



VINAYAKA MISSION'S RESEARCH FOUNDATION, SALEM

(Deemed to be University under Section 3 of the UGC Act, 1956)

Pre – Ph.D. Written Examination – January – 2023

Chemistry

Paper I: Research Methodology

Time: 2 Hours

Marks: 50

PART – A

(5*2M= 10M)

Write Brief notes about the following

Answer all questions

All questions carry equal marks

1. Briefly explain the preparation of research paper. What are the major components of a Research paper?
2. Write any two chemistry related software's, write short note on them.
3. Deduce the structure of the compound from following spectra MF: $C_{10}H_{12}O_2$ IR: 1780 cm^{-1} , 2985 cm^{-1} ; 1600 cm^{-1} ; $^1\text{H NMR } \delta = 1.2\text{ (d, 6H)}, 3.8\text{ (Sept, 1H)}, 7.8\text{ (s, 5H)}$.
4. Write the different steps used in the annual report.
5. Name the any four chemical science database used during the literature review and explain mention about them.

PART – B

(4*5M=20M)

Write Short answers to the following

Answer all questions choosing either a or b

All questions carry equal marks

1. a. What is monograph? Mention its importance and how it is different from research manuscripts?
Or
b. Explain the sequences of writing a research paper and its on-line submission.
2. a. Explain the mechanism of Mclafferty rearrangement for n-butyl benzene and n-propyl acetate.
Or
b. Explain the principle and applications of Atomic force microscope.



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3. a. Write the Principle and applications of Fluorescent, Electron microscopy (TEM & SEM)

Or

- b. Discuss the principles and applications of HPLC.

4. a. Write the applications of Chemistry databases, e- journals, search engines.

Or

- b. Explain the authorship and contributorship in publication.

PART – C

(2*10M=20M)

Answer any two essay type questions

All questions carry equal marks

1. a) Describe objectives and significance of research
b) Discuss the use of internet in chemical literature search.
2. a) Explain the principles and applications of TLC and paper chromatography, briefly write on TLC stains
b) Explain the size exclusion chromatography with special references to proteins.
3. a) Discuss the use of Scifinder in chemical literature search.
b) Explain the sequences of writing a research paper and its on-line submission.
4. a) With neat diagram, explain the principle and working of GC
b) Elucidate the structure of an organic compound with mol formula $C_8H_8O_2$ and spectral data U V, 250 (ϵ 12000), IR 3050 -2850, 2740, 1670, 1230 820; PMR (δ) 9.8 (1H, S), 7.8 (2H, d) ($J=8$ Hz), 6.9(2H, d) ($J=8.0$ Hz), 3.9 (3H, S); MS (m/s) 136, 135, 92, 77, 51, 29; CMR δ 55,114,129, 139,169, 190, elucidate the structure of the compound.
5. a) Explain the terms ionization process, molecular ion peak and base peak with reference to the interpretation of mass spectrum
b) Explain the safety methods used in the chemistry laboratory
c) Write a note on Impact Factor of journal as per Journal. How H index and i10 index is calculated?.

