

St. Mary's School, Dwarka
Holiday Homework
Class XII
Subject: Chemistry (043)

Objective:

- To enable the students to revise the concepts already taught in the class .
- Application of the concepts to real life situations.
- To give an exposure to the students about the type of HOTS questions related to the topic.

Assignment No. 1

Instructions: Attempt the questions keeping in mind the weightage of each question.

Q1. Recently a medicine Hydrochloroquine (HCQ) was in news.



(a) Why this medicine was in news and in much more in demand worldwide?

(b) Originally for treatment of which disease this medicine was invented?

(c) Is the use of this medicine successful?

(d) Write the functional groups present in the HCQ?

(e) What is the difference between chloroquine and hydroxychloroquine?

Q2. Why haloalkanes are more reactive than haloarenes?

Q3. When an alkyl halide is treated with ethanolic solution of KCN, the major product is alkyl cyanide where as if alkyl halide is treated with AgCN, the major product is alkyl isocyanide. 1

Q4. Aryl halides cannot be prepared by the action of sodium halide in the presence H_2SO_4 . Why? 1

Q5. p- dichlorobenzene has highest m.p. than those of ortho and m-isomers.? 1

Q6. a. Haloalkanes easily dissolve in organic solvents, why?

b. What is known as a racemic mixture? Give an example. 2

Q7. a. What is meant by chirality of a compound? Give an example.

b. Which one of the following compounds is more easily hydrolysed, $CH_3CHClCH_2CH_3$ or $CH_3CH_2CH_2Cl$ 2

Q8. Explain as to why

a. alkyl halides, though polar, are immiscible with water.

b. the dipole moment in chlorobenzene is lower than that of cyclohexyl chloride. 2

Q9. I. State one use each of DDT and iodoform.

II. Which compound in the following couple will react faster in S_N2 displacement and why?

- a. 1-Bromopentane or 2-bromopentane
- b. 1-Bromo-2-methyl butane or 2-bromo-2-methylbutane. 3
- Q10. a. Write a chemical test to distinguish between:
- i. Chlorobenzene and Benzyl chloride.
- ii. Chloroform and Carbon tetrachloride
- b. Why is methyl chloride hydrolysed more easily than chlorobenzene? 3

Assignment No. 2

- Q.1 Activity : Prepare a hand sanitizer at home.
- a. What are the ingredients required to manufacture a hand sanitizer according to guidelines of WHO?
- b. Write the steps involved in manufacturing of hand sanitizer at home?
- c. Is this hand sanitizer effective against all disease causing germs?
- d. In your opinion, which is better option to keep yourself free from disease causing germs and bacteria: hand-wash or rubbing your hand with sanitizer ? 4
- Q.2 Rearrange the following compounds in the increasing order of their boiling points:
CH₃-CHO, CH₃-CH₂-OH, CH₃-CH₂-CH₃ 1
- Q.3 Arrange the following compounds in the increasing order of their acid strengths:
4-Nitrophenol, Phenol, 2,4,6-Trinitrophenol 1
- Q.4 Give chemical test to distinguish between ethanol and phenol. 1
- Q.5 Predict the product. CH₃-CH=CH₂ --- (i) B₂H₆ (ii) 3H₂O₂/OH⁻ -----> ? 1
- Q.6 Name the reagents used in the following reactions:
- a. Nitration of phenol to 2,4,6-trinitro phenol b. butanal to butanol
- c. Friedel-Crafts acetylation of anisole d. oxidation of primary alcohol to aldehyde 2
- Q.7 Name the reagent used in the following reactions :
- a. Bromination of phenol to 2,4,6-tribromophenol b. butan-2-one to butan-2-ol
- c. Friedel-Crafts alkylation of anisole d. oxidation of primary alcohol to carboxylic acid 2
- Q.8 Explain the mechanism of the following reaction :
2CH₃-CH₂-OH ---H⁺/413 K-----> CH₃-CH₂-O-CH₂CH₃ + H₂O 2

- Q.9 Explain the following observations:
- The boiling point of ethanol is higher than that of methoxymethane.
 - Phenol is more acidic than ethanol.
 - o- and p- nitrophenols are more acidic than phenol.
- 3
- Q.10
- Phenol does not give protonation reaction readily.
 - Phenyl methyl ether reacts with HI to give phenol and methyl iodide and not iodobenzene and methyl alcohol.
 - Preparation of ethers by acid dehydration of secondary or tertiary alcohols is not a suitable method.
- 3

Assignment No. 3

- Q.1 Activity: (I) Collect vanilla beans, cinnamon and meadow sweet herb. Crush them in your kitchen. Smell them. Find out the chemicals responsible for their peculiar smell.
 II. Write the IUPAC name and draw structure of the chemicals responsible for their odour.
 III. Find out the aldehydes which smell like a. green tomatoes b. burnt oats, flour, slightly woody c. green, grassy
- 3
- Q.2 Write the structure of 4-chloropenta-2-one.
- 1
- Q.3 Arrange the following in the decreasing order of their reactivity towards nucleophilic addition reaction : HCHO , $\text{CH}_3\text{-CO-CH}_3$, $\text{CH}_3\text{-CHO}$
- 1
- Q.4 Give a chemical test to distinguish between the following pair of compounds:
 $\text{C}_6\text{H}_5\text{-CHO}$ and $\text{C}_6\text{H}_5\text{-CO-CH}_3$
- 1
- Q.5 Write the IUPAC name of the compound $\text{CH}_3\text{-CH=CH-CHO}$
- 1
- Q.6 Account for the following:
- CH_3CHO is more reactive than CH_3COCH_3 towards reaction with HCN .
 - Carboxylic acid is stronger acid than phenol.
- 2
- Q.7 Write the chemical equations to illustrate the following name reactions:
 I. Rosenmund reduction II. Cannizzaro's reaction
- 2
- Q.8 Account for the following:
- $\text{Cl-CH}_2\text{COOH}$ is a stronger acid than CH_3COOH .
 - Carboxylic acids do not give reactions of carbonyl group.
- 2
- Q.9 Write the products formed when ethanal reacts with the following reagents:
- CH_3MgBr and then H_3O^+
 - Zn-Hg/Conc. HCl
 - $\text{C}_6\text{H}_5\text{CHO}$ in the presence of dilute NaOH .
- 3
- Q.10 An organic compound (A) (molecular formula $\text{C}_8\text{H}_{16}\text{O}_2$) was hydrolysed with dilute sulphuric acid to give a carboxylic acid (B) and an alcohol (C). Oxidation of (C) with chromic

acid also produced (B). On dehydration (C) gives but-1-ene. Write the equations for the reactions involved.

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Assignment – 4

- Q.1 Activity : I. Collect the household articles – soaps, detergents, dish-washing detergents and cake, toothpaste.
Find the composition of all these ingredients. Which article consists of quaternary ammonium salts and why ?
II. Take three transparent glass and fill glasses with water, vinegar and baking soda respectively(occupy only half of the glass). Add one dispirin tablets in each glass. Report your observation about solubility of dispirin in these glasses and possible reason behind it. 1
- Q.2 Arrange the following compounds in increasing order of solubility in water :
 $C_6H_5NH_2$, $(C_2H_5)_2NH$, $C_2H_5NH_2$ 1
- Q.3 Why are diazonium salts of aromatic amines more stable than those of aliphatic amines ? 1
- Q.4 Give a chemical test to distinguish between ethylamine and aniline. 1
- Q.5 Give the IUPAC name of $H_2N-CH_2-CH_2-CH=CH_2$ 1
- Q.6 Illustrate the following reactions giving suitable example in each case:
a. Hoffmann bromamide degradation reaction
b. Gabriel phthalimide synthesis 2
- Q.7 Give reasons for the following:
a. Aniline does not undergo Friedel-Crafts reaction
b. Acetylation of $-NH_2$ group is done in aniline before preparing its ortho and para compounds. 2
- Q.8 Write the structures of main products when aniline reacts with the following reagents:
(i) Br_2 in water (ii) $(CH_3CO)_2O$ /pyridine 2
- Q.9 State reason for the following:
(i) pK_b value for aniline is more than that of methylamine.
(ii) Ethylamine is soluble in water whereas aniline is not soluble in water.
(iii) Primary amines have higher boiling points than tertiary amines. 3
- Q.10 Give the structures of A, B and C in the following reactions :
(i) $C_6H_5N_2Cl \xrightarrow{CuCN} A \xrightarrow{H_3O^+} B \xrightarrow{NH_3, \Delta} C$
(ii) $C_6H_5NO_2 \xrightarrow{Sn/HCl} A \xrightarrow{NaNO_2/HCl, 273K} B \xrightarrow{H_3O^+} C$

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