

**2022**  
**B.A./B.Sc.**  
**First Semester**  
 GENERIC ELECTIVE – 1  
**CHEMISTRY**  
*Course Code: CHG 1.11*  
 (Conceptual Organic Chemistry)

*Total Mark: 70*  
*Time: 3 hours*

*Pass Mark: 28*

*Answer five questions, taking one from each unit.*

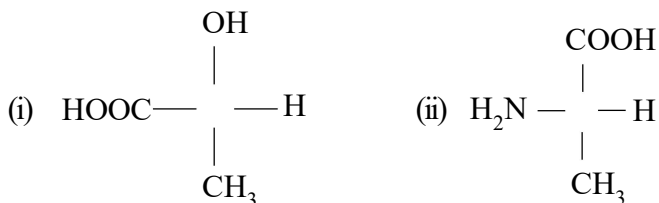
**UNIT-I**

1. (a) What is inductive effect? Explain with example. 1+2=3
- (b) Differentiate between homolytic and heterolytic bond cleavage. 3
- (c) What are carbocations? Explain the stability of 1<sup>o</sup>, 2<sup>o</sup> and 3<sup>o</sup> carbocations. 1+2=3
- (d) Define hybridisation. Give the hybridisation, structure, and shape of NH<sub>3</sub> and C<sub>2</sub>H<sub>2</sub>. 1+2+2=5
2. (a) Define Hückel's rule. Explain with one example. 1+2=3
- (b) Write short note on the following: 2+2=4
  - (i) Nucleophiles
  - (ii) Electrophiles
- (c) Find out the hybridisation, structure, and shape of ethylene. 3
- (d) What is resonance? Draw the resonance structure of ozone and benzene. 1+3=4

**UNIT-II**

3. (a) What is flying wedge structure of CHCl(OH)Br? 2
- (b) Explain enantiomers and diastereoisomerism with an example each. 2+2=4
- (c) Define geometrical isomerism. Draw the E & Z notation for 1-bromo-1-chloro-2-fluoro-2-iodoethene. 2+2=4

- (d) What is R & S nomenclature? Assign R & S configuration to each of the following: 2+1+1=4



4. (a) What are conformers? Draw and explain the important conformation of butane with its potential energy diagram. 1+3=4
- (b) Write notes on the following: 1½×2=3
- (i) Chirality
- (ii) Racemic mixture
- (c) State the necessary conditions for a compound to show optical isomerism. 3
- (d) What is D & L nomenclature system? Draw the D & L notation of glucose molecule. 1+1½+1½=4

### UNIT-III

5. (a) Explain Cannizzaro's reaction with suitable chemical reaction. 4
- (b) Compare the reactivity of alkene and alkyne with respect to addition reaction. 3
- (c) Give the chemical reactions when 2×2=4
- (i) alkene reacts with water in presence of strong acidic catalyst
- (ii) acetone reacts with sodium bisulphate
- (d) Define ozonolysis. Write the chemical reaction of ozonolysis of acetylene. 1+2=3
6. (a) Explain Markovnikov's rule with suitable example. 3
- (b) Explain with reaction cross-aldol condensation. 4
- (c) Complete the following reactions: 2×2=4
- (i)  $\text{CH}_3\text{CH}=\text{O} + \text{H}_2\text{N}-\text{OH} \longrightarrow ? + ?$
- (ii)  $(\text{CH}_3)_2\text{C}=\text{O} + \text{C}_6\text{H}_5-\text{NH}-\text{NH}_2 \longrightarrow ? + ?$
- (d) Explain the acidic character of terminal alkynes. 3

## UNIT-IV

7. (a) Explain the free radical mechanism of halogenation of alkane. 4  
(b) What is nucleophilic substitution reaction? Differentiate between SN1 and SN2 mechanism. 1+3=4  
(c) Complete the following reactions: 1½×2=3  
(i)  $\text{CH}_3\text{CH}_2\text{Br} + \text{KOH} \xrightarrow{\text{H}_2\text{O}/\Delta}$   
(ii)  $\text{CH}_3\text{CH}_2\text{OH} \xrightarrow{\text{H}_2\text{SO}_4/\Delta}$   
(d) Explain Wurtz reaction with chemical reaction. 3
8. (a) What is Corey-House reaction? Explain. 4  
(b) Differentiate between elimination reaction and substitution reaction. 3  
(c) Give the chemical reaction when 1½×2=3  
(i) 1, 2 bromoethane is treated with zinc dust in presence of alcohol  
(ii) ethyl bromide reacts with ammonia in presence of alcohol  
(d) Explain Saytzeff's rule with suitable example. 4

## UNIT-V

9. (a) Toluene is more easily nitrated than benzene. Explain. 4  
(b) Explain Rosenmund reduction reaction. 3  
(c) Explain the mechanism of sulphonation of benzene. 4  
(d) Write a note on directive effect on methyl group. 3
10. (a) Explain Friedel Crafts alkylation reaction. 4  
(b) Amino groups ( $-\text{NH}_2$ ) acts as an ortho-para director. Give reason. 3  
(c) Discuss the chemical reaction of oxidation of alkyl benzene with  $\text{KMnO}_4$ . 4  
(d) Complete the reactions: 1½×2=3  
(i)  $\text{CH}_3\text{COCl} + 4[\text{H}] \xrightarrow{\text{LiAlH}_4}$   
(ii)  $\text{CH}_3\text{COOH} \xrightarrow{\text{LiAlH}_4/\text{ether}}$
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