1. Give reason for following:

(a) H_2SO_4 is not used for the preparation of alcohol with KI.

(b) Alkyl halide, though polar are immiscible in water.

(c) Grignard Reagent should be prepared under anhy. Condition.

(d) Out of $C_6H_5CH_2Cl$ and $C_6H_5CHClC_6H_5$ which is more easily hydrolysed by aq. KOH.

(e) p-Dichlorobenzene has higher m.pt and solubility than those of o- and m- isomers.

(f) Haloalkanes react with KCN to form alkyl cyanides as main product while AgCN form isocyanides as main product.

(g) The treatment of alkyl chloride with aq. KOH leads to the formation of alcohols but in the presence of alc. KOH alkenes are the major products.

(h) p-Nitrochlorobenzene undergoes nucleophilic substitution faster than chlorobenzene.

(i) The dipole moment of chlorobenzene is lower than that of Cyclohexyl chloride.

(j) Haloalkanes have higher boiling points as compared to those of corresponding alkanes.

(k) The boiling points of alkyl halides decreases in the order:

$$RI > RBr > RCl > RF$$

(l) chloroform is stored in closed dark coloured bottles.

(m) Although chlorine is an electron withdrawing group, yet it is ortho-, para-directing in electrophilic aromatic substitution reactions.

(n) Aryl halides are extremely less reactive towards Nucleophilic Substitution reactions.

(o) Benzylic halides show reactivity towards S_N1 reaction.

(p) Use of DDT was banned in United State in 1973.

2. Explain the following name reaction:

(a) Sinart Reaction (b) Wurtz fittig reaction
(c) Fittig Reaction (d) Wurtz reaction
(e) Finkelstein Reaction (f) Sandmeyer's Reaction.

3. Complete the equation given below with structure of the product formed:

(a) $CH_3CH_2CH_2Cl + NaI \xrightarrow{Acetone,\ \Delta}$?

(b) $CH_3CH=C(CH_3)_2 + HBr \longrightarrow$

(c) $CH_3CH_2CH=CH_2 + HBr \xrightarrow{Peroxide}$

(d) $CH_3CH_2CH_2OH + SOCl_2 \longrightarrow$

(e) $(CH_3)_3C-Br + KOH \xrightarrow{Ethanol,\ \Delta}$

(f) $(CH_3)_2CH-Cl \xrightarrow[dry\ ether]{Na}$

(g) $CH_3CH_2Br + AgF \xrightarrow{\Delta}$

(h) $CH_3CH(Br)CH_2CH_3 \xrightarrow{H_2O}$

4. Convert the following:

(a) 1-chlorobutane to n-Octane
(b) Benzene to biphenyl
(c) Toluene to Benzyl alcohol
(d) Methyl Magnesium bromide to 2-methyl propan-2-ol
(e) Aniline to chlorobenzene
(f) tert-Butyl bromide to isobutyl bromide
(g) Benzyl chloride to Benzyl alcohol

5. What happens when:

(a) n-butyl chloride is treated with alcoholic KOH
(b) Methyl bromide is treated with Na in presence of dry ether
(c) Ethyl chloride is treated with aq. KOH
(d) chlorobenzene is subjected to hydrolysis
(e) Bromobenzene is treated with Mg in presence of dry ether.
(f) Methyl chloride is treated with KCN

6. (a) Arrange the following in order of increasing boiling pt.
(i) Bromomethane, Bromoform, chloromethane, Dibromomethane
(ii) 1-chloropropane, Isopropyl chloride, 1-chlorobutane.

7. (a) Give the Mechanism of S_N1 and S_N2 Reactions.
(b) Explain the following Reaction:

$$n\text{-BuBr} + KCN \xrightarrow[H_2O]{EtOH} n\text{-BuCN}$$

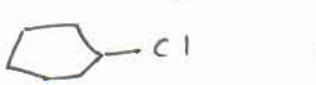
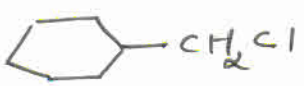
8. Give a chemical test to distinguish between the following pairs of compounds.

(a) Ethyl bromide and Bromobenzene
(b) Ethyl bromide and Vinyl chloride
(c) chlorobenzene and n-Pentyl chloride
(d) chlorobenzene and chlorocyclohexane
(e) Bromobenzene and Benzyl bromide

(9) Primary alkyl halide (A) C_4H_9Br Reacted with alcoholic KOH to give compound (B). Compound (B) when React with HBr (C) which is an isomer of (A). When (A) was Reacted with Na metal, it gave a compound (A)-C_8H_{18} that was different than the compound when n-butyl bromide was Reacted with Sodium. Give the structural formula of (A) and write the equation for all the Rxs.

(10) Predict the order of Reactivity of the following Compounds in S_N1 and S_N2 Reactions.
(a) The four isomeric bromobutanes
(b) $C_6H_5CH_2Br$, $C_6H_5CH_2(C_6H_5)Br$, $C_6H_5CH_2(CH_3)Br$, $C_6H_5CH_2(CH_3)(C_6H_5)Br$.

(11) Which of the following undergo S_N2 faster

(a)  

(b)  

(12) (a) Give the uses of:
(i) Freon-12 (ii) DDT (iii) CCl_4 (iv) Iodoform

(13) What is a Racemic mixture? Give an example.

(14) Identify the compounds A, B, C and D in the following sequence of reaction.

(a) $C_2H_5OH \xrightarrow[443\,K]{Conc.\,H_2SO_4} A \xrightarrow{HBr} B \xrightarrow{KOH\,(aq.)} C \xrightarrow{I_2,\,NaOH} D$ (yellow ppt.)

(b) $CH_3-\underset{\underset{Br}{|}}{CH}-CH_2-CH_3 \xrightarrow{alc.\,KOH} A \xrightarrow{Br_2} B \xrightarrow{alc.\,KOH} C \xrightarrow[Hg^{2+},\,H_2SO_4]{H_2O} D$

(15) Diphenyls are potential threat to the environment. How are these produced from arylhalides?

(16) Discuss the role of Lewis acids in the preparation of aryl bromides and chlorides in the dark.

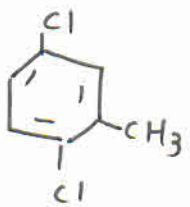
(17) Write the IUPAC name of the following compounds:

(a) $CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH-CH_3$ (with Cl on the CH)

(b) $CH_3-\underset{\underset{Cl}{|}}{CH}-CH_2-CH=CH_2$

(c) $CH_3-CH=CH-\underset{\underset{Br}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_3$

(d) $(CH_3)_2CH\,CH(Cl)CH_3$

(e) 

(f) $CH_3-\underset{\underset{Br}{|}}{CH}-CH_2-\underset{\underset{Cl}{|}}{CH}-CH_3$