

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

CH-501 : ORGANIC CHEMISTRY

Paper-1

(Chemistry)

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) Discuss nucleophilic substitution reactions in nitrobenzene and prove $-\text{NO}_2$ group of nitrobenzene is ortho, para directing.

How is nitroethane prepared from :

- (i) Ethyl bromide and
(ii) Ethane ?

5

- (B) How is aniline obtained from :

- (i) Benzonitrite and
(ii) Nitrobenzene ?

How will you separate primary, secondary and tertiary amines from their mixture by Hofmann's method ?

5

OR

- (C) Give reduction reaction of nitrobenzene in :

- (i) Acidic and
(ii) Neutral medium.

2½

- (D) Explain Gabriel-phthalimide reaction for the preparation of primary amine.

2½

- (E) How is Benzene diazonium chloride converted into :

- (i) Phenol and
(ii) Nitro benzene ?

2½

- (F) Give the preparation and uses of Picric acid.

2½

2. (A) Discuss the structure of pyridine on the basis of MO theory. Explain aromaticity of pyridine and pyrrole with reference to Huckel's rule.

5

- (B) How is pyridine obtained from :

- (i) Acetylene and
(ii) Pyrrole ?

Discuss the mechanism of electrophilic substitution reaction in pyridine.

5

OR

- (A) Explain the molecular orbital picture and aromaticity of thiophene.

2½

- (B) Explain pyridine is more basic than pyrrole.

2½

- (C) Discuss Fischer-Indole synthesis of Indole.

2½

- (D) Discuss Skraup synthesis of quinoline.

2½

3. (A) What are organometallic compounds? How is methyl magnesium bromide prepared in laboratory? What happens when methyl magnesium bromide reacts with :
 (i) Acetonitrile
 (ii) Carbondisulphide and
 (iii) Dry ice followed by hydrolysis? 5
 (B) Give the principle and calculations involved in the estimation of nitrogen by Kjeldahl's method. An organic compound contain 12.76% C, 2.13% H and 85.11% Br. Its vapour density is 94. Determine the empirical formula of organic compound. 5
 (At. wt. of C = 12, H = 1 and Br = 80)

OR

- (C) How is diethyl zinc prepared from ethyl iodide? What is the action of acetyl chloride on diethyl zinc? 2½
 (D) Write a note on Reformatsky reaction. 2½
 (E) An organic compound containing C, H and O gave the following results on analysis :
 C = 40% ; H = 6.66%. CH_2O
 Determine Empirical formula of organic compound. 2½
 (F) What happens when methyl magnesium bromide is reacted with :
 (i) Acetyl chloride
 (ii) Formaldehyde? 2½
 (A) Write notes on following with examples :
 (i) Hyperchromic and
 (ii) Hypochromic shifts. 5
 (B) Explain the types of molecular vibrations in polyatomic molecules with reference of I.R. spectroscopy. 5

OR

- (C) State and explain Beer-Lambert's Law. 2½
 (D) How is IR spectroscopy useful to distinguish cis and trans isomers? 2½
 (E) Explain chromophores and auxochromes with suitable examples. 2½
 (F) Write note on finger print region in IR spectroscopy. 2½
 5. Attempt any ten of the following :
 (I) What is the action of heat on 1-Nitropropane? 1
 (II) Give carbylamine reaction of ethyl amine. 1
 (III) What happens when mixture of NaNO_2 and HCl is reacted with aniline? 1
 (IV) What are heterocyclic compounds? 1
 (V) How does pyridine reacts with sodamide? 1
 (VI) Give the structural formula of isoquinoline. 1
 (VII) Define Hypsochromic shift. 1
 (VIII) Name the reagent used for estimation of halogens by Carius method. 1
 (IX) How does Grignard Reagent reacts with chloramine? 1
 (X) Define 'red shift'. 1
 (XI) Give the range of IR region. 1
 (XII) Give the unit scale of IR spectra. 1