

UNIT TEST PAPER

CLASS : XII  
SUBJECT : CHEMISTRY.

MAX. MARKS : 50  
TIME : 2 hours

Haloalkanes & Haloarenes, Alcohols, phenols & ethers,  
Aldehydes, ketones & Carboxylic acids

General Instructions:

1. All questions are compulsory.
2. There will be no overall options.
3. Internal choice is given in all three 5 marks questions.

1. Explain why the dipole moment of chloroform is lower than that of cyclohexyl chloride?
  2. Which of the following 2 compounds would react faster by  $SN^2$  pathway:- 1-bromobutane or 2-bromobutane and why?
  3. Out of benzene and phenol which is more easily nitrated and why?
  4. Di-tert-butyl ether cannot be made by Williamson's synthesis. Explain why?
  5. Write the IUPAC name of the following organic compound.  $CH_3-O-CH_2-CH(OH)-CH_2-CH_3$
  6. Identify the following name reactions and write the reagents used:  $CH_3CHO \rightarrow CH_3-CH_3 + H_2O$
  7. Fluorine is more electronegative than Chlorine even then p-Fluorobenzoic acid is weaker acid than p-Chlorobenzoic acid. State the reason for this.
  8. Propanal is more reactive than propanone. Give reason.
  9. Account for the following:
    - i) Haloalkanes undergo nucleophilic substitutions while haloarenes undergo electrophilic substitution reaction
    - ii) Haloalkanes react with KCN form alkylcyanides while isocyanides are formed with AgCN.
  10. How the following conversions can be carried out ?
    - i) Toluene to benzyl alcohol
    - ii) Ethanol to but-1-yne.
  11. Write the equations of the reactions which takes place when
    - i) Thionyl chloride is treated with 2-propanol.
    - ii) Cumene hydroperoxide is treated with dil.  $H_2SO_4$ .
  12. When toluene is chlorinated:
    - i) in presence of sunlight
    - ii) in dark, in the presence of Lewis acid, two separate compounds are obtained. Explain with suitable mechanism.
  13. Write the steps involved in the mechanism of acid catalysed hydration of propene
  14. Arrange the following compounds in an increasing order of the property mentioned  
 $CH_3CH_2CH(Br)COOH$ ,  $CH_3CH(Br)CH_2COOH$ ,  $(CH_3)_2CHCOOH$ ,  $CH_3CH_2CH_2COOH$ ..... acidic strength.  
 $CH_3CHO$ ,  $CH_3CH_2OH$ ,  $CH_3OCH_3$ ,  $CH_3CH_2CH_3$  ----- boiling point.
  15. The decreasing order of acidity of a few carboxylic acids is given below:  
 $C_6H_5COOH > C_6H_5CH_2COOH > CH_3COOH > CH_3CH_2COOH$  Explain plausible reason for the order of acidity followed.
  16. Distinguish between: i) Acetaldehyde and Acetone (ii) Phenol and Aniline
  17. Give reasons:
    - i) The  $\alpha$ -hydrogen atoms of carbonyl compounds are acidic.
    - ii) Benzaldehyde is less reactive in nucleophilic addition reactions.
  18. Write equations for
    - i) Cross aldol condensation between propanal and ethanal in the presence of dil. NaOH.
    - ii) Disproportionation of Benzaldehyde in conc. NaOH.
  19. Compound (A) reacts with  $SOCl_2$  to give compound (B). B reacts with Mg to form Grignard reagent which is treated with acetone and the product is hydrolyzed to give 2-methylbutan-2-ol. Identify A and B compounds?
  20. How will you bring about the following conversions in more than two steps?
    - i) Propanone to Propene
    - ii) Benzoic acid to Benzaldehyde.
- Or//
- Account for the following:
- i) p-nitro phenol is a stronger acid than phenol.
  - ii) Phenols undergo substitution at ortho and para positions
  - iii) During preparation of an ester from carboxylic acid and alcohol the ester is distilled as soon as it is formed.
21. Write the equation involved in the following reactions:
  - i) Reimer – Tiemann Reaction.
  - ii) Kolbe's Reaction
  - iii) Williamson ether synthesis.
- Or//
- Name the reagents for the following
- i) Oxidation of primary alcohol to aldehyde.
  - ii) Oxidation of primary alcohol to carboxylic acid.

- iii) Dehydration of propan-2-ol to propene.
22. An organic compound (A) having molecular formula  $C_6H_6O$  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).

Or//

Explain the following:

- (i) Wolf Kishner reduction
  - (ii) Haloform reaction
  - (iii) HVZ reaction
23. How do the following react
- i) Acetyl chloride and toluene in the presence of anhydrous  $AlCl_3$
  - ii) Semicarbazide and formaldehyde
  - iii) Ethyl benzene and alkaline  $KMnO_4$

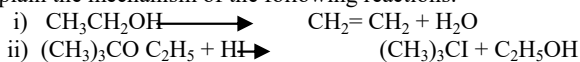
Or//

A compound X ( $C_2H_4O$ ) on oxidation gives Y ( $C_2H_4O_2$ ). X undergoes haloform reaction. On treatment with  $HCN$ , X forms a product Z which on hydrolysis gives 2-hydroxy propanoic acid.

- i) Write down the structures of X and Y.
  - ii) Name the product when X reacts with dil.  $NaOH$ .
  - iii) Write down the equations for the reactions involved.
24. Account for the following:
- i) C -OH bond angle in alcohol is less than tetrahedral angle of  $109.5^\circ$
  - ii) Alcohol reacts with  $SOCl_2$  to give pure halo alkane.
  - iii) Methyl phenyl ether reacts with  $HI$  to give phenol and methyl iodide and not methanol and iodo benzene.
  - iv) In the reaction between acid chloride and alcohol a small amount of pyridine is added.
  - v) Water is a stronger acid than alcohol.

OR

a) Explain the mechanism of the following reactions:



b) Carry out the following conversions:

- i) Chloro benzene to phenol.
  - ii) Tert butyl alcohol to 2-methyl prop-1-ene.
25. a) Describe the following reactions with one example of each
- i) Friedal- Craft reaction
  - ii) Cannizzaro Reaction

b) Compound A ( $C_6H_{12}O_2$ ) on reduction with  $LiAlH_4$  yields two compounds B and C. The compound B On oxidation gave D which on treatment with aqueous alkali and subsequent heating furnished E. The latter on catalytic hydrogenation gave C. The compound D on further oxidation gave  $CH_3COOH$  Deduce the structure of A,B,C,D and E.

OR//

a) Write the chemical reaction to illustrate the following:

- i) Rosenmund reduction
  - ii) Aldol condensation.
- b) Distinguish between the following pairs :
- i) Propanal and propanone
  - ii) Acetophenone and Benzophenone
  - iii) Phenol and Benzoic acid.

Or//

a) Convert

- i) Acetophenone to 2-phenyl-2-butanol.
  - ii) Propene to acetone.
- b) An organic compound 'A' contains 69.77% carbon, 11.63% hydrogen and the rest is oxygen. The molecular mass of 'A' is 86. It does not reduce Tollen's reagent but forms an addition compound with sodium hydrogen sulphite. 'A' gives a positive iodoform test. On vigorous oxidation 'A' gives ethanoic and propanoic acids. Deduce the possible structure of molecule 'A'.

OR

a) How do you separate the following mixtures?

- i) o-Nitrophenol & p-Nitrophenol
  - ii) Aldehyde & Ketone
- b) An unknown aldehyde A,  $C_7H_6O$  on reaction with  $KOH$  gives B and C. A reacts with  $Zn-Hg$  and conc.  $HCl$  to give D which changes to A by  $CrO_2Cl_2$ . B on heating with soda lime gives E. identify A to E and write all reactions.