QP CODE: 24800571

24800571

Reg No : .....

Name : .....

INTEGRATED MSC DEGREE EXAMINATION, DECEMBER 2023

Sixth Semester

INTEGRATED MSC BASIC SCIENCE-CHEMISTRY

CORE - ICH6CR02 - ORGANIC CHEMISTRY - III

2020 Admission Onwards

E1E11414

Time: 3 Hours Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

*Weight **1** each.*

1. Explain octant rules.
2. Which of the following molecules do not absorb in the infrared region: HCl, ClBr, N_2, H_2, O_2? Why?
3. An organic compund (A) with molecular formula C_3H_7NO gives absorption peaks in the regions 3413 (m), 3236 (m), 3030-2899 (m), 1667 (s), 1634 (s) and 1460 (s) cm^{-1}. Give the probable structure of A.
4. What is shift reagents?
5. What do you mean by gradient-selected COSY experiment?
6. How to identify methylene carbons using DEPT spectrum?
7. Explain about fragmentation patterns in mass spectrometry.
8. A compound has the molecular formula of C_3H_6O. Write any five possible structures for this compound.
9. What is Kasha's rule?
10. Describe the optical method employed to detect blood gases

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

*Weight **2** each.*

11. Write a detailed account of the various types of transitions involved in the UVspectrum. What is the effect of hydrogen bonding on UV absorption?

12. The UV spectrum of benzonitrile shows a primary absorption band at 224 nm and a secondary band at 271 nm. a) If a solution of benzonitrile in water with a concentration of $1x10^{-4}$ M, is examined at a wavelength of 224 nm, the absorbance is determined to be 1.30. The cell length is 1 cm. What is the molar absorptivity of this absorption band? b) If the same solution is examined at 271 nm, what will be the absorbance reading? (ε=1000)? What will be the intensity ratio I_0/I?

13. Using IR spectroscopy determine the presence of i) benzamide; ii) conjugated and unconjugated nitro-compound in an organic compound.

14. Which type of nuclei show magnetic properties for the purpose of NMR spectroscopy?

15. Explain LC- MS and GC- MS.

16. Write the spectral details of products of pinacol pinacolone rearrangement.

17. Explore the impact of temperature on fluorescence emission. How does increasing or decreasing the temperature of a solvent influence the emission intensity, wavelength, and quantum yield of a fluorophore?

18. Provide examples of common extrinsic fluorophores used in biological labeling and imaging. How are these fluorophores introduced into biological samples for specific applications?

(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

*Weight **5** each.*

19. Explain four factors that influence the C=O stretching vibrations in carbonyl compounds citing examples.

20. Write a detailed note on factors affecting chemical shift.

21. Describe the experimental methods and techniques used to measure fluorescence quantum yield and fluorescence lifetime. Explain the principles behind these methods and their respective advantages and limitations.

22. Explain the fundamental principles behind time-domain lifetime measurements in fluorescence spectroscopy. Describe how these measurements provide insights into the dynamics of excited states in molecules.

(2×5=10 weightage)