

Research Methodology Syllabus for Qualifying Examination for PhD Submission

Research Methodology: An Introduction

Meaning of Research, Objectives of Research, Motivation in Research, Types of Research, Research Approaches, Significance of Research, Research Methods versus Methodology, Research and Scientific Method, Importance of Knowing How Research is Done, Research Process, Criteria of Good Research, Problems Encountered by Researchers in India.

Defining the Research Problem

What is a Research Problem?, Selecting the Problem, Necessity of Defining the Problem, Technique Involved in Defining a Problem, An Illustration, Conclusion.

Research Design

Meaning of Research Design, Need for Research Design, Features of a Good Design, Important Concepts Relating to Research Design, Different Research Designs, Basic Principles of Experimental Designs, Important Experimental Designs, Conclusion.

Design of Sample Surveys

Introduction, Sample Design, Sampling and Non-Sampling Errors, Sample Survey Vs. Census Survey, Types of Sampling Designs.

Measurement and Scaling

Quantitative and Qualitative Data, Classifications of Measurement Scales, Goodness of Measurement Scales, Sources of Error in Measurement, Techniques of Developing Measurement Tools, Scaling, Scale Classification Bases, Scaling Techniques, Multidimensional Scaling, Deciding the Scale.

Data Collection

Introduction, Experiments and Surveys, Collection of Primary Data, Collection of Secondary Data, Selection of Appropriate Method for Data Collection, Case Study Method.

Data Preparation

Data Preparation Process, Some Problems in Preparation Process, Missing Values and Outliers, Types of Analysis, Statistics in Research.

Descriptive Statistics

Measure of Central Tendency, Measures of Central Dispersion, Measures of Skewness, Kurtosis, Measures of Relationship, Association in Case of Attributes, Other Measures.

Sampling and Statistical Inference

Parameter and Statistic, Sampling and Non-Sampling Errors, Sampling Distribution, Degree of Freedom, Standard Error, Central Limit Theorem, Finite Population Correction, Statistical Inference.

Testing of Hypothesis

What is a Hypothesis?, Basic Concepts Concerning Testing of Hypotheses, Tests of Hypotheses, Test Statistics and Critical Region, Critical Value and Decision Rule, Procedure for Hypothesis Testing, Hypothesis Testing for – Mean, Proportion, Variance, Difference of

ss
10/09/2018
Head of the Department of
Instrument Technology
U. College of Engineering (A)
Andhra University
Visakhapatnam-530 003

Two Mean, Difference of Two Proportions, Difference of Two Variances, P-Value Approach, Power of the Test, Limitations of Tests of Hypothesis.

Chi-square Tests

Test of Difference of more than Two Proportions, Test of Independence of Attributes, Test of Goodness of Fit, Caution in using Chi-Square Tests.

Analysis of Variance

The Anova Technique, The Basic Principle of ANOVA, One Way ANOVA, Two Way ANOVA, Latin-Square Design, Analysis of Covariance (ANOCOVA)

Other Nonparametric Methods

Sign Tests, Wilcoxon Signed Rank Sum Test for Single Population, Mann Whitney U Test, Run Test, Kruskal Wallis Test, Spearman's Rank Correlation, Some Features of Non-Parametric Tests.

Linear Regression Analysis

Dependent and Independent Variables, Simple Linear Regression Model, Multiple Linear Regression Model, Problem of Multicollinearity, Qualitative Explanatory Variables, Using SPSS.

Factor Analysis

The Mathematical Basis, Important Methods of Factor Analysis, Rotation in Factor Analysis, R-Type and Q-Type Factor Analysis, Merits and Demerits of Factor Analysis, Using SPSS.

Discriminant Analysis

Introduction, Two Group Discriminant Analysis, Multiple Discriminant Analysis.

Cluster Analysis

Introduction, Distance Measures, Clustering Algorithms, Agglomerative Clustering.

Other Multivariate Techniques

Characteristics and Applications, Classification of Multivariate Techniques, Some Multivariate Techniques, Conclusions.

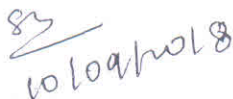
Interpretation and Report Writing

Meaning of Interpretation, Technique of Interpretation, Precaution in Interpretation, Significance of Report Writing, Different Steps in Writing Report, Layout of the Research Report, Types of Reports, Oral Presentation, Mechanics of Writing a Research Report, Precautions for Writing Research Reports, Conclusions.

Text Book

C. R. Kothari, Gaurav Garg, **Research Methodology Methods and Techniques**, New Age International publishers, Third Edition, 2014.

o0o



Head of the Department of
Instrument Technology
A.U. College of Engineering (A)
Andhra University
Visakhapatnam-530 003

MODEL QUESTION PAPER

RESEARCH METHODOLOGY

Max. Marks: 100

Time: 3 hours

Answer any FIVE Questions
All Questions carry equal marks

1. a) Briefly describe the different steps involved in a research process.
b) What are the techniques involved in defining a research problem?
2. a) What are the important concepts relating to research design? Explain.
b) What do you mean by 'Sample Design'? What points should be taken into consideration by a researcher in sample design for any research project?
3. a) What are the classifications of measurement scales? Explain with examples.
b) Enumerate the different methods of collecting data giving one example each.
4. a) What are the important steps of data preparation process? Explain in detail.
b) Discuss about measures of central tendency and how they are useful in any research work.
5. a) Explain how sampling and statistical inference are useful for any research work.
b) What is testing of hypothesis? Explain how it is useful for illustrating a research problem with two examples.
6. a) What is Chi-Square test? Explain the significance in statistical analysis of any research problem.
b) What is analysis of variance? Give an example to illustrate the same.
7. a) What are the various methods of Linear Regression Analysis? Explain.
b) What is factor analysis? Explain with an example.
8. a) Explain the difference between two group discriminant analysis and multiple discriminant analysis with examples.
b) What is cluster analysis? Explain the difference between hierarchical clustering and non-hierarchical clustering.

o0o

su
6/24/2018
Head of the Department of
Instrument Technology
A.U. College of Engineering (A)
Andhra University
Visakhapatnam-530 003