Class – XII (BVM SCHOOL)

CH-: Aldehyde,Ketones & acids

Q.1 Write the IUPAC name of the following compound:- CH_3-O-CH_2-CH(OH)-CH_2-CHO [1]

Q.2 Although phenoxide ion has more no. of resonating structures than carboxylate ion , even though carbxylic acid is a stronger acid why ? [1]

Q.3 Why Carboxylic acid have higher boiling point than alcohols as alcohol forms strongest inter molecular hydrogen bonding?[1]

Q.4 Which acid is stronger and why? F_3C-C_6H_4COOH and $CH_3C_6H_4$COOH .[1]

Q.5 Complete the following reactions:- [2]

(i) $CH_3CH_2MgBr + CO_2$ ---------> (ii) $CH_3CH_2COOH + Cl_2$ --------> Red P

Q.6 An organic compound (A) $\{C_8H_{16}O_2\}$ was hydrolysed with dilute sulphuric acid to give a carboxylic acid (B) & an alcohol (C). Oxidation of (C)with chromic acid produced (B).(C) on dehyration gives but-1-ene. Identity A,B,C. [2]

Q.7 (i)Arrange the following compounds in increasing order of their reactivity towards HCN.
Acetaldehyde, Acetone, Di-tert-butyl ketone, Methyl tert-butyl ketone.
(ii) Why are aldehydes are more reactive than ketones when undergo nucleophillic addition reaction?[2]

Q.8 Arrange the following acids in the order of increasing acidic strength
(i) Formic acid, benzoic acid, acetic acid
(ii)CH_3CH_2COOH, C_6H_5COOH, CH_3COOH, $C_6H_5CH_2COOH$ [2]

Q.9 How would you obtain
(i) But-2-enal from ethanol (ii) Butanoic acid from butanol, (iii) Benzoic acid from ethylbenzene?[3]

Q.10 Account for the given statement.
(i) During the preparation of ammonia derivatives from aldehydes or ketones, pH is controlled.
(ii) Formaldehyde gives cannizzaro's reaction but acetaldehyde does not.
(iii) Carboxylic acids do not give characteristics reactions of carbonyl compounds [3]

Q.11 Identify the missing reagent/products in the following reactions : [2]

(i) $CH_3CH_2COCH_3 + A$----------> $CH_3CH_2COONa + B + NaI + H_2O$

(ii) $C_6H_5COCH_3 + A$ ----------> C_6H_5–C(OMgBr)($CH_2C_6H_5$)(CH_3) ----------H_3O----------> B --------Δ→ C

Q.12Give the reaction mechanism for following reactions : [3]

(i) $CH_3CHO + HCN$ ---------→ CH_3 CH(CN)-OH

(ii) $CH_3COOH + C_2H_5OH$ ---------→$CH_3COOC_2H_5 + H_2O$

(iii) CH_3COCH_3 ----------(i) CH3MgBr----------(ii) H2O----------> $(CH_3)C$-OH

Q.13 (a) A compound 'A' (C_2H_4O) on oxidation give 'B' ($C_2H_4O_2$). 'A' undergoes iodoform reaction. On treatment with HCN, 'A' forms a product 'C' which on hydrolysis gives 2- hydroxy propanoic acid.
(i) Write down the structure of A, B and C.
(ii) Name the product when 'A' reacts with dil. NaOH.
(iii)Write down the equations for the reactions involved.
(b) Give chemical tests to distinguish between compounds in the following pairs:-
(i) Acetophenone and benzophenone (ii) Phenol and benzoic acid [5]

Q.14 (a) An organic compound with molecular formula $C_9H_{10}O$ forms 2, 4-DNP derivative, reduces tollen's reagent and undergoes cannizzaro reaction. On vigorous oxidation, it gives 1, 2-benzene dicarboxylic acid.
(i) Identify the compound.
(ii) Write down the equations for the reactions involved.
(b) Describe the following reactions
(i) Cannizzaro reaction (ii) Wollf kishner reduction (iii) Rosenmund reaction [5]

Q.15 Convert:-(a) Benzyl alcohol to Phenylethanoic acid (b) Ethanoic acid to propanoic acid
(c) Ethanol to 3-Hydroxy butanal. (d) Ethanol to propanone
(e) acetaldehyde to lactic acid [5]

Q.1 Draw the structure of the compound whose IUPAC name is 4 – chloro-1-phenylpentane – 2 –one.[1]
Q.2 Write the IUPAC name of the following compound: $(CH_3)_3CCH_2Br$. [1]
Q.3 Arrange the compound of each set in order of reactivity towards S_N^2 displacement.
1 – Bromo – 3 – methylbutane , 2 – Bromo – 2 – methylbutane, 3 – Bromo – 2 methylbutane. [1]
Q.4 Which compound in each of the following pairs will react faster in S_{N2} reaction with – OH? Why? [2]
(i) CH_3Br or CH_3I (ii) $(CH_3)_3$ CCl or CH_3Cl
Q.5 What products would you expect from the elimination of the following alkyl halides, which product will be major in
each case? (i) 2- Bromo – 2 methyl butane (ii) 3 – bromo- 2 , 3 , 5 - trimethylhexane .[2]
Q.6 An optically active compound having molecular formula $C_7H_{15}Br$ reacts with aqueous KOH to give $C_7H_{15}OH$, which
is optically inactive. Give mechanism for the reaction. [2]
Q.7 Give an example for each describe the following reactions: [3]
(i) Gatterman reaction (ii) Coupling reaction. (iii) Finkelstein reaction.
Q.8 An organic compound (A) having molecular formula C_3H_7Cl on reaction with alcoholic solution of KCN gives compound B. The compound B on hydrolysis with dilute HCl gives compound C and C on reduction with H_2/Ni gives
1-aminobutane. Identify A, B and C.[3]
Q.9 Identify missing links:-[3]

(i) $CH_3\text{-}\underset{\displaystyle Br}{\underset{|}{CH}}\text{-}CH_3 \xrightarrow{\text{alc. KOH}} X \xrightarrow[CCl_4]{HBr\ /\ \text{peroxide}} Y$

(ii) $CH_3CH_2CH = CH_2 + Br_2 \longrightarrow A$
(iii) $CH_3CH_2CH = CH_2 + Br2 \xrightarrow{\text{Heat/ UV light}} B$

Q.10 Explain why:[2]
(i)The dipole moment of chlorobenzene is lower than that of cyclohexyl chlorides
(ii)Grignard reagents should be prepared under anhydrous conditions?
Q.11 Write structure of the major organic product in each of the following:[3]
(i) $(CH_3)_3CBr + KOH \xrightarrow{\text{Ethanol/Heat}}$

(ii)$CH_3CH_2Cl + SbF_3 \longrightarrow$
(iii)$(CH_3)_2 CH – Cl \xrightarrow{\text{Na/ dry ether}}$
Q.12 Give a chemical test to distinguish between the following pairs of compounds :[4]
(i) Chlorobenzene and cyclohexylchloride. (ii) Vinyl chloride and Ethyl chloride.
(iii) *n*-Propylbromide and Isopropylbromide. (iv)bromo butane & chloro butane.
Q.13 How will you bring about the following conversions?[6]
(i) Benzene to 3-Bromonitrobenzene (ii) Ethanol to But-1-yne
(iii) 1-Bromopropane to 2-Bromopropan (iv)Aniline to chlorobenzene
(v) 2-Methyl-1-propene to 2-chloro-2-methylpropane (vi) Ethyl chloride to propanoic acid [6]
Q.14 (a) Which of the following two compounds would react faster by S_N^2 path way: 1 – bromobutane or 2 – bromobutane and why?
(b) Allyl chloride is more reactive than n – propyl chloride towards nucleophilic substitution reaction and why?
(c) Haloalkanes react with KCN to give alkyl cyanide as main product while with AgCN they form isocyanide as main product. Give reason.
(d) Why haloarenes are much less reactive than haloalkanes towards nucleophilic substitution reactions.
(e) Alkyl halides, though polar are immiscible in water. Why?[5]
Q.15 Complete the following reactions :-[6]
(i) Cyclo hexene + $Br_2 \xrightarrow{hv}$
(ii) 2,4,6 –Trinitrochloro benzene $\xrightarrow{NaOH}$
(iii) Ethyl benzene + $Br_2 \xrightarrow{hv}$
(iv) $C_6H_5ONa + C_2H_5Cl \longrightarrow$
(v) $C_6H_5CH_2CHBrCH_3 \xrightarrow{\text{alc. KOH}} A \xrightarrow{HBr} B$

Q.1 Write the IUPAC name of the following compound: [1]

$H_3C - CH - CH_2 - CH - CH - CH_2OH$

CH_3 OH CH_3

Q.2 How do you account for the miscibility of ethoxyethane with water. [1]

Q.3 Explain why:

(i)The dipole moment of chlorobenzene is lower than that of cyclohexyl chlorides

(ii)Grignard reagents should be prepared under anhydrous conditions?

(iii)Alkyl halides, through polar are immiscible in water. [3]

Q.4 Suggest a possible mechanism for the following reaction: [2]

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

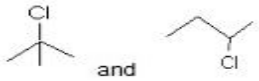
Q.5 Give an example for each describe the following reactions:

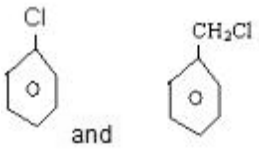
(i) Gatterman reaction (ii) Coupling reaction. (iii)Riemer timann reaction [3]

Q.6 Explain as to why haloarenes are much less reactive than haloalkanes towards nucleophilic substitution reactions.

Q.7 Which compound in each of the following pairs will react faster in SN^2 reaction with – OH? Why? [3]

(i) CH_3Br or CH_3I

(ii)  and

(iii)  and

Q.8 Alcohols react both as nucleophiles & electrophiles. Write one reaction of each type and describe its mechanism.

Q.9 What products would you expect from the elimination of the following alkyl halides, which product will be major in each case? (i) 2- Bromo – 2 methyl butane (ii)3 – bromo- 2 , 3 , 5 - trimethylhexane

Q.10 Complete the following reactions. [2]

$CH_3\text{-}CH(Br)\text{-}CH_2\text{-}CH_3 \xrightarrow{\text{alc. KOH}} A \xrightarrow{Br_2} B \xrightarrow{\text{alc. KOH}} C \longrightarrow D$

$H_2o/\ Hg^{2+}$

Q.11 Explain the following observations:

(i) The boiling point of ethanol is higher than that of methoxymethane.

(ii) Phenol is more acidic than ethanol (iii) o – and p – nitrophenols are more acidic than phenol. [3]

Q.12 Name the reagent which are used in the following conversions: Write chemical reaction also. [3]

(i) A primary alcohol to an aldehyde (ii)Butane – 2 – one to butane – 2 – ol. (iii)Phenol to 2, 4, 6-tribromophemnol.

Q.13 Explain the mechanism of the following reactions:

(i) Addition of Grignard's reagent to the carbonyl group of a compound forming an adduct followed by hydrolysis.

(ii) Acid catalysed dehydration of an alcohol forming an alkene. [4]

Q.14 Give one chemical test each to distinguish between the following pairs of compounds:[4]

(i) Phenol & benzoic acid (ii) 1 – Propanol & 2 – propanol (iii) Ethanol & phenol (iv)Phenol & benzyl alcohol

Q.15 How would you carry out the following conversions?

(i) Ethyl magnesium chloride to propan -1 – ol (ii)Benzyl chloride to benzyl alcohol.

(iii)An alkyl halide to a quaternary ammonium salt. (iv) Propene to Propan – 1 – ol

(v) Phenol to salicylaldehyde. (vi) Methanol to ethanol

(vii) Anisole to 4-methoxyacetophenone [7]

Q.16 Write the formula of main product in the following chemical reactions.

(i) $(CH_3)_2\ CH - Cl \xrightarrow{Na/\ dry\ ether}$ (ii) $CH_3Br + AgF \longrightarrow$

(iii) $CH_3CH_2Br + NaI \longrightarrow$ (iv) $C_6H_5N_2Cl + KI \longrightarrow$ [4]

Q.17. An organic compound (A) having molecular formula C6H6O gives a characteristic colour with aqueous $FeCl_3$ solution (A) on treatment with CO_2 and NaOH at 400 K under high pressure gives (B) which on acidification gives a compound (C). C reacts with acetyl chloride to give (D), which is a popular Pain Killer. Deduce the structures of (A), (B), (C) and (D). [4] Or

Compound (A) reacts with $SOCl_2$ to give compound (B). B reacts with Mg to form Grignard reagent which is treated with acetone & product is hydrolyzed to give 2-methylbutan-2-ol. What are A & B compounds?Write all reactions.