RAVI MATHS TUITION CENTER, CHENNAI-82. WHATSAPP.- 8056206308

12TH CBSE CHEMISTRY CHAPTER TEST Haloalkanes and Haloarenes 1

12th Standard CBSE

Chemistry

Exam Time : 01:30:00 Hrs

Total Marks : 70

1) Alkyl halides are insoluble in water because they do not form ..... with water. 1

2) Small quantity of alcohol is added to chloroform to remove ..... formed as a result of exposure to air and light. 1

3) Alkyl halides are ..... reactive than haloarenes but ..... reactive than ..... towards nucleophilic substitute ion reations. 1

4) With aqueous KOH, alkyl halides undergo ..... reaction but with hot alcoholic KOH, they undergo ..... reaction. 1

5) With potassium cyanide, alkyl halides gives ..... while with silver cyanide ..... are the major products. 1

6) Nitroalkanes are formed when alkyl halides react with ..... while alkyl nitrites are formed when alkyl halides are treated with 1

7) The reaction of p-nitrochlorobenzene with sodium methoxide to form p-nitro anisole occurs by ..... reaction 1

8) The well known refrigerant freon has the structure 1

9) Vinyl chloride on reaction with dimethyl copper gives..... 1

10) DDT stands for 1

11) ..... is used to eradicate malaria. 1

12) Hydrolysis of 2-bromo-3-methylbutane yields only..... 1

13) Butanenitrile can be prepared by heating ..... with alcoholic KCN. 1

14) Toluene reacts with chlorine in presence of catalyst $FeCl_3$ to form 1

15) Chlorobenzene and Sodium react in dry ether medium to form 1

16) Chlorobenzene reacts with ..... in presence of conc.H_2SO_4 to form DDT. 1

17) Iodobenzene on heating with copper powder forms diphenyl. The reaction is called..... 1

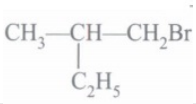
18) Write IUPAC name of the following compound? 1

19) Chloromethane on treatment with excess of ammonia gives _____ 1

20) The isomer of C_4H_9Br, (optical active) is _____ 1

21) Out of chlorobenzene, o-chlorotoluene, m-chloro toluene, least reactive towards nucleophilic substitution is _____ 1

22) Out of chlorobenzene, p-chloronitrobenzene, 2,4,6- Trinitrobenzene, most reactive towards nucleophilic substitution reaction is _____ 1

23) The IUPAC name of  is _____ 1

24) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer. 1

Assertion (A) Boiling points of chlorides, bromides and iodides are considered to be higher than hydrocarbons.

Reason (R) Due to greater polarity and higher molecular mass, the intermolecular forces of attraction are weaker in halogen derivative as compared to hydrocarbon.

Codes:

(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).

(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).

(c) (A) is correct; (R) is incorrect.

(d) (A) is incorrect; (R) is correct.

25) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer. 1

Assertion (A) S_N1 reaction is accompanied by racemisation.

Reason (R) Carbocation is formed in this reaction and attack of nucleophile can be from either side of the leaving group.

Codes:

(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).

(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).

(c) (A) is correct; (R) is incorrect.

(d) (A) is incorrect; (R) is correct.

26) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer. 1

Assertion (A) It is necessary to avoid traces of moisture from Grignard reagent.

Reason (R) Grignard reagent reacts with water and forms hydrocarbon.

Codes:

(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

27) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer. 1

Assertion (A) Bond cleavage inhaloarene is difficult than halo alkane.

Reason (R) Phenyl carbocation is more stable.

Codes:

(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

28) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer. 1

Assertion (A) Nitration of chlorobenzene leads to the formation of ortho and para nitrochloro benzene.

Reason (R) -NO_2 group is a o,p-directing group.

Codes:

(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

29) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer. 1

Assertion (A) neo pentyl chloride is formed when neo pentyl alcohol reacts with HCl.

Reason (R) neo pentyl alcohol is a primary alcohol.

Codes:

(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

30) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer. 1

Assertion (A) S_N1 mechanism is ruled out in case of haloarene.
Reason (R) Phenyl cation is formed as a result of self ionisation which is not stabilised by resonance.
Codes:
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

31) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer. 1

Assertion (A) Phosphorus chlorides (In and penta) are preferred over thionyl chloride for the preparation of alkyl chlorides from alcohols.
Reason (R) Thionyl chloride give pure alkyl halides.
Codes:
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

32) **Assertion:** Boiling point of alkyl halides increases with increase in molecular weight. 1
Reason: Boiling point of alkyl halides is in the order RI > RBr > RCI > RF.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

33) **Assertion:** The presence of nitro group facilitates nucleophilic substitution reactions in aryl halides. 1
Reason: The intermediate carbanion is stabilised due to the presence of nitro group.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

34) **Assertion:** Boiling point of RCI is greater than RF. 1
Reason: R-CI is more stable than R-F.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

35) **Assertion:** Bromobenzene upon reaction with Br2/Fe gives 1, 4-dibromobenzene as the major product. 1
Reason: In bromobenzene, the inductive effect of the bromo group is more dominant than the mesomeric effect in directing the incoming electrophile.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

36) **Assertion:** n-Butyl bromide has higher boiling point than isobutyl bromide. 1
Reason: The branching of the chain makes the molecule more compact and therefore decreases the surface area.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

37) **Assertion:** Carbon -halogen bond in aryl halide has partial double bond character. 1
Reason: Aryl halides undergo nucleophilic substitution easily.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

38) **Assertion:** p- Dichlorobenzene has higher melting point than o-dichlorobenzene. 1
Reason: Stronger the van der Waals' forces of attraction, higher is the melting point.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

39) **Assertion:** Haloalkanes show H-bonding. 1
Reason: Haloalkanes are insoluble in water.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

40) **Assertion:** Vinyl chloride is less reactive than alkyl chloride. 1
Reason: Stability of alkyl halide decreases as the strength of C-X bond decreases.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

41) **Assertion:** Aryl halide gives a mixture of o-and p-products. 1
Reason: Aryl halides undergo electrophilic substitutions more readily than benzene.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

42) **Assertion :** Nucleophilic substitution reaction on an optically active alkyl halide gives a mixture of enantiomers. 1
Reason: The reaction occurs by $S_N2$mechanism.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

43) **Assertion :** Electron withdrawing groups in aryl halides decrease the reactivity towards nucleophilic substitution. 1
Reason: 2,4- Dinitrochlorobenzene is more reactive than chlorobenzene.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

44) **Assertion:** p-Dichlorobenzene is less soluble in organic solvents than the corresponding o-isomer. 1
Reason: o -Dichlorobenzene is polar while p-dichlorobenzene is not.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

45) **Assertion:** $S_N1$mechanism is facilitated by polar protic solvents like water, alcohol, etc. 1
Reason: $C_6H_5CH(C_6H_5)$ Br is less reactive than$C_6H_5CH(CH_3)$Br in S_N1 reactions.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

46) **Assertion:** Tertiary halo alkanes are more reactive than primary halo alkanes towards elimination reactions. 1
Reason: The +I- effect of the alkyl groups weakens the C - X bond.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

47) **Assertion:** Vinylic halides are highly reactive towards nucleophilic substitution reactions. 1
Reason: Reactivity is due to the polarity of carbon-halogen bond.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

48) **Assertion:** Benzyl chloride is more reactive than p-chlorotoluene towards aqueous NaOH. 1
Reason: The C - CI bond in benzyl chloride is more polar than C - CI bond in p chlorotoluene.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

49) **Assertion:** 2-Chloro-3-methylbutane on treatment with alcoholic potash gives 2-methylbut-2-ene as major product. 1
Reason: The reaction occurs according to Saytzeff rule.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

50) **Assertion:** Lower members of alkyl halides are colourless gases. 1
Reason: Alkyl iodides in general turn black on exposure to air and light.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

51) **Assertion:** Isopropyl chloride is less reactive than CH_3Br in S_N2 reactions. 1
Reason: $S_N2$reactions are always accompanied by inversion of configuration.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

52) In the following questions a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices. 1
Assertion: KCN reacts with methyl chloride to give methyl isocyanide.
Reason: CN^- is an ambident nucleophile.
Codes:
(a) Assertion and reason both are correct and reason is correct explanation of assertion.
(b) Assertion and reason both are wrong statements.
(c) Assertion is correct but reason is wrong statement.
(d) Assertion is wrong but reason is correct statement.
(e) Assertion and reason both are correct statements but reason is not correct explanation of assertion.

53) In the following questions a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices. 1

Assertion: tert-Butyl bromide undergoes Wurtz reaction to give 2, 2, 3, 3-tetramethylbutane.

Reason: In Wurtz reaction, alkyl halides react with sodium in dry ether to give hydrocarbon containing double the number of carbon atoms present in the halide.

Codes:

(a) Assertion and reason both are correct and reason is correct explanation of assertion.

(b) Assertion and reason both are wrong statements.

(c) Assertion is correct but reason is wrong statement.

(d) Assertion is wrong but reason is correct statement.

(e) Assertion and reason both are correct statements but reason is not correct explanation of assertion.

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54) In the following questions a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices. 1

Assertion: Presence of a nitro group at ortho or para position increases the reactivity of haloarenes towards nucleophilic substitution.

Reason: Nitro group, being an electron withdrawing group decreases the electron density over the benzene ring.

Codes:

(a) Assertion and reason both are correct and reason is correct explanation of assertion.

(b) Assertion and reason both are wrong statements.

(c) Assertion is correct but reason is wrong statement.

(d) Assertion is wrong but reason is correct statement.

(e) Assertion and reason both are correct statements but reason is not correct explanation of assertion.

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55) In the following questions a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices. 1

Assertion: In monohaloarenes, further electrophilic substitution occurs at ortho and para positions.

Reason: Halogen atom is a ring deactivator.

Codes:

(a) Assertion and reason both are correct and reason is correct explanation of assertion.

(b) Assertion and reason both are wrong statements.

(c) Assertion is correct but reason is wrong statement.

(d) Assertion is wrong but reason is correct statement.

(e) Assertion and reason both are correct statements but reason is not correct explanation of assertion.

56) In the following questions a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices. 1

Assertion: Aryl iodides can be prepared by reaction of arenes with iodine in the presence of an oxidising agent.

Reason: Oxidising agent oxidises I_2 into HI.

Codes:

(a) Assertion and reason both are correct and reason is correct explanation of assertion.

(b) Assertion and reason both are wrong statements.

(c) Assertion is correct but reason is wrong statement.

(d) Assertion is wrong but reason is correct statement.

(e) Assertion and reason both are correct statements but reason is not correct explanation of assertion.

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57) In the following questions a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices. 1

Assertion: It is difficult to replace chlorine by -OH in chlorobenzene in comparison to that in chloroethane.

Reason: Chlorine-carbon (C-Cl) bond in chlorobenzene has a partial double bond character due to resonance.

Codes:

(a) Assertion and reason both are correct and reason is correct explanation of assertion.

(b) Assertion and reason both are wrong statements.

(c) Assertion is correct but reason is wrong statement.

(d) Assertion is wrong but reason is correct statement.

(e) Assertion and reason both are correct statements but reason is no! correct explanation of assertion.

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58) In the following questions a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices. 1

Assertion: Hydrolysis of (-)-2-bromooctane proceeds with inversion of configuration.

Reason: This reaction proceeds through the formation of a carbocation.

Codes:

(a) Assertion and reason both are correct and reason is correct explanation of assertion.

(b) Assertion and reason both are wrong statements.

(c) Assertion is correct but reason is wrong statement.

(d) Assertion is wrong but reason is correct statement.

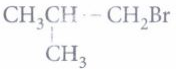
(e) Assertion and reason both are correct statements but reason is no! correct explanation of assertion.

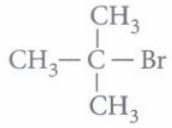
59) **Read the passage given below and answer the following questions:** 4

A primary alkyl halide (A) C_4H_9Br reacted with alcoholic KOH to give compound (B). Compound (B) is reacted with HBr to give compound (C) which is an isomer of (A). When (A) reacted with sodium metal, it gave a compound (D) C_8H_{18} that is different than the compound obtained when n-butyl bromide reacted with sodium metal

The following questions are multiple choice questions. Choose the most ap appropriate answer:

(i) Compound (A) is

(a) $CH_3CH_2CH_2CH_2Br$ **(b)** 

(c)  **(d)** $CH_3CH_2CH_2Br$

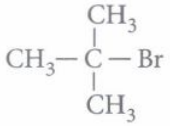
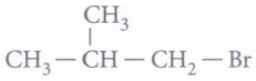
(ii) Which type of isomerism is present in compound (A) and (C)?

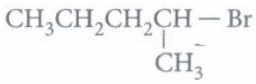
(a) Positional **(b) Functional** **(c) Chain** **(d) Both (a) and (c)**

(iii) IUPAC name of compound (D) is

(a) n-octane **(b) 2,5-dimethylhexane** **(c) 2-methylheptane** **(d) 3,4-dimethylhexane.**

(iv) When compoound (C) is treated with alc. KOH and then treated with HBr in presence of peroxide, the compound obtained is

a)  **(b)** 

(c) $CH_3CH_2CH_2CH_2Br$ **(d)** 

60) **Read the passage given below and answer the following questions:** 4

Nucleophilic substitution reactions are of two types; substitution nucleophilic bimolecular (S_N2) and substitution nucleophilic unimolecular (S_N1) depending on molecules taking part in determining the rate of reaction. Reactivity of alkyl halide towards S_N1 and S_N2 reactions depends on various factors such as steric hindrance, stability of intermediate or transition state and polarity of solvent. S_N2 reaction mechanism is favoured mostly by primary alkyl halide then secondary and then tertiary. This order is reversed in case of S_N1 reactions.

The following questions are multiple choice questions. Choose the most appropriate answer:

(i) Which of the following is most reactive towards nucleophilic substitution reaction?

(a) C_6H_5Cl **(b)** $CH_2 = CHCl$ **(c)** $ClCH_2CH = CH_2$ **(d)** $CH_3CH = CHCl$

(ii) Isopropyl chloride undergoes hydrolysis by

(a) S_N1 mechanism **(b) S_N2 mechanism** **(c) S_N1 and S_N2 mechanism** **(d) neither S_N1 and S_N2 mechanism**

(iii) The most reactive nucleophile among the following is

(a) CH_3O^- **(b)** $C_6H_5O^-$ **(c)** $(CH_3)_2CHO^-$ **(d)** $(CH_3)_3CO^-$

(iv) Tertiary alkyl halides are practically inert to substitution by S_N2 mechanism because of

(a) insolubility **(b) instability** **(c) inductive effect** **(d) stearic hindrance.**

61) **Read the passage given below and a.9swer the following questions:** 4

A chlorocompound (A) on reduction with Zn-Cu and ethanol gives the hydrocarbon (B) with five carbon atoms. When (A) is dissolved in dry ether and treated with sodium metal it gave 2,2,5,5 tetramethylhexane. The treatment of (A) with alcoholic KCN gives compound (C).

The following questions are multiple choice questions. Choose the most appropriate answer:

(i) The compound (A) is

(a) 1-chloro- 2, 2-dimethylpropane **(b) 1-chloro- 2, 2-dimethyl butane**
(c) 1-chloro-2-methyl butane **(d) 2-chloro-2-methyl butane.**

(ii) The reaction of (C) with Na, C_2H_5OH gives

(a) $(CH_3)_3C\ CH_2CONH_2$ **(b)** $(CH_3)_3C\ NH_2$
(c) $(CH)_3C\ CH_2CH_2NH_2$ **(d)** $(CH_3)_2CHCH_2NH_2$

(iii) The reaction of (C) with Na, C_2H_5OH is called

(a) Gilman reaction **(b) Mendius reaction**
(c) Grooves process **(d) Swart's reaction.**

(iv) Compound (B) is

(a) n-pentane **(b) 2, 2-dimethylpropane**
(c) 2-methylbutane **(d) none of these.**

****

1) H-bonds 1

2) phosgene($COCl_2$) 1

3) more, less,allyl/benzyl halides 1

4) substitution, elimination 1

5) alkyl cyanides, alkyl isocyanides 1

6) Silver nitrite, potassium nitrite 1

7) bimolecular aromatic nucleophilic substitution 1

8) CF_2Cl_2 1

9) propene, $2CH_2=CHCl+(CH_3)_2Cu \rightarrow 2H_2=CHCH_3+CuCl_2$ 1

10) p,p' - dichlorodiphenyltrichloroethane 1

11) DDT 1

12) 2-Methyl-2-butanol 1

13) n-Propyl bromide 1

14) o and p-chlorotoluene 1

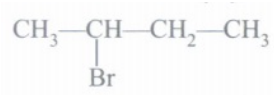
15) biphenyl 1

16) Chloral (CCl_3CHO) 1

17) diphenyl, Ullmann biaryl synthesis. 1

18) 1, 4 - dichloro - 3 - methylbenzene. 1

19) Methanamine 1

20)  1

21) o-Chlorotoluene, because--CH_3, group is electron releasing, decreases reactivity towards nucleophilic substitution reactions. 1

22) 1

2, 4, 6-Trinitrobenzene, because -NO_2 (electron withdrawing groups) increase rate of nucleophilic substitution reaction.

23) 1

1-Bromo-2-methyl butane

24) 1

(c) (A) is correct but (R) is incorrect. Due to greater polarity as well as higher molecular mass as compared to the parent hydrocarbon, the intermolecular forces of attraction (dipole-dipole and van der Waals') are stronger in the halogen derivatives that is why the boiling points of chlorides, bromides and iodides are considerably higher than those of the hydrocarbons of comparable molecular mass.

25) 1

(a) In case of optically active alkyl halides, S_N1 reactions are accompanied by racemisation. The carbocation formed in the slow step being sp^2 -hybridised is planar (achiral). The attack of the nucleophile may be from either side resulting mixture of products. One product has same configuration, while other has opposite configuration. Thus, both (A) and (R) are correct and (R) is the correct explanation of (A).

26) 1

(a) It is necessary to avoid traces of moisture from Grignard reagent, because it reacts with water to give hydrocarbon.

$$RMgX + H_2O \longrightarrow RH + Mg(OH)X$$

Both (A) and (R) are correct and (R) is correct explanation of (A).

27) 1

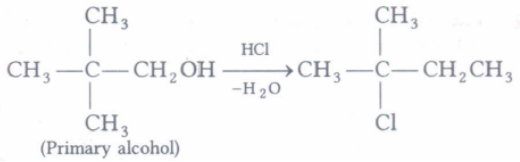
(c) (A) is correct but (R) is incorrect. Bond cleavage in haloarene is difficult than haloalkane due to partial double bond character in C-Cl bond because of resonance, so it is less reactive towards nucleophilic substitution reaction. Phenyl carbo cation is very unstable.

28) 1

(c) (A) is correct but (R) is incorrect. Presence of - Cl in chlorobenzene activates the ring at ortho and ,para-positions and therefore, nitration of chlorobenzene leads to the formation of o- and p-chloro nitro chlorobenzene. NO_2 group is a meta-directing group.

29) 1

(d) 2- chloro -2 methylbutane (not neo pentyl chloride) is formed when neo pentyl alcohol reacts with HCI. The initially formed primary carbocation undergoes rearrangement to form more stable tertiary carbocation. The reaction is given as follows



Therefore, (A) is incorrect but (R) is correct statement.

30) 1

(a) In case of haloarenes, the phenyl cation formed as a result of self ionisation will not be stabilised by resonance and therefore S_N1 mechanism is ruled out. Thus, both (A) and (R) are correct and (R) is correct explanation of (A).

31) 1

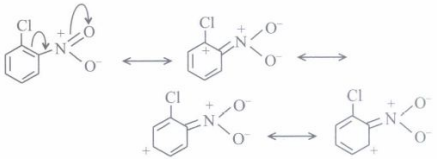
(b) (A) is not correct but (R) is correct. In fact, the use of thionylchloride is preferred over phosphorus chlorides for preparing haloalkanes from alcohols because the other products of the reaction (i.e.) HCI(g) and SO_2(g) being gases escape out leaving behind pure haloalkane.

32) 1

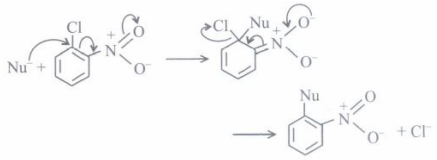
(b): Greater the molecular mass, stronger the van der Waals' forces of attraction and hence higher is the melting point/boiling point.

33) 1

(a): The C-atom of C - CI in chloronitrobenzene carries a small +ve charge.



Because of the positive charge, attack at this carbon atom by the nucleophile is facilitated.

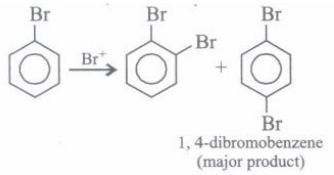


34) 1

(c): For the same alkyl group, the boiling points are in the order RI > RBr > RCI > RF. This is because with the increase in the size of halogen, the magnitude of van der Waals' force increases and boiling point increases.
Bond strength decreases as the size of the halogen increases. $CH_3F > CH_3CI > CH_3Br > CH_3I$ and stability decreases as the strength of C- X bond decreases.

35) 1

(c): Bromobenzene shows both -1 effect as well as +M effect; but mesomeric effect dominates the -I character and becomes the directing factor for incoming electrophile. Formation of electrophile :
$Br - Br + FeBr_3 \rightarrow Br^+ + FeBr_4^-$
Bromobenzene acts as an ortho-para director for upcoming electrophiles.



36) 1

(a): Branching of chain makes molecule more compact and therefore, decreases the surface area. Due to decreases in surface area, the magnitude of van der Waals' force of attraction decreases and consequently, the boiling points of branched chain are less than those of straight chain compounds.

37) **(c):** Aryl halides undergo nucleophilic substitution with difficulty. 1

38) 1

(b): Among dichlorobenzenes, the p-isomer being symmetrical, packs closely in the crystal lattice and hence has much higher melting point than o- and m- isomers.

39) 1

(d): Even though haloalkanes are polar molecules, still they are insoluble in water. This is due to the fact that halo alkanes can neither form hydrogen bonds with water nor they can break the hydrogen bonds already existing between water molecules.

40) 1

(b): Vinyl chloride itself shows resonance structure and thus stabilized. As vinyl chloride has partial double bond character thus breaking of C - CI bond is difficult which makes vinyl chloride less reactive than alkyl chloride.

41) 1

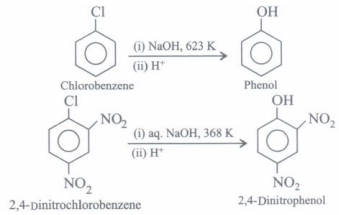
(c): Halogens are somewhat deactivating but a, p-directing. As a result, aryl halides undergo the usual electrophilic substitution reactions less readily than benzene.

42) 1

(c): In case of optically active alkyl halides, S_N1 reactions are accompanied by racemisation. The carbocation formed is sp^2 hybridised and planar. The attack of the nucleophile may be accomplished from either side resulting in a mixture of products with opposite configuration i.e., racemic mixture.

43) 1

(d): Halobenzenes become reactive to nucleophilic substitution reactions when electron withdrawing groups (nitro, cyano) are present at ortho/para position. This is evident from the milder conditions required for hydrolysis in 2, 4-dinitrochlorobenzene than chlorobenzene.



44) 1

(b): p-Dichlorobenzene being more symmetrical than a-isomer fits closely in the crystal lattice and hence greater amount of energy is needed to break the crystal lattice. Thus, p-isomer is less soluble than o-isomer.

45) 1

(c): Carbocation intermediate obtained from $C_6H_5CH(C_6H_5)$ Br is more stable than that obtained from $C_6H_5CH(CH_3)$Br because it is stabilized by two phenyl groups due to resonance. Therefore, the former bromide is reactive than the latter in S_N1 reactions.

46) 1

(a): Due to steric hindrance, tertiary haloakanes do not prefer to undergo substitution but instead undergo elimination.

47) 1

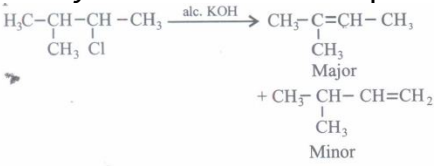
(d): Vinylic halides are very less reactive towards nucleophilic substitution reactions because of resonance effect. Resonance gives rise to partial double bond character to the carbon-halogen bond making it stronger and therefore more difficult to cleave than a Csp^3 - X bond. It also reduces the polarity of the carbon-halogen bond thereby making heterolysis difficult.

48) 1

(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

49) 1

(a): 2-Chloro-3-methylbutane on treatment with alcoholic potash gives 2-methylbut-2-ene as main product.



Elimination occurs according to Saytzeff rule, "the major product is one which involves elimination of H from less hydrogenated carbon''.

50) 1

(c): Alkyl iodides in general turn brown due to liberation of I_2 on decomposition by the action of air and light.

51) 1

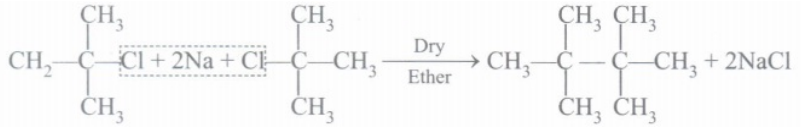
(b): As the size of the alkyl groups increases, the S_N2 reactivity decreases, further C-Cl bond is stronger and more difficult to cleave than C- Br bond. So CH_3Br is more reactive than $(CH_3)_2CHCl$.

52) 1

(d) Assertion is wrong but reason is correct statement. AgCN reacts with CH_3Cl to give isocyanide, KCN gives cyanide. CN^- is ambident nucleophile,

53) 1

(a) Assertion and reason both are correct and reason is correct explanation of assertion.



54) 1

(a) Assertion and reason both are correct and reason is correct explanation of assertion.

55) 1

(e) Assertion and reason both are correct statements but reason is not correct explanation of assertion.

56) 1

(c) Assertion is correct but reason is wrong statement

57) 1

(a) Assertion and reason both are correct and reason is correct explanation of assertion.

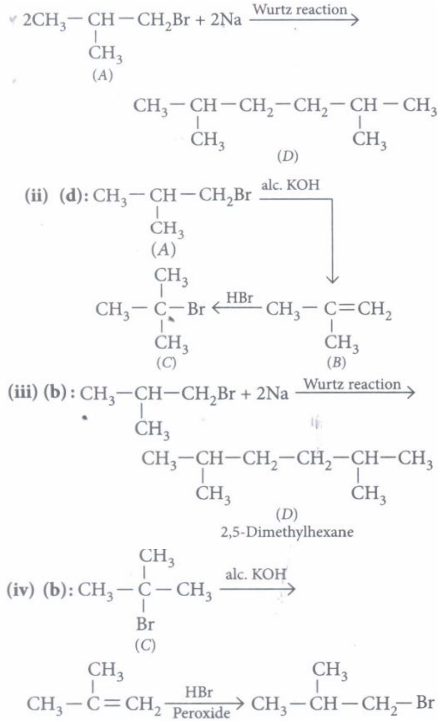
58) 1

(c) Assertion is correct but reason is wrong statement.

59) 4

(i) (b): When compound (A) reacted with Na-metal, it gave a compound D(C_8H_{18}) which is different from the compound obtained when n-butyl bromide reacted with Na metal and hence the
compound (A) must be isobutyl bromide.

$$2CH_3CH_2CH_2CH_2Br + 2Na \xrightarrow{Wurtzreaction} CH_3CH_2CH_2CH_2CH_2CH_2CH_2CH_3$$

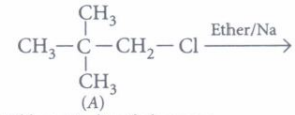


60) 4

(i) (c) : Allylic chlorides are most reactive.
(ii) (c): 2^0 - alkyl halides undergo hydrolysis by S_N1 or S_N2 mechanism.
(iii) (a): Smaller the size of the nucleophile (i.e., CH_3O^-), more reactive it is.
(iv) (d): Stearic hindrance due to bulky alkyl groups prevents the attack of the nucleophile in S_N2 mechanism.

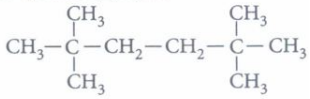
61)

(i) (a) :



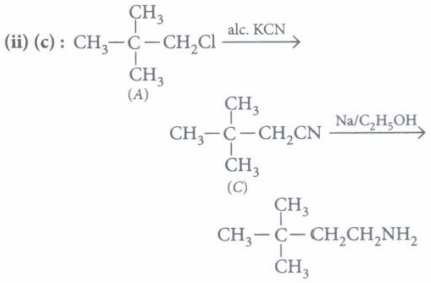
(A)

1-Chloro-2,2-dimethylpropane



2, 2, 5, 5- Tetramethylhexane

(ii) (c) :



(iii) (b)

(iv) (b):