.



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CLASS 12 CHEMISTRY — BIHAR BOARD (BSEB)

DAILY PRACTICE PROBLEM — DPP 51

Haloalkanes and Haloarenes | Haloarenes, chlorobenzene and aromatic substitution

Student Name: _____	Roll No.: _____
DPP No.: 51 Chapter: Haloalkanes and Haloarenes	Date: _____
Topic: Haloarenes, chlorobenzene and aromatic substitution	Score: ____ / 30

Instructions: Answer all objective questions. Attempt any 3 short-answer questions and any 1 long-answer question.

Section A — Objective Questions (15 × 1 = 15)

- Chlorobenzene formula:
(A) C_6H_5Cl (B) $C_6H_4CH_2Cl$ (C) $CH_2=CHCl$ (D) C_6H_5Cl
- C-X bond in haloarene has:
(A) single only (B) partial double character (C) ionic only (D) no polarity
- Haloarenes less reactive in S_N because:
(A) weak C-X (B) resonance/ sp^2 C-X (C) no ring (D) high solubility
- Chlorobenzene+NaOH high T/P gives:
(A) phenol (B) aniline (C) benzene (D) toluene
- This reaction is:
(A) Dow process (B) Haber (C) Wurtz (D) Finkelstein
- Chlorobenzene+Na/dry ether gives:
(A) biphenyl (B) phenol (C) benzene (D) toluene
- Coupling of aryl halides:
(A) Fittig (B) Wurtz (C) Swarts (D) Sandmeyer
- Halogen on benzene is:
(A) meta activating (B) o,p directing deactivating (C) o,p activating (D) meta directing
- Nitration of chlorobenzene yields:
(A) meta only (B) ortho/para products (C) phenol (D) benzene
- Halogen deactivates by:
(A) -I effect (B) +I (C) no inductive (D) metal effect
- Halogen directs o/p by:
(A) -M only (B) +M resonance (C) no electrons (D) steric only
- Diazonium to aryl halide:
(A) Sandmeyer (B) Wurtz (C) Kolbe (D) Friedel-Crafts
- Sandmeyer reagent:
(A) $CuCl/CuBr$ (B) Na (C) Mg (D) KOH
- $C_6H_5N_2Cl + CuCl$ gives:
(A) C_6H_5Cl (B) phenol (C) aniline (D) benzene
- Haloarenes vs haloalkanes S_N :
(A) more reactive (B) less reactive (C) same (D) ionic

Section B — Short Answer (Attempt any 3) (3 × 2 = 6)

- Why are haloarenes less reactive in nucleophilic substitution?
- Why are halogens deactivating but o,p directing?
- What is Dow process?
- Write Fittig reaction.
- Write Sandmeyer reaction for chlorobenzene.

Section C — Long Answer (Attempt any 1) (1 × 5 = 5)

- Explain nucleophilic substitution of chlorobenzene.
- Discuss preparation and EAS reactions of chlorobenzene.

Teacher record: MCQ ____/15 | Short ____/6 | Long ____/5 | Presentation/Homework ____/4 | Total ____/30



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CLASS 12 CHEMISTRY — BIHAR BOARD (BSEB)

TEACHER ANSWER KEY — DPP 51

Haloalkanes and Haloarenes | Haloarenes, chlorobenzene and aromatic substitution

MCQ answers: 1-A, 2-B, 3-B, 4-A, 5-A, 6-A, 7-A, 8-B, 9-B, 10-A, 11-B, 12-A, 13-A, 14-A, 15-B

Short-answer marking points

16. Resonance partial double bond, sp^2 C-X, strong bond and difficult attack.

17. -I deactivates; +M increases electron density at ortho/para.

18. Chlorobenzene to phenol using aq NaOH at high T/P then acidification.

19. $2ArX + 2Na / \text{dry ether} \rightarrow Ar-Ar + 2NaX$.

20. $C_6H_5N_2Cl + CuCl \rightarrow C_6H_5Cl + N_2$.

Long-answer marking points

21. State harsh conditions/benzyne or activated substitution and contrast with haloalkanes.

22. Preparation via benzene/ diazonium salt; nitration o/p orientation.

Remedial rule: Score below 15/26: revise mechanisms, conversions and named reactions; take a 10-MCQ re-test.



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CLASS 12 CHEMISTRY — BIHAR BOARD (BSEB)

DAILY PRACTICE PROBLEM — DPP 52

Haloalkanes and Haloarenes | Full chapter important-question test

Student Name: _____	Roll No.: _____
DPP No.: 52 Chapter: Haloalkanes and Haloarenes	Date: _____
Topic: Full chapter important-question test	Score: ____ / 30

Instructions: Answer all objective questions. Attempt any 3 short-answer questions and any 1 long-answer question.

Section A — Objective Questions (15 × 1 = 15)

- C-X strength:
(A) C-I > C-Br > C-Cl > C-F (B) C-F > C-Cl > C-Br > C-I (C) same (D) C-Cl > C-F > C-I > C-Br
- Leaving group:
(A) F > Cl > Br > I (B) I > Br > Cl > F (C) same (D) Cl > I > Br > F
- SN1 favoured:
(A) methyl (B) tertiary (C) primary (D) vinyl
- SN2 favoured:
(A) tertiary (B) primary (C) aryl (D) neopentyl
- SN2 gives:
(A) racemisation (B) inversion (C) retention (D) none
- Alc KOH gives:
(A) alcohol (B) alkene (C) ether (D) amine
- Aq KOH gives:
(A) alkene (B) alcohol (C) alkyne (D) benzene
- Finkelstein:
(A) NaI/acetone (B) AgF (C) Na/dry ether (D) KOH
- Swarts gives:
(A) RCl (B) RBr (C) RF (D) RI
- Grignard:
(A) RMgX (B) RXMg (C) R $\cdot$ Mg (D) MgX $\cdot$
- Chlorobenzene + NaOH gives:
(A) phenol (B) aniline (C) benzene (D) toluene
- Chlorobenzene + Na gives:
(A) biphenyl (B) phenol (C) benzene (D) toluene
- Haloarenes unreactive due:
(A) weak C-X (B) resonance partial double (C) ionic C-X (D) no bond
- CFCs cause:
(A) ozone depletion (B) acid rain (C) hardness (D) green colour
- DDT:
(A) insecticide (B) fertiliser (C) antibiotic (D) detergent

Section B — Short Answer (Attempt any 3) (3 × 2 = 6)

- Differentiate SN1 and SN2.
- Why dry ether in Grignard preparation?
- State Zaitsev rule.
- Why are haloarenes less reactive?
- Write Finkelstein reaction.

Section C — Long Answer (Attempt any 1) (1 × 5 = 5)

- Explain SN1/SN2 with stereochemistry.
- Write preparation and reactions of chlorobenzene.

Teacher record: MCQ ____/15 | Short ____/6 | Long ____/5 | Presentation/Homework ____/4 | Total ____/30



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Faith Strength Education

CLASS 12 CHEMISTRY — BIHAR BOARD (BSEB)

TEACHER ANSWER KEY — DPP 52

Haloalkanes and Haloarenes | Full chapter important-question test

MCQ answers: 1-B, 2-B, 3-B, 4-B, 5-B, 6-B, 7-B, 8-A, 9-C, 10-A, 11-A, 12-A, 13-B, 14-A, 15-A

Short-answer marking points

- 16. Rate law, steps/intermediate, substrate, solvent and stereochemical outcome.
- 17. It avoids hydrolysis and stabilises reagent.
- 18. More substituted alkene is major in β -elimination.
- 19. Resonance causes partial double-bond character and sp^2 carbon holds X strongly.
- 20. $RCl + NaI / \text{acetone} \rightarrow RI + NaCl$.

Long-answer marking points

- 21. $SN1$ carbocation/racemisation; $SN2$ concerted backside attack/inversion.
- 22. Benzene halogenation/diazonium method; nitration and Dow conversion.

Remedial rule: Score below 15/26: revise mechanisms, conversions and named reactions; take a 10-MCQ re-test.