

**2022**  
**B.A./B.Sc.**  
**Sixth Semester**  
 CORE – 14  
**CHEMISTRY**  
*Course Code: CHC 6.21*  
 (Organic Chemistry - V)

Total Mark: 70

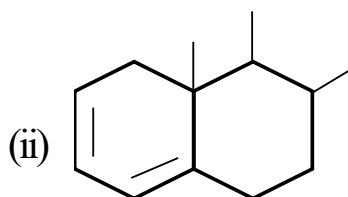
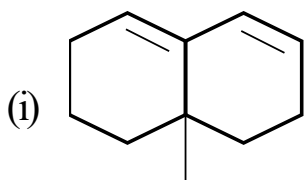
Pass Mark: 28

Time: 3 hours

Answer five questions, taking one from each unit.

**UNIT-I**

1. (a) Describe the various type of absorption band which arises as a result of electronic transitions. 4
- (b) Describe Woodward-Fieser rules for calculating absorption maximum in dienes. 3
- (c) On the basis of Woodward rules calculate the absorption maximum ( $\lambda_{max}$ ) of the following compounds: 2×2=4

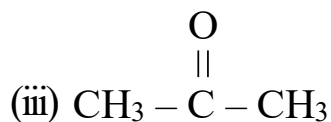
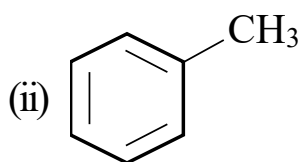


- (d) Explain hypsochromic shift by taking suitable example. 3
2. (a) Discuss the principal of infrared spectrum. 4
  - (b) Discuss in detail the various factors which influence the vibrational frequency of particular group? Give examples. 4

- (c) Give the approximate value of IR absorption band of the following:
- (i) C–H stretching in CH<sub>2</sub> and CH<sub>3</sub> 1×3=3
  - (ii) C=O stretching in saturated aldehyde
  - (iii) O–H stretching free
- (d) Explain the fingerprint region and overtone in IR spectroscopy. 1½+1½=3

## UNIT-II

3. (a) Describe briefly the principal of H1 NMR spectroscopy. 4
- (b) What is meant by chemical shift? Describe the factors which influence the chemical shift. 4
- (c) How many NMR signals would you expect from the following? 1×3=3
- (i) CH<sub>3</sub>CHOH



- (d) Explain the equivalent and non-equivalent protons with an example. 3
4. (a) Briefly explain the shielding and deshielding effect in NMR spectroscopy. 3
- (b) Identify the number of equivalent protons in the following: 1×4=4
- (i) CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>OH
  - (ii) CH<sub>3</sub>CH<sub>2</sub>CHO
  - (iii) C<sub>6</sub>H<sub>5</sub>CH<sub>3</sub>
  - (iv) C<sub>6</sub>H<sub>5</sub>OH
- (c) What is anisotropic effect? Explain the anisotropic effect on the chemical shift in NMR spectroscopy. 4
- (d) Write a note on spin-spin coupling and coupling constant. 1½+1½=3

### UNIT-III

5. (a) Describe the Ruff's degradation for the conversion of an aldohexose to aldopentose. 4  
(b) What are disaccharides? Draw the Haworth's structure of cellulose. 3  
(c) Explain the mechanism of glucose to glucosazone. 3  
(d) What are the limitations of open chain D-(+)-glucose structure? How is ring size of glucose determined? 4
6. (a) Draw the Haworth structure of glycopyranose and glucofuranose. 2+2=4  
(b) Give evidence to show that fructose is ketohexose. 3  
(c) Explain the term anomers and epimers with examples.  $1\frac{1}{2}+1\frac{1}{2}=3$   
(d) How will you convert the following?  $2\times 2=4$   
(i) Glucose into fructose  
(ii) Fructose into glucose

### UNIT-IV

7. (a) Briefly describe the relationship between colour and chemical constitution on the basis of resonance. 4  
(b) Outline the synthesis of following dyes:  $3\times 2=6$   
(i) Malachite green  
(ii) Indigo  
(c) Explain the terms with an example:  $2\times 2=4$   
(i) Auxochrome  
(ii) Complimentary colour
8. (a) What are dyes? How are dyes classified based on application to fibre? 5  
(b) Outline the synthesis of Congo red. 3  
(c) Describe the electronic concept of colour and constitution? 4  
(d) Write a note on mordant dye. 2

## UNIT-V

9. (a) What is Ziegler-Natta polymerisation? What are its advantages over free radical polymerisation? 4
- (b) Give the preparation and important uses of the following polymers:  
(i) Neoprene  
(ii) Teflon  $2\frac{1}{2}\times 2=5$
- (c) Explain chain growth and step growth polymerisation? Give one example in each case.  $2\frac{1}{2}+2\frac{1}{2}=5$
10. (a) Explain the mechanism of cationic vinyl polymerisation. 5
- (b) Outline the synthesis of Bakelite. Give its two important uses. 3
- (c) What are biodegradable polymers? Explain the preparation of any two biosynthetic biodegradable polymers and write its uses.  $1+2+2+1=6$
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