

[This question paper contains 2 printed pages.]

**Your Roll No.....**

**Sr. No. of Question Paper : 5633**

**J**

Unique Paper Code : 2513040015

Name of the Paper : Research Methodology

Name of the Course : **B.Sc. (H) Instrumentation**

Semester : VI

Duration : 3 Hours

Maximum Marks : 90

**Instructions for Candidates**

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Use of scientific calculator is allowed.
3. Question No. 1 is compulsory. All questions carry equal marks. Attempt any 5 questions in all.

1. (a) Define Research. Explain its importance. (3)  
(b) What are the steps involved in a research process? (3)  
(c) What is Intellectual Property Rights? (3)  
(d) What is sampling? What is the significance of sampling in the context of research? (3)  
(e) Describe the ANOVA test. (3)  
(f) What is plagiarism? How plagiarism can be avoided? (3)
2. (a) Explain the terms Fundamental Research, Analytical Research, Applied Research, and Industrial Research with suitable examples. (8)  
(b) How do you formulate a research problem? What considerations should a researcher keep in mind while formulating a research question? (5)  
(c) Why is proper citation important in academic writing? (5)
3. (a) Discuss the importance of literature review in approaching a research problem? (6)

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- (b) How is Literature Review carried out? What are the different tools for Literature Review? (6)
- (c) Describe types or methods of Literature Review. (6)
- 4. (a) Explain different types of probability and non-probability sampling. What are the factors that determine the sample size? (7)
- (b) Differentiate between primary and secondary data with suitable examples. (7)
- (c) What is meant by hypothesis in research? Explain various types of hypothesis? (7)
- 5. (a) Explain the significance of a research report and list the steps involved in writing such a report. (7)
- (b) Write briefly about References/Bibliography and its importance in context of research report. (6)
- (c) Write the guidelines for writing abstract and conclusions in a research report. (5)
- 6. (a) Describe the t test in brief. A random sample of size 20 from a normal population gives a sample mean of 42 and sample standard deviation of 6. Test the hypothesis that the mean of population is 44. ( $t_{.95} = 2.093$ ) (8)
- (b) Explain questionnaire as a tool for data collection. List its advantages and disadvantages (5)
- (c) Describe any three commonly used metrics to evaluate the quality and impact of academic journals. (5)
- 7. (a) What are the different formats of research proposal writing? Explain the format of experimental report writing. (7)
- (b) Differentiate between ANOVA and Chi-Square test. (6)
- (c) What is meant by Research Gap? How it can be identified? (5)