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M.Sc. (Chemistry) (Semester –4th)

RESEARCH METHODOLOGY

Subject Code: MREM0101

Paper ID: [20220224]

Time: 03 Hours

Maximum Marks: 60

Instruction for candidates:

1. Section A is compulsory. It carries 16 marks. It consists of 4 questions of 4 marks each.
2. Section B consist of 4 questions of 8 marks each. The student has to attempt any 3 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A

(4 marks each)

- Q1. Describe the different types of research design. Provide an example of a situation where each type might be used.
- Q2. Discuss the importance of a literature review in the problem formulation process. How does it help in research?
- Q3. Define "Content Validity" and "Criterion-Related Validity" in the context of research. How are these types of validity assessed in research?
- Q4. Differentiate between probability sampling and non-probability sampling methods.

Section – B

(8 marks each)

- Q5. Explain the types of reliability and the importance of ensuring reliability in research.
- Q6. What are the key steps involved in report writing for research, and why is the report format important?
- Q7. Explain the difference between simple and multiple regression analysis in the context of data analysis. Provide an example for each.
- Q8. Define the T-test, Z-test, Chi-Square test, and ANOVA. Provide a hypothetical research scenario and discuss how these tests can be applied to analyze the data and draw meaningful conclusions.

Section – C

(10 marks each)

- Q9. Explain the process of designing a questionnaire for data collection. What are the key considerations in constructing effective questionnaires?
- Q10. Describe the fundamental principles of experimental design and discuss the differences between randomized block, completely randomized block, Latin square, and factorial designs. Provide examples where each might be applied.
- Q11. Discuss the different techniques of multivariate analysis and provide real-world applications for each technique.