

SIXTH SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2026

(Regular/Improvement/Supplementary)

CHEMISTRY

GCHE6B10T: ORGANIC CHEMISTRY III

Time: 2 Hours

Maximum Marks: 60

SECTION A: Answer the following questions. Each carries *two* marks.

(Ceiling 20 marks)

1. Explain the splitting pattern observed in ^1H NMR spectrum of $\text{CH}_3\text{CHClCH}_3$.
2. What are essential oils? What are they used for?
3. Draw the furanose ring structures of the two anomers of D-fructose and name them.
4. Unlike Glucose, methyl glucoside reduces neither Tollen's reagent nor Fehling's solution. Justify.
5. What is a polypeptide linkage? In a polypeptide, what do the terms 'N-terminal' and 'C-terminal' refer to?
6. What is Cope rearrangement? Give an example.
7. Give the importance of finger print region in IR spectroscopy.
8. The UV spectrum of acetone shows two peaks at $\lambda_{\text{max}} \sim 280 \text{ nm}$; $\epsilon_{\text{max}} = 15$ and $\lambda_{\text{max}} \sim 190 \text{ nm}$; $\epsilon_{\text{max}} = 100$. Identify the electronic transition for each. Which one of these is more intense?
9. What are complex lipids? Give an example.
10. Give the significance of acid value.
11. How is methoxy group in an alkaloid estimated?
12. Draw the π M.O diagram of 1, 3-butadiene.

SECTION B: Answer the following questions. Each carries *five* marks.

(Ceiling 30 marks)

13. How many NMR signals would be given by the following alcohols in the presence of a trace of acid? Indicate all singlet signals as *s* and others as *m*
(i) $(\text{CH}_3)_2\text{CH}-\text{CH}_2\text{OH}$
(ii) $(\text{CH}_3)_3\text{C}-\text{OH}$
14. Discuss how chain shortening can be introduced among aldoses.
15. Explain the structure of lactose and sucrose. Comment on their reducing property.
16. What are hormones. Classify sex hormones with examples.
17. Discuss the UV spectrum of buta-1,3-diene. How does the presence of conjugation affect the λ_{max} of absorptions?
18. List the important steps involved in the isolation of alkaloids from plants.
19. Briefly explain the Sanger's method for the end group analysis of a polypeptide.

SECTION C: Answer any *one* question. The question carries *ten* marks.

20. Discuss the components of the general structure of nucleic acids. What are their important biological functions?
21. Derive Woodward – Hoffmann selection rules for thermal and photochemical [4+2] and [2+2] cycloaddition reactions.

(1 x 10 = 10 Marks)