

## Bachelor of Science (B.Sc.) Semester—V (C.B.S.) Examination

## CH-501 : ORGANIC CHEMISTRY

## (Chemistry)

## Paper—1

Time : Three Hours]

[Maximum Marks : 50

**N.B. :—** (1) All **FIVE** questions are compulsory and carry equal marks.

(2) Write chemical equations and draw diagrams wherever necessary.

1. (A) How will you prepare nitrobenzene in laboratory ? Give the reduction of nitrobenzene in :
- Acidic
  - Alkaline
  - Neutral medium. 5
- (B) How is aniline obtained from :
- Nitrobenzene
  - Benzonitrile ?
- Write the action of following on aniline :
- Bromine water
  - Conc.  $H_2SO_4$  at 455 K. 5
- OR**
- (C) Starting from benzene diazonium chloride, how will you prepare :
- Benzene
  - p-amino azobenzene ? 2½
- (D) How will you prepare ethylamine by Hofmann's degradation of amides ? What happens when ethylamine is heated with chloroform and alcoholic KOH ? 2½
- (E) Give preparation and uses of 2,4,6-trinitrophenol. 2½
- (F) What are nitroalkanes ? Give the preparation of nitroethane from ethyl bromide. 2½
2. (A) What is Aromaticity ? Discuss molecular orbital diagram of :
- Thiophene
  - Furan. 5
- (B) How will you convert the following to Pyridine :
- Pentamethylene diamine
  - Pyrrole
  - 3-Methyl pyridine
  - Ethylene ? 5
- OR**
- (C) Give Skraup synthesis of Quinoline. 2½
- (D) Discuss the preferential attack of nucleophile in pyridine at 2-position. 2½
- (E) Why is pyridine more basic than pyrrole ? 2½
- (F) Write a note on 'Fischer-Indole Synthesis'. 2½

3. (A) Give the principle and calculations involved in the Kjeldahl's method of estimation of Nitrogen. An aromatic organic compound on analysis gave the following composition :  
C = 77.42%, H = 7.52% and N = 15.06%, its V.D. is found to be 46.5.  
Determine the empirical and molecular formulae of the compound. 5
- (B) What happens when :  
(i) Methylmagnesium bromide is treated with carbon disulphide  
(ii) Methylmagnesium bromide is treated with ethyl alcohol  
(iii) Diethylzinc is treated with acetyl chloride  
(iv) Methyl Lithium is treated with methyl alcohol  
(v) Methyl lithium is treated with Chloramine ? 5
- OR**
- (C) Write a note on Reformatsky Reaction. 2½
- (D) Give the principle and method of calculation in the estimation of chlorine in organic compound by Carius method. 2½
- (E) What is Grignard Reagent ? Give one example. What product do you expect on treatment of methyl magnesium bromide with dry ice followed by hydrolysis ? 2½
- (F) 0.28 gm of an organic compound on combustion gave 0.9625 gm CO<sub>2</sub> and 0.1575 gm water. Calculate the percentage of Carbon and Hydrogen present in organic compound. 2½
4. (A) Explain the types of molecular vibrations in poly-atomic molecules with reference to I.R. Spectroscopy. 5
- (B) Define the terms :  
(i) Bathochromic shift  
(ii) Hypsochromic shift  
(iii) Hyperchromic shift  
(iv) Hypochromic shift  
with suitable examples and intensity diagram. 5
- OR**
- (C) What is the effect of conjugation on U.V. Spectra of Alkenes ? Explain with suitable example. 2½
- (D) How is I.R. spectrum of an organic compound useful to identify functional groups ? 2½
- (E) State and explain Beer-Lambert's Law. 2½
- (F) Give selection rules for I.R. Spectroscopy. 2½
5. Attempt any **TEN** of the following :
- (i) What happens when nitromethane is treated with chlorine in presence of alkali ? 1
- (ii) Give the reaction for the preparation of TNT. 1
- (iii) What happens when Aniline is treated with HNO<sub>2</sub> in presence of HCl at 0°C ? 1
- (iv) What are Heterocyclic compounds ? 1
- (v) Give structural formulae of two condensed heterocyclic compounds containing nitrogen in the ring. 1
- (vi) Draw molecular orbital diagram of pyrrole. 1
- (vii) What are organometallic compounds ? 1
- (viii) How is diethyl zinc prepared from ethyl iodide ? 1
- (ix) Give the principle of Liebig's method. 1
- (x) Define term chromophores. 1
- (xi) Give the range of Infrared region. 1
- (xii) Define Auxochromes with suitable example. 1