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M – 7143

Reg. No. : .....

Name : .....

Third Semester M.Sc. Degree Examination, March 2022

Chemistry / Polymer Chemistry / Analytical Chemistry / Applied Chemistry

CH/CL/CA/PC 232 : ORGANIC CHEMISTRY – III

(Common for chemistry (2016-2019 Admission) and Polymer Chemistry  
(2018-2019 Admission))

Time : 3 Hours

Max. Marks : 75

SECTION – A

Answer any **two** among (a), (b) and (c) from EACH questions. Each sub question carries 2 marks:

1. (a) What is meant by finger printing in IR spectroscopy?  
(b) Explain the effect of solvent polarity on K and R band in UV spectra.  
(c) Predict the structural formula for the compounds with the following molecular formulae show only one PMR signal:  $C_8H_{18}$  and  $C_2H_6O$ .
2. (a) Comment on the difference between the scale on  $^1H$  NMR and  $^{13}C$  NMR spectroscopy.  
(b) What does  $m/z$  mean?  
(c) Predict the signal pattern in DEPT-90 and DEPT-135 spectra of phenyl acetic acid
3. (a) Discuss the Diekmann reaction.  
(b) Give the synthetic applications of osmium tetroxide.  
(c) Write about the Haung-Minlon modification of Wolf-Kishner reduction.

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4. (a) Name three common carbonyl protecting groups used in peptide synthesis.  
(b) What are the important uses of  $\text{LiAlH}_4$ ?  
(c) What is chiral auxiliary?
5. (a) What is the principle of thin layer chromatograph?  
(b) Describe the application of supercritical liquid  $\text{CO}_2$  in extraction.  
(c) What is ultracentrifugation?

(10 × 2 = 20 Marks)

SECTION – B

Answer (a) or (b) of EACH question and each question carries 5 marks.

6. (a) What is MALDI? What is its importance in mass spectrometry?  
(b) Write the fragmentation patterns for the following class of compounds:  
(i) Aliphatic ketones and (ii) aromatic carboxylic acids
7. (a) Discuss the mechanism of the formation of metastable ions.  
(b) Describe the importance of off resonance decoupling.
8. (a) Explain the synthetic applications of (i) lithium aluminum hydride and (ii) sodium borohydride.  
(b) Explain with mechanisms: (i) Mannich reaction and (ii) Reimer-Tiemann reaction
9. (a) Discuss the synthetic importance of umpolung concept in organic synthesis.  
(b) Discuss the electrochemical reduction of nitro and carbonyl compounds.
10. (a) Discuss the Gel and Capillary electrophoresis and their applications.  
(b) What is the Craig's technique for liquid-liquid extraction?

(5 × 5 = 25 Marks)



SECTION -- C

Answer any three questions and each question carries 10 marks.

11. What is Nuclear Overhauser Effect (NOE)? Explain its use in structural elucidations using suitable examples.
12. Discuss the mass spectral fragmentation patterns of aromatic compounds and halo compounds with examples.
13. Write notes on the metal mediated C-C coupling reactions with special reference to
  - (a) Suzuki coupling
  - (b) Heck coupling
  - (c) Negishi-Sonagashira coupling
14. (a) Discuss the mechanism and applications of Sharpless asymmetric epoxidation  
  
(b) What is olefin metathesis? What are Grubb's catalysts? Using suitable example show how this reaction can be used for the synthesis of large ring compounds?
15. With a schematic diagram explain the principle, instrumentation and applications of gas chromatography.

(3 × 10 = 30 Marks)

