

## Holiday Homework

Class—XII

### Chemistry(2019-2020)

- 1) Complete your investigatory project (except the observation part) in loose sheets including objective, material/chemicals, basic principle, procedure, conclusion and bibliography on the topic assigned in the class.
- 2) Write all reaction mechanisms of chapter 11(Alcohols, phenols and ethers) in your assignment register.
- 3) Make a list of all name reactions from the chapters (a) Haloalkanes and Haloarenes (b) Alcohol, Phenols and Ethers (c) Aldehydes, Ketones and Carboxylic acids in alphabetical order in your assignment register.
- 4) Read newspaper daily to extract scientific information and also to know what is happening around us .
- 5) Do the following assignment questions in your assignment register.

### Haloalkanes and Haloarenes

- 1) An acid having molecular formula  $C_3H_5O_2Br$  is optically active.What is its structure?
- 2) An organic compound with molecular formula  $C_4H_9Br$  is treated with aq. KOH. The rate of reaction depends on the concentration of the compound A only. When another optically active isomer B of this compound was treated with aq. KOH solution, the rate of reaction was found to depend on the concentration of compound and KOH both.
  - (i) Write down the structural formula of both A and B.
  - (ii) Out of these two compounds which one will be converted to the product with inverted configuration?
- 3) Carry out the following conversions:
  - a) 2- Methylpent-1-ene to 2- Methylpentan-2-ol.
  - b) Chlorobenzene to Benzene.
  - c) Ethyl chloride to propanoic acid.
- 4) Bottles containing  $C_6H_5I$  and  $C_6H_5CH_2I$  lost their original labels. They were labelled A and B for testing. A and B were separately taken in a test tube and boiled with NaOH solution.

The end solution in each test tube was made acidic with dilute  $\text{HNO}_3$  and then  $\text{AgNO}_3$  solution was added. Substance B gave a yellow ppt. Which one of the following statement is true for this experiment and why?

### Alcohols, Phenols and Ethers

- 1) Why are ethers relatively less reactive compounds?
- 2) How many isomers are possible for the compound with the molecular formula  $\text{C}_4\text{H}_{10}\text{O}$ ? Which one is optically active and why?
- 3) Phenol is acidic but does not react with sodium bicarbonate solution. Give reason.
- 4) An organic compound A reacts with thionyl chloride to give compound B. B reacts with magnesium to form a Grignard reagent which is treated with acetone and the product is hydrolysed to give 2-methyl-2-butanol. What are A and B compounds?
- 5) When t-butanol and n-butanol are separately treated with a few drops of dilute  $\text{KMnO}_4$ , in one case only the purple color disappears and a brown ppt. is formed. Which of the two alcohols gives the above reaction and what is the brown ppt.?
- 6) A compound (A) with molecular formula  $\text{C}_4\text{H}_{10}\text{O}$  on oxidation forms compound (B). The compound (B) gives positive iodoform test and on reaction with  $\text{CH}_3\text{MgBr}$  followed by hydrolysis gives (C). Identify A, B and C and give the sequence of reactions.

### Aldehydes, Ketones and Carboxylic acids

- 1) Explain the following:
  - a) C—O bond length in  $\text{RCOOH}$  is shorter than in  $\text{ROH}$ .
  - b) It is necessary to control the pH during reactions of aldehydes and ketones with ammonia derivatives.
  - c) Alkenes undergo electrophilic addition reaction whereas carbonyl compounds undergo nucleophilic addition reactions.
  - d) Benzophenone does not react with sodium bisulphite.
- 2) When  $\text{CH}_2=\text{CHCOOH}$  is treated with  $\text{LiAlH}_4$ , the compound obtained will be
  - (a)  $\text{CH}_3\text{CH}_2\text{COOH}$
  - (b)  $\text{CH}_2=\text{CHCOOH}$
  - (c)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$
  - (d)  $\text{CH}_3\text{CH}_2\text{CHO}$
- 3) The IUPAC name of the compound  $\text{CH}_3\text{COCH}(\text{CH}_3)_2$

(a) Isopropylmethylketone    (b) 2-Methyl-3-butanone    (c) 4-Methylisopropylketone    (d) 3-Methyl-2-butanone

4) An organic compound  $C_2H_4O$  gives red ppt. when warmed with fehling's solution. It also undergoes aldol condensation in the presence of NaOH.

(a) Write the IUPAC name of the compound.

(b) What is the state of hybridisation of carbon atoms in the compound?

© Write the balanced equation for the reaction.

5) An organic compound A ( $C_3H_6O$ ) is resistant to oxidation but forms compound B ( $C_3H_8O$ ) on reduction. B reacts with HBr to form compound C. C with Mg forms Grignard reagent which reacts with A to form a product which on hydrolysis gives E. Identify A, B, C, D and E. Write chemical equations for the reactions involved.

6) Give suitable chemical test to distinguish between the following pair of compounds:

(i) Propanal and propanoic acid.

(ii) Acetophenone and benzaldehyde.

(iii) Ethanal and Propanal.

7) An alkene (A) on ozonolysis gives acetone and an aldehyde. The aldehyde is easily oxidised to an acid (B). When (B) is treated with bromine in the presence of phosphorus, it gives compound (C) which on hydrolysis gives a hydroxyl acid (D). This acid can also be obtained from acetone by reaction with HCN followed by hydrolysis. Identify the compounds A, B, C and D.

6) it has been observed that most of the students are not serious about the practicals. They focus only on theory. But it's not an easy task to score high in practicals also so it's important for all of you to give some time to practicals by learning some basic practical questions. Here are some practical based viva questions. Complete your auxiliary notebooks with these questions along with their answers and also learn them. After vacations there will be a test from these questions in the first practical class.

1) What is a standard solution?

2) Are molarity and molality same? Write their formula also.

3) What volume of 10 M HCl must be diluted with water to get 1L of 1M HCl?

4) Why is the front door of the balance closed during weighing?

5) What is the principle of volumetric analysis?

- 6) What is the difference between End point and Equivalence point?
- 7) What are Primary and Secondary standard substances? Give one example of each.
- 8) Burette and pipette must be rinsed with the solution with which they are filled, why?
- 9) It is customary to read lower meniscus in case of colourless solution and upper meniscus in case of coloured solution, why?
- 10) Pipette should never be held from its bulb, why?
- 11) Why the last drop of solution must not be blown out of the pipette?
- 12) What is Qualitative analysis?
- 13) What type of bond is present in an inorganic salt?
- 14) Why a salt containing lead turn black in colour , when placed for a long time in lab.?
- 15) Tell the importance of preliminary tests in qualitative analysis.
- 16) What is the expected information when copper sulphate is heated in a dry test tube?
- 17) Name the radical which produces  $\text{CO}_2$  on heating.
- 18) In the flame test, sodium imparts yellow color to the flame but magnesium does not impart any color. Why?
- 19) What is the chemistry of flame test?
- 20) Why do we use conc. HCl in preparing a paste of the salt for flame test?
- 21) Why is platinum metal preferred to other metals for flame test?
- 22) Why dil.  $\text{H}_2\text{SO}_4$  is preferred while testing acid radicals over dil. HCl?
- 23)  $\text{NO}_2$  and  $\text{Br}_2$  are brown in color. How will you distinguish between them?
- 24) How will you test whether the given solution in a bottle is lime water?
- 25) Why a dark brown is formed at the junction of two layers in ring test for nitrates?
- 26) Why do bromides and iodides not respond to chromyl chloride test?
- 27) Why is O.S. boiled with conc.  $\text{HNO}_3$  in III group?
- 28) Why is  $\text{NH}_4\text{Cl}$  added along with  $\text{NH}_4\text{OH}$  in III group?
- 29)  $\text{Na}_2\text{CO}_3$  cannot be used in place of  $(\text{NH}_4)_2\text{CO}_3$  in the V group analysis. Explain.
- 30) Name a cation which is not obtained from metal.